LIBERTY UNION HIGH SCHOOL DISTRICT

BIDDING DOCUMENTS

FOR THE

LIBERTY UNION HIGH SCHOOL DISTRICT

FOR

OFFICE REMODEL

AT

LIBERTY UNION HIGH SCHOOL DISTRICT

19 Oak Street
Brentwood, CA 94513
Telephone: (925) 634-2166

April 17, 2025

APPLICATION #: 01- 122562

LICENSED ARCHITECT
RODOLFO L. CHACON
No. C 28654
Ren. 2.28.27
STATE OF CALIFORNIA

SIGNED:
1.6.2025

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 01-122562 INC:
REVIEWED FOR
SS ☐ FLS ☐ ACS ☑
DATE: 01/30/2026

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NOTICE INVITING BIDS

LIBERTY UNION HIGH SCHOOL DISTRICT

NOTICE IS HEREBY GIVEN that the Liberty Union High School District of Contra Costa County, California, acting by and through its Governing Board, hereinafter referred to as "District", will receive prior to ***1:00 P.M. on the of April 17,***2026 ~~1:00 p.m. on the 10th day of April, 2025~~ sealed bids for the award of a Contract for the following:

BID NO. U2527C

PROJECT: GATEWAY PROGRAM PORTABLES

All bids shall be made and presented only on the forms presented by the District. Bids shall be received in the Maintenance and Operations Office of the District located at 19 Oak Street, Brentwood, California 94513, and all Bids shall be opened and publicly read aloud at the above stated time and place. The District's time clock shall govern and control the time for all bids to be received by the District and no other clock shall be used to determine the time when bids shall be received by the District in accordance with this Notice Inviting Bids. Any bids received after the time specified above or after any extensions due to material changes shall be returned unopened.

The Contract Time is ***67 days*** ~~73 days~~.

CONTRACTOR should consult the General Conditions, Supplementary Conditions, and General Requirements regarding Milestones and Liquidated Damages.

Miscellaneous Information

Bids shall be received in the place identified above, and shall be opened and publicly read aloud at the above-stated time and place.

The Contract Documents, including but not limited to all Bid Documents, are available purchase from the Draftech Blueprinting Online Planroom (draftechplanroom.com); click link "Private Jobs"; click "Enter Job Key", "Gateway". Contract documents are also available for review at selected Builder's Exchanges. It is the responsibility of each prospective bidder to obtain all Contract Documents for review and to verify the completeness of all Contract Documents before submitting a Bid. It is the responsibility of each prospective bidder to check with the planroom on a daily basis through the close of bids for any applicable ***Bid Clarification*** ~~Addenda~~ or updates. The District does not assume any liability or responsibility based on any defective or incomplete copying, excerpting, scanning, faxing, downloading or printing of the Contract Documents or any Bid Documents.

There will be a mandatory Pre-Bid Conference at 9:00 am. On Thursday, March 20, 2025. Bidders shall meet at the Maintenance and Operations Office, 19 Oak Street, Brentwood, CA 94513. Any Contractor bidding on the Project who fails to attend the entire mandatory job walk and conference will be deemed a non-responsive bidder and will have its bid returned unopened.

Each bidder shall be a licensed contractor pursuant to the California Business and Professions Code, and be licensed to perform the work called for in the Contract Documents. The successful bidder must

possess a valid and active ***Class "A" and/or Class "B"*** ~~Class "B"~~ License at the time of bid and throughout the duration of this Contract. The Contractor's California State License number shall be clearly stated on the bidder's proposal.

Subcontractors shall be licensed pursuant to California law for the trades necessary to perform the Work called for in the Contract Documents.

Each bid must strictly conform with and be responsive to the Contract Documents as defined in the General Conditions.

The District reserves the right to reject any or all bids or to waive any irregularities or informalities in any bids or in the bidding.

Each bidder shall submit with its bid — on the form furnished with the Contract Documents — a list of the designated subcontractors on this Project as required by the Subletting and Subcontracting Fair Practices Act, California Public Contract Code section 4100 et seq.

In accordance with California Public Contract Code section 22300, the District will permit the substitution of securities for any moneys withheld by the District to ensure performance under the Contract. At the request and expense of the Contractor, securities equivalent to the amount withheld shall be deposited with the District, or with a state or federally chartered bank as the escrow agent, who shall then pay such moneys to the Contractor. Upon satisfactory completion of the Contract, the securities shall be returned to the Contractor.

Each bidder's bid must be accompanied by one of the following forms of bidder's security: (1) cash; (2) a cashier's check made payable to the District; (3) a certified check made payable to the District; or (4) a bidder's bond executed by a California admitted surety as defined in Code of Civil Procedure section 995.120, made payable to the District in the form set forth in the Contract Documents. Such bidder's security must be in an amount not less than ten percent (10%) of the maximum amount of bid as a guarantee that the bidder will enter into the proposed Contract, if the same is awarded to such bidder, and will provide the required Performance and Payment Bonds, insurance certificates and any other required documents. In the event of failure to enter into said Contract or provide the necessary documents, said security will be forfeited.

The Contractor and all subcontractors shall comply with the requirements set forth in Division 2, Part 7, Chapter 1 of the Labor Code. The District has obtained from the Director of the Department of Industrial Relations the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this work is to be performed for each craft, classification or type of worker needed to execute the Contract. These per diem rates, including holiday and overtime work, as well as employer payments for health and welfare, pension, vacation, and similar purposes, are on file at the District, and are also available from the Director of the Department of Industrial Relations. Pursuant to California Labor Code section 1720 et seq., it shall be mandatory upon the Contractor to whom the Contract is awarded, and upon any subcontractor under such Contractor, to pay not less than the said specified rates to all workers employed by them in the execution of the Contract.

A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in the Labor Code, unless currently registered and qualified to perform public work pursuant to Labor Code section 1725.5. It is not a violation of this section for an unregistered

contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

All payroll records as detailed in Labor Code §1776 of the Contractor and all Subcontractors shall be certified and furnished directly to the Labor Commissioner in accordance with Labor Code §1771.4(a)(3) once every thirty (30) days while Work is being performed on the Project and within thirty (30) days after the final day of Work performed on the Project (or more frequently if required by the District or the Labor Commissioner). The Contractor and all Subcontractors shall submit their own payroll records to the Labor Commissioner on the internet website of the Department of Industrial Relations and such payroll records shall be in an electronic format prescribed by the Labor Commissioner. Monitoring and enforcement of the prevailing wage laws and related requirements will be performed by the Labor Commissioner/ Department of Labor Standards Enforcement (DLSE).

Each Bidder shall comply with all In-Use Off-Road Diesel-Fueled Fleets Regulations (the "Fleets Regulation") implemented by the California Air Resources Board ("CARB") which apply broadly to all self-propelled off-road diesel vehicles 25 horsepower or greater and other forms of equipment used in California. Bidders are required to comply with all CARB orders and Fleets Regulation requirements, including, without limitation, all applicable sections of the Fleets Regulation, as codified in Title 13 of the California Code of Regulations section 2449 et seq. throughout the duration of the Project. Bidders must provide, with their Bid, copies of the Bidder's and all listed subcontractors' most recent and valid Certificate(s) of Reported Compliance ("CRC") issued by the CARB. Any Bidder's failure to provide valid CRCs as required herein may render such Bidder's Bid non-responsive. Additionally, any Bidder's failure to complete and submit the enclosed Fleet Compliance Certification form with its Bid, may render such Bid non-responsive.

No bidder may withdraw any bid for a period of ninety (90) calendar days after the date set for the opening of bids.

Separate payment and performance bonds, each in an amount equal to 100% of the total Contract amount, are required, and shall be provided to the District prior to execution of the Contract and shall be in the form set forth in the Contract Documents.

All bonds (Bid, Performance, and Payment) must be issued by a California admitted surety as defined in California Code of Civil Procedure section 995.120.

Where applicable, bidders must meet the requirements set forth in Public Contract Code section 10115 et seq., Military and Veterans Code section 999 et seq. and California Code of Regulations, Title 2, Section 1896.60 et seq. regarding Disabled Veteran Business Enterprise ("DVBE") Programs. Forms are included in this Bid Package.

Any request for substitutions pursuant to Public Contract Code section 3400 must be made at the time of Bid on the Substitution Request Form set forth in the Contract Documents and included with the bid.

No telephone or facsimile machine will be available to bidders on the District premises at any time.

It is each bidder's sole responsibility to ensure its bid is timely delivered and received at the location designated as specified above. Any bid received at the designated location after the scheduled closing time for receipt of bids shall be returned to the bidder unopened.

LIBERTY UNION HIGH SCHOOL DISTRICT

INSTRUCTIONS TO BIDDERS

1. Preparation of Bid Form. Proposals under these specifications shall be submitted on the blank forms furnished herewith at the time and place stated in the Notice Inviting Bids. The District's time clock shall govern and control the time for all bids to be received by the District and no other clock shall be used to determine the time when bids shall be received by the District in accordance with the Notice Inviting Bids. All blanks in the bid form must be appropriately filled in, and all proposed prices must be stated clearly and legibly in both words and numerals. All bids must be signed by the bidder in permanent black or blue ink and submitted to the District in accordance with the Notice Inviting Bids. The District reserves the right to reject any Bid if all of the above information is not furnished. It is each Bidder's sole responsibility to ensure its Bid is timely submitted and received by the District in accordance with the Notice Inviting Bids. Any bid received by the District after the scheduled closing time for the receipt of Bids shall be returned to the Bidder unopened.

2. Bid Security. Each bid must be accompanied by one of the following forms of bidder's security: (1) cash; (2) a cashier's check made payable to the District; (3) a certified check made payable to the District; or (4) a bidder's bond executed by a California admitted surety as defined in Code of Civil Procedure section 995.120, made payable to the District, in the form set forth in the Contract Documents. Such bidder's security must be in an amount not less than ten percent (10%) of the maximum amount of such bidder's bid as a guarantee that the bidder will enter into the Contract, if the same is awarded to such bidder, and will provide the required Performance and Payment Bonds, insurance certificates and any other required documents. In the event that a bidder is awarded the Contract and such bidder fails to enter into said Contract or provide the surety bond or bonds within five (5) calendar days after award of the Contract to bidder, said security will be forfeited.

3. Signature. The bid form, all bonds, all designations of subcontractors, the Contractor's Certificate, the Agreement, and all Guarantees must be signed in permanent blue ink in the name of the bidder and must bear the signature in longhand of the person or persons duly authorized to sign the bid.

If bidder is a corporation, the legal name of the corporation shall first be set forth, together with two signatures: one from the President and one from the Secretary or Assistant Secretary. Alternatively, the signature of other authorized officers or agents may be affixed, if a certified copy of the resolution of the corporate board of directors authorizing them to do so is provided to the District. Such documents shall include the title of such signatories below the signature and shall bear the corporate seal.

If bidder is a partnership, the true name of the firm shall first be set forth, together with the names of all persons comprising the partnership or co-partnership. The bid must be signed by all partners comprising the partnership unless proof in the form of a certified copy of a statement of partnership acknowledging the signer to be a general partner is presented to the District, in which case the general partner may sign.

Bids submitted as joint ventures must so state and be signed by each joint venturer.

Bids submitted by individuals must be signed by the bidder unless an up to date power- of-attorney is on file in the District office, in which case, said person may sign for the individual.

The above rules also apply in the case of the use of a fictitious firm name. In addition, however, where a fictitious name is used, it must be so indicated in the signature.

4. Modifications. Changes in or additions to the bid form, recapitulations of the work bid upon, alternative proposals, or any other modification of the bid form which is not specifically called for in the Contract Documents may result in the District's rejection of the bid as not being responsive to the Notice Inviting Bids. **No oral or telephonic modification of any bid submitted will be considered**.

5. Erasures, Inconsistent or Illegible Bids. The bid submitted must not contain any erasures, interlineations, or other corrections unless each such correction creates no inconsistency and is suitably authenticated by affixing in the margin immediately opposite the correction the signature or signatures of the person or persons signing the bid. In the event of inconsistency between words and figures in the bid price, words shall control figures. In the event that the District determines that any bid is unintelligible, inconsistent, or ambiguous, the District may reject such bid as not being responsive to the Notice Inviting Bids.

6. Examination of Site and Contract Documents. Each bidder shall visit the site of the proposed work and become fully acquainted with the conditions relating to the construction and labor so that the facilities, difficulties, and restrictions attending the execution of the work under the Contract are fully understood. Bidders shall thoroughly examine and be familiar with the drawings and specifications and all others documents and requirements that are attached to and/or contained in the Project Manual or other documents issued to bidders. The failure or omission of any bidder to receive or examine any Contract Documents, form, instrument, ***bid clarifications*** ~~addendum~~, or other document or to visit the site and become acquainted with conditions there existing shall not relieve any bidder from obligations with respect to the bid or to the contract. The submission of a bid shall be taken as prima facie evidence of compliance with this Section. Bidders shall not, at any time after submission of the bid, dispute, complain, or assert that there were any misunderstandings with regard to the nature or amount of work to be done.

7. Withdrawal of Bids. Any bid may be withdrawn, either personally or by written request, at any time prior to the scheduled closing time for receipt of bids. The bid security for bids withdrawn prior to the scheduled closing time for receipt of bids, in accordance with this paragraph, shall be returned upon demand therefor.

No bidder may withdraw any bid for a period of ninety (90) calendar days after the date set for the opening of bids.

8. Agreements, Insurance and Bonds. The Agreement form which the successful bidder, as Contractor, will be required to execute, and the forms and amounts of surety bonds and insurance endorsements which Contractor will be required to be furnished at the time of execution of the Agreement, are included in the Bid Documents and should be carefully examined by the bidder. The number of executed copies of the Agreement, the Performance Bond, and the Payment Bond required is three (3). Payment and Performance bonds must be executed by an admitted surety insurer as defined in Code of Civil Procedure 995.120. Additionally, the Contractor must provide to the District with its executed Agreement: (i) a complete and accurate copy of the Contractor's Workplace Violence Prevention Plan in accordance with Labor Code Section 6401.9 that is applicable to the Project (the "Project WVPP"); and (ii) the name, position, and telephone number of each person having responsibility for implementing the Project WVPP and receiving reports of workplace violence, if and to the extent that information is not conspicuously specified in the Project WVPP.

9. Interpretation of Plans and Documents/Pre-Bid Clarification. If any prospective bidder is in doubt as to the true meaning of any part of the Contract Documents, or finds discrepancies in, or omissions, a written request for an interpretation or correction thereof may be submitted to the District. The bidder submitting the request shall be responsible for its prompt delivery. **Any interpretation or correction of**

the Contract Documents will only be made by *Bid Clarifications* ~~Addendum~~ duly issued, and a copy of such *Bid Clarification* ~~Addendum~~ will be made available for each contractor receiving a set of the Contract Documents. No person is authorized to make any oral interpretation of any provision in the Contract Documents, nor shall any oral interpretation be binding on the District. If discrepancies on drawings, specifications or elsewhere in the Contract Documents are not covered by ***bid clarification*** ~~addenda~~, bidder shall include in their bid methods of construction and materials for the higher quality and complete assembly. Each request for clarification shall be submitted to the District in writing, via email, to only the following person(s)

TO: Paul Melloni, Director of Facilities, mellonip@luhsd.net

CC: Tracie Rose, Architect, tracier@qka.com

Each transmitted request shall contain the name of the person and/or firm filing the request, address, telephone and fax number, Specifications and/or Drawing number. Bidder is responsible for the legibility of any and all requests. Pre-bid clarification requests shall be filed a minimum of **six (6)** days prior to the bid opening. Requests received less than **six (6)** days before the bid opening shall not be considered or responded to by the District. The District will issue a written response to all timely pre-bid clarification requests that materially affect a bidder's price through a ***Bid Clarification*** ~~Addendum~~ duly issued by the District not less than seventy-two (72) hours prior to the bid opening.

10. Bidders Interested in More Than One Bid. No person, firm, or corporation shall be allowed to make, or file, or be interested in more than one prime bid for the same work unless alternate bids are specifically called for. A person, firm, or corporation that has submitted a proposal to a bidder, or that has quoted prices of materials to a bidder, is not thereby disqualified from submitting a proposal or quoting prices to other bidders or making a prime proposal.

11. Award of Contract. The Contract will be awarded to the lowest responsive responsible bidder by action of the governing Board. The District reserves the right to reject any or all bids, or to waive any irregularities or informalities in any bids or in the bidding process. In the event an award is made to bidder, and such bidder fails or refuses to execute the Contract and provide the required documents detailed in Section 8 above within five (5) calendar days after award of the Contract to bidder, the District may award the Contract to the next lowest responsible and responsive bidder or release all bidders**. Each bid must conform and be responsive to the Contract Documents as defined in the General Conditions**.

12. Bid Protest Procedure. Any bidder may file a bid protest. The protest shall be filed in writing with the District's Director of Facilities not more than five (5) business days after the date of the bid opening. An e-mail address shall be provided and by filing the protest, protesting bidder consents to receipt of e-mail notices for purposes of the protest and protest related questions and protest appeal, if applicable. The protest shall specify the reasons and facts upon which the protest is based.

a. Resolution of Bid Controversy: Once the bid protest is received, the apparent lowest responsible bidder will be notified of the protest and the evidence presented. If appropriate, the apparent low bidder will be given an opportunity to rebut the evidence and present evidence that the apparent low bidder should be allowed to perform the Work. If deemed appropriate by the District, an informal hearing will be held. District will issue a written decision within fifteen (15) calendar days of receipt of the protest, unless factors beyond the District's reasonable control prevent such resolution. The decision on the bid protest will be copied to all parties involved in the protest.

b. Appeal: If the protesting bidder or the apparent low bidder is not satisfied with the decision, the matter may be appealed to the Chief Business Official or their designee, within three (3)

business days after receipt of the District's written decision on the bid protest. The appeal must be in writing and sent via overnight registered mail with all accompanying information relied upon for the appeal and an e-mail address from which questions and responses may be provided to:

Liberty Union High School District
Business Department
20 Oak Street
Brentwood, CA 94513

c. Appeal Review: The Chief Business Official or their designee shall review the decision on the bid protest from the Director of Facilities and issue a written response to the appeal, or if appropriate, appoint a Hearing Office to conduct a hearing and issue a written decision. The written decision of the Chief Business Official or the Hearing Officer shall be rendered within fifteen (15) calendar days and shall state the basis for the decision. The decision concerning the appeal will be final and not subject to any further appeals.

d. Reservation of Rights to Proceed with Project Pending Appeal. The District reserves the right to proceed to award the Project and commence construction pending an Appeal. If there is State Funding or a critical completion deadline, the District may choose to shorten the time limits set forth in this Section if written notice is provided to the protesting party. E-mailed notice with a written confirmation sent by First Class Mail shall be sufficient to constitute written notice. If there is no written response to a written notice shortening time, the District may proceed with the award.

e. Finality. Failure to comply with this Bid Protest Procedure shall constitute a waiver of the right to protest and shall constitute a failure to exhaust the protesting bidder's administrative remedies.

13. Alternates. If alternate bids are called for, the Contract may be awarded at the election of the Governing Board to the lowest responsible and responsive bidder using the method and procedures outlined in the Notice Inviting Bids and as specified in the section entitled Alternate/Deductive Bid Alternates.

a. Subcontractor Listing for Alternates. If alternate bids are called for and the bidder intends to use different or additional subcontractors, a separate list of subcontractors must be submitted for each such alternate.

14. Evidence of Responsibility. Upon the request of the District, a bidder whose bid is under consideration for the award of the Contract shall submit promptly to the District satisfactory evidence showing the bidder's financial resources, surety and insurance claims experience, construction experience, completion ability, workload, organization available for the performance of the Contract, and other factors pertinent to a Project of the scope and complexity involved.

15. Listing Subcontractors. Each bidder shall submit with his bid, on the form furnished with the Contract Documents, a list of the names, license numbers, scopes of work, locations of the places of business, contact information, and Department of Industrial Relations ("DIR") registration numbers of each subcontractor who will perform work or labor or render service to the bidder in or about the project, or a subcontractor who under subcontract to the bidder, specially fabricates and installs a portion of the work, in an amount in excess of one-half of 1 percent of the bidder's total bid as required by the Subletting and Subcontracting Fair Practices Act (Public Contract Code section 4100, et seq.) Pursuant to Labor Code section 1725.5, all subcontractors (of any tier) performing work on this Project must be properly registered with DIR.

16. Workers' Compensation. In accordance with the provisions of Labor Code section 3700, the successful bidder as the Contractor shall secure payment of compensation to all employees. The Contractor shall sign and file with the District the following certificate prior to performing the work under this contract: "I am aware of the provisions of Section 3700 of the Labor Code, which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract." The form of such certificate is included as a part of the Bid Documents.

17. Contractor's License. To perform the work required by this notice, the Contractor must possess the Contractor's License as specified in the Notice Inviting Bids, and the Contractor must maintain the license throughout the duration of the contract. If, at the time of bid, bidder is not licensed to perform the Project in accordance with Division 3, Chapter 9, of the Business and Professions Code for the State of California and the Notice to Contractors calling for bids, such bid will not be considered and the Contractor will forfeit its bid security to the District.

18. Anti-Discrimination. It is the policy of the District that in connection with all work performed under contracts, there be no discrimination against any prospective or active employee engaged in the work because of race, color, ancestry, national origin, religious creed, sex, age, or marital status. The Contractor agrees to comply with applicable federal and California laws, including, but not limited to, the California Fair Employment and Housing Act, beginning with Government Code section 12900 and Labor Code section 1735. In addition, the Contractor agrees to require like compliance by any subcontractors employed on the work by such Contractor.

19. Preference for Materials and Substitutions.

a. One Product Specified. Unless the Plans and Specifications state that no Substitution is permitted, whenever the Contract Documents indicate any specific article, device, equipment, product, material, fixture, patented process, form, method, construction, or any specific name, make, trade name, or catalog number, with or without the words, "or equal," such specification shall be read as if the language "or equal" is incorporated.

b. Request for Substitution. Bidder may, unless otherwise stated, offer any material, process, article, etc., which is materially equal or better in every respect to that so indicated or specified ("Specified Item") and will completely accomplish the purpose of the Contract Document. If bidder desires to offer a Substitution for a Specified Item, such bidder must make a request in writing on the District's Substitution Request Form ("Request Form") and submit the completed Request Form with the bidder's bid. The Request Form must be accompanied by evidence as to whether the proposed substitution:

1) Is equal in quality, service, and ability to the Specified Item as demonstrated by a side by side comparison of key characteristics and performance criteria (CSI comparison chart);
2) Will entail no changes in detail, construction and scheduling of related work;
3) Will be acceptable in consideration of the required design and artistic effect;
4) Will provide no cost disadvantage to the District;
5) Will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts; and
6) Will require no change in the Contract Time.

In completing the Request Form, bidder must state with respect to each requested substitution whether bidder will agree to provide the Specified Item in the event that the District denies bidder's request for substitution of a Specified Item. In the event that bidder does not agree in the Request

Form to provide the Specified Item and the District denies the requested Substitution, the bidder's bid shall be considered non-responsive and the District may award the Contract to the next lowest bidder or in its sole discretion, release all bidders. In the event that bidder has agreed in the Request Form to provide the Specified Item and the District denies bidder's requested substitution for a Specified Item, bidder shall execute the Agreement and provide the Specified Item without any additional cost or charge to the District, and if bidder fails to execute the Agreement with the Specified Item(s), bidder's bid bond will be forfeited.

After the bids are opened, the apparent lowest bidder shall provide, within five (5) calendar days of opening such bids, any and all Drawings, Specifications, samples, performance data, calculations, and other information as may be required to assist the Architect and the District in determining whether the proposed substitution is acceptable. The burden of establishing these facts shall be upon the bidder.

After the District's receipt of such evidence by bidder, the District will make its final decision as to whether the bidder's request for Substitution for any Specified Items will be granted. The District shall have sole discretion in deciding as to whether a proposed request for Substitution is equal to or better than a Specified Item. Any request for Substitution which is granted by the District shall be documented and processed through a Change Order. The District may condition its approval of any Substitution upon delivery to the District of an extended warranty or other assurances of adequate performance of the Substitution. Any and all risks of delay due to DSA, or any other governmental agency having jurisdiction shall be on the bidder.

20. Disqualification of Bidders and Proposals. More than one proposal for the same work from any individual, firm, partnership, corporation, or association under the same or different names will not be accepted; and reasonable grounds for believing that any bidder is interested in more than one proposal for the work will be cause for rejecting all proposals in which such bidder is interested and the bidder will forfeit their bid security to the District.

21. Unbalanced or Altered Bids. Proposals in which the prices are obviously unbalanced, and those which are incomplete or show any alteration of form, or contain any additions or conditional or alternate bids that are not called for or otherwise permitted, may be rejected. A proposal on which the signature of the bidder has been omitted may be rejected. If, in the District's sole discretion, it determines any pricing, costs or other information submitted by a bidder may result in an unbalanced bid, the District may deem such bid non-responsive. A bid may be determined by the District to be unbalanced if the bid is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that the bid will result in the lowest overall cost to the District even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advanced payment.

22. Employment of Apprentices. The Contractor and all Subcontractors shall comply with the provisions of California Labor Code including, but not limited to sections 1777.5, 1777.6, and 1777.7 concerning the employment of apprentices. The Contractor and any Subcontractor under him shall comply with the requirements of said sections, including applicable portions of all subsequent amendments in the employment of apprentices; however, the Contractor shall have full responsibility for compliance with said Labor Code sections, for all apprenticeable occupations, regardless of any other contractual or employment relationships alleged to exist.

23. Non-Collusion Declaration. Public Contract Code section 7106 requires bidders to submit declaration of non-collusion with their bids. This form is included with the bid documents and must be signed and dated by the bidder under penalty of perjury.

24. Wage Rates, Travel and Subsistence.

a. The Contractor and all subcontractors shall comply with the requirements set forth in Division 2, Part 7, Chapter 1 of the Labor Code. Pursuant to Labor Code section 1770 et seq., the District has obtained from the Director of the Department of Industrial Relations the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this work is to be performed for each craft, classification or type of worker needed to execute the contract. Copies are available from the District to any interested party on request and are also available from the Director of the Department of Industrial Relations. The Contractor shall obtain copies of the above-referenced prevailing wage sheets and post a copy of such wage rates at appropriate, conspicuous, weatherproof points at the Site.

b. Any worker employed to perform work on the Project and such work is not covered by any classification listed in the published general prevailing wage rate determinations or per diem wages determined by the Director of the Department of Industrial Relations, shall be paid not less than the minimum rate of wages specified therein for the classification which most nearly corresponds to the employment of such person in such classification.

c. Holiday and overtime work, when permitted by law, shall be paid for at the rate set forth in the prevailing wage rate determinations issued by the Director of the Department of Industrial Relations or at least one and one-half (1½) times the specified basic rate of per diem wages, plus employer payments, unless otherwise specified in the Contract Documents or authorized by law.

d. These per diem rates, including holiday and overtime work, and employer payments for health and welfare, pension, vacation, and similar purposes, are on file at the administrative office of the District, located as noted above and are also available from the Director of the Department of Industrial Relations. It is the Contractor's responsibility to ensure the appropriate prevailing rates of per diem wages are paid for each classification. It shall be mandatory upon the Contractor to whom the Contract is awarded, and upon any subcontractor under such Contractor, to pay not less than the said specified rates to all workers employed by them in the execution of the Contract.

25. DIR Registration of Contractor and Subcontractors. A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in the Labor Code, unless currently registered and qualified to perform public work pursuant to Section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

This Project is a public works project as defined in Labor Code section 1720. Each contractor bidding on this Project and all subcontractors (of any tier) performing any portion of the Work must comply with the Labor Code sections 1725.5 and 1771.1 and must be properly and currently registered with DIR and qualified to perform public works pursuant to Labor Code section 1725.5 throughout the duration of the Project. For more information and up to date requirements, contractors are recommended to periodically review the DIR's website at www.dir.ca.gov. Contractor shall be solely responsible for ensuring compliance with Labor Code section 1725.5 as well as any requirements implemented by DIR applicable to its services or its subcontractors throughout the term of the Agreement and in no event shall contractor be granted increased payment from the District or any time extensions to complete the Project as a result of contractor's efforts to maintain compliance with the Labor Code or any requirements implemented by the DIR. Failure to comply with these requirements shall be deemed a material breach of this Agreement

and grounds for termination for cause. The contractor and all subcontractors shall furnish certified payroll records as required pursuant Labor Code section 1776 directly to the Labor Commissioner in accordance with Labor Code section 1771.4(a)(3) once every thirty (30) days while Work is being performed on the Project and within thirty (30) days after the final day of Work performed on the Project (or more frequently if required by the District or the Labor Commissioner). The Contractor and all Subcontractors shall submit their own payroll records to the Labor Commissioner on the internet website of the Department of Industrial Relations and such payroll records shall be in an electronic format and manner prescribed by the Labor Commissioner. The District reserves the right to withhold contract payments if the District is notified, or determines as the result of its own investigation, that contractor is in violation of any of the requirements set forth in Labor Code section 1720 et seq. at no penalty or cost to the District. Monitoring and enforcement of the prevailing wage laws and related requirements will be performed by the Labor Commissioner/ Department of Labor Standards Enforcement (DLSE).

26. No Telephone or Facsimile Availability. No telephone or facsimile machine will be available to bidders on the District premises at any time.

27. Obtaining Bidding Documents. Bidding Documents, may be obtained from:

Draftech Blueprinting, Inc.
1544 Terrace Way
Santa Rosa, CA 95404
(707) 578-9442

Copies of the Contract Documents are also available for examination beginning on March 17, 2025 on the Draftech Bluepinting Online Planroom (draftechplanroom.com); click link “Private Jobs”; click link “Enter job key”; “Gateway”. Contract documents are also available for review at selected Builder's Exchanges

Bidder shall utilize a complete set of Bidding Documents in preparing a bid. The failure or omission of bidder to receive any Bidding Document, form, instrument, ***Bid Clarification*** ~~Addendum~~, or other document shall not relieve bidder from any obligations with respect to the bid and/or Contract.

28. ***Bid Clarification*** ~~Addenda~~. The District reserves the right to revise the Contract Documents prior to the Bid Opening date. Clarifications, revisions or any other notice of a change in the Contract Documents will be issued only by the District and only in the form of a written ***Bid Clarification*** ~~Addendum~~. Each prospective Bidder shall provide the District a name, address, email address, and facsimile number to which ***Bid Clarifications*** ~~Addenda~~ may be sent, as well as a telephone number by which the District can contact the Bidder. Copies of ***Bid Clarifications*** ~~Addenda~~ will be furnished by fax, mail, e-mail, or other proper means of delivery to all who are known by the issuing office to have received a complete set of the Contract Documents and provided such current information. Any other purported ***Bid Clarification*** ~~Addenda~~ are void and unenforceable.

Bidder is responsible for receiving and ascertaining the disposition of all ***Bid Clarifications*** ~~Addenda~~ issued regardless of District notification and to acknowledge all ***Bid Clarifications*** ~~Addenda~~ in the submitted sealed bid prior to the Bid Opening. Copies of ***Bid Clarifications*** ~~Addenda~~ will be made available for inspection wherever Bidding Documents are on file for inspection. Each ***Bid Clarification*** ~~Addendum~~ will be numbered, dated, and identified with the Project number. Oral statements or any instructions in any form, other than ***Bid Clarifications*** ~~Addendum~~ as described above, shall be void and unenforceable. Any ***Bid Clarification*** ~~Addendum~~ duly issued by the District and not noted as being acknowledged by Bidder as required in the Bid Form, may result in the Bid being deemed non-responsive.

29. Debarment. Bidder may also be subject to debarment, in addition to seeking remedies for False Claims under Government Code section 12650 et seq. and Penal Code section 72, the District may debar a Contractor pursuant to Article 15 of the General Conditions if the Board, or the Board may designate a hearing officer who, in his or her discretion, finds the Contractor has done any of the following:

a. Intentionally or with reckless disregard, violated any term of a contract with the District

b. Committed an act or omission which reflects on the Contractor's quality, fitness or capacity to perform work for the District;

c. Committed an act or offense which indicates a lack of business integrity or business honesty; or,

d. Made or submitted a false claim against the District or any other public entity (See Government Code section 12650, et seq., and Penal Code section 72).

30. Iran Contracting Act Certification Form. Each bidder shall submit a completed Iran Contracting Act Certification Form to the District with its Bid. Failure to (1) submit a fully executed Iran Contracting Act Certification Form to the District prior to the Bid Opening, or (2) complete any required portion of the Iran Contracting Act Certification Form may result in the bidder/Contractor being deemed non-responsive by the District.

31. Fleet Compliance Certification Form. The District is a Public Works Awarding Body, as defined under Title 13 California Code of Regulations section 2449(c)(46). Accordingly, all Bidders must submit, with their Bids, valid Certificate(s) of Reported Compliance ("CRC") for the Bidder's fleet and for the fleet(s) of its listed subcontractors (including any applicable leased equipment or vehicles). Each Bidder must also complete and submit to the District, with its Bid, the enclosed Fleet Compliance Certification form for the Project. **FAILURE TO PROVIDE ALL APPLICABLE CRC'S TO THE DISTRICT FOR THE BIDDER, AND FOR ALL LISTED SUBCONTRACTORS, MAY RENDER A BID NON-RESPONSIVE. ADDITIONALLY, FAILURE TO COMPLETE AND SUBMIT THE ENCLOSED FLEET COMPLIANCE CERTIFICATION FORM, MAY RENDER A BID NON-RESPONSIVE.**

CHECKLIST OF MANDATORY BID FORMS

(For Contractor's use and reference only. Additional documents may be required so bidders should carefully review all Contract Documents and Bid Documents)

- ❑ Designation of Subcontractors
- ❑ Bid Form
- ❑ Contractor's Certificate Regarding Workers Compensation (form must be provided with bid documents even though an OCIP is in-place)
- ❑ Non-Collusion Declaration
- ❑ Bid Bond (or Bid Guarantee form if Security is other than Bid Bond)
- ❑ Substitution Request Form (If Substitution Request Form is not submitted then NO Substitutions will be allowed after the bids are opened)
- ❑ Acknowledgment of Bidding Practices Regarding Indemnity
- ❑ DVBE Participation Statement
- ❑ Contractor's Certificate Regarding Drug-Free Work Place
- ❑ Contractor's Certificate Regarding Alcoholic Beverage and Tobacco-Free Campus Policy
- ❑ Iran Contracting Act Certification Form
- ❑ Fleet Compliance Certification Form and All Applicable Certificates of Reported Compliance

PRE-BID CLARIFICATION FORM (For Contractor's Use)

PROJECT NAME:	M & O NEW OFFICE		
PROJECT NUMBER:	2249.00		
TO:	Paul Melloni & Tracie Rose	EMAIL:	mellonip@luhsd.net & tracier@qka.com

DATE:			
FROM:		EMAIL:	
DOCUMENT/DIVISION NUMBER:		DRAWING NUMBER:	

REQUESTED CLARIFICATION:
RESPONSE TO CLARIFICATION:

Attach additional numbered sheets as necessary; however, only one (1) request shall be contained on each submitted form.

DESIGNATION OF SUBCONTRACTORS

In compliance with the Subletting and Subcontracting Fair Practices Act (California Public Contract Code section 4100 et seq.,) and any amendments thereof, each Bidder shall set forth below: (a) the name, license number, and location of the place of business of each subcontractor who will perform work or labor or render service to the Contractor, who will perform work or labor or work or improvement to be performed under this Contract, or a subcontractor licensed by the State of California who, under subcontract to the Contractor, specially fabricates and installs a portion of the work or improvements according to detailed Drawings contained in the Plans and Specifications in an amount in excess of one-half of one percent of the Contractor's total bid; and (b) the portion and description of the work which will be done by each subcontractor under this Act. The Contractor shall list only one subcontractor for each such portion as is defined by the Contractor in this bid. All subcontractors shall be properly licensed by the California State Licensing Board.

If a Contractor fails to specify a subcontractor, or if a Contractor specifies more than one subcontractor for the same portion of work to be performed under the Contract in excess of one-half of one percent of the Contractor's total bid, the Contractor shall be deemed to have agreed that the Contractor is fully qualified to perform that portion, and that the Contractor alone shall perform that portion.

No Contractor whose bid is accepted shall (a) substitute any subcontractor, (b) permit any subcontractor to be voluntarily assigned or transferred or allow the relevant portion of the work to be performed by anyone other than the original subcontractor listed in the original bid, or (c) sublet or subcontract any portion of the work in excess of one-half of one percent of the Contractor's total bid where the original bid did not designate a subcontractor, except as authorized in the Subletting and Subcontracting Fair Practices Act.

Subletting or subcontracting of any portion of the work in excess of one-half of one percent of the Contractor's total bid where no subcontractor was designated in the original bid shall only be permitted in cases of public emergency or necessity, and then only after a finding, reduced to writing as a public record, of the authority awarding this Contract setting forth the facts constituting the emergency or necessity.

All subcontractors (of any tier) performing any portion of the Work must comply with the Labor Code sections 1725.5 and 1771.1 and must be properly and currently registered with the California Department of Industrial Relations and qualified to perform public works pursuant to Labor Code section 1725.5 throughout the duration of the Project.

NOTE: If alternate bids are called for and bidder intends to use different or additional subcontractors on the alternates, a separate list of subcontractors must be provided for each such Alternate.

DESIGNATION OF SUBCONTRACTORS FORM

Scope of Work	Name of Subcontractor	Location & Place of Business	License Type and Number	DIR Registration Number	*E-Mail & Telephone**

Scope of Work	Name of Subcontractor	Location & Place of Business	License Type and Number	DIR Registration Number	*E-Mail & Telephone**

* This information must be provided at the time of submission of bid or must be provided within 24 hours after the time set for the opening of bids. Bidders who choose to provide this information within 24 hours after the time set for the opening of bids are solely responsible to ensure the District receives this information in a timely manner. The District is not responsible for any problems or delays associated with emails, faxes, delivery, etc. Absent a verified fax or email receipt date and time by the District, the District's determination of whether the information was received timely shall govern and be determinative. Bidder shall not revise or amend any other information in this form submitted at the time of bid. The information submitted at the time of bid shall govern over any conflicts, discrepancies, ambiguities or other differences in any subsequent Subcontractor Designation Forms submitted by the bidder.

Proper Name of Bidder: _____

Date: _____

Name: _____

Signature of Bidder Representative: _____

Address: _____

Phone: _____

_____

BID FORM

FOR

GATEWAY PROGRAM PORTABLES
COMMUNITY EDUCATION CENTER
929 2ND STREET, BRENTWOOD, CA 94513

Project No. 2249.00
Bid No. U2527C

FOR

LIBERTY UNION HIGH SCHOOL DISTRICT

CONTRACTOR NAME: _____

ADDRESS: _____

_____

TELEPHONE: ( ) _____

FAX: ( ) _____

EMAIL _____

TO: Liberty Union High School District, acting by and through its Governing Board, herein called "District".

1. Pursuant to and in compliance with your Notice Inviting Bids and other documents relating thereto, the undersigned bidder, having thoroughly studied and familiarized himself with the terms of the Contract, the local conditions affecting the performance of the Contract, the cost of the work at the place where the work is to be done, the labor market, the supply chain market for materials and equipment necessary to complete the Project, with the Drawings and Specifications, and other Contract Documents, hereby proposes and agrees to perform within the time stipulated, the Contract, including all of its component parts, and everything required to be performed, including its acceptance by the District, and to provide and furnish any and all labor, materials, tools, expendable equipment, and utility and transportation services necessary to perform the Contract and complete all of the Work in a workmanlike manner required in connection with the construction of:

BID NO. U2527C

Gateway Program Portables

in the District described above, all in strict conformance with the drawings and other Contract Documents on file at the Maintenance & Operations Office of said District for amounts set forth herein.

2. BIDDER ACKNOWLEDGES THE FOLLOWING ***BID CLARIFICATIONS*** ~~ADDENDUM~~:

Number	Number	Number	Number	Number	Number	Number	Number
_____	_____	_____	_____	_____	_____	_____	_____

Acknowledge the inclusion of all ***bid clarifications*** ~~addenda~~ issued prior to bid in the blanks provided above. Your failure to do so may render your bid non-responsive.

3. ***TOTAL CASH PURCHASE PRICE IN WORDS & NUMBERS***

a. Bid Item No. 01 for the Base Scope for the Gateway Portable Program Project:

_____ ***DOLLARS***

($ _____)

b. Bid Item No. 02 for the Lump Sum Allowance for Dry Rot Repair:

THIRTY THOUSAND ***DOLLARS***

($30,000.00)

c. Total Base Bid (Bid Item No. 01 + Bid Item No. 02):

_____ ***DOLLARS***

($ _____)

4. TIME FOR COMPLETION: The District may give a notice to proceed within ninety (90) days of the award of the bid by the District. Once the Contractor has received the notice to proceed, the Contractor shall complete the work in the time specified in the Agreement. By submitting this bid, Contractor has thoroughly studied this Project, the labor market, and the supply chain market for materials and equipment that are necessary to complete the Project and Contractor agrees that the Contract Time for this Project is adequate for the timely and proper completion of the Project. Further, Contractor has included in the analysis of the time required for this Project, Rain Days, Governmental Delays, and the requisite time to complete Punch List.

In the event that the District desires to postpone giving the notice to proceed beyond this ninety (90) day period, it is expressly understood that with reasonable notice to the Contractor, giving the notice to proceed may be postponed by the District. It is further expressly understood by the Contractor, that the Contractor shall not be entitled to any claim of additional compensation as a result of the postponement of giving the notice to proceed.

If the Contractor believes that a postponement will cause a hardship to it, the Contractor may terminate the contract with written notice to the District within ten (10) days after receipt by the Contractor of the District's notice of postponement. Should the Contractor terminate the Contract as a result of a notice of postponement, the District shall have the authority to award the Contract to the next lowest responsible bidder, if applicable.

It is understood that the District reserves the right to reject any or all bids and/or waive any irregularities or informalities in this bid or in the bid process. The Contractor understands that it may not withdraw this bid for a period of ninety (90) days after the date set for the opening of bids.

5. Attached is bid security in the amount of not less than ten percent (10%) of the bid:

Bid bond (10% of the Bid), certified check, or cashier's check (circle one)

6. The required List of Designated Subcontractors is attached hereto.

7. The required Non-Collusion Declaration is attached hereto.

8. The Substitution Request Form, if applicable, is attached hereto.

9. It is understood and agreed that if written notice of the acceptance of this bid is mailed, telegraphed, or delivered to the undersigned after the opening of the bid, and within the time this bid is required to remain open, or at any time thereafter before this bid is withdrawn, the undersigned will execute and deliver to the District a Contract in the form attached hereto in accordance with the bid as accepted, and that he or she will also furnish and deliver to the District the Performance Bond and Payment Bond, all within five (5) calendar days after award of Contract, and that the work under the Contract shall be commenced by the undersigned bidder, if awarded the Contract, by the start date provided in the District's Notice to Proceed, and shall be completed by the Contractor in the time specified in the Contract Documents.

10. The names of all persons interested in the foregoing proposal as principals are as follows:

_____

_____

_____

_____

_____

_____

(IMPORTANT NOTICE: If bidder or other interested person is a corporation, state the legal name of such corporation, as well as the names of the president, secretary, treasurer, and manager thereof; if a co-partnership, state the true names of the firm, as well as the names of all individual co-partners comprising the firm; if bidder or other interested person is an individual, state the first and last names in full.)

11. PROTEST PROCEDURES. If there is a bid protest, the grounds shall be submitted as set forth in the Instructions to Bidders.

12. The undersigned bidder shall be licensed and shall provide the following California Contractor's license information:

License Number: _____

License Expiration Date: _____

Name on License: _____

Class of License: _____

DIR Registration Number: _____

If the bidder is a joint venture, each member of the joint venture must include the above information.

13. Time is of the essence regarding this Contract, therefore, in the event the bidder to whom the Contract is awarded fails or refuses to post the required bonds and return executed copies of the Agreement form within five (5) calendar days from the date of receiving the Notice of Award, the District may declare the bidder's bid deposit or bond forfeited as damages.

14. The bidder declares that he/she has carefully examined the location of the proposed Project, that he/she has examined the Contract Documents, including the Plans, General Conditions, Supplemental Conditions, ***Bid Clarifications*** ~~Addenda~~, and Specifications, all others documents and requirements that are attached to and/or contained in the Project Manual, all other documents issued to bidders and read the accompanying instructions to bidders, and hereby proposes and agrees, if this proposal is accepted, to furnish all materials and do all work required to complete the said work in accordance with the Contract Documents, in the time and manner therein prescribed for the unit cost and lump sum amounts set forth in this Bid Form. The undersigned bidder hereby acknowledges and agrees that such bidder shall not be entitled to any price increase to the Total Cash Purchase Price set forth above on account of or due to any external factors including, but not limited to, inflation, labor shortages, and/or supply chain issues/shortages.

15. DEBARMENT. In addition to seeking remedies for False Claims under Government Code section 12650 et seq. and Penal Code section 72, the District may debar a Contractor pursuant to Article 15 of the

General Conditions if the Board, or the Board may designate a hearing officer who, in his or her discretion, finds the Contractor has done any of the following:

a. Intentionally or with reckless disregard, violated any term of a contract with the District;

b. Committed an act or omission which reflects on the Contractor's quality, fitness or capacity to perform work for the District;

c. Committed an act or offense which indicates a lack of business integrity or business honesty; or

d. Made or submitted a false claim against the District or any other public entity. (See Government Code section 12650, et seq., and Penal Code section 72)

16. DESIGNATION OF SUBCONTRACTORS. In compliance with the Subletting and Subcontracting Fair Practices Act (California Public Contract Code section 4100 et seq.) and any amendments thereof, each bidder shall list subcontractors on the District's form Subcontractor list. This subcontractor list shall be submitted with the bid and is a required form

I agree to receive service of notices at the e-mail address listed below.

I the below-indicated bidder, declare under penalty of perjury that the information provided and representations made in this bid are true and correct.

_____
Proper Name of Company

_____
Name of Bidder Representative

_____
Street Address

_____
City, State, and Zip

( )_____
Phone Number

( )_____
Fax Number

_____
E-Mail

By: _____ Date: _____
Signature of Bidder Representative

NOTE: If bidder is a corporation, the legal name of the corporation shall be set forth above together with the signature of authorized officers or agents and the document shall bear the corporate seal; if bidder is a partnership, the true name of the firm shall be set forth above, together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership; and if bidder is an individual, his signature shall be placed above.

All signatures must be made in permanent blue ink.

CONTRACTOR'S CERTIFICATE REGARDING WORKERS' COMPENSATION FORM

(form must be provided with bid documents even though an OCIP is in-place)

Labor Code section 3700 in relevant part provides:

Every employer except the State shall secure the payment of compensation in one or more of the following ways:

1. By being insured against liability to pay compensation by one or more insurers duly authorized to write compensation insurance in this State.

2. By securing from the Director of Industrial Relations a certificate of consent to self-insure, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to employees.

3. For any county, city, city and county, municipal corporation, public district, public agency, or any political subdivision of the state, including each member of a pooling arrangement under a joint exercise of powers agreement (but not the state itself), by securing from the Director of Industrial Relations a certificate of consent to self-insure against workers' compensation claims, which certificate may be given upon furnishing proof satisfactory to the director of ability to administer workers' compensation claims properly, and to pay workers' compensation claims that may become due to its employees. On or before March 31, 1979, a political subdivision of the state which, on December 31, 1978, was uninsured for its liability to pay compensation, shall file a properly completed and executed application for a certificate of consent to self-insure against workers' compensation claims. The certificate shall be issued and be subject to the provisions of Section 3702.

I am aware of the provisions of Labor Code section 3700 which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provision before commencing the performance of the work of this Contract.

_____

(Signature)

_____

(Print)

_____

(Date)

In accordance with Article 5 (commencing at section 1860), Chapter 1, Part 7, Division 2 of the Labor Code, the above certificate must be signed and submitted with the Contractor's bid.

NON-COLLUSION DECLARATION

The undersigned declares:

I am the _____ [Title] of _____ [Name of Company], the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____ [Date], at _____ [City], _____ [State].

Signed: _____

Typed Name: _____

BID GUARANTEE FORM

(Use only when not using a Bid Bond)

Accompanying this proposal is a cashier's check payable to the order of the Liberty Union High School District or a certified check payable to the order of the Liberty Union High School District in an amount equal to ten percent (10%) of the base bid and alternates ($_____).

The proceeds of this check shall become the property of said District, if, this proposal shall be accepted by the District through the District's Governing Board, and the undersigned fails to execute a Contract with and furnish the sureties required by the District within the required time; otherwise, said check is to be returned to the undersigned.

_____

Bidder

Note: Use this form, in lieu of Bid Bond form, when a cashier's check or certified check is accompanying the bid

BID BOND FORM

KNOW ALL MEN BY THESE PRESENT that we, the undersigned, (hereafter called "Principal"), and _____ (hereafter called "Surety"), are hereby held and firmly bound unto the Liberty Union High School District (hereafter called "District") in the sum of _____ ($_____) for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors, and assigns.

SIGNED this _____ day of _____, 20___.

The condition of the above obligation is such that whereas the Principal has submitted to the District a certain Bid, attached hereto and hereby made a part hereof, to enter into a Contract in writing for the construction of _____.

NOW, THEREFORE,

a. If said Bid is rejected, or

b. If said Bid is accepted and the Principal executes and delivers a Contract or the attached Agreement form within five (5) calendar days after acceptance (properly completed in accordance with said Bid), and furnishes bonds for his faithful performance of said Contract and for payment of all persons performing labor or furnishing materials in connection therewith,

Then this obligation shall be void; otherwise, the same shall remain in force and effect.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract, or the call for bids, or the work to be performed thereunder, or the specifications accompanying the same, shall in anyway affect its obligation under this bond, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of said Contract, or the call for bids, or the work, or to the specifications.

In the event suit is brought upon this bond by the District and judgment is recovered, the Surety shall pay all costs incurred by the District in such suit, including without limitation, attorneys' fees to be fixed by the court.

IN WITNESS WHEREOF, Principal and Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, on the day and year first set forth above.

(Corporate Seal)

By _____
Principal's Signature

_____
Typed or Printed Name

_____
Principal's Title

(Corporate Seal)

By _____
Surety's Signature

_____
Typed or Printed Name

_____
Title

(Attached Attorney in Fact Certificate)

_____
Surety's Name

_____
Surety's Address

_____
Surety's Phone Number

IMPORTANT:

Surety companies executing bonds must possess a certificate of authority from the California Insurance Commissioner authorizing them to write surety insurance defined in California Insurance Code section 105, and if the work or project is financed, in whole or in part, with federal, grant, or loan funds, it must also appear on the Treasury Department's most current list (Circular 570 as amended).

THIS IS A REQUIRED FORM.

Any claims under this bond may be addressed to:

(Name and Address of Surety)

_____

_____

_____

(Name and Address of agent or representative for
service of process in California if different from above)

_____

_____

_____

(Telephone Number of Surety and agent or
representative for service of process in California).

_____

_____

_____

REQUEST FOR SUBSTITUTION AT TIME OF BID

Pursuant to Public Contract Code section 3400, bidder submits the following request to Substitute with the bid that is submitted. I understand that if the request to substitute is not an "or equal" or is not accepted by District and I answer "no" I will not provide the specified item, then I will be held non-responsive and my bid will be rejected. With this understanding, I hereby request Substitution of the following articles, devices, equipment, products, materials, fixtures, patented processes, forms, methods, or types of construction:

	Specification Section	Specified Item	Requested Substituted Item	Contractor Agrees to Provide Specified Item if request to Substitute is Denied[1] (circle one)	District Decision (circle one)
1.				Yes No	Grant Deny
2.				Yes No	Grant Deny
3.				Yes No	Grant Deny
4.				Yes No	Grant Deny
5.				Yes No	Grant Deny
6.				Yes No	Grant Deny
7.				Yes No	Grant Deny
8.				Yes No	Grant Deny
9.				Yes No	Grant Deny
10.				Yes No	Grant Deny
11.				Yes No	Grant Deny
12.				Yes No	Grant Deny

This Request Form must be accompanied by evidence as to whether the proposed Substitution (1) is equal in quality, service, and ability to the Specified Item; (2) will entail no change in detail, construction, and scheduling of related work; (3) will be acceptable in consideration of the required design and artistic

[1] Bidder must state whether bidder will provide the Specified Item in the event the Substitution request is evaluate and denied. If bidder states that bidder will not provide the Specified Item the denial of a request to Substitute shall result in the rejection of the bidder as non-responsive. However, if bidder states that bidder will provide the Specified Item in the event that bidder's request for Substitution is denied, bidder shall execute the Agreement and provide the Specified Item(s). If bidder refuses to execute the Agreement due to the District's decision to require the Specified Item(s) at no additional cost, bidder's Bid Bond shall be forfeited.

effect; (4) will provide no cost disadvantage to the District; (5) will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts; (6) will require no change of the construction schedule or milestones for the Project; and, (7) Contractor agrees to pay for any DSA Fees or other Governmental Plan check costs associated with this Substitution Request. (See General Conditions Section 3.6)

The undersigned states that the following paragraphs are correct:

1. The proposed Substitution does not affect the dimensions shown on the Drawings.

2. The undersigned will pay for changes to the building design, including Architect, engineering, or other consultant design, detailing, DSA plan check or other governmental plan check costs, and construction costs caused by the requested substitution.

3. The proposed substitution will have no adverse effect on other trades, the Contract Time, or specified warranty requirements.

4. Maintenance and service parts will be available locally for the proposed substitution.

5. In order for the Architect to properly review the substitution request, within five (5) days following the opening of bids, the Contractor shall provide samples, test criteria, manufacturer information, and any other documents requested by Architect or Architect's engineers or consultants, including the submissions that would ordinarily be required under Article 3.7 for Shop Drawings along with a document which provides a side by side comparison of key characteristics and performance criteria (often known as a CSI side by side comparison chart).

6. If Substitution Request is accepted by the District, Contractor is still required to provide a Submittal for the substituted item pursuant to Article 3.7 and shall provide required Schedule information (including schedule fragnets, if applicable) for the substituted item as required under Article 8.3.2.1. The approval of the Architect, Engineer, or District of the substitution request does not mean that the Contractor is relieved of Contractor's responsibilities for Submittals, Shop Drawings, and schedules under Article 3.7 and 8.3.2 if the Contractor is awarded the Project.

Name of Bidder: _____

By: _____

District: _____

By: _____

ACKNOWLEDGMENT OF BIDDING PRACTICES REGARDING INDEMNITY FORM

TO: Liberty Union High School District

RE: Project Number: 2249.00

Construction Contract for: Gateway Program Portables

Please be advised that with respect to the above-referenced Project the undersigned Contractor on behalf of itself and all subcontractors hereby waives the benefits and protection of Labor Code section 3864, which provides:

> "If an action as provided in this chapter is prosecuted by the employee, the employer, or both jointly against the third person results in judgment against such third person, the employer shall have no liability to reimburse or hold such third person harmless on such judgment or settlement in the absence of a written agreement to do so executed prior to the injury."

This Agreement has been signed by an authorized representative of the contracting party and shall be binding upon its successors and assignees. The undersigned further agrees to promptly notify the District of any changes of ownership of the contracting party or any subcontractor while this Agreement is in force.

_____

Contracting Party

_____

Name of Agent/Title

DISABLED VETERAN BUSINESS ENTERPRISE (DVBE) PARTICIPATION STATEMENT

Each bidder must complete this form in order to comply with the Liberty Union High School District ("District") policy for participation of disabled veteran business enterprises (School District projects funded in whole or in part by the State of California pursuant to the Leroy F. Greene School Facilities Act of 1998. (Education Code §17070.10, *et seq*.)

Project Name: Gateway Program Portables

Bid No.: 2249.00

DSA No.: 01-121939

The undersigned, on behalf of the Contractor named below, certifies that the Contractor has made reasonable efforts to secure participation by DVBE in the Contract to be awarded for the above-referenced Bid No., including participation by DVBE subcontractors and/or material suppliers. **Check only one of the following**:

- ❑ The Contractor was unable after reasonable efforts to secure DVBE participation in the Contract for the above-referenced Project/Bid No. However, the Contractor will use DVBE services if the opportunity arises at any time during construction of the Project. Upon completion of the Project, the Contractor will report to the District the total dollar amount of DVBE participation in any Contract awarded to Contractor, and in any change orders, for the above-referenced Project.

- ❑ The Contractor has secured DVBE participation in the Contract for the above referenced Project/Bid No., and anticipates that such DVBE participation will equal approximately _____dollars ($_____), which represents approximately _____percent (___%) of the total Contract for such Project. Upon completion of the Project, Contractor will report to the District the actual total dollar amount of DVBE participation in the Contract awarded to Contractor, and in any change orders, for such Project

Company: _____

Name: _____

Title: _____

Signature: _____

Date: _____

CONTRACTOR'S CERTIFICATE REGARDING DRUG-FREE WORKPLACE

This Drug-Free Workplace Certification form is required from all successful bidders pursuant to the requirements mandated by Government Code section 8350 et seq., the Drug-Free Workplace Act of 1990. The Drug-Free Workplace Act of 1990 requires that every person or organization awarded a contract or grant for the procurement of any property or service from any State agency must certify that it will provide a drug-free workplace by performing certain specified acts. In addition, the Act provides that each contract or grant awarded by a State agency may be subject to suspension of payments or termination of the contract or grant, and the Contractor or grantee may be subject to debarment from future contracting, if the contracting agency determines that specified acts have occurred.

Pursuant to Government Code section 8355, every person or organization awarded a contract or grant from a State agency shall certify that it will provide a drug-free workplace by doing all of the following:

1. Publishing a statement, notifying employees that the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited in the person's or organization's workplace, and specifying actions which will be taken against employees for violations of the prohibition.

2. Establishing a drug-free awareness program to inform employees about all of the following:

   a. The dangers of drug abuse in the workplace;
   b. The person's or organization's policy of maintaining a drug-free workplace;
   c. The availability of drug counseling, rehabilitation and employee-assistance programs; and
   d. The penalties that may be imposed upon employees for drug abuse violations;

3. Requiring that each employee engaged in the performance of the contract or grant be given a copy of the statement required by subdivision (a) and that, as a condition of employment on the contract or grant, the employee agrees to abide by the terms of the statement.

I, the undersigned, agree to fulfill the terms and requirements of Government Code section 8355 listed above and will (a) publish a statement notifying employees concerning the prohibition of controlled substance at the workplace, (b) establish a drug-free awareness program, and (c) require each employee engaged in the performance of the contact be given a copy of the statement required by section 8355(a) and require such employee agree to abide by the terms of that statement.

I also understand that if the Liberty Union High School District determines that I have either (a) made a false certification herein, or (b) violated this certification by failing to carry out the requirements of Section 8355, that the contract awarded herein is subject to termination, suspension of payments, or both. I further understand that, should I violate the terms of the Drug-Free Workplace Act of 1990, I may be subject to debarment in accordance with the requirements of Section 8350 et seq.

I acknowledge that I am aware of the provisions of Government Code section 8350 et seq. and hereby certify that I will adhere to the requirements of the Drug-Free Workplace Act of 1990.

DATE:_____

_____
CONTRACTOR

By:_____
Signature

CONTRACTOR'S CERTIFICATE REGARDING ALCOHOLIC BEVERAGE AND TOBACCO-FREE CAMPUS POLICY

The Contractor agrees that it will abide by and implement the District's Alcoholic Beverage and Tobacco-Free Campus Policy, which prohibits the use of alcoholic beverages and tobacco products, of any kind and at any time, in District-owned or leased buildings, on District property and in District vehicles. The Contractor shall procure signs stating "ALCOHOLIC BEVERAGE AND TOBACCO USE IS PROHIBITED" and shall ensure that these signs are prominently displayed in all entrances to school property at all times.

DATE:_____

_____
CONTRACTOR

By:_____
Signature

IRAN CONTRACTING ACT CERTIFICATION
OF ELIGIBILITY TO PROPOSAL FOR
CONTRACTS OF $ 1 MILLION OR MORE
(Public Contract Code sections 2202-2208)

Pursuant to Public Contract Code 2204. (a) A public entity shall require a person that submits a proposal or proposal to, or otherwise proposes to enter into or renew a contract with, a public entity with respect to a contract for goods or services of one million dollars ($1,000,000) or more to certify, at the time the proposal is submitted or the contract is renewed, that the person is not identified on a list created pursuant to subdivision (b) of Section 2203 as a person engaging in investment activities in Iran described in subdivision (a) of Section 2202.5, or as a person described in subdivision (b) of Section 2202.5, as applicable. A state agency shall submit the certification information to the Department of General Services.

To comply with this requirement, please insert your Contractor or financial institution name and Federal ID Number (if available) and complete **one** of the options below. Please note: California law establishes penalties for providing false certifications, including civil penalties equal to the greater of $250,000 or twice the amount of the contract for which the false certification was made; contract termination; and three-year ineligibility to proposal on contracts. (Public Contract Code section 2205.)

OPTION #1 – CERTIFICATION
I, the official named below, certify I am duly authorized to execute this certification on behalf of the Contractor/financial institution identified below, and the Contractor/financial institution identified below is not on the current list of persons engaged in investment activities in Iran created by DGS and is not a financial institution extending twenty million dollars ($20,000,000) or more in credit to another person/vendor, for 45 days or more, if that other person/vendor will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS.

Contractor Name/Financial Institution	*Federal ID Number (or n/a)*
By (Authorized Signature)	
Printed Name and Title of Person Signing	
Date Executed	*Executed in*

OPTION #2 – EXEMPTION

Pursuant to Public Contract Code sections 2203(c) and (d), a public entity may permit a contractor/financial institution engaged in investment activities in Iran, on a case-by-case basis, to be eligible for, or to proposal on, submit a proposal for, or enters into or renews, a contract for goods and services.

If you have obtained an exemption from the certification requirement under the Iran Contracting Act, please fill out the information below, and attach documentation demonstrating the exemption approval.

Contractor Name/Financial Institution	*Federal ID Number (or n/a)*
By (Authorized Signature)	
Printed Name and Title of Person Signing	*Date Executed*

FLEET COMPLIANCE CERTIFICATION

Bidder hereby acknowledges that they have reviewed the California Air Resources Board's policies, rules and regulations and are familiar with the requirements of Title 13, California Code of Regulations, Division 3, Chapter 9, effective on January 1, 2024 (the "Regulation"). Bidder hereby certifies, subject to penalty for perjury, that the option checked below relating to the Bidder's fleet, and/or that of their subcontractor(s) ("Fleet") is true and correct:

- ☐ The Fleet is subject to the requirements of the Regulation, and the appropriate Certificate(s) of Reported Compliance have been attached hereto.

- ☐ The Fleet is exempt from the Regulation under section 2449.1(f)(2), and a signed description of the subject vehicles, and reasoning for exemption has been attached hereto.

- ☐ Bidder and/or their subcontractor is unable to procure R99 or R100 renewable diesel fuel as defined in the Regulation pursuant to section 2449.1(f)(3). Bidder shall keep detailed records describing the normal refueling methods, their attempts to procure renewable diesel fuel and proof that shows they were not able to procure renewable diesel (i.e. third party correspondence or vendor bids).

- ☐ The Fleet is exempt from the requirements of the Regulation pursuant to section 2449(i)(4) because this Project has been deemed an Emergency, as defined under section 2449(c)(18). Bidder shall only operate the exempted vehicles in the emergency situation and records of the exempted vehicles must be maintained, pursuant to section 2449(i)(4).

- ☐ The Fleet does not fall under the Regulation or are otherwise exempted and a detailed reasoning is attached hereto.

Name of Bidder: _____

Signature: _____

Name: _____

Title: _____

Date: _____

[End of Bid Documents to be Submitted with Bid]

AGREEMENT FORM

THIS AGREEMENT, entered into this___ day of_____, 20__ in the County of Contra Costa, State of California, by and between the Liberty Union High School District, hereinafter called the "District", and _____, hereinafter called the "Contractor".

WITNESSETH that the District and the Contractor for the consideration stated herein agree as follows:

ARTICLE 1 - SCOPE OF WORK: The Contractor shall furnish all labor, materials, equipment, tools, and utility and transportation services, and perform and complete all work required in connection with Gateway Program Portables ("Project") in strict accordance with the Contract Documents enumerated in Article 7 below. The Contractor shall be liable to the District for any damages arising as a result of a failure to comply with that obligation, and the Contractor shall not be excused with respect to any failure to so comply by an act or omission of the Architect, Engineer, Inspector, Division of the State Architect (DSA), or representative of any of them, unless such act or omission actually prevents the Contractor from fully complying with the Contract Documents and the Contractor protests, in accordance with the Contract Documents, that the act or omission is preventing the Contractor from fully complying with the Contract Documents. Such protest shall not be effective unless reduced to writing and filed with the District office within seven (7) days of the date of occurrence of such act or omission preventing the Contractor from fully complying with the Contract Documents.

ARTICLE 2 - TIME OF COMPLETION: The District may give notice to proceed within ninety (90) days of the award of the bid by the District. Once the Contractor has received a notice to proceed, the Contractor shall reach Substantial Completion (See Article 1.1.46) of the Work within ***sixty seven (67)*** ~~seventy three (73)~~ calendar days from receipt of the Notice to Proceed. This shall be called Contract Time. (See Article 8.1.1). It is expressly understood that time is of the essence.

Contractor has thoroughly studied the Project, the labor market, and the supply chain market for materials and equipment that are necessary to complete the Project, and has satisfied itself that the time period for this Project was adequate for the timely and proper completion of the Project within each milestone and within the Contract time. Further, Contractor has included in the analysis of the time required for this Project, items set forth in General Conditions Article 8.3.2.1, Submittal Schedules, Rain Day Float, and Governmental Delay Float.

In the event that the District desires to postpone giving the notice to proceed beyond this ninety (90) day period, it is expressly understood that with reasonable notice to the Contractor, giving the notice to proceed may be postponed by the District. It is further expressly understood by the Contractor, that the Contractor shall not be entitled to any claim of additional compensation as a result of the District's postponement of giving the notice to proceed.

If the Contractor believes that a postponement will cause hardship to it, the Contractor may terminate the Contract with written notice to the District within ten (10) days after receipt by the Contractor of the District's notice of postponement. It is further understood by the Contractor that in the event that the Contractor terminates the Contract as a result of postponement by the District, the District shall only be obligated to pay the Contractor for the work performed by the Contractor at the time of notification of postponement. Should the Contractor terminate the Contract as a result of a notice of postponement, the District shall have the authority to award the Contract to the next lowest responsible bidder.

ARTICLE 3 - LIQUIDATED DAMAGES: It being impracticable and infeasible to determine the amount of actual damage, it is agreed that the Contractor will pay the District the sum of two thousand dollars ***($2,000)*** ~~($1,000.00)~~ per calendar day for each and every day of delay beyond the Contract Time set forth in Article 2 of this Agreement (inclusive of Milestones that are critical on the critical path or noted as critical to the District) as liquidated damages and not as a penalty or forfeiture. In the event Liquidated Damages are not paid, the Contractor further agrees that the District may deduct such amount thereof from any money due or that may become due the Contractor under the Contract (See Article 9.6 and 2.2 of the General Conditions).

ARTICLE 4 - CONTRACT PRICE: The District shall pay to the Contractor as full consideration for the faithful performance of the Contract, subject to any additions or deductions as provided in the Contract Documents, the sum of _____ DOLLARS ($_____), said sum being the total amount stipulated in the Bid Contractor submitted. Payment shall be made as set forth in the General Conditions.

Should any Change Order result in an increase in the Contract Price, the cost of such Change Order shall be agreed to in advance by the Contractor and the District, subject to the monetary limitations set forth in Public Contract Code section 20118.4. In the event that the Contractor proceeds with a Change in work without an agreement between the District and Contractor regarding the cost of a Change Order, the Contractor waives any Claim of additional compensation for such additional work. In no event shall the Contractor be entitled to increase the Contract Price set forth above on account of any external factors including, but not limited to, inflation, labor shortages, and/or supply chain issues/shortages.

ARTICLE 5 - HOLD HARMLESS AGREEMENT: Contractor shall defend, indemnify and hold harmless District, Architect, Inspector, the State of California and their officers, employees, agents and independent contractors from any and all liabilities, claims, actions, liens, judgments, demands, damages, losses, costs or expenses of any kind arising from death, personal injury, property damage or other cause based or asserted upon any act, omission, or breach connected with or arising from the progress of Work or performance of service under this Agreement or the Contract Documents. As part of this indemnity, Contractor shall protect and defend, at its own expense, District, Architect, Construction Manager, Inspector, the State of California and their officers, employees, agents and independent contractors from any legal action including attorney's fees or other proceeding based upon such act, omission, breach or as otherwise required by this Article.

Furthermore, Contractor agrees to and does hereby defend, indemnify and hold harmless District, Architect, Construction Manager, Inspector, the State of California and their officers, employees, agents and independent contractors from every claim or demand made, and every liability, loss, damage, expense or attorney's fees of any nature whatsoever, which may be incurred by reason of:

(a) Liability for (1) death or bodily injury to persons; (2) damage or injury to, loss (including theft), or loss of use of, any property; (3) any failure or alleged failure to comply with any provision of law or the Contract Documents; or (4) any other loss, damage or expense, sustained by any person, firm or corporation or in connection with the Work called for in this Agreement or the Contract Documents, except for liability resulting from the sole or active negligence, or the willful misconduct of the District.

(b) Any bodily injury to or death of persons or damage to property caused by any act, omission or breach of Contractor or any person, firm or corporation employed by Contractor, either directly or by independent contract, including all damages or injury to or death of persons, loss (including theft) or loss of use of any property, sustained by any person, firm or corporation, including the District, arising out of

or in any way connected with Work covered by this Agreement or the Contract Documents, whether said injury or damage occurs either on or off District property, but not for any loss, injury, death or damages caused by the sole or active negligence or willful misconduct of the District.

(c) Any dispute between Contractor and Contractor's subcontractors/suppliers/Sureties, including, but not limited to, any failure or alleged failure of the Contractor (or any person hired or employed directly or indirectly by the Contractor) to pay any Subcontractor or Materialman of any tier or any other person employed in connection with the Work and/or filing of any stop notice or mechanic's lien claims.

(d) Any claims, allegations, penalties, assessments, or liabilities to the extent caused by the Contractor's failure or the failure of any Subcontractor of any tier, to fully comply with the DIR registration requirements under Labor Code section 1725.5 at all times during the performance of any Work on the Project and shall reimburse the District for any penalties assessed against the District arising from any failure by the Contractor or any Subcontractor of any tier from complying with Labor Code sections 1725.5 and 1771.1. Nothing in this paragraph, however, shall require the Contractor or any Subcontractor to be liable to the District or indemnify the District for any penalties caused by the District in accordance with Labor Code section 1773.3 (g).

Contractor, at its own expense, cost, and risk, shall defend, with counsel of the District's choosing, any and all claims, actions, suits, or other proceedings that may be brought or instituted against the District, its officers, agents or employees, on account of or founded upon any cause, damage, or injury identified herein Article 5 and shall pay or satisfy any judgment that may be rendered against the District, its officers, agents or employees in any action, suit or other proceedings as a result thereof.

The Contractor's and Subcontractors' obligation to defend, indemnify and hold harmless the Owner, Architect, Inspector, the State of California and their officers, employees, agents and independent contractors hereunder shall include, without limitation, any and all claims, damages, and costs for the following: (1) any damages or injury to or death of any person, and damage or injury to, loss (including theft), or loss of use of, any property; (2) breach of any warranty, express or implied; (3) failure of the Contractor or Subcontractors to comply with any applicable governmental law, rule, regulation, or other requirement; (4) products installed in or used in connection with the Work; and (5) any claims of violation of the Americans with Disabilities Act ("ADA").

Contractor shall reimburse Owner, Architect, Inspector, the State of California and their officers, employees, agents and independent contractors for any and all legal expenses and costs incurred by each of them in connection therewith or in enforcing the indemnity herein provided. The only limitations on this provision shall be those imposed by Civil Code Section 2782. Such indemnification shall extend to all claims, demands, or liabilities occurring after completion of the Project as well as during the progress of the Work.

This Hold Harmless Agreement shall survive termination of this Agreement, for any reason whatsoever, and binds each party's legal representatives, successors, and assigns.

ARTICLE 6 - PROVISIONS REQUIRED BY LAW: Each and every provision of law and clause required to be inserted in this Contract shall be deemed to be inserted herein, and this Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted or is not inserted correctly, then upon application of either party the Contract shall forthwith be physically amended to make such insertion or correction.

ARTICLE 7 - COMPONENT PARTS OF THE CONTRACT: The Contract entered into by this Agreement consists of the following Contract Documents, all of which are component parts of the Contract as if herein set out in full or attached hereto.

Notice Inviting Bids
Instructions to Bidders
Designation of Subcontractors
Non-Collusion Declaration
Bid Guarantee Form
Bid Bond
Bid Form
Contractor's Certificate Regarding Worker's Compensation
Acknowledgment of Bidding Practices Regarding Indemnity
DVBE Participation Statement and Close-Out Forms
Agreement Form
Payment Bond
Performance Bond
Guarantee
Escrow Agreement for Security Deposit In Lieu of Retention
Workers' Compensation/Employers Liability Endorsement
General Liability Endorsement
Automobile Liability Endorsement
Contractor's Certificate Regarding Drug-Free Workplace
Contractor's Certificate Regarding Alcohol and Tobacco
Iran Contracting Act Certification Form
Fleet Compliance Certification Form
Contractor's Certificate Regarding Background Checks
General Conditions
Supplementary and Special Conditions
Specifications
All ***Bid Clarifications*** ~~Addenda~~ as Issued
Drawings/Plans
Substitution Request Form
Requirements, Reports and/or any other Documents in the Project Manual or Other Documents Issued to Bidders

All of the above named Contract Documents are intended to be complementary. Work required by one of the above named Contract Documents and not by others shall be done as if required by all.

ARTICLE 8 - PREVAILING WAGES: Wage rates for this Project shall be in accordance with the general prevailing rate of holiday and overtime work in the locality in which the work is to be performed for each craft, classification, or type of work needed to execute the Contract as determined by the Director of the Department of Industrial Relations. Copies of schedules of rates so determined by the Director of the Department of Industrial Relations are on file at the administrative office of the District and are also available from the Director of the Department of Industrial Relations. Monitoring and enforcement of the prevailing wage laws and related requirements will be performed by the Labor Commissioner/ Department of Labor Standards Enforcement (DLSE).

The following are hereby referenced and made a part of this Agreement and Contractor stipulates to the provisions contained therein.

1. Chapter 1 of Part 7 of Division 2 of the Labor Code (Section 1720 et seq.)

2. California Code of Regulations, Title 8, Chapter 8, Subchapters 3 through 6 (Section 16000 et seq.)

ARTICLE 9 - RECORD AUDIT: In accordance with Government Code section 8546.7(and Davis Bacon, if applicable) and Article 13.11 of the General Conditions, records of both the District and the Contractor shall be subject to examination and audit for a period of five (5) years after a Final Retention Payment or the Recording of a Notice of Completion, whichever occurs first.

ARTICLE 10 - CONTRACTOR'S LICENSE: The Contractor must possess throughout the Project a ***Class A and/or Class B*** ~~Class B~~ Contractor's License, issued by the State of California, which must be current and in good standing.

IN WITNESS WHEREOF, this Agreement has been duly executed by the above named parties, on the day and year first above written.

DISTRICT:	CONTRACTOR:
_____	_____
Typed or Printed Name	Typed or Printed Name
_____	_____
Title	Title
_____	_____
Signature	Signature
Dated: _____	Dated: _____
	_____
	Type or Printed Name
	_____
	Title (Authorized Officers or Agents)
	_____
	Signature
	(CORPORATE SEAL)

PAYMENT BOND

(CALIFORNIA PUBLIC WORK)

KNOW ALL MEN BY THESE PRESENTS:

THAT WHEREAS, the LIBERTY UNION HIGH SCHOOL DISTRICT (sometimes referred to hereinafter as "Obligee") has awarded to _____ (hereinafter designated as the "Principal" or "Contractor"), an agreement for the work described as follows: GATEWAY PROGRAM PORTABLES (hereinafter referred to as the "Public Work"); and

WHEREAS, said Contractor is required to furnish a bond in connection with said Contract, and pursuant to California Civil Code section 9550;

NOW, THEREFORE, We, _____, the undersigned Contractor, as Principal; and _____, a corporation organized and existing under the laws of the State of , and duly authorized to transact business under the laws of the State of California, as Surety, are held and firmly bound unto the LIBERTY UNION HIGH SCHOOL DISTRICT and to any and all persons, companies, or corporations entitled by law to file stop notices under California Civil Code section 9100, or any person, company, or corporation entitled to make a claim on this bond, in the sum of _____ Dollars ($_____), such sum being not less than one hundred percent (100%) of the total amount payable by said Obligee under the terms of said Contract, for which payment will and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if said Principal, its heirs, executors, administrators, successors, or assigns, or subcontractor, shall fail to pay any person or persons named in Civil Code section 9100; or fail to pay for any materials, provisions, or other supplies, used in, upon, for, or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or for amounts due under the Unemployment Insurance Code, with respect to work or labor thereon of any kind; or shall fail to deduct, withhold, and pay over to the Employment Development Department, any amounts required to be deducted, withheld, and paid over by Unemployment Insurance Code section 13020 with respect to work and labor thereon of any kind, then said Surety will pay for the same, in an amount not exceeding the amount herein above set forth, and in the event suit is brought upon this bond, also will pay such reasonable attorneys' fees as shall be fixed by the court, awarded and taxed as provided in California Civil Code section 9550 et seq.

This bond shall inure to the benefit of any person named in Civil Code section 9100 giving such person or his/her assigns a right of action in any suit brought upon this bond.

It is further stipulated and agreed that the Surety of this bond shall not be exonerated or released from the obligation of the bond by any change, extension of time for performance, addition, alteration or modification in, to, or of any contract, plans, or specifications, or agreement pertaining or relating to any scheme or work of improvement herein above described; or pertaining or relating to the furnishing of labor, materials, or equipment therefor; nor by any change or modification of any terms of payment or extension of time for payment pertaining or relating to any scheme or work of improvement herein above described; nor by any rescission or attempted rescission of the contract, agreement or bond; nor by any conditions

precedent or subsequent in the bond attempting to limit the right of recovery of claimants otherwise entitled to recover under any such contract or agreement or under the bond; nor by any fraud practiced by any person other than the claimant seeking to recover on the bond; and that this bond be construed most strongly against the Surety and in favor of all persons for whose benefit such bond is given; and under no circumstances shall the Surety be released from liability to those for whose benefit such bond has been given, by reason of any breach of contract between the Obligee and the Contractor or on the part of any obligee named in such bond; that the sole condition of recovery shall be that the claimant is a person described in California Civil Code section 9100, and who has not been paid the full amount of his or her claim; and that the Surety does hereby waive notice of any such change, extension of time, addition, alteration or modification herein mentioned.

IN WITNESS WHEREOF this instrument has been duly executed by the Principal and Surety above named, on the_____ day of _____, 20___.

PRINCIPAL/CONTRACTOR:

_____

By: _____

SURETY:

_____

By: _____
Attorney-in-Fact

IMPORTANT: THIS IS A REQUIRED FORM.

Surety companies executing bonds must possess a certificate of authority from the California Insurance Commissioner authorizing them to write surety insurance defined in California Insurance Code section 105, and if the work or project is financed, in whole or in part, with federal, grant or loan funds, Surety's name must also appear on the Treasury Department's most current list (Circular 570 as amended).

Any claims under this bond may be addressed to:

(Name and Address of Surety)	(Name and Address of agent or representative for service for service of process in California)
_____	_____
_____	_____
Telephone: _____	Telephone: _____

A notary public or other office completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA)
) ss.
COUNTY OF)

On _____, before me, _____, personally appeared _____, who proved on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies) as the Attorney-in-Fact of _____ (Surety) and acknowledged to me that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

_____ (SEAL)
Notary Public in and for said State

Commission expires: _____

NOTE: A copy of the power-of-attorney to local representatives of the bonding company must be attached hereto.

PERFORMANCE BOND

(CALIFORNIA PUBLIC WORK)

KNOW ALL MEN BY THESE PRESENTS:

THAT WHEREAS, the LIBERTY UNION HIGH SCHOOL DISTRICT (sometimes referred to hereinafter as "Obligee") has awarded to _____ (hereinafter designated as the "Principal" or "Contractor"), an agreement for the work described as follows: GATEWAY PROGRAM PORTABLES (hereinafter referred to as the "Public Work"); and

WHEREAS, the work to be performed by the Contractor is more particularly set forth in that certain contract for said Public Work dated _____ _____, (hereinafter referred to as the "Contract"), which Contract is incorporated herein by this reference; and

WHEREAS, the Contractor is required by said Contract to perform the terms thereof and to provide a bond both for the performance and guaranty thereof.

NOW, THEREFORE, we, _____, the undersigned Contractor, as Principal, and _____, a corporation organized and existing under the laws of the State of California, and duly authorized to transact business under the laws of the State of California, as Surety, are held and firmly bound unto the LIBERTY UNION HIGH SCHOOL DISTRICT in the sum of _____ Dollars ($_____), said sum being not less than one hundred percent (100%) of the total amount payable by said Obligee under the terms of said Contract, for which amount well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT, if the bounded Contractor, his or her heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions, and agreements in said Contract and any alteration thereof made as therein provided, on his or her part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their intent and meaning; and shall faithfully fulfill guarantees of all materials and workmanship; and indemnify, defend and save harmless the Obligee, its officers and agents, as stipulated in said Contract, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

The Surety, for value received, hereby stipulates and agrees that it shall not be exonerated or released from the obligation of this bond (either by total exoneration or pro tanto) by any change, extension of time, alteration in or addition to the terms of the contract or to the work to be performed there under or the specifications accompanying the same, nor by any change or modification to any terms of payment or extension of time for any payment pertaining or relating to any scheme of work of improvement under the contract. Surety also stipulates and agrees that it shall not be exonerated or released from the obligation of this bond (either by total exoneration or pro tanto) by any overpayment or underpayment by the Obligee that is based upon estimates approved by the Architect. The Surety stipulates and agrees that none of the aforementioned changes, modifications, alterations, additions, extension of time or actions shall in any way affect its obligation on this bond, and it does hereby waive notice of any such changes, modifications,

alterations, additions or extension of time to the terms of the contract, or to the work, or the specifications as well notice of any other actions that result in the foregoing.

Whenever Principal shall be, and is declared by the Obligee to be, in default under the Contract, the Surety shall promptly either remedy the default, or shall promptly take over and complete the Contract through its agents or independent contractors, subject to acceptance and approval of such agents or independent contractors by Obligee as hereinafter set forth, in accordance with its terms and conditions and to pay and perform all obligations of Principal under the Contract, including, without limitation, all obligations with respect to warranties, guarantees and the payment of Liquidated Damages; or, at Obligee's sole discretion and election, Surety shall obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Obligee of the lowest responsible bidder, arrange for a contract between such bidder and the Obligee and make available as Work progresses (even though there should be a default or succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the "balance of the Contract Price" (as hereinafter defined), and to pay and perform all obligations of Principal under the Contract, including, without limitation, all obligations with respect to warranties, guarantees and the payment of Liquidated Damages. The term "balance of the Contract Price," as used in this paragraph, shall mean the total amount payable to Principal by the Obligee under the Contract and any modifications thereto, less the amount previously paid by the Obligee to the Principal, less any withholdings by the Obligee allowed under the Contract. Obligee shall not be required or obligated to accept a tender of a completion contractor from the Surety.

Surety expressly agrees that the Obligee may reject any agent or contractor which may be proposed by Surety in fulfillment of its obligations in the event of default by the Principal. Unless otherwise agreed by Obligee, in its sole discretion, Surety shall not utilize Principal in completing the Contract nor shall Surety accept a bid from Principal for completion of the work in the event of default by the Principal.

No final settlement between the Obligee and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

The Surety shall remain responsible and liable for all patent and latent defects that arise out of or relate to the Contractor's failure and/or inability to properly complete the Public Work as required by the Contract and the Contract Documents. The obligation of the Surety hereunder shall continue so long as any obligation of the Contractor remains.

Contractor and Surety agree that if the Obligee is required to engage the services of an attorney in connection with enforcement of the bond, Contractor and Surety shall pay Obligee's reasonable attorneys' fees incurred, with or without suit, in addition to the above sum.

In the event suit is brought upon this bond by the Obligee and judgment is recovered, the Surety shall pay all costs incurred by the Obligee in such suit, including reasonable attorneys' fees to be fixed by the Court.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____, 20___.

PRINCIPAL/CONTRACTOR:

_____

By: _____

SURETY:

_____

By: _____
Attorney-in-Fact

The rate of premium on this bond is _____ per thousand.

The total amount of premium charged: $_____ (This must be filled in by a corporate surety).

IMPORTANT: THIS IS A REQUIRED FORM.

Surety companies executing bonds must possess a certificate of authority from the California Insurance Commissioner authorizing them to write surety insurance defined in California Insurance Code section 105, and if the work or project is financed, in whole or in part, with federal, grant or loan funds, Surety's name must also appear on the Treasury Department's most current list (Circular 570 as amended).

Any claims under this bond may be addressed to:

(Name and Address of Surety)	(Name and Address of agent or representative for service for service of process in California)
_____	_____
_____	_____
Telephone:_____	Telephone: _____

A notary public or other office completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA)
) ss.
COUNTY OF)

On _____, before me, _____, personally appeared _____, who proved on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies) as the Attorney-in-Fact of _____ (Surety) and acknowledged to me that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

_____ (SEAL)
Notary Public in and for said State

Commission expires:_____

NOTE: A copy of the power-of-attorney to local representatives of the bonding company must be attached hereto.

GUARANTEE

Guarantee for _____. We hereby guarantee that the _____, which we have installed in _____ _____ has been done in accordance with the Contract Documents, including without limitation, the drawings and specifications, and that the work as installed will fulfill the requirements included in the bid documents. The undersigned and its surety agrees to repair or replace any or all such work, together with any other adjacent work, which may be displaced in connection with such replacement, that may prove to be defective in workmanship or material within a period of one (1) year from the date of the Notice of Completion of the above-mentioned structure by the Liberty Union High School District, ordinary wear and tear and unusual abuse or neglect excepted.

In the event the undersigned or its surety fails to comply with the above-mentioned conditions within a reasonable period of time, as determined by the District, but not later than ten (10) days after being notified in writing by the District or within forty eight (48) hours in the case of an emergency or urgent matter, the undersigned and its surety authorizes the District to proceed to have said defects repaired and made good at the expense of the undersigned and its surety, who will pay the costs and charges therefor upon demand. The undersigned and its surety shall be jointly and severally liable for any costs arising from the District's enforcement of this Guarantee.

	Countersigned
_____	_____
(Proper Name)	(Proper Name)
By: _____	By: _____
_____	_____
(Signature of Subcontractor or Contractor)	(Signature of General Contractor if for Subcontractor)

Representatives to be contacted for service:

Name: _____

Address: _____

_____

Phone Number: _____

ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION

This Escrow Agreement is made and entered into by and between the Liberty Union High School District, 20 Oak Street, Brentwood, CA 94513 hereinafter called "Owner", and _____ whose address is _____, hereinafter called "Contractor", and _____ whose address is _____, hereinafter called "Escrow Agent".

For the consideration hereinafter set forth, the Owner, Contractor and Escrow Agent agree as follows:

1. Pursuant to Section 22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for Retention earnings required to be withheld by Owner pursuant to the Construction Contract entered into between the Owner and Contractor for Gateway Program Portables in the amount of _____ dated _____ (hereinafter referred to as the "Contract"). Alternatively, on written request of the Contractor, the Owner shall make payments of the Retention earnings directly to the escrow agent. When Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the Owner within ten (10) days of deposit. The market value of the securities at the time of the substitution shall be at least equal to the cash amount then required to be withheld as Retention under the terms of the Contract between the Owner and Contractor. Securities shall be held in the name of the Owner, and shall designate the Contractor as beneficial owner.

2. The Owner shall make progress payments to the Contractor for such funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that the Escrow Agent holds securities in the form and amount specified above.

3. When the Owner makes payments of Retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until such time as the escrow created under this Contract is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this Agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Owner pays the Escrow Agent directly.

4. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account and all expenses of the Owner. These expenses and payment terms shall be determined by the Owner, Contractor, and Escrow Agent.

5. The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the Owner.

6. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from the Owner to the Escrow Agent that Owner consents to the withdrawal of the amount sought to be withdrawn by Contractor.

7. The Owner shall have a right to draw upon the securities in the event of default by the Contractor. Upon seven (7) days' written notice to the Escrow Agent from the Owner of the notice of default under Article 2.2, Article 9.6 or Article 14, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the Owner.

8. Upon receipt of written notification from the Owner certifying that the Contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payment of fees and charges.

9. Escrow Agent shall rely on the written notifications from the Owner and the Contractor pursuant to Sections (5) to (8), inclusive, of this Agreement and the Owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest as set forth above.

10. The names of the persons who are authorized to give written notice or to receive written notice on behalf of the Owner and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

On behalf of Owner:

_____

Title

_____

Name

_____

Signature

_____

Address

On behalf of Contractor:

_____

Title

_____

Name

_____

Signature

_____

Address

On behalf of Agent:

Title

Name

Signature

Address

At the time the Escrow Account is opened, the Owner and Contractor shall deliver to the Escrow Agent a fully executed counterpart of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date set forth above.

OWNER	CONTRACTOR
Title	Title
Name	Name
Signature	Signature

INSURANCE DOCUMENTS & ENDORSEMENTS

The OCIP insurance endorsements and documents must be provided to the Liberty Union High School District within five (5) calendar days after receipt of notification of award. If the apparent low bidder fails to provide the documents required below, the District may award the Contract to the next lowest responsible and responsive bidder or release all bidders, and the bidder's bid security will be forfeited. All insurance provided by the bidder shall fully comply with the requirements set forth in Article 11 of the General Conditions.

DISABLED VETERAN BUSINESS ENTERPRISE (DVBE) CONTRACTOR CLOSE-OUT STATEMENT

The Contractor shall complete this form, as a condition to Final Payment, for purposes of reporting participation by Disabled Veteran Business Enterprises (DVBE) in the Contract for the Project/Bid No. specified below.

Project Name: Gateway Program Portables

Bid No.: 2249.00

DSA No.: 01-121939

Name	Address/Phone	Category of Work*	$ Amount of Contract

* Categories of work include: (1) construction services (specify services that DVBE will provide); (2) architecture and engineering services; (3) procurement of materials, supplies and equipment; and (4) information technology.

The undersigned, on behalf of the Contractor, certifies that DVBE participation on the Contract for Bid No. _____ equaled _____ dollars ($_____), which represents approximately _____ percent (__%) of the total Contract price including change orders for the Project.

Company: _____

Name: _____

Title: _____

Signature: _____

Date: _____

CONTRACTOR CERTIFICATION REGARDING BACKGROUND CHECKS

(Modernization Projects)

_____ certifies that it has performed one of the following:
[Name of contractor/consultant]

☐ Pursuant to Education Code section 45125.1, Contractor has conducted criminal background checks, through the California Department of Justice, of all employees providing services to the Liberty Union High School District, pursuant to the Contract/Purchase Order dated _____, and Contractor hereby certifies that none of the employees have been convicted of, or have an arrest pending final adjudication for, any serious or violent felonies, as specified in Penal Code sections 1192.7(c) and 667.5(c), respectively.

As further required by Education Code section 45125.1, attached hereto as Attachment "A" is a list of the names of the employees of the undersigned who may come in contact with pupils.

OR

☐ Pursuant to Education Code section 45125.2, Contractor will ensure the safety of pupils by one or more of the following methods:

☐ 1. The installation of a physical barrier at the worksite to limit contact with pupils.

☐ 2. Continual supervision and monitoring of all employees of the entity by an employee of the entity whom the Department of Justice has ascertained has not been convicted of a violent or serious felony.

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct.

Date_____, 20___

_____
[Name of Contractor/Consultant]

_____

By its:_____

ATTACHMENT A:

CONTRACTOR CERTIFICATION REGARDING BACKGROUND CHECKS

(INSERT NAMES OF EMPLOYEES WHO MAY COME IN CONTACT WITH PUPILS)

ARTICLE 1
DEFINITIONS

1.1 BASIC DEFINITIONS

NOTE: The following shall not be construed as a comprehensive list of all definitions in the Contract Documents and there may be other definitions set forth in the Contract Documents. Additionally, any references to any DSA forms, documents or requirements shall be construed to incorporate any updates, supplements, or additions. The Contractor shall be required to meet the latest DSA requirements applicable to the Project.

1.1.1 Action of the Governing Board is a vote of a majority of the District's Governing Board.

1.1.2 Approval means written authorization through action of the Governing Board.

1.1.3 Architect means the architect, engineer, or other design professional engaged by the District to design and perform general observation of the work of construction and interpret the Drawings and Specifications for the Project. (See ARTICLE 4)

1.1.4 As-Builts are a set of Plans and Specifications maintained by the Contractor clearly showing all changes, revisions, substitutions, field changes, final locations, and other significant features of the Project. The As-Builts shall be maintained continuously throughout the Work for the Project and is both a prerequisite to the issuance of Payment Application and a requirement for Contract Close-Out. (See Article 3.17)

1.1.5 Beneficial Occupancy is the point in time when a building (or buildings) is fit for occupancy and its intended use. Basic requirements are that the building is safe, at or near Substantial Completion, and all fire/life safety items are approved and operational. The fact that a building is occupied does not mean that the building is ready for Beneficial Occupancy if there are elements that are unsafe or if fire/life safety items are not approved and operational. Taking occupancy on a structure that is under a fire watch is not considered beneficial occupancy. Further, taking of Beneficial Occupancy is not a point in time when retention is due unless the entire Project has obtained a Certificate of Substantial Completion that meets the definition of 1.1.46.

1.1.6 Claims. A Claim is a request for payment, supported by back-up documentation which includes, invoices time sheets, or other documents substantiating legitimacy or entitlement that is submitted during the Project or immediately following the Project made prior to the Final Retention Payment Application and prior to Final Completion of the Project. A "Claim" means a separate demand by the Contractor for (1) time extension, (2) payment of money or damages arising from Work done by or on behalf of the Contractor pursuant to the CONTRACT and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (3) and amount the payment of which is disputed by the District. (See Article 4.6)

1.1.7 Change Order (CO). A CO is a written instrument prepared by the Architect and signed by the District (as authorized by the District's Governing Board), the Contractor, and the Architect, stating their agreement upon (1) A description of a change in the Work, (2) The amount of the adjustment in the Contract Sum, if any; and (3) The extent of the adjustment in the Contract Time, if any. (See Article 7.2)

1.1.8 Change Order Request (COR). A COR is a written request supported by backup documentation prepared by the Contractor requesting that the District and the Architect issue a CO based upon a proposed change, or a change that results in an adjustment in cost, time or both, or arising from an RFP, CCD or ICD. (See Article 7.6)

1.1.9 Close-Out means the process for Final Completion of the Project, but also includes the requirements for the DSA Certification that the Project is Complete (See DSA Certification Guide). (See Article 9.9)

1.1.10 Construction Change Document (CCD). A Construction Change Document is a DSA term that is utilized to address changes to the DSA approved Plans and Specifications. There are two types of Construction Change Documents. (1) DSA approved CCD Category A for work affecting structural, access or fire/ life safety of the Project which will require a DSA approval; and, (2) CCD Category B for work NOT affecting structural safety, access compliance or fire/ life safety that will not require a DSA approval (except to confirm that no approval is required). Both CCD Category A and Category B shall be set forth in DSA Form 140 and submitted to DSA as required. (See Article 7.3)

1.1.11 Complete/ Completion/ Final Completion means that all Work in the Contract Documents is finished, the requirements of the Contract Documents have been met, the Project has been Closed Out, and all Work has ceased on the Project. This may also be referred to as Final Completion. In most cases, the recording of a Notice of Completion shall represent Completion of the Project. Beneficial Occupancy does not mean the Work is Complete.

1.1.12 Completion Date is the date when all Work for the Project shall be Substantially Complete and is the date assigned at the end of the Contract Time for the Project. (See Article 1.1.46

1.1.13 Construction Manager. The Construction Manager is a consultant to the District contracted to assist in Project planning, management and construction of the Project. If there is a Construction Manager, they may assist in various aspects of the Project including, but not limited to Monitoring the progress of the construction, reviewing and monitoring the schedule, progress of work, monitoring pay requests, facilitating communications, advising the District and its Board of Education on various aspects of the construction process, monitoring the RFI, COR, CCD, ICD, RFP, Claims, Disputes and other Project related processes.

1.1.14 Contract or Agreement when the terms are used in these General Conditions shall be references to the Contract Documents as defined herein.

1.1.15 Contract Documents (sometimes referred to as Construction Documents) consist of the Agreement between District and Contractor (hereinafter the Agreement or Contract), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, ***Bid Clarifications*** ~~Addenda~~ issued prior to bid, instructions to bidders, notice to bidders, and the requirements contained in the Bid Documents, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is a written amendment to the Contract signed by parties, a Change Order, a Construction Change Document, or a written order for a minor change in the Work issued by the Architect. The Contract Documents collectively form the Contract. The Contract represents the entire and integrated Agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a written Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Architect and Contractor, between the District and any Subcontractor or Sub-subcontractor, or between any

persons or entities other than the District and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

1.1.16 Contract Time is the time period specified in the Contract Documents in which the Project shall be completed. This is sometimes referred to a Contract Duration, or "time in which the Contractor has to complete the Project". (See Article 8.1.1)

1.1.17 Contractor, District, and Architect are those mentioned as such in the Agreement. They are treated throughout the Contract Documents as if they are of singular number and neuter gender. Any reference to "Owner" shall mean "District" or Liberty Union High School District.

1.1.18 Cure is the act of remedying a material failure to perform under the terms of the Contract Documents during the time provided to correct Contractor's Default. Specific time periods are provided to Cure and Correct a Contractor Default under Article 14 and for a Partial Default under Article 2.2 as well as elsewhere in the Contract Documents.

1.1.19 Days mean calendar days unless otherwise specifically stated.

1.1.20 Default is a material breach of Contract. A Termination for Cause under Article 14 is a declaration of Default of the Contract and shall act as a demand upon the Surety to perform under the terms of the Performance Bond. Partial Defaults may also be tendered to the Surety at District's discretion. (See Article 2.2)

1.1.21 Dispute. A dispute is a disagreement on terms or conditions of the Project where the Contractor's opinion of the Project, Payment, Change Order or Request for Proposal differs from that of the District or Architect. A dispute only rises to the level of a claim once the dispute is assembled with back-up documentation and presented for evaluation. (See Article 4.6)

1.1.22 District Representative is the person designated by the District to represent the District during the Construction for the Project. This District Representative shall have the delegated authority as further defined in Article 1.1.2. This District Representative may be an employee of the District who may have the delegated authority as set forth in Article 1.1.3, and may also include Construction Managers. In some cases, the District and its Board may be assisted by a Construction Manager. When a Construction Manager is assisting the District, the Contractor, Architect, and Inspector shall have a primary contact with the District's Construction Manager who will advise the District.

1.1.23 Drawings/Plans are graphic and pictorial portions of the Contract Documents prepared for the Project and approved changes thereto, wherever located and whenever issued, showing the design, location, and scope of the Work, generally including Plans, elevations, sections, details, schedules, and diagrams as drawn or approved by the Architect. Sometimes Drawings will also be included in ***Bid Clarifications*** ~~Addenda~~, Change Orders, and Specifications.

1.1.24 DSA is the Division of State Architect. DSA is the agency that provides design and construction oversight for K-12 Schools, Community Colleges, and State Funded Charter School Projects. DSA is the responsible agency for this Project and Contractor has submitted a bid for the Project since Contractor is familiar with Contractor's responsibilities under the DSA requirements more thoroughly set forth at Title 24 of the California Code of Regulations. Contractor agrees to abide by the jurisdiction of DSA and shall construct the Project to conform with the approved Plans, Specifications, ***Bid Clarifications***

~~Addenda~~, and Change Orders (inclusive of approved CCD's and ICD's issued by the District pending CCD approval). See DSA website.

1.1.25 Emergency shall be defined as a sudden, unexpected occurrence, involving a clear and imminent threat to the continuation of school classes, a critical path delay that will result in not being able to occupy the school when students arrive to use the facility, danger from the facility or from outside the facility, Act of God, or other action which requires immediate action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services.

1.1.26 Float the total number of days an activity may be extended or delayed without delaying the Completion Date shown in the schedule. Float will fall into three categories: (1) Rain Days; (2) Governmental Delays; and, (3) Project Float. (See Article 8.1.4)

1.1.27 Immediate Change Directive. (ICD) A written order prepared by the Architect and signed by the District and the Architect, directing a change in the Work where the Work must proceed immediately and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. (See Article 7.3)

1.1.28 Inspector of Record (IOR)/ Project Inspector (PI) is the individual retained by the District in accordance with Title 24 of the California Code of Regulations and who will be assigned to the Project

1.1.29 Notice of Non-Compliance (DSA Form 154) is a document issued by the Inspector if there is a deviation from the DSA approved Plans, Specifications, and Change Orders. (See Article 7.1.2)

1.1.30 Payment Application or Certificate of Payment is the Contractor's certified representation of the actual level of Work performed on the Project. Payment Applications are sometimes also called "Certificate of Payment", "Request for Payment", "Payment Application", or similar terms, and shall follow the Schedule of Values that are approved by the Architect, Inspector and District. (See Article 9.3)

1.1.31 Project is the complete construction of the Work performed in accordance with the Contract Documents.

1.1.32 Project Manual is the volume assembled for the Work which may include, without limitation, the bidding requirements, sample forms, Conditions of the Contract, and Specifications.

1.1.33 Provide shall include "provide complete in place," that is "furnish and install complete."

1.1.34 Punch List/ Punch Item/ Incomplete Punch Item is a list of minor repair items, prepared after the issuance of a Certificate of Substantial Completion, by the Inspector and Architect of Work required in order to complete the Contract Documents and ensure compliance with the DSA Approved Plans so the Project may be Closed Out. Issuance of the Retention Payment is dependent of the proper completion of the Punch List. (See Article 9.9)

1.1.34.1 *Contractor's List of Punch Items* is a list of minor repair items the Contractor submits when the Contractor considers the Work Substantially Complete. Submission of this List of Incomplete Punch Items is the Contractor's representation that the Project is Substantially Complete. (See Article 9.9.1.1)

1.1.35 Request for Information (RFI) is a written request prepared by the Contractor requesting the Architect to provide additional information necessary to clarify or amplify an item which the Contractor believes is not clearly shown or called for in the Drawings or Specifications, or to address problems which have arisen under field conditions. (See Article 7.4)

1.1.36 Request for Proposal (RFP) is a written request prepared by the Architect (and/or CM) requesting the Contractor to submit to an estimate of the effect of a proposed change on the Contract Price and (if applicable) the Contract Time. (See Article 7.5)

1.1.37 Safety Orders are those issued by any city, county, state or federal agency having jurisdiction over the Project.

1.1.38 Schedule is the Contractor's view of the practical way in which the Work will be accomplished. In this Agreement there is a requirement for a Baseline Schedule and regular Schedule Updates that show all Work to be completed during the Contract Time and shall include all items listed under Article 8.3.2.9. See Article 8 of the General Conditions.

1.1.39 Schedule of Values is a detailed breakdown of the Contract Price for each Project, building, Phase of Work or Site as determined by the District. This Schedule of Values shall adequately detail the price for the Work so Progress Payments Applications can be meaningfully reviewed by the Inspector, Architect of Record, Engineer of Record, and District. (See Article 9.2)

1.1.40 Separate Contracts are Contracts that the District may have with other Contractors, vendors, suppliers, or entities to perform Work on the Project. This may include, but is not limited to Multi-Prime Trade Contractors, furniture installers, testing agencies, clean-up contractors, or network or low voltage contractors. Contractor shall plan for certain other contractors that may also be working on the Project site and address these other contractors in Contractor's Schedule. (See Article 6)

1.1.41 Site refers to the grounds of the Project as defined in the Contract Documents and such adjacent lands as may be directly affected by the performance of the Work.

1.1.42 Specifications are that portion of the Contract Documents consisting of the written requirements for material, equipment, construction systems, instructions, quality assurance standards, workmanship, and performance of related services.

1.1.43 Standards, Rules, and Regulations referred to are recognized printed standards and shall be considered as one and a part of these Specifications within limits specified. Federal, state and local regulations are incorporated into the Contract Documents by reference.

1.1.44 Stop Work Order, or an Order to Comply, is issued when either (1) the Work proceeds without DSA approval; (2) the Work proceeds without a DSA Inspector of Record, or (3) where DSA determines that the Work is not being performed in accordance with applicable rules and regulations, and would compromise the structural integrity of the Project or would endanger lives. If a Stop Work Order is issued, the Work in the affected area shall cease until DSA withdraws the Stop Work Order. Pursuant to Education Code section 17307.5(b), the District shall not be held liable in any action filed against the District for any delays caused by compliance with the Stop Work Order

1.1.45 Subcontractor, as used herein, includes those having direct or indirect contracts with Contractor and ones who furnished labor, material or services for a special design according to Plans, Drawings, and Specifications of this Work.

1.1.46 Substantial Completion/ Substantially Complete(d) is not reached unless and until each of the following four (4) conditions have been met: (1) all contractually required items have been installed with the exception of only minor and Incomplete Punch List Items (See Article 9.9.1.2); (2) All Fire/Life Safety Systems have been installed, and are working and signed off on the DSA Form 152 Inspection Card, and all building systems including mechanical, electrical and plumbing are all functioning; (3) all other items in the DSA Form 152 Inspection Card for the Project have been approved and signed off; and (4) the Project is fit for occupancy and its intended use. For the purposes of this Contract, any references to Completion Date means Substantial Completion Date.

1.1.47 Substitution is a change in product, material, equipment, or method of construction from those required by the Construction Documents proposed by the Contractor. For this Project, a Substitution is subject to the filing of a Construction Substitution Request Form at the time of bid and meeting the requirements of Article 3.10.

1.1.48 Supplementary Conditions/ Supplementary General Conditions/ Special Conditions are terms that are sometimes used interchangeably and refer to any additional requirements or changes to the General Conditions as noted.

1.1.49 Surety is the person, firm, or corporation that executes as a bid bond, Payment Bond or Performance Bond guarantor on the Contractor's Bid, Contractor's Performance on the Contract and Payment of the Contractor's Subcontractors, material suppliers, vendors and labor on the Project. The Surety is bound to the same extent as the Contractor is bound once a Default occurs. A default includes a Termination for Substantial Failure to Perform under Article 14, but also includes any breach of Contract and is subject to the requirements and responsibilities as set forth in the Performance Bond.

1.1.50 Work shall include all labor, materials, services and equipment necessary for the Contractor to fulfill all of its obligations pursuant to the Contract Documents. It shall include the initial obligation of any Contractor or Subcontractor who performs any portion of the Work, to visit the Site of the proposed Work (a continuing obligation after the commencement of the Work), to fully acquaint and familiarize itself with the conditions as they exist and the character of the operations to be carried out under the Contract Documents, and make such investigation as it may see fit so that it shall fully understand the facilities, physical conditions, and restrictions attending the Work under the Contract Documents. Each such Contractor and its Subcontractors shall also thoroughly examine and become familiar with the Drawings, Specifications, and associated Contract Documents and bid documents before preparing and submitting any bid.

1.1.51 Workers include laborers, workers, and mechanics.

1.2 EXECUTION, CORRELATION AND INTENT

1.2.1 Correlation and Intent

1.2.1.1 *Documents Complementary and Inclusive*. The Contract Documents are complementary and are intended to include all items required for the proper execution and completion of the Work. All Contract Documents form the Contractor's Contract with the District. Any item of Work

mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be provided by Contractor as if shown or mentioned in both. The Contractor is bound to provide the Work complete and is under a legal duty to carefully study Plans and schedule operations well ahead of time and identify inconsistencies with the Plans and Specifications and call such inconsistencies to the attention of the Architect or Registered Engineer through the Inspector under Section 4-343(b) of Title 24.

1.2.1.2 *Work to be Complete.* Contractor has thoroughly studied the Contract Documents and understands that the District contracted with Contractor to provide a complete Project which means complete systems and buildings. The entire set of Contract Documents shows a complete Project and Contractor agrees that there are multiple disciplines putting together a set of Contract Documents. Thus, if portions of a system are shown on some Drawings and not others, this does not mean the Contractor is to only provide part of a system. For example, if an air conditioning unit is shown on the mechanical Drawings, the plumbing for the air conditioning is shown on another Drawing, and the electrical shown on the electrical Drawings, the Contractor is to provide a complete and working air conditioning system. The only time when an item is supplied incomplete is if the system is shown specifically as incomplete since others will be completing the system. Work includes, but is not limited to materials, workmanship, and manufacture of fabrication of components for the Project.

1.2.1.3 *Coverage of the Drawings and Specifications*. The Drawings and Specifications generally describe the Work to be performed by Contractor. Generally, the Specifications describe Work which cannot be readily indicated on the Drawings and indicate types, qualities, and methods of installation of the various materials and equipment required for the Work. It is not intended to mention every item of Work in the Specifications, which can be adequately shown on the Drawings, or to show on the Drawings all items of Work described or required by the Specifications even if they are of such nature that they could have been shown. All materials or labor for Work, which is shown on either the Drawings or the Specifications (or is reasonably inferable therefrom as being necessary to complete the Work), shall be provided by the Contractor. The Contractor is responsible for the whole Project as contractually set forth as the Contract Documents. It is intended that the Work be of sound, quality construction, and the Contractor shall be responsible for the inclusion of adequate amounts to cover installation of all items indicated, described, or implied in the portion of the Work to be performed by them.

1.2.1.4 *Conflicts*. In the event there is a discrepancy between the various Contract Documents, it is intended that the more stringent, higher quality, and greater quantity of Work shall apply.

1.2.1.5 *Conformance with Laws*. Each and every provision of law required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein, even if through mistake or otherwise any such provision is not inserted, or is not correctly inserted. Contractor, all Subcontractors and any and all workers performing Work on this Project shall fully comply with all laws, ordinances, codes, rules and regulations of all governmental authorities and public and municipal utilities affecting the construction and operation of the physical plant of the Project, all quasi-governmental and other regulations affecting the construction and operation of the physical plant of the Project, and other special requirements, if any, designated in the Contract Documents including, but not limited to, any existing and future order, regulations, guidelines or other requirements issued by any federal, state or local authority applicable to the Project. All workers shall comply with current recommendations and requirements related to COVID-19. All workers must fully comply with any current and future orders and recommendations issued by the County where the District is located including, but not limited to, the County Public Health Department, as well as other applicable guidelines and

recommendations issued by OSHA and CDC. If there are any inconsistencies or conflicts with any guidelines or recommendations, the stricter and more stringent provisions shall apply and prevail.

Before commencing any portion of the Work, Contractor shall check and review the Drawings and Specifications for such portion for conformance and compliance with all laws, ordinances, codes, rules and regulations of all governmental authorities and public and municipal utilities affecting the construction and operation of the physical plant of the Project, all quasi-governmental and other regulations affecting the construction and operation of the physical plant of the Project, and other special requirements, if any, designated in the Contract Documents. Such checking shall include review of Title 24 of the California Code of Regulations, California Building Code, local utility, local water connection, local grading and all other applicable agencies. In the event Contractor observes any violation of any law, ordinance, code, rule or regulation, or inconsistency with the Contract Documents, Contractor shall, within five (5) days, notify the Inspector, Architect and District in writing of same and shall ensure that any such violation or inconsistency shall be corrected in the manner provided hereunder prior to the construction of that portion of the Project. (See Title 24 Section 4-343)

The Contractor shall bear all expenses of correcting Work done contrary to said laws, ordinances, rules, and regulations if the Contractor performed same (1) without first consulting the Architect for further instructions regarding said Work or (2) disregarded the Architect's instructions regarding said Work.

1.2.1.6 *Ambiguity and Inconsistency*. Before commencing any portion of the Work, Contractor shall carefully examine all Drawings and Specifications and other information given to Contractor as to materials and methods of construction and other Project requirements. Prior to commencing any portion of the Work, Contractor shall notify Architect and District in writing of any perceived or alleged error, inconsistency, conflict, ambiguity, or lack of detail or explanation in the Drawings and Specifications in the manner provided herein. If the Contractor or its Subcontractors, material or equipment suppliers, or any of their officers, agents, and employees performs, permits, or causes the performance of any Work under the Contract Documents, which it knows or should have known to be in error, inconsistent, or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all costs arising therefrom including, without limitation, the cost of correction thereof without increase or adjustment to the Contract Price or the time for performance. Contractor shall maintain an adequate inspection system and perform personal observations and review work and pre-plan the project to ensure the Work performed under the Contract conforms to Contract requirements. Contractor shall maintain records of such review and observation to ensure strict compliance with the terms of the Contract.

1.2.1.7 *Typical Parts and Sections*. Whenever typical parts or sections of the Work are completely detailed on the Drawings, and other parts or sections which are of the same construction are shown in outline only, the complete or more detailed shall apply to the Work which is shown in outline.

1.2.1.8 *Dimensions*. Dimensions of Work shall not be determined by scale or rule. Figured dimensions shall be followed at all times. If figured dimensions are lacking on Drawings, Architect shall supply them on request. The Architect's decisions on matters relating to aesthetic effect will be final.

1.2.2 ***Bid Clarifications*** ~~Addenda~~ and Deferred Approvals

1.2.2.1 ***Bid Clarifications*** ~~*Addenda*~~ are the changes in Specifications, Drawings, Contract Documents, and Plans which have been authorized in writing by the District or Architect, and which alter, explain, or clarify the Contract Documents. ***Bid Clarifications*** ~~Addenda~~ shall govern over all

other Contract Documents. Subsequent ***bid clarifications*** ~~addenda~~ issued shall govern over prior ***bid clarifications*** ~~addenda~~ unless otherwise specified in the ***bid clarification*** ~~addenda.~~

1.2.2.2 *Deferred Approvals*. Deferred Approvals are Submittals that are reviewed by the Architect (or Engineer of Record) and submitted to DSA for approval based on thorough detailing of manufacturer and Project specific design. See Article 3.9.1and 3.9.3. The Deferred Approval item cannot be fully detailed on the originally approved Drawings or Specifications because of variations in product design and manufacture. Contract Documents which require Deferred Approval items are meant to be for illustration purposes only. Approval of Plans for such a portion of the Work may be deferred until the material suppliers and Subcontractors are selected. All Deferred Approvals are noted in the Plans and Specifications. Contractor is responsible for all Deferred Approval requirements set forth in the Contract Documents. Contractor is responsible to comply with all laws, building codes, Title 24 and regulations necessary to obtain all necessary approvals, including those required from the Division of the State Architect ("DSA") and the State Fire Marshall. Contractor shall not be granted an extension of time for failure to plan, schedule for and obtain necessary approvals. Contractor shall Schedule all Deferred Approval items in the Baseline Schedule and Schedule Updates under Article 3.9.6

1.2.3 Specification Interpretation

1.2.3.1 *Titles*. The Specifications are separated into titled sections for convenience only and not to dictate or determine the trade or craft involved.

1.2.3.2 *As Shown, Etc*. Where "as shown," "as indicated," "as detailed," or words of similar import are used, reference is made to the Drawings accompanying the Specifications unless otherwise stated. Where "as directed," "as required," "as permitted," "as authorized," "as accepted," "as selected," or words of similar import are used, the direction, requirement, permission, authorization, approval, acceptance, or selection by Architect is intended unless otherwise stated.

1.2.3.3 *General Conditions*. The General Conditions and Supplementary General Conditions are a part of the Contract Documents which further defines and refines the Contract entered between the Contractor and District.

1.2.3.4 *Abbreviations*. In the interest of brevity, the Specifications are written in an abbreviated form and may not include complete sentences. Omission of words or phrases such as "Contractor shall," "shall be," etc., are intentional. Nevertheless, the requirements of the Specifications are mandatory. Omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the Drawings. In the interest of brevity, the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

1.2.3.5 *Plural*. Words in the singular shall include the plural whenever applicable or the context so indicates.

1.2.3.6 *Metric*. The Specifications may indicate metric units of measurement as a supplement to U.S. customary units. When indicated thus: 1" (25 mm), the U. S. customary unit is specific, and the metric unit is nonspecific. When not shown with parentheses, the unit is specific. The metric units correspond to the "International System of Units" (SI) and generally follow ASTM E 380, "Standard for Metric Practice."

1.2.3.7 *Standard Specifications*. Any reference to standard specifications of any society, institute, association, or governmental authority is a reference to the organization's standard specifications, which are in effect at the date of the Contractor's proposal unless directed otherwise. If applicable specifications are revised prior to completion of any part of the Work, the Contractor may, if acceptable to Architect, perform such Work in accordance with the revised specifications. The standard specifications, except as modified in the Specifications for the Project, shall have full force and effect as though printed in the Specifications. Architect will furnish, upon request, information as to how copies of the standard specifications referred to may be obtained.

1.2.4 Rules of Document Interpretation

1.2.4.1 In the event of conflict within the Drawings, the following rules shall apply:

a. General Notes, when identified as such, shall be incorporated into other portions of Drawings.

b. Schedules, when identified as such, are complementary with other notes and other portions of Drawings including those identified as General Notes.

c. Larger scale Drawings shall take precedence over smaller scale Drawings.

d. At no time shall the Contractor base construction on scaled Drawings.

1.2.4.2 Specifications shall govern as to materials, workmanship, and installation procedures.

1.2.4.3 If Contractor observes that Drawings and Specifications are in conflict, Contractor shall, prior to commencing work, notify the Architect in writing for the purposes of obtaining an interpretation of the Contact Documents.

1.2.4.4 In the case of conflict or inconsistencies, the order of precedence shall be as follows:

a. General Conditions take precedence over Drawings and Specifications.

b. Supplemental Conditions take precedence over General Conditions.

c. The Agreement Form shall take precedence over the Supplemental Conditions.

d. In the case of disagreement or conflict between or within Specifications, and Drawings, the more stringent, higher quality, and greater quantity of Work shall apply.

e. ***Bid Clarifications*** ~~Addenda~~ shall take precedence over Drawings and Specifications.

f. General Conditions shall take precedence over ***Bid Clarifications*** ~~Addenda~~.

g. Drawings and Specifications take precedence over the Soils Report.

1.3 OWNERSHIP AND USE OF ARCHITECT'S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

The Drawings, Specifications, and other Contract Documents for the Project are the property of the District and/or Architect pursuant Contract requirements between the District and Architect. The Contractor may retain one Contract record set. Neither the Contractor nor any Subcontractor, or material or equipment supplier shall own or claim a Copyright in the Drawings, Specifications, and other documents prepared by the Architect. All copies except the Contractor's record set, shall be returned or properly accounted for upon completion of the Work. The Drawings, Specifications, and other documents prepared by the Architect, and copies thereof furnished to the Contractor are not to be used by the Contractor or any Subcontractor, Sub-subcontractor, or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work. The District and/or Architect hereby grants the Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers a limited license to use applicable portions of the Drawings, Specifications, and other documents prepared for the Project in the execution of their Work under the Contract Documents. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the District's property interest or other reserved right.

ARTICLE 2
DISTRICT

2.1 INFORMATION AND SERVICES REQUIRED OF THE DISTRICT

2.1.1 Site Survey

The District will furnish, at its expense, a legal description of the Site and a land survey showing the boundaries of the Site. Contractor shall be responsible for all surveys regarding location of construction, grading and site work.

2.1.2 Soils

When required by the scope of the Project, the District will furnish, at its expense, the services of geotechnical engineers or consultants when reasonably required and deemed necessary by the Architect or as required by local or state codes. Such services, with written reports and appropriate written professional recommendations, may include test boring, test pits, soil bearing values, percolation tests, air and water pollution tests, and ground corrosion and resistivity tests, including necessary operations for determining subsoil, air, and water conditions.

2.1.3 Soils Report Part of the Contract Documents: Contractor Reliance

A soils investigation report has been obtained from test holes at the Site, and such report is incorporated into this Contract and made available for the Contractor's use in preparing its bid and Work under this Contract. Where the Plans and Specifications are more specific and provide more significant structure, systems, reinforcing, thicknesses, or construction methods, the Drawings shall control over the soils report. The soils report is available at the Architect's office for review and it is Contractor's responsibility to ensure that Contractor has reviewed the soils investigation report. Any information obtained from such report or any other information given on Drawings as to subsurface soil condition or to elevations of existing grades or elevations of underlying rock is approximate only. If, during the course of Work under this Contract, Contractor encounters subsurface conditions which differ materially from those indicated in the soils report, then Contractor shall notify the District within five (5) calendar days of discovery of the condition, and changes to the Contract Price may be made in accordance with Article 7 entitled "Changes in the Work." Contractor agrees that no claim against District will be made by Contractor for damages and hereby waives any rights to damages in the event the Contractor fails to notify District within the five-day period mentioned above.

WARNING: DISTRICT DOES NOT WARRANT THE SOILS AT THE PROJECT SITE. CONTRACTOR HAS REVIEWED AND IS FAMILIAR WITH THE REQUIREMENTS OF THE SOILS INVESTIGATION REPORT. CONTRACTOR UNDERSTANDS THAT PLANS, DRAWINGS AND SPECIFICATIONS SUPERSEDE THE SOILS REPORT IF THERE ARE CONFLICTS. FURTHER, IN ADDITION TO THE INFORMATION IN THE SOILS REPORT, CONTRACTOR HAS CONDUCTED AN INDEPENDENT INVESTIGATION OF THE PROJECT SITE AND THE SOILS CONDITIONS OF THE SITE. DISTRICT DOES NOT WARRANT THE SOILS CONDITIONS OF THE SITE AND CONTRACTOR IS FULLY RESPONSIBLE TO ASCERTAIN SITE CONDITIONS

FOR THE PURPOSES OF DETERMINING CONSTRUCTION MEANS AND METHODS PRIOR TO COMMENCING CONSTRUCTION.

2.1.4 Utilities

2.1.4.1 *Location of Point of Connection.* The locations shown for the point of connection are approximate. It shall be the responsibility of the Contractor to determine the exact location of all service connections.

2.1.4.2 *Regional Notification Center.* Contractor, except in an emergency, shall contact the appropriate regional notification center at least two (2) business days prior to commencing any excavation if the excavation will be conducted in an area or in a private easement which is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the District, and obtain an inquiry identification number from that notification center. See Government Code section 4216.3. No excavation shall be commenced and carried out by the Contractor unless such an inquiry identification number has been assigned to the Contractor or any Subcontractor of the Contractor and the District has been given the identification number by the Contractor. Any damages arising from failure to make appropriate regional notification shall be at the sole risk of Contractor. Contractor shall solely be responsible for any fines, penalties or damages for violation of this Article and Government Code section 4216.6 or 4216.7. Any delays caused by failure to make appropriate regional notification shall be at the sole risk of Contractor and shall not be considered for extension of time pursuant to Article 8.4.

2.1.4.3 *Utilities - Removal and Restoration.* The District has endeavored to determine the existence of utilities at the Site of the Work from the records of the District of known utilities in the vicinity of the Work. The positions of these utilities as derived from such records are shown in the Contract Documents. Thus, the locations of the main or trunklines located on the Drawings are approximate locations and not exact.

No excavations were made to verify the locations shown for underground utilities. Other than the main or trunkline, which the District has endeavored to locate on the Plans, service connections or laterals to these utilities may not be shown on the Plans. It shall be the responsibility of the Contractor to determine the exact location of all service connections. The Contractor shall make its own investigations, including exploratory excavations, to determine the locations and type of service connections, prior to commencing work which could result in damage to such utilities. The Contractor shall immediately notify the District's representative as to any utility main or trunkline discovered by Contractor in a different position than provided by the Regional Notification Center. With respect to main or trunklines, Contractor is to immediately notify District if the location is substantially different than as shown in the Contract Documents.

Contractor shall coordinate its Work with all utilities, including, but not limited to electricity, water, gas and telephone and meet with said utilities prior to the start of any work. Contractor shall show timing of all utility coordination activities under the Scheduling requirements of Article 8.

2.1.4.4 *Other Utilities.* In case it should be necessary to remove, relocate, or temporarily maintain a utility because of interference with the Work, the work on the utility shall be performed and paid for as follows:

When it is necessary to remove, relocate or temporarily maintain a service connection, the cost of which is not required to be borne by the owner of the service connection, the Contractor shall bear all expenses incidental to the work on the service connection. The work on the service connection shall be done in a manner satisfactory to the owner thereof; it being understood that the owner of the service connection has the option of doing such work with his own forces or permitting the work to be done by the Contractor.

When it is necessary to remove, relocate, or temporarily maintain a utility which is in the position shown on the Plans, the cost of which is not required to be borne by the owner thereof, the Contractor shall bear all expenses incidental to the work on the utility. The work on the utility shall be done in a manner satisfactory to the owner thereof; it being understood that the owner of the utility has the option of doing such work with his own forces or permitting the work to be done by the Contractor.

When it is necessary to remove, relocate, or temporarily maintain a utility which is not shown on the Plans or is in a position different from that shown on the Plans and were it in the position shown on the Plans would not need to be removed, relocated, or temporarily maintained, and the cost of which is not required to be borne by the owner thereof, the District will make arrangements with the owner of the utility for such work to be done at no cost to the Contractor, or will require the Contractor to do such work in accordance with Article 7 or will make changes in the alignment and grade of the Work to obviate the necessity to remove, relocate, or temporarily maintain the utility. Changes in alignment and grade will be ordered in accordance with Article 7 herein.

No representations are made that the obligations to move or temporarily maintain any utility and to pay the cost thereof is or is not required to be borne by the owner of such utility, and it shall be the responsibility of the Contractor to investigate to find out whether said cost is required to be borne by the owner of the utility.

The right is reserved to governmental agencies and to owners of utilities to enter at any time upon any street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the Work and for the purpose of maintaining and making repairs to their property.

2.1.5 Existing Utility Lines; Removal, Relocation

2.1.5.1 *Main or Trunkline Facilities*. If the Contractor while performing the Contract discovers utility facilities not identified in the Contract Documents, Contractor shall notify the District and utility in writing prior to commencing work.

The owner of the public utility shall have the sole discretion to perform repairs or relocation work or permit the Contractor to do such repairs or relocation work at a reasonable price.

The Contractor shall exercise reasonable care and shall be compensated by the District for the actual verified field costs of locating, and removing, relocating, protecting or temporarily maintaining such main or trunkline utility facilities located in a substantially different location than in the Plans and Specifications, and for equipment in use on the project necessarily idled during such work. This Work shall be performed in accordance with Article 7 of these General Conditions.

2.1.5.2 *Assessment*. Nothing in these subparagraphs shall be deemed to require the District to indicate the presence of existing service laterals or appurtenances whenever the presence of such

utilities on the Site can be inferred from the presence of other visible facilities, such as buildings, or meter junction boxes on or adjacent to the Site and could be inferred from the Main or Trunkline shown on the Drawings.

2.1.5.3 *Notification.* If the Contractor, while performing Work under this Contract, discovers utility facilities not identified by the District in the Contract Documents. Contractor shall, within five (5) days, notify the District and the utility in writing. If Contractor fails to notify the District within forty eight hours after discovery of any utility facilities not identified by District in the Contract Documents, Contractor waives all rights to be compensated for any extra Work or damages resulting from such discovered utilities.

2.1.6 Easements

District shall secure and pay for easements for permanent structures or permanent changes in existing facilities, if any, unless otherwise specified in the Contract Documents.

2.2 DISTRICT'S RIGHT TO CARRY OUT THE WORK DUE TO PARTIAL DEFAULT IN A SPECIFIC SEGREGATED AREA OF WORK (48 HOUR NOTICE TO CURE AND CORRECT)

If the Contractor Defaults or neglects to carry out the Work in accordance with the Contract Documents, the District may provide forty-eight (48) hour written notice to cure (a shorter period of time in the case of Emergency or a critical path delay as defined in Article 2.2.1) Contractor's Partial Default in a specific segregated area of work. The District's right to issue a Partial Default of the Contractor's Work and take over that segregated area of Work includes, but is not limited to:

1. Failure to supply adequate workers on the entire Project or any part thereof;
2. Failure to supply a sufficient quantity of materials;
3. Failure to perform any provision of this Contract;
4. Failure to comply with safety requirements, or due to Contractor is creation of an unsafe condition;
5. Cases of bona fide emergency;
6. Failure to order materials in a timely manner;
7. Failure to prepare Deferred Approval items or Shop Drawings in a timely manner;
8. Failure to comply with Contractor's Baseline or Update Schedule, meet critical Milestones which would result in a delay to the critical path, or delay the Contract Time;
9. Failure to comply with the Subletting and Subcontracting Fair Practices, Public Contract Code section 4100, et seq.
10. Failure to meet the requirements of the Americans with Disabilities Act;
11. Failure to complete Punch List work;

12. Failure to proceed on an Immediate Change Directive

13. Failure to correct a Notice of Deviation

If during the forty eight (48) hour period, the Contractor fails to Cure and correct the deficiency noted in the 48 hour notice of Partial Default with diligence and promptness, the District may correct such deficiencies without prejudice to other remedies the District may have, including a Termination for Cause as set forth in Article 14. If there are inadequate funds remaining the Project balance or in the Retention Escrow to address at least 150% of the costs set forth in the Article 2.2 notice, the District may copy the Surety on the written notice of Partial Default. If a notice to the Surety is provided, except in the cases of emergency or critical path delay, the Surety has the option to take over and complete the Work described in the written notice if Surety personally delivers notice to District that it intends to perform such work. In the case where written notice has been provided, the District shall allow Surety seven (7) days to perform the Work.

2.2.1 Service of Notice of Partial Default with Right to Cure

A written notice of Partial Default and right to cure under Article 2.2 ("Article 2.2 Notice" or "Notice of Partial Default") shall be served by e-mail (with a copy provided by regular mail) to the e-mail address provided on the Bid submitted and copied to the Project Superintendent.

2.2.2 Shortened Time for Partial Default in the Case of Emergencies.

In an Emergency situation, the District may correct any of the deficiencies described in Article 2.2 without prejudice to other remedies by providing service of written notice of Emergency requiring a shortened time for Partial Default specifying the time given to cure, if any.

2.2.3 Shortened Time for Partial Default in the Case of Critical Path Delay

In the case of critical path delay, the District may correct any of the deficiencies described in Article 2.2 without prejudice to other remedies providing service of written notice of critical path delay to the Contractor with a specific description of the critical path delay items noting the line item or area of Work that is on the critical path and prescribe the length of shortened time to cure, if any.

2.2.4 Written Notice of Partial Default to be Deducted by Deductive Change Order

The District shall have the right to determine the reasonable value of the Article 2.2 Partial Default Work, or if there is an actual value for the Work, shall use that value and issue a Deductive Change Orders under Article 7.7.4

ARTICLE 3
THE CONTRACTOR

3.1 SUPERVISION AND CONSTRUCTION PROCEDURES

3.1.1 Contractor

The Contractor shall continually supervise and direct the Work using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, procedures; and shall coordinate all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. The Contractor shall not perform the Work without utilizing the Contract Documents or, where required, approved Submittals, Shop Drawings, or samples for any such portion of the Work. If any of the Work is performed by contractors retained directly by the District, Contractor shall be responsible for the coordination and sequencing of the work of those other contractors so as to avoid any impact on the Project Schedule pursuant to the requirements of Article 6 and Article 8. Specific duties of the Contractor shall include those set out in Section 43 of Title 21 of the California Code of Regulations and Section 4-343 of Title 24 of the California Code of Regulations. These duties include, but are not limited to the following:

3.1.1.1 *Responsibilities*. It is the duty of the Contractor to complete the Work covered by his or her Contract in accordance with the approved Plans and Specifications. The Contractor in no way is relieved of any responsibility by the activities of the Architect, Engineer, Inspector or DSA in the performance of their duties.

3.1.1.2 Performance of the Work. The Contractor shall carefully study the approved Plans and Specifications and shall plan its schedule of operations well ahead of time. If at any time it is discovered that work is being done which is not in accordance with the approved Plans and Specifications, the Contractor shall correct the Work immediately.

3.1.2 Contractor Responsibility to Study the Plans and Specifications

All inconsistencies or timing or sequences which appear to be in error in the Plans and Specifications shall promptly be called to the attention of the Architect or, Engineer, for interpretation or correction. Local conditions which may affect the structure shall be brought to the Architect's attention at once. In no case, shall the instruction of the Architect be construed to cause work to be done which is not in conformity with the approved Plans, Specifications, change orders, construction change documents, and as required by law. (See Title 24, Section 4-343)

3.1.3 All Work Under the Direction of Inspector

Pursuant to Title 24 requirements, the Contractor shall not carry on Work except with the knowledge of the Inspector. (See Title 24 generally)

3.1.4 Contractor to Establish Timing and Protocol with Inspector

Contractor shall establish a protocol for requesting inspection with Inspector so as to not delay the Work and provide adequate time for the Inspector to perform inspection. If such a protocol is not established ahead of time, Inspector may utilize the time criteria set by Title 24 of 48 hours in advance of submitting form DSA 156 for each new area. DSA requirements under PR 13-01 specifically gives the

Special Inspector fourteen (14) days to post to the DSA website. Contractor is responsible for delays and for failure to plan.

For some Projects, there may be a need to incrementally install certain assemblies. It is up to Contractor to identify areas and assemblies that may be constructed incrementally. Contractor must identify and establish incremental areas of construction and establish protocols with Inspector for DSA 152 approvals so they may be presented to DSA. (See PR-13 item 1.17 for further discussion)

3.1.5 Verified Reports

The Contractor shall make and submit to the office from time to time, verified reports as required in Title 24 Section 4-366. As part of the Close-Out of the Project (see Article 9.9), Contractor shall be required to execute a Form 6-C as required under Title 24 Sections 4-343.

Contractor shall fully comply with any and all reporting requirements of Education Code sections 17315, et seq., in the manner prescribed by Title 24, as applicable.

3.1.6 Contractor Responsibility

The Contractor shall be responsible to the District for acts and omissions of the Contractor's employees, Subcontractors, material and equipment suppliers, and their agents, employees, invitees, and other persons performing portions of the Work under direct or indirect contract with the Contractor or any of its Subcontractors.

3.1.7 Obligations not Changed by Architect's Actions

The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract or by tests, inspections, or approvals required or performed by persons other than the Contractor.

3.1.8 Acceptance/Approval of Work

The Contractor shall be responsible to determine when any completed portions of the Work already performed under this Contract or provided pursuant to Article 6 are suitable to receive subsequent Work thereon.

3.2 SUPERVISION

3.2.1 Full Time Supervision

Unless personally present on the Project site where the Work is being performed, the Contractor shall keep on the Work at all times during its progress a competent, English speaking construction Superintendent satisfactory to the District. The Superintendent shall be present on a full-time basis, shall be dedicated exclusively to the Project and shall not share superintendency duties with another project or job. The Superintendent shall not be replaced except with written consent of the District. The Superintendent shall represent the Contractor in its absence and shall be fully authorized to receive and fulfill any instruction from the Architect, the Inspector, the District or any other District Representative (including CM in the cases where the District has a CM representative). All Requests for Information shall be originated by the Superintendent and responses thereto shall be given to the Superintendent. No Work

shall begin on any day by any Subcontractor or other person on the Project site until the Superintendent has arrived, or shall any Work continue during the day after the Superintendent has departed from the Project site. The Superintendent shall have authority to bind Contractor through the Superintendent's acts. The Superintendent shall represent the Contractor, and communications given to the Superintendent shall be binding on the Contractor. Before commencing the Work, Contractor shall give written notice to District (and CM representative) and Architect of the name and a Statement of Qualifications of such superintendent. Superintendent shall not be changed except with written consent of District, unless a superintendent proves to be unsatisfactory to Contractor and ceases to be in its employ, in which case, Contractor shall notify District and Architect in writing. Contractor shall provide a replacement superintendent approved by the District prior to performing additional work.

3.2.2 Staff

Notwithstanding other requirements of the Contract Documents, the Contractor and each Subcontractor shall: (1) furnish a competent and adequate staff as necessary for the proper administration, coordination, supervision, and superintendence of its portion of the Work; (2) organize the procurement of all materials and equipment so that the materials and equipment will be available at the time they are needed for the Work; and (3) keep an adequate force of skilled and fit workers on the job to complete the Work in accordance with all requirements of the Contract Documents.

3.2.3 Right to Remove

District shall have the right, but not the obligation, to require the removal from the Project of any superintendent, staff member, agent, or employee of any Contractor, Subcontractor, material or equipment supplier.

3.3 LABOR AND MATERIALS

3.3.1 Contractor to Provide

Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, material, equipment, tools, construction equipment and machinery, water, heat, air conditioning, utilities, transportation, and other facilities, services and permits necessary for proper execution and completion of the Work whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

3.3.2 Quality

Unless otherwise specified, all materials and equipment to be permanently installed in the Project shall be new and shall be of the highest quality or as specifically stated in the Contract Documents. The Contractor shall, if requested, furnish satisfactory evidence as to kind and quality of all materials and equipment within ten (10) days of a written request by the District, including furnishing the District with bona fide copies of invoices for materials or services provided on the Project. All labor shall be performed by workers skilled in their respective trades, and shall be of the same or higher quality as with the standards of other school construction.

3.3.3 Replacement

Any work, materials, or equipment, which do not conform to these requirements or the standards set forth in the Contract Documents, may be disapproved by the District, in which case, they shall be removed and replaced by the Contractor at no additional cost or extension of time to the District.

3.3.4 Discipline

The Contractor shall enforce strict discipline and good order among the Contractor's and Subcontractor's employees, and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them. As used in this subsection, "unfit" includes any person who the District concludes is improperly skilled for the task assigned to that person, who fails to comply with the requirements of this article, or who creates safety hazards which jeopardize other persons and/or property.

3.3.5 Fingerprinting (Applicable at the time Project is Occupied and on all Projects where Workers will come in Contact with Pupils, such as Modernization Projects)

If applicable, Contractor shall comply with the applicable provisions of Education Code section 45125.1 in a method as determined by the District. Pursuant to Education Code section 45125.1, Contractor shall either conduct criminal background checks of all employees of Contractor assigned to the Project site, and shall certify that no employees who have been convicted of or who have an arrest pending final adjudication for any serious or violent felonies, as specified in Education Code section 45125.1, will have contact with pupils, by utilizing the Contractor Certification Regarding Background Checks and the corresponding Attachment "A" as found in the Contract Documents or shall be separated by a physical barrier from students.

If it is determined that Contractor must provide certification of employees, as part of such certification, Contractor must provide the District with a list of all employees providing services pursuant to this Agreement, and designate which sites such employees will be assigned. In performing the services set forth in this Agreement, Contractor shall not utilize any employees who are not included on the above-referenced list.

Contractor's failure to comply with this law shall be considered a material breach of this Agreement upon where this Agreement may be terminated, at District's sole discretion, without any further compensation to Contractor.

In the case of new construction Projects where there are no students, if the Project Schedule provides for Beneficial Occupancy or portions of the Project or if the Project should be delayed, then Contractor, at no additional costs, shall meet the requirements of either fingerprinting or providing a physical barrier as required by the District.

3.3.6 Noise, Drugs, Tobacco, and Alcohol

Contractor shall take all steps necessary to insure that employees of Contractor or any of its Subcontractors' employees do not use, consume, or work under the influence of any alcohol, tobacco or illegal drugs while on the Project. Contractor shall further prevent any of its employees or its Subcontractor employees from playing any recorded music devices or radios or wearing any radio headphone devices for entertainment while working on the Project. Likewise, Contractor shall prevent its employees or Subcontractor's employees from bringing any animal onto the Project. Contractors shall not violate any written school policies.

3.3.7 Delivery of Material

Contractor shall place orders for materials or equipment so that the Work may be completed in accordance with the Construction schedule for the Work as set forth in Article 8 of this Agreement. Contractor shall, upon demand from the Architect, furnish to the Architect documentary evidence including, but not limited to purchase orders, invoices, bills of materials, work orders and bills of lading, showing that orders have been placed. Contractor shall have a system to receive materials and to ensure that the proper materials are being delivered, including in the case of critical materials to the Project, checking the delivery against Shop Drawings and ensuring that the materials meet the requirements of not only the Plans and Specifications, but also the approved Shop Drawings and Submittals and in conformance with Contractor's plan for delivery of materials (including but not limited to Contractor's representations in the Schedules for the Project and Contractor's equipment and materials schedule under Article 3.7.2.2). Contractor shall be responsible for all costs of accepting non-conforming materials delivered to the Project given Contractor's responsibilities and system for acceptance of deliveries. Contractor shall notify Inspector and District Representative (including CM) as early as possible, in writing, of the delivery of materials for the Project. The deliveries shall include documentation identifying the shipment sufficiently so that the Inspector, Architect or District Representative (including CM) may review the materials that are received. Under no circumstances shall materials be delivered to the Project site that are meant for another Project.

3.3.8 Liens and Other Security Interests of Subcontractors and Material Suppliers

No material, supplies, or equipment for the Work shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees upon completion of all Work to deliver premises, together with all improvements and appurtenances constructed or placed thereon by it, to District free from any claims, security interests, liens, or charges. Contractor further agrees that neither it nor any person, firm, or corporation furnishing any materials or labor for any Work covered by this Contract shall have any right to place a lien upon the premises or any improvement or appurtenance thereof, except that Contractor may install metering devices or other equipment of a utility company or political subdivision, title to which is commonly retained by the utility company or political subdivision. In event of installation of any such metering device or equipment, Contractor shall advise District as to its owner within five (5) days of such installation in writing, prior to making the installation.

Contractor agrees to indemnify, defend and hold the District harmless from any liens, stop notices, or assertion of security interests, including judgments and levies. If after written notice Contractor fails to address the lien, stop notice, or other security interest, the District may proceed to address the lien, stop notice or claim and seek reimbursement from Contractor.

3.3.9 Title to Materials

The title to new materials or equipment for the Work of this Contract shall remain with Contractor until incorporated in the Work of this Contract until final acceptance of the Project; no part of said materials shall be removed from its place of storage, and Contractor shall keep an accurate inventory of all said materials and equipment in a manner satisfactory to the District or its authorized representative. Responsibility for materials remains with Contractor and Contractor shall replace materials in case of loss. District similarly may pay for materials stored off site, but Contractor shall remain responsible for the materials that are stored off site.

3.3.10 Assemblies

For all material and equipment specified or indicated in the Drawings, the Contractor shall provide all labor, materials, equipment, and services necessary, (including engineering as specifically required with Shop Drawings or Deferred Approvals) for complete assemblies and complete working systems. Incidental items not indicated on the Drawings, nor mentioned in the Specifications, that can legitimately and reasonably be inferred to belong to the Work described, or be necessary in good practice to provide a complete assembly or system, shall be furnished as though itemized in the Contract Documents in every detail. In all instances, material and equipment shall be installed in strict accordance with each manufacturer's most recent published recommendations and Specifications.

3.3.11 Noise Control

The Contractor shall be responsible for the installation of noise reducing devices on construction equipment. Contractor shall comply with the requirements of the city and county having jurisdiction with regard to noise ordinances governing construction sites and activities. Construction equipment noise is subject to the control of the Environmental Protection Agency's Noise Control Program (Part 204 of Title 40, Code of Federal Regulations). If school is in session at any point during the progress of the Project, and, in the District's reasonable discretion, the noise from such Work disrupts or disturbs the students or faculty or the normal operation of the school, at the District's request, the Contractor shall schedule the performance of all such Work around normal school hours or make other arrangements so that the Work does not cause such disruption or disturbance. There are specific periods of testing at operational schools and it is critical that Contractor control noise during periods of testing. In no event shall Contractor have a right to receive additional compensation or an extension to the Contract time as a result of any such rescheduling or the making of such arrangements. These controls shall be implemented during site preparation and construction. All noise related issues, including school operations, and noise during testing should be detailed in the Schedule provided pursuant to Article 8.

3.3.12 Prevention and Reporting of Workplace Violence

3.3.12.1 *Statutory Requirements*. Each employer required by Labor Code Section 6401.7 to have in effect an Injury and Illness Prevention Plan ("IIPP") must also establish, implement and maintain a written Workplace Violence Prevention Plan in accordance with Labor Code Section 6401.9 ("WVPP"). The WVPP may be incorporated as a stand-alone section of the IIPP, or may be a separate document. As described in Subdivision (b)(2) of Section 6401.9, certain employers, employees, and places of employment may be exempt from the WVPP requirements. However, in accordance with Subdivision (b)(3) of Section 6401.9, and notwithstanding an applicable exemption, the California Department of Industrial Relations, Division of Occupational Safety and Health ("Cal OSHA") may issue special orders requiring compliance with WVPP requirements.

3.3.12.2 *Project WVPP*. Not later than five (5) days following receipt of the Notice of Award, and as a condition precedent to commencing any work or services on or at the Project Site, the Contractor shall provide to the District: (i) a complete and accurate copy of the Contractor's WVPP applicable to the Project ("Project WVPP"); and (ii) the name, position, and telephone number of each person having responsibility for implementing the Project WVPP and receiving reports of workplace violence, if and to the extent that information is not conspicuously specified in the Project WVPP. Notwithstanding the District's receipt of the Project WVPP and related information, and subject to coordination requirements specified in Section 3.3.12.3 herein, the Contractor shall at all times retain sole responsibility for: (i) implementing and maintaining the Project WVPP; and (ii) ensuring compliance with Project WVPP requirements by each subcontractor, consultant, supplier, and other entity under contract

with or otherwise subject to the Contractor's control that, for any length of time, will be present on or at the Project Site (each an "Other Employer").

3.3.12.3 *Coordination Requirements*. The Contractor shall implement procedures to effectively coordinate the Project WVPP with the District and all Other Employers, to ensure that they and their employees understand their respective roles in connection with the Project WVPP. Such procedures shall ensure that: (i) all employees are trained in regard to workplace violence prevention; (ii) each workplace violence incident involving any employee is reported, investigated, and recorded; and (iii) if any employee experiences a workplace violence incident, the Contractor shall record the information in a violent incident log and shall provide a copy of that log to the District upon request. In addition, and without limiting the foregoing, the Contractor, during weekly safety meetings conducted at the Project Site, shall reiterate the requirements of the Project WVPP and the procedures for reporting and logging workplace violent incidents, and for otherwise complying with requirements of the Project WVPP. The Contractor shall require that all employees who will be on or at the Project Site in connection with the Project (whether employed by the Contractor or any Other Employer) attend (and sign an attendance sheet for) the weekly safety meetings. If attendance at any weekly safety meeting reasonably is not possible with respect to any particular Other Employer (e.g., a supplier whose employee(s) will only temporarily be at the Project Site), the Contractor shall provide and describe directly to each such Other Employer and its applicable employee(s) the requirements of the Project WVPP and the procedures for reporting and logging workplace violent incidents, and for otherwise complying with requirements of the Project WVPP.

3.3.12.4 *Compliance and Indemnification.* In connection with the Project, and without limiting anything else in the Contract, the Contractor shall: (i) fully comply with all applicable requirements of the Project WVPP, Labor Code Section 6401.7, and Labor Code Section 6401.9 (collectively, the "IIPP and WVPP Requirements"); and (ii) ensure that all Other Employers fully comply with all applicable IIPP and WVPP Requirements. With respect to any and each failure by the Contractor or any of the Other Employers to full comply with all appliable IIPP and WVPP Requirements, and in accordance with Section 3.3.12 of these General Conditions, the Contractor shall indemnify, defend, and hold-harmless the District, the District's governing board and each individual member thereof, and the District's other officers, employees, agents and representatives, and each of them.

3.3.13 California Air Resources Board ("CARB")

3.3.13.1 Contractor shall comply, and shall ensure all subcontractors comply, with all applicable requirements of the most current version of the regulations imposed by the California Air Resources Board ("CARB") including, without limitation, all applicable terms of Title 13, California Code of Regulations Division 3, Chapter 9 and all pending amendments ("Fleet Regulation").

3.3.13.2 Throughout the Project, and for three (3) years thereafter, Contractor shall make available for inspection and copying any and all documents or information associated with Contractor's and its subcontractors' fleets including, without limitation, the Certificates of Reported Compliance ("CRCs"), fuel/refueling records, maintenance records, emissions records, and any other information the Contractor is required to produce, keep or maintain pursuant to the Fleet Regulation upon two (2) calendar days' notice from the District.

3.3.13.3 Contractor shall be solely liable for any and all costs associated with compliance with the Fleet Regulation as well as for any and all penalties, fines, damages, or costs associated with any and all violations, or failures to comply with the Fleet Regulation. Contractor shall defend, indemnify and hold harmless the District, its officials, officers, employees and agents free and harmless

from any claims, liabilities, costs, penalties or interest arising out of any failure or alleged failure to comply with the Fleet Regulation.

3.4 WARRANTY

The Contractor warrants to the District and Architect that material and equipment furnished under the Contract will be of the highest quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. Contractor's warranty to District includes, but is not limited to, the following representations:

3.4.1 In addition to any other warranties provided elsewhere, Contractor shall, and hereby does, warrant all Work after the date of Notice of Completion of Work by District and shall repair or replace any or all such Work, together with any other Work, which may be displaced in so doing that may prove defective in workmanship or materials within a one (1) year period from date of Final Completion which shall be no later than the final date of Punch List as noted at Article 9.11) without expense whatsoever to District, ordinary wear and tear, unusual abuse or neglect excepted. District will give notice of observed defects with reasonable promptness. Contractor shall notify District upon completion of repairs.

3.4.2 In the event of failure of Contractor to comply with above mentioned conditions within one week after being notified in writing, District is hereby authorized to proceed to have defects repaired and made good at expense of Contractor who hereby agrees to pay costs and charges therefore immediately on demand.

3.4.3 If, in the opinion of the District, defective Work creates a dangerous condition or requires immediate correction or attention to prevent further loss to the District, the District will attempt to give the notice required by this Article. If the Contractor cannot be contacted or does not comply with the District's requirements for correction within a reasonable time as determined by the District, the District may, notwithstanding the provisions of this article, proceed to make such correction or attention which shall be charged against Contractor. Such action by the District will not relieve the Contractor of the guarantee provided in this Article or elsewhere in this Contract.

3.4.4 This Article does not in any way limit the guarantee on any items for which a longer warranty is specified or on any items for which a manufacturer gives a guarantee for a longer period. Contractor shall furnish District all appropriate guarantee or warranty certificates upon completion of the project.

3.5 TAXES

Contractor will pay all applicable Federal, State, and local taxes on all materials, labor, or services furnished by it, and all taxes arising out of its operations under the Contract Documents. District is exempt from Federal Excise Tax, and a Certificate of Exemption shall be provided upon request.

3.6 PERMITS, FEES AND NOTICES

3.6.1 Payment

The Contractor shall secure and pay for all permits and governmental fees, licenses, and inspections necessary for proper execution and completion of the Work which are necessary after execution

of the Contract and are legally required by any authority having jurisdiction over the Project, except those required by the Division of the State Architect (DSA). District shall be responsible for all testing and inspection as required by the DSA on-site or within the distance limitations set forth in Article 13.5.2, unless a different mileage range is specified in the Supplemental Conditions.

3.6.1.1 *DSA Fees*. DSA policy is to charge CCD review fees for processing and approval of changes in the Plans and Specifications through the Construction Change Document process. Contractor is specifically directed to the current DSA IR A-30 which provides fee structure and charges that will be incurred for proceeding with respect to the CCD process, a process that must be followed for each change in the Plans and Specifications.

3.6.2 Compliance

The Contractor shall comply with and give notices required by any law, ordinance, rule, regulation, and lawful order of public authorities bearing on performance of the Work. Specifically, the Division of State Architect provides State oversight of the Project and enforcement of Title 24 rules and regulations. Contractor is directed to the DSA website. There will be local governmental oversight from City, County or both. Finally, Regional Water Quality Control Board, State Fire Marshall, local fire marshal, Department of Industrial Relations, Department of Labor Standards Enforcement, and Air Quality Management District (Local and State) are some of the agencies that provide oversight and may require specific permits, fees, or provide oversight over the Project. Contractor represents understanding and specialized knowledge of the rules governing school districts and Contractor shall maintain compliance over the applicable rules and will file all documents required in order to ensure compliance with State, local, and other rules that apply to the Project.

3.6.3 Responsibility

The Contractor shall perform all Work in conformance with every law, statute, ordinance, building code, rule, regulation or order. The Contractor shall assume full responsibility for such Work and shall bear the attributable cost of correction or project delay.

Pursuant to Title 24 Section 4-343(b):

> "Contractor shall carefully study the approved Plans and Specifications and shall plan a schedule of operations well ahead of time. ... All inconsistencies or items which appear to be in error in the Plans and Specifications shall be promptly called to the attention of the architect or registered engineer, through the inspector, for interpretation or correction."

To help Contractor plan its operations, Contractor is directed to study the current version of the DSA 152 Inspection Card Manual identifying the exact steps the Inspector is to follow in the review and sign off process for the DSA 152. The DSA 152 Inspection Card Manual provides specific detail as to the order of operations, review items and compliance items beyond the Specifications and Plans which are reviewed for DSA compliance. The most current version of this manual is located on DSA's website.

Contractor is also specifically directed to the time periods for posting of Special Inspection Reports and Inspector Notifications under DSA PR 13-01 since the timing of Inspection is not a Governmental Entity related delay.

3.7 SUBMITTALS REQUIRED AT THE COMMENCEMENT OF THE PROJECT

3.7.1 Requirements Within Ten (10) Calendar Days

Within ten (10) calendar days after Notice to Proceed, Contract shall submit the following:

3.7.1.1 Detailed Schedule of Values (See Article 9.2)

3.7.1.2 Submittal Listing and Schedule for Submittals

3.7.1.3 Critical Path Baseline Schedule (See Article 8)

3.7.2 Requirements Within Thirty-Five (35) Calendar Days

Within thirty-five (35) calendar days after Notice to Proceed, Contractor shall submit the following:

3.7.2.1 *All Submittals for the Project* except those specifically agreed upon by District and Architect, in writing, and shall be specifically incorporated into the Submittal section of the Schedule so as to not delay the Work. The agreement to allow a later Submittal does not mean that Article 3.3.7 is waived. Contractor shall order materials and ensure prices are honored and secured for the Project.

a. Structural Steel may be included as a later Submittal than 35 days if Structural Steel is a significant portion of the Work, at least one or some of the Project is a structural steel structural system, or as specifically agreed upon by the Architect or District.

b. It is specifically agreed that submissions of structural steel Submittals shall not be piecemeal (unless some portion is requested separately by the District or Architect), shall provide complete designs, shall be stamped by the structural steel Subcontractor, Contractor, and structural steel Subcontractor's structural engineer at time of submission and as further addressed in Article 3.9.

c. In no case shall the submission of structural steel Drawings delay the critical path for the schedule. If a Milestone is provided for submission of complete structural steel Shop Drawings then the date shall be no later than as set forth in the Milestone

3.7.2.2 *Exceptions to Submittal Within Thirty-Five (35) Days by Written Agreement*. A written request detailing the specific reasons for a submission later than 35 days due to complexity of design or non-critical path status of the Submittal shall be submitted at the time the Baseline Schedule is submitted. The Baseline Schedule shall not include a delayed Submittal until written agreement is provided. In addition to the request for providing a Submittal after the thirty-five (35) day period, a copy of the Contract with the Subcontractor who shall be performing the Submittal, a written statement from the Subcontractor verifying that work has commenced on the Submittal and providing Subcontractor's own schedule of Milestones and completion dates, and a corresponding Submittal designation in the Schedule as required under Article 8. Approval of a delayed Submittal shall not result in any increase in the Contract Price or result in an extension of time for the completion of the Project.

3.7.2.3 *Piecemeal Submissions of Submittals.* Piecemeal Submittals mean providing portions of Shop Drawings or Submittals as they are being completed. The submission of piecemeal Submittals results in the appearance of a submission when there is inadequate information for the Architect or Engineer to adequately review a submission. Piecemeal differs from submission of complete buildings or phases of buildings or complete assemblies. The Architect may agree to allow submission of single buildings or areas as long as the Submittals are complete. .

3.8 DOCUMENTS, SAMPLES, AND COMPUTER AT THE SITE

The Contractor shall maintain at the Site for the District one current copy of the California Building Code, Titles 19 and 24 of the California Code of Regulations, any other document required by DSA, and one record copy of the Drawings, Specifications, ***Bid Clarifications*** ~~Addenda~~, Change Orders, and other Modifications, in good order and marked currently to record changes and selections made during construction. In addition, the Contractor shall maintain at the Site approved Shop Drawings, Product Data, Samples, and similar required Submittals. These documents shall be available to the Architect and shall be delivered to the Architect for delivery to the District upon completion of the Work.

Contractor shall have an operational computer with internet access so Contractor can review and post documents as required for the Project, including but not limited to the filing and posting of DSA required documents for the Project.

Contractor shall be prepared to review documents posted to the DSA Project website.

3.9 SUBMITTALS INCLUDING SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

3.9.1 Definitions

3.9.1.1 *Deferred Approvals*. Approval of certain aspects of the construction may be deferred until the construction Contract has been awarded. To facilitate the design process, DSA grants Deferred Approval to the design and detailing of certain elements of the Project at the request of the Architect or Engineer of Record. Design elements that may be deferred may include, but are not limited to access floors, bleachers, elevator guide rails and related elevator systems, exterior wall systems - precast concrete, glass fiber reinforced concrete, etc., skylights, window wall systems, storefronts, stage rigging, and other systems as noted in the Contract Documents. (Also see Article 1.2.2.2 and 3.9.3)

3.9.1.2 *Shop Drawings.* The term "Shop Drawings" as used herein means Drawings, diagrams, equipment or product schedules, and other data, which are prepared by Contractor, Subcontractors, manufacturers, suppliers, or distributors illustrating some portion of the Work, and includes: illustrations; fabrication, erection, layout and setting Drawings; manufacturer's standard Drawings; schedules; descriptive literature, instructions, catalogs, and brochures; performance and test data including charts; wiring and control diagrams; and all other Drawings and descriptive data pertaining to materials, equipment, piping, duct and conduit systems, and methods of construction as may be required to show that the materials, equipment, or systems and their position conform to the requirements of the Contract Documents.

3.9.1.3 *Manufactured* applies to standard units usually mass-produced, and "Fabricated" means items specifically assembled or made out of selected materials to meet individual design requirements. Shop Drawings shall: establish the actual detail of all manufactured or Fabricated items, indicate proper relation to adjoining work, amplify design details of mechanical and electrical

systems and equipment in proper relation to physical spaces in the structure, and incorporate minor changes of design or construction to suit actual conditions.

3.9.1.4 *Submittals* is a term used interchangeably and sometimes refers to Shop Drawings, Product Data, and samples since all Subcontractor submissions are tracked in a Submittal Log and may include any of the noted items. However, generally, a Submittal is a manufacturer's product information and Product Data including description, characteristics, size, physical characteristics, and requirements to prepare the jobsite for receiving of the particular manufactured item.

3.9.1.5 *Samples*. The term "samples" as used herein are physical examples furnished by Contractor to illustrate materials, equipment, or quality and includes natural materials, Fabricated items, equipment, devices, appliances, or parts thereof as called for in the Specifications, and any other samples as may be required by the Architect to determine whether the kind, quality, construction, finish, color, and other characteristics of the materials, etc., proposed by the Contractor conform to the required characteristics of the various parts of the Work. All Work shall be in accordance with the approved samples.

3.9.2 Shop Drawings.

3.9.2.1 *When Shop Drawings Are Required.* Shop Drawings are required for prefabricated components and for installation and coordination of these prefabricated components into the Project. In addition, Shop Drawings, are prepared to address the actual size and installation of components from various Subcontractors and provides an opportunity for the Contractor to coordinate and address conflicts between the subcontracting trades. In some cases, each Subcontractor or trade will provide Shop Drawings in a BIM format or other format as agreed by District.

3.9.2.2 *Purpose for Shop Drawings.* Shop Drawings are the Contractor's manufacturer, Subcontractor, supplier, vendor or the Contractor's detailed drawings showing particularized method for assembly, specifics to a manufacturer, manufacturer component installation requirements, specifics as to a manufactured item, alterations to a manufactured, a custom created item, or drawn version of more detailed information expanding on the Architect's design shown in the Contact Documents. The Shop Drawings address the appearance, performance, size, weight, characteristics and prescriptive descriptions associated with the Contractor or Contractor's Subcontractor's plan for installation or assembly based on the design in the Specifications and Contract Documents. The Shop Drawing often is more detailed than the information shown in the Contract Documents to give the Architect and Engineer the opportunity to review the fabricator's version of the product (along with particulars specific to that particular product), prior to fabrication. References to the Contract Documents, Construction Documents, Drawings, Plans, and Specifications assist the Architect and Engineer in their review of the Shop Drawings. Attachment of manufacturer's material Specifications, "catalog cut sheets," and other manufacturer's information may be provided to accompany Shop Drawings. Because Shop Drawings facilitate the Architect's and Engineer's approval of the system, they should be as clear and complete as possible so they may be reviewed by Architect or Engineer for the Project.

3.9.2.3 *Shop Drawing Requirements.* The Contractor shall obtain and submit with Shop Drawings all seismic and other calculations and all Product Data from equipment manufacturers. "Product Data" as used herein are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate a material, product, or system for some portion of the Work.

3.9.2.4 *Not a Reproduction of Architectural or Engineering Drawings.* The Shop Drawings are not a reproduction of the architectural or engineering Drawings. Instead, they must show more detail than the Construction Documents and details the fabrication and/or installation of the items to the manufacturer's production crew or Contractor's installation crews.

3.9.2.5 *Shop Drawings Engineering Requirements*: Some Shop Drawings require an engineer stamp to be affixed on the Drawings and calculations. In such cases, a current and valid engineering stamp shall be affixed by a California registered engineer. No out of State engineers shall stamp Shop Drawings. (See DSA IR A-18). In most cases, an engineer means California registered mechanical, structural, electrical or plumbing engineer. California Registered Civil Engineers will not be accepted for structural details unless specifically approved by DSA.

3.9.2.6 *DSA Approvals Required Prior to Work.* No work on a Shop Drawing that requires DSA approval may proceed until DSA approval is received. Contractor has provided DSA approval time and allowed adequate time for corrections in Contractor's Schedule as required pursuant to Article 8.

3.9.2.7 *Shop Drawing Identification.* All Shop Drawings must be properly identified with the name of the Project and dated, and accompanied by a letter of transmittal referring to the name of the Project and to the Specification section number for identification of each item clearly stating in narrative form, as well as "clouding" all qualifications, departures, or deviations from the Contract Documents. Shop Drawings, for each section of the Work shall be numbered consecutively and the numbering system shall be retained throughout all revisions. All Subcontractor submissions shall be made through the Contractor. Each drawing shall have a clear space for the stamps of Architect and Contractor.

3.9.3 Deferred Approvals

Deferred approvals shall be submitted and processed to ensure all DSA and other governmental approvals are secured so as to not delay the Project. There may be additional requirements for Deferred Approvals at Division 1 of the Specifications. All Deferred Approvals shall be prepared by Contractor or Contractor's agent early enough so as to not delay the Project. Contractor is aware that Title 24 California Code of Regulations Section 4-317 have specific requirements for Deferred Approval as to governing agencies and as to the Architect and Engineer for the Project. As a result, any delay associated with the time for approval by applicable agencies or by the Architect or Architect's consultants shall be Contractor's. Contractor is required to comply with inclusion of Deferred Approvals in the Schedule as required under Article 3.9.6*DSA Approvals Required Prior to Work.* No work on a Deferred Approval item may proceed on the components until DSA approval is received. Contractor has provided DSA approval time and allowed adequate time for any DSA revisions in Contractor's Schedule as required pursuant to Article 8.

3.9.4 Submittals and Samples

3.9.4.1 *Information Required With Submittals*: Manufacturer, trade name, model or type number and quantities: Information provided must be of sufficient detail to allow Architect and Engineer to compare the submitted item with the specified products and acceptable products listed, in the Specifications and ***bid clarifications*** ~~addenda~~.

3.9.4.2 *Description of Use and Performance Characteristics*: Information should be furnished describing the normal use and expected performance of the product. The Architect and Contractor review this information to confirm that the product is appropriate for the intended use.

3.9.4.3 *Size and Physical Characteristics:* The size and physical characteristics, such as adjustment capabilities, which is reviewed by both the Contractor and Architect. The Contractor has the most available information for comparing adjoining materials and equipment. The Contractor also needs to know the size and weight of the equipment for lifting and handling considerations.

3.9.4.4 *Finish Characteristics:* The Architect reviews the available finishes and selects the appropriate finish, if the finish was not previously specified in the documents. The Contractor should confirm that finish requirements in the Specifications are being met by the product.

3.9.4.5 *Contractor Responsible for Jobsite Dimensions*: Some material is custom-Fabricated to job conditions, requiring dimensions from the jobsite. These jobsite dimensions are provided by the Contractor as part of the Contractor's responsibilities for the Project and shall be provided prior to release of the product for manufacture. Contractor shall not rely on Architect or Engineers to provide jobsite dimensions.

3.9.4.6 *Full Range of Samples Required (When Specific Items Not Specified).* Except in cases where the exact color and type of item is specified since the District is utilizing items Standardized or pre-selected by District, the full range of color, graining, texture, or other characteristics are anticipated for review in finished products, a sufficient number of samples of the specified materials shall be furnished by the Contractor to indicate the full range of characteristics which will be present in the finished products. Products delivered or erected without Submittal and approval without providing a full range of samples shall be subject to rejection. Except for range samples, and unless otherwise called for in the various sections of the Specifications or Specification Section 1, samples shall be submitted in duplicate.

3.9.4.7 *Labeling of Samples.* All samples shall be marked, tagged, or otherwise properly identified with the name of the submitting party, the name of the Project, the purpose for which the samples are submitted and the date.

3.9.4.8 *Transmittal letter.* All samples shall be accompanied by a letter of transmittal containing similar information, together with the Specification section number.

3.9.4.9 *Labels and Instructions.* All samples of materials shall be supplied with the manufacturer's descriptive labels and application instructions. Each tag or sticker shall have clear space for the review stamps of Contractor and Architect.

3.9.4.10 *Architect's Review.* The Architect will review and, if appropriate, approve submissions and will return them to the Contractor with the Architect's stamp and signature applied thereto, indicating the timing for review and appropriate action in compliance with the Architect's (or District's) standard procedures. In the cases where a CM is hired by the District, CM may be the party that receives and performance logging and initial processing of the Samples. CM may, in some cases, reject samples that are not in conformance with Contract requirements.

3.9.5 Submittal Submission Procedure

3.9.5.1 *Transmittal Letter and Other Requirements.* All Submittals must be properly identified with the name of the Project and dated, and each lot submitted must be accompanied by a letter of transmittal referring to the name of the Project and to the Specification section number for identification of each item clearly stating in narrative form, as well as "clouding" on the submissions, all qualifications, departures, or deviations from the Contract Documents. Shop Drawings, for each section of the Work shall be numbered consecutively and the numbering system shall be retained throughout all

revisions. All Subcontractor submissions shall be made through the Contractor. Each drawing shall have a clear space for the stamps of Architect and Contractor. Refer to Division 1. In the case where a CM is hired on the Project, the CM may be designated to receive the Submittals for the Project, log the Submittals, and in some cases reject Submittals that do not conform to Contract requirements. Submittal Procedures for further information.

3.9.5.2 *Copies Required.* Each Submittal shall include one (1) legible, reproducible (if electronic is available, electronic copies shall also be provided) and five (5) legible prints of each drawing or schedule, table, cut sheet, etc., including fabrication, erection, layout and setting drawings, and such other drawings as required under the various sections of the Specifications, until final acceptance thereof is obtained. Subcontractor shall submit copies, in an amount as requested by the Contractor, of: (1) manufacturers' descriptive data for materials, equipment, and fixtures, including catalog sheets showing dimensions, performance, characteristics, and capacities; (2) wiring diagrams and controls; (3) schedules; (4) all seismic calculations and other calculations; and (5) other pertinent information as required by the District or Architect. (See also Division 1)

3.9.5.3 *Corrections.* The Contractor shall make all corrections required by Architect, District or CM and shall resubmit, as required by Architect or CM, corrected copies of Shop Drawings or new samples until approved. Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections required by the Architect on previous submissions. Professional services required for more than one (1) re-review of required Submittals of Shop Drawings, Product Data, or samples are subject to charge to the Contractor pursuant to Article 4.5.

3.9.5.4 *Approval Prior to Commencement of Work.* No portion of the Work requiring a Shop Drawing or sample submission or other Submittal shall be commenced until the submission has been reviewed by Contractor and Architect (and CM, if applicable) and approved by Architect (and CM where applicable) unless specifically directed in writing by the Architect. All such portions of the Work shall be in accordance with approved Shop Drawings and samples.

3.9.5.5 *District's Property.* All Submittals, Shop Drawings, computer disks, BIM modeling information, clash checks, schedules, annotated Specifications, samples and other Submittals shall become the District's property upon receipt by the District or Architect.

3.9.6 Schedule Requirements for Submittals

Contractor shall obtain and shall submit all required Submittals (i.e. Shop Drawings, Deferred Approvals, Samples, etc.), in accordance with Contractor's "Schedule for Submission of Shop Drawings and Samples" as required in the scheduling portion of the General Conditions at Articles 8 and the Specifications (as long as the Specifications do not conflict with General Conditions. In the case of conflict, the conflicting provision shall be controlled by the General Conditions and the remaining Specifications sections shall be interpreted as if the general conditions language is inserted) with such promptness as to cause no delay in its own Work or in that of any other contractor or subcontractor but in no event later than thirty five (35) days after the Notice to Proceed is issued except in the specific cases noted as an exception under Article 3.7.2.1. No extensions of time will be granted to Contractor or any Subcontractor because of its failure to have Shop Drawings and samples submitted in accordance with Division 1 and the Schedule. Each Subcontractor shall submit all Shop Drawings, samples, and manufacturer's descriptive data for the review of the District, the Contractor, and the Architect through the Contractor.

3.9.6.1 *Consideration of Schedule.* Contractor has considered lead times, DSA or other agency governmental review times, Architect or Engineer review times, manufacturing seasons, and specific long lead procurement concerns for all submittals for the Project.

3.9.7 General Submittal Requirements

3.9.7.1 *Contractor Submittal Representations and Coordination.* By submitting Shop Drawings, Product Data, samples, etc., the Contractor represents that it has determined and verified all materials, field measurements, catalog numbers, related field construction criteria, and other relevant data in connection with each such submission, and that it has checked, verified, and coordinated the information contained within such Submittals with the requirements of the Work and of the Contract Documents, including the construction schedule.

3.9.7.2 *Contractor Coordination.* Contractor shall stamp, sign, and date each Submittal indicating its representation that the Submittal meets all of the requirements of the Contract Documents and evidence Contractor's review through execution of the following stamp to be placed on each Shop Drawings:

> "[Contractor] has reviewed and approved the field dimensions and the construction criteria, and has also made written notation regarding any information in the Shop Drawings and Submittals that does not conform to the Contract Documents. This Shop Drawing or Submittal has been coordinated with all other Shop Drawings and Submittals received to date by me as Contractor and this duty of coordination has not been delegated to Subcontractors, material suppliers, the Architect, or the Engineers on this Project.
>
> _____
> Signature of Contractor and date

3.9.7.3 *No Deviation from Contract Documents.* The submission of the Shop Drawings, Product Data, samples, etc., shall not deviate from the *requirem*ents of the Contract Documents including detailing and design intent which is specifically outlined in Contract Documents except as specifically authorized by the Architect or through an accepted substitution pursuant to Article 3.10.4. All deviations from the Contract Documents shall be narratively described in a transmittal accompanying the Shop Drawings. However, Shop Drawings shall not be used as a means of requesting a substitution, the procedure for which is defined in Article 3.10.4, "Substitutions."

3.9.7.4 *Contractor Responsibility for Shop Drawings Conformance to Contract Documents*. Review by District and Architect shall not relieve the Contractor or any Subcontractor from its responsibility in preparing and submitting proper Shop Drawings in accordance with the Contract Documents.

3.9.7.5 *Incomplete Submittals.* Any submission, which in Architect's opinion is incomplete, contains errors, or has been checked superficially, will be returned not reviewed by the Architect for resubmission by the Contractor. Refer to Submittal Procedures of the Specifications for additional information. The Contractor shall be responsible for any related delays and shall not be the basis for any Claim.

3.9.7.6 *Shop Drawings and Submittals Shall Not Be Used as a Method to Make a Substitution.* Shop Drawings and Submittals shall not be used as a means of requesting a substitution or to make changes in the Contract Documents. If changes are made to the Contract Documents through the

Shop Drawings, the Architect shall have the right to reject the Submittal. If the Architect does not note the deviation from the approved Plans and Specifications, the Contractor is still responsible for the change and the Architect or the District may require the Shop Drawings be revised to properly reflect the approved Contract Documents. The Architect or District may also require that the Contractor bear all costs under Article 4.5 and consequential damages associated with a CCD to revise Plans and Specifications to accommodate the deviation from approved Plans and Specifications.

3.9.7.7 Extent of Review. In reviewing Shop Drawings, the Architect will not verify dimensions and field conditions. The Architect will review and approve Shop Drawings, Product Data, samples, etc., for aesthetics and for conformance with the design concept of the Work and the information in the Contract Documents. The Architect's review shall neither be construed as a complete check which relieves the Contractor, Subcontractor, manufacturer, fabricator, or supplier from responsibility for any deficiency that may exist or from any departures or deviations from the requirements of the Contract Documents unless the Contractor has, in writing, called the Architect's attention to the deviations at the time of submission. The Architect's review shall not relieve the Contractor or Subcontractors from responsibility for errors of any sort in Shop Drawings or schedules, for proper fitting of the Work, coordination of the differing Subcontractor trades and Shop Drawings and Work which is not indicated on the Shop Drawings at the time of submission of Shop Drawings. Contractor and Subcontractors shall be solely responsible for any quantities which may be shown on the Submittals or Contract Documents.

3.10 SUBSTITUTIONS

3.10.1 Definition

A Substitution is a change in product, material, equipment, or method of construction from those required by the Construction Documents proposed by the Contractor. For this Project, a Substitution is subject to the filing of a Construction Substitution Request Form at the time of bid and meeting the requirements of this Article.

3.10.2 One Product Specified

Unless the Specifications state that no substitution is permitted, whenever the Contract Documents indicate any specific article, device, equipment, product, material, fixture, patented process, form, method, or type of construction or any specific name, make, trade name, or catalog number, with or without the words "or equal," such specification shall be deemed to be used for the purpose of facilitating description of the material, process, or article desired and shall be deemed to be followed by the words "or equal." Subject to the requirements of properly submitting a Substitution Request for as Addressed in Article 3.10.4, the Contractor may, unless otherwise stated, offer any material, process, article, etc., which shall be materially equal or better in every respect to that so indicated or specified ("Specified Item") and will completely accomplish the purpose of the Contract Documents.

3.10.3 Products Specified Which Are Commercially Unavailable

If the Contractor fails to make a request for substitutions for products, prior to the submission of its bid, and such products subsequently become commercially unavailable, the Contractor may request a substitution for such commercially unavailable item. The decision to grant this request is solely at the District's discretion. The written approval of the District, consistent with the procedure for Change Orders, shall be required for the use of a proposed substitute material. The District may condition its approval of the substitution upon the delivery to District of an extended warranty or other assurances of adequate performance of the substitution as well as an equitable deduction in the Contract Price should the

substituted item cost less than the Specified Item. All risks of delay due the approval of a requested substitution by the DSA, or any other governmental agency having jurisdiction, shall be on the requesting party. All additional costs, DSA review costs, all procurement and construction delays, and all costs for review by the Architect or its consultants shall be the responsibility of the Contractor and will be deducted from Contractor's pay request.

3.10.4 Substitution Request Form

Requests for substitutions of products, materials, or processes in place of a Specified Item must be in writing on the District's Substitution Request Form ("Request Form") at the time of submitting bids to the District, except as provided for in Article 3.10.3.

The Request Form must be accompanied by evidence as to whether the proposed substitution:

a. Is equal in quality/service/ability to the Specified Item;

b. Will entail no changes in detail, construction, and scheduling of related work;

c. Will be acceptable in consideration of the required design and artistic effect;

d. Will provide no cost disadvantage to the District;

e. Will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts; and

f. Will required no change of the construction schedule.

In completing the Request Form, the bidder must state, with respect to each requested substitution, whether the bidder will agree to provide the Specified Item in the event that the District denies the bidder's request for such requested substitution. In the event that the bidder has agreed in the Request Form to provide the Specified Item and the District denies the bidder's requested substitution for a Specified Item, the bidder shall provide the Specified Item without any additional cost or charge to the District.

After bids are opened, the apparent lowest bidder shall provide, within five (5) days of opening such bids, any and all Drawing, Specifications, samples, performance data, calculations, and other information, as may be required to assist the Architect, CM and the District in determining whether the proposed substitution is acceptable. The burden of establishing these facts shall be upon the bidder.

After the District's receipt of such evidence by the bidder, the District will make its final decision as to whether the bidder's request for substitution for any Specified Items will be granted. The decision as to whether a proposed request for substitution is equal to a Specified Item shall be at the sole discretion of the District. Any request for substitution that is granted by the District shall be documented and processed though a Change Order. Contractor must submit a complete Submittal of the requested substitution and a Shop Drawing showing configuration, dimensions, and other critical information associated with the substitution that meets the requirements of Article 3.9. The District may condition its approval of any substitution upon delivery to the District of an extended warranty or other assurances of adequate performance of the substitution. Any and all risks of delay due to approval by the DSA or any other governmental agency having jurisdiction shall be on the bidder.

If the Architect and District accept a proposed substitution, the Contractor agrees to pay for all DSA review costs, engineering and design services, including, without limitation, compensation to the Architect and affected engineers for their required time to process such substitution through the Division of the State Architect, if required, and to make all changes and adjustments in materials or the work of all trades directly or indirectly affected by the substituted item or items at no cost to the District.

3.10.5 Substitution Requests After Bid

The District, in its sole discretion, may accept a request for substitution by the Contractor or may request Contractor substitute a specified item. Any substitutions requested after bids are opened shall be subject to the same conditions and requirements set forth in Article 3.10.4 above. If any substitutions, that in the District or Architect's determination, results in a credit to the District, the credit amount shall be agreed upon in writing, otherwise, the request for substitution shall be deemed denied.

3.11 INTEGRATION OF WORK

3.11.1 Scope

The Contractor shall be responsible for cutting, fitting, or patching to complete the Work and to make all parts fit together properly. Contractor shall be responsible for ensuring that all trades are coordinated and scheduled so as to ensure the timely and proper execution of the work. When modifying existing work or installing new Work adjacent to existing work, Contractor shall match, as closely as conditions of Site and materials will allow, the finishes, textures, and colors of the original work, refinishing existing work at no additional cost to District. All cost caused by defective or ill-timed work shall be borne by Contractor. Contractor shall be solely responsible for protecting existing work on adjacent properties and shall obtain all required permits for shoring and excavations near property lines.

3.11.2 Structural Members

New or existing structural members and elements, including reinforcing bars and seismic bracing, shall not be cut, bored, or drilled except by written authority of the Architect. Work done contrary to such authority is at the Contractor's risk and subject to replacement at its own expense without reimbursement under the Contract. Schedule delays resulting from Agency approvals for unauthorized work shall be the Contractor's responsibility.

3.11.3 Subsequent Removal

Permission to patch any areas or items of the Work shall not constitute a waiver of the District's or the Architect's right to require complete removal and replacement of the areas of items of the Work if, in the opinion of the Architect or the District, the patching does not satisfactorily restore quality and appearance of the Work or does not otherwise conform to the Contract Documents.

3.12 CLEANING UP

3.12.1 Contractor's Responsibility to Clean Up

Contractor at all times shall keep premises free from debris such as waste, dust, excess water, storm water runoffs, rubbish, and excess materials and equipment. Contractor shall not leave debris under, in, or about the premises, but shall promptly remove same from the premises and dispose of it in a

lawful manner. Disposal receipts or dump tickets shall be furnished to the Architect within five (5) days of request.

Contractor shall remove rubbish and debris resulting from the Work on a daily basis. Contractor shall maintain the structures and Site in a clean and orderly condition at all times until acceptance of the Project by the District. Contractor shall keep its access driveways and adjacent streets, sidewalks, gutters and drains free of rubbish, debris and excess water by cleaning and removal each day. All concrete, sidewalks, and paths of travel shall be broom cleaned daily.

3.12.2 General Final Clean-Up

Upon completion of Work, Contractor shall employ experience workers or professional cleaners for final cleaning. Contractor shall clean each surface to the condition expected in a normal, commercial, building cleaning and maintenance program including, but not limited to, the performance of the following:

a. Clean interior and exterior of buildings, including fixtures, equipment, walls, floors, ceilings, roofs, window sills and ledges, horizontal projections, and any areas where debris has collected, so surfaces are free from foreign material or discoloration;

b. Clean the Project site. The grounds should be cleared of any Contractor equipment, raked clean of debris and trash removed. Sweep paved areas broom clean;

c. Repair or replace any damaged materials. Replace any chipped or broken glass;

d. Remove any and all stains;

e. Remove labels that aren't permanent labels;

f. Clean and polish all glass, plumbing fixtures, equipment, finish hardware and similar finish surfaces. Remove any glazing compounds;

g. Remove temporary utilities, fencing, barricades, planking, sanitary facilities and similar temporary facilities from Site;

h. Remove temporary film that remains on any hardware, doors or other surfaces; and

i. Seal the bottom and tops of all doors.

3.12.3 Special Clean-Up.

In addition to the general cleaning, the following special cleaning shall be done at the completion of the Work in accordance with the Specifications including, but not limited to:

a. Remove putty stains from glazing, then wash and polish glazing;

b. Remove marks, stains, fingerprints and other soil or dirt from painted, stained or decorated work;

c. Remove temporary protection and clean and polish floors and waxed surfaces;

d. Clean and polish hardware and plumbing trim; remove stains, dust, dirt, plaster and paint;

e. Wipe surfaces of mechanical and electrical equipment;

f. Remove spots, soil, plaster and paint from tile work, and wash tile;

g. Clean all fixtures and equipment, remove excess lubrication, clean light fixtures and lamps, polish metal surfaces;

h. Vacuum-clean carpeted surfaces; and

i. Remove debris from roofs, down spout and drainage system.

3.12.4 Failure to Cleanup

If the Contractor fails to clean up as provided in the Contract Documents, the District may do so, and the cost thereof shall be the responsibility of the Contractor pursuant to Article 2.2 and seek a Deductive Change Order.

3.13 ACCESS TO WORK

The Contractor shall provide the District, the Architect, Engineers and the Inspector of Record, access to the Work in preparation and progress wherever located. Contractor shall provide safe and proper facilities for such access so that District's representatives may perform their functions.

CONTRACTOR IS AWARE THAT THIS CONTRACT MAY BE SPLIT INTO SEVERAL PHASES AS ADDRESSED IN ARTICLE 6.

3.13.1 Special Inspection, Inspections or Tests Out of State, Out of Country or Remote from Project

If Contractor has a Subcontractor or supplier that requires in plant or special inspections or inspections or tests that are out of the country, out of the state, or a distance of more than 200 miles from the Project site, the Special Inspector or Inspector shall be provided access so the special inspection or inspection may occur in the remote location. In some cases, the DSA Inspector may also require access in addition to Special Inspectors and individuals performing tests. Inspections/tests shall occur during normal work hours. (See also Article 4.3.6)

3.14 ROYALTIES AND PATENTS

3.14.1 Payment and Indemnity for Infringement

Contractor shall hold and save the District and its officers, agents, and employees, the Construction Manager, the Architect, and the Architect's consultants harmless from liability of any nature or kind, including cost and expense, for or on account of any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the District, unless otherwise specifically provided in the Contract Documents, and unless such liability arises

from the sole negligence, or active negligence, or willful misconduct of the District, the Architect, or the Architect's consultants.

3.14.2 Review

The review by the Architect of any method of construction, invention, appliance, process, article, device, or material of any kind shall be for its adequacy for the Work and shall not be an approval for the use by the Contractor in violation of any patent or other rights of any person or entity.

3.15 INDEMNIFICATION

3.15.1 Contractor

See Agreement Form. Contractor shall ensure that its contract with each of its Subcontractors contains provisions requiring the Subcontractors to defend, indemnify and hold harmless the District, Architect, Inspector, the State of California to a minimum level as set forth in this Article and consistent with the indemnity and hold harmless language in the Agreement Form.

3.16 SUBMISSION OF DAILY REPORTS

3.16.1 General

By 10:00 a.m. on the following business day, the Contractor shall submit a Daily Report to the Inspector and copy the Architect for the previous day's Work. If there is a Construction Manager, the original Daily Report is to be provided to the Construction Manager and copies sent to the Architect and the Inspector. Daily Reports shall be prepared on forms approved by the District, together with applicable delivery tickets, listing all labor, materials, and equipment involved for that day. The District reserves the right to note inconsistencies or inaccuracies in the Daily Reports. In such cases, pertinent notes shall be entered by each party to explain points which cannot be resolved that day. Each party shall retain a signed copy of the report. Daily Reports by Subcontractors or others shall be submitted through the Contractor.

3.16.2 Labor

The Daily Report shall show names of workers, classifications, hours worked and hourly rate. The locations where work occurred shall also be identified in the Daily Report. Project superintendent expenses are not allowed.

3.16.3 Materials

The Daily Report required shall describe and list quantities of materials used and unit costs.

3.16.4 Equipment

The Daily Report required shall show type of equipment, size, identification number, and hours of operation, including loading and transportation, if applicable, and hourly/daily cost. Move-on and move-off fees shall be noted.

3.16.5 Other Services and Expenditures

Other services and expenditures shall be described in the Daily Report in detail as the District requires.

3.16.6 Failure to Submit Daily Report

If Contractor does not submit its Daily Report by 10 am the next business day, the Inspector of Record shall prepare a Daily Report addressing each of the above items. The cost for the Inspector's services to prepare the Daily Report shall be addressed through a Deductive Change Order under Article 7.7.4.

3.17 AS-BUILT DRAWINGS AND ANNOTATED SPECIFICATIONS

Throughout the duration of the Project, Contractor shall maintain on a current basis an accurate and complete set of As-Built Drawings (and Annotated Specifications) clearly showing all changes, revisions to Specifications and substitutions during construction, including, without limitation, field changes and the final location of all electrical and mechanical equipment, utility lines, ducts, outlets, structural members, walls, partitions, and other significant features. In case a Specification allows Contractor to elect one of several brands, makes, or types of material or equipment, the annotations shall show which of the allowable items the Contractor has furnished. The Contractor will update the As-Built Drawings and Annotated Specifications as often as necessary to keep them current, but no less often than weekly.

Contractor shall update As-Built Drawings with complete information on an area of Work at or near the time when the Work is being performed and prior to any DSA 152 sign off and prior to any Work being covered.

The As-Built Drawings and Annotated Specifications shall be kept at the Site and available for review and inspection by the District and the Architect. Failure to maintain and update the As-Built Drawings is a basis to withhold Progress Payments pursuant to Article 9.6.

3.17.1 Upon Beneficial Occupancy

Contractor shall obtain and pay for reproducible Plans upon Beneficial Occupancy. Contractor shall deliver Plans to District Representative (Construction Manager if one is hired for the Project).

3.17.2 As-Builts at Completion of Work

Upon completion of the Work and prior to and as a condition precedent to Application for Retention Payment, the Contractor will provide one neatly prepared and complete set of As-Built Drawings and Annotated Specifications to the District. Contractor shall certify the As-Builts as a complete and accurate reflection of the actual construction conditions of the Work by affixing a stamp indicating the Drawings are As-Builts and certifying accuracy on the final set of As-Builts. Failure to deliver a complete As-Built set of Drawings may result in significant withholdings to ensure Work is properly documented. (See Article 9.9.2)

3.17.3 Log of Control and Survey Documentation

Contractor shall complete and maintain an accurate log or all control and survey documentation for the Project as the Work progresses. All reference and control points shall be recorded

on the As-Built Drawings. The basis of elevations shall be one of the established benchmarks that must be maintained on the As-Builts.

3.17.4 Record Coordinates for Key Items

Contractor shall record, by coordinates, all utilities on-site with top of pipe elevations, major grade and alignment changes, rim, grate or top of curb and flow line elevations of all drainage structures and sewer manholes. Contractor shall update record information at or near the time when work is occurring in an area and prior to DSA 152 sign off on any category of Work and prior to covering the Work.

3.17.5 BIM As-Built Drawings

If BIM is utilized for the Project, then an electronic version of such As-Built Drawings and Annotated Specifications will be delivered to District (in an acceptable format to District).

3.18 EQUIPMENT MANUALS

Contractor shall obtain and furnish three (3) complete sets of manuals containing the manufacturers' instructions for maintenance and operation of each item of equipment and apparatus furnished under the Contract Documents and any additional data specifically requested under the various sections of the Specifications for each division of the Work. The manuals shall be arranged in logical, sequential order, labeled, indexed, and placed in three-ring binders. At the completion of its Work, the Contractor shall certify, by endorsement thereon, that each of the manuals is complete, accurate, and covers all of its Work. Prior to submittal of Contractor's Application for Retention Payment, and as a further condition to its approval by the Architect, each Subcontractor shall deliver the manuals, arranged in logical, sequential order, labeled, indexed, endorsed, and placed in three-ring binders, to the Contractor, who shall assemble these manuals for all divisions of the Work, review them for completeness, and submit them to the District through the Architect.

3.19 DIR REGISTRATION

Strict compliance with all DIR registration requirements in accordance with Labor Code sections 1725.5 and 1771.1 is a material obligation of the Contractor and all of its subcontractors (of any tier) under the Contract Documents. The foregoing includes, without limitation, compliance with DIR registration requirements at all times during performance of the Work by the Contractor and all of its subcontractors of any tier. The failure of the Contractor and all subcontractors of any tier to be properly registered with DIR at all times during performance of the Work is a material breach of the Contract and subject to termination for cause.

An affirmative and ongoing obligation of the Contractor under the Contract Documents is the verification that all subcontractors of any tier are at all times during performance of the Work are in full and strict compliance with the DIR registration requirements. The Contractor shall not permit or allow any subcontractor of any tier to perform any Work without the Contractor's verification that all subcontractors are in full and strict compliance with the DIR registration requirements. Any subcontractors of any tier not properly registered with DIR shall be substituted in accordance with Labor Code section 1771.1. Contractor or its subcontractors of any tier shall not be entitled to any additional costs or time arising from or in any way related to compliance with the DIR registration requirements.

ARTICLE 4
ADMINISTRATION OF THE CONTRACT AND CLAIMS

4.1 ARCHITECT

4.1.1 Replacement of Architect

In the case of the termination of the Architect, the District may appoint an Architect or another construction professional or may perform such functions with its own licensed professional personnel. The status of the replacement Architect under the Contract Documents shall be the same as that of the former Architect.

4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

4.2.1 Status

Pursuant to Titles 2 of the California Code of Regulations and as required pursuant to the Field Act, Education Code 17280 et seq., the Architect will provide administration of the Contract Documents and the Work, and will be the District's representative during construction, as well as during the one (1) year period following the commencement of any warranties. The Architect will have authority to act on behalf of the District only to the extent provided in the Contract Documents.

4.2.2 Site Visits

The Architect will visit the Site at intervals necessary in the judgment of the Architect to become generally familiar with the progress and quality of the Work and to determine in general if the Work is being performed in accordance with the Contract Documents and as otherwise required by DSA.

4.2.3 Limitations of Construction Responsibility

The Architect, District and CM shall not have control over, charge of, or be responsible for construction means, methods, techniques, schedules, sequences or procedures, fabrication, procurement, shipment, delivery, receipt, installation, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility under the Contract Documents. The Architect, District and CM shall not be responsible for the Contractor's, Subcontractors', material or equipment suppliers', or any other person's schedules or failure to carry out the Work in accordance with the Contract Documents. The Architect, District and CM shall not have control over or charge of acts or omissions of the Contractor, Subcontractors, their agents or employees, or any other persons or entities performing or supplying portions of the Work. The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect, District or CM in the Architect, District or CM's administration of the Contract Documents, or by tests, inspections, or approvals required or performed by persons other than the Contractor.

4.2.4 Communications Facilitating Contract Administration

Except where a CM is on the Project, or as otherwise provided in the Contract Documents or when direct communications are warranted by special circumstances, the District and the Contractor shall communicate through the Architect. In the cases where a CM is hired for the Project, all

communication shall be through the CM (unless otherwise directed) with copies to the District, Architect and Inspector. Where direct communication is necessary between the District and the Contractor, the District's communication shall be through the District's authorized designated person. The Architect and CM shall be promptly informed, and shall receive copies of all written communications. Contractor shall not rely upon any communications from the District that is not from the District's Representative. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material or equipment suppliers shall be through the Contractor. In the case where a CM is hired for the Project, the CM shall be the main point of contact for communication of information. Copies should be sent to the Architect, District Representative and Inspector.

4.2.5 Payment Applications

The Architect will review and make recommendations to the District regarding the amounts due the Contractor on the Certificates for Payment pursuant to Article 9.3.4and subject to the Inspector's review, (CM review, if applicable) and Architect's observation. This review of Payment Applications is sometimes called a "Pencil Draft." Return of a Pencil Draft shall constitute the District's dispute of the Payment Application that has been submitted. Contractor shall promptly respond to Pencil Drafts or Contractor's Payment Applications may be delayed. Contractor's failure to promptly respond to a Pencil Draft shall qualify as a delay in the Prompt Payment of a Request for Payment or Request for Retention.

4.2.6 Rejection of Work

In addition to the rights, duties, and obligations of the Inspector under this Article, the Architect may recommend to the District that the District reject Work which does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable to achieve the intent of the Contract Documents, the Architect (and/or CM) may recommend to the District that the District require additional inspection or testing of the Work in accordance with Article 13.5, whether or not such Work is Fabricated, installed, or completed. District may have Non-conforming Work removed and replaced pursuant to Article 9.7. However, neither this authority of the Architect (or CM) nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect (or CM) to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work.

Contractor shall, without charge, replace or correct Work found by the District to not be in conformance to Contract requirements. Contractor shall promptly segregate and remove rejected materials from the Project site.

This section is does not address a Notice of Non-Compliance and the remedies associated with a Notice of Non-Compliance which are addressed at Article 7.1.2

4.2.7 Warranties upon Completion

The Architect (and where applicable CM), in conjunction with the Inspector will conduct field reviews of the Work to determine the date of Substantial Completion and of Final Completion, shall receive and forward to the District for the District's review written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment when the Architect believes the Work has been completed in compliance with the requirements of the Contract Documents (See Article 9.11 for Close-Out). The handling by the Architect (or where applicable CM) of such warranties, maintenance manuals, or similar documents shall not diminish or transfer to the

Architect any responsibilities or liabilities required by the Contract Documents of the Contractor or other entities, parties, or persons performing or supplying the Work.

On some Projects, the District will take a phased occupancy of the Project. In those cases, the District may commence the running of warranties on the buildings, or phases that are accepted after Punch List is completed and the District has accepted Completion of the separate phase. A separate Notice of Completion may be filed for the separate building or phase of work and warranties shall commence for the separate phase only to the extent that warranties do not require coordination or connection to other buildings or other parts of the site and only if the warranted item is completed to its entirety in the segregated building or phased area.

If written warranties are not provided at the time the Punch List is nearing completion, Architect (with recommendations from the CM and Inspector) shall determine the dollar value of the warranties and shall make recommendation for withholdings necessary to effectuate the transfer of such warranties to the District for future use as part of the Punch List for the Project pursuant to Article 9.6.

Warranties are not commenced through utilizing of equipment for testing and operation as necessary to acclimate buildings or where necessary to test systems.

4.2.8 Interpretation

The Architect will interpret and decide matters concerning performance and requirements of the Contract Documents. Architect shall make clarifications as necessary to interpret the Contract Documents.

4.3 PROJECT INSPECTOR

4.3.1 General

One or more Project Inspectors employed by the District and approved by the Division of the State Architect will be assigned to the Work in accordance with the requirements of Title 24 of the California Code of Regulations. The Inspector(s) duties are as specifically defined in Title 24 Section 4-333 and 4-342 and in DSA IR A-8.

4.3.2 Inspector's Duties and DSA Noted Timelines for Inspection

All Work shall be under the observation of the Inspector. Contractor shall establish a protocol for requesting inspection with Inspector so as to not delay the Work and provide adequate time for the Inspector to perform inspection. If such a protocol is not established ahead of time, Inspector may utilize the time criteria set by Title 24 of 48 hours in advance of submitting form DSA 156 for each new area. The Inspector shall have free access to any or all parts of the Work at any time. The Contractor shall furnish the Inspector such information as may be necessary to keep the Inspector fully informed regarding progress and manner of Work and character of materials. Such observations shall not, in any way, relieve the Contractor from responsibility for full compliance with all terms and conditions of the Contract, or be construed to lessen to any degree the Contractor's responsibility for providing efficient and capable superintendence. The Inspector is not authorized to make changes in the Drawings or Specifications nor shall the Inspector's approval of the Work and methods relieve the Contractor of responsibility for the correction of subsequently discovered defects, or from its obligation to comply with the Contract Documents.

Inspector shall electronically post DSA required documents on the DSA electronic posting website. It is the Contractor's responsibility to determine the status of posting and determine if all the criteria for sign off of a category of Work on the Project Inspection Card (Form DSA 152) as defined more thoroughly in the most current version of the DSA 152 manual posted on the DSA website.

Inspector may collaborate with Contractor about approval of areas that may be constructed and approved incrementally under the DSA 152 card pursuant to the guidelines of PR-13 at Article 1.17. Inspector shall work with Contractor to present incremental approval proposals to DSA.

4.3.3 Inspector's Authority to Reject or Stop Work

The Inspector shall have the authority to reject Work whenever provisions of the Contract Documents are not being complied with, and Contractor shall instruct its Subcontractors and employees accordingly. In addition, the Inspector may stop any Work that poses a probable risk of harm to persons or property. The Contractor shall instruct its employees, Subcontractors, material and equipment suppliers, etc., accordingly. The absence of any Stop Work Order or rejection of any portion of the Work shall not relieve the Contractor from any of its obligations pursuant to the Contract Documents.

4.3.4 Inspector's Facilities

Within seven (7) days after the notice to proceed, the Contractor shall provide the Inspector with the temporary facilities as required. More specific requirements for the Inspector facilities may be further described under Division 1 of the Specifications.

4.3.5 Testing Times

The District will provide inspection and testing at its cost during the normal eight (8) hour day Monday through Friday (except holidays). Work by the Contractor outside of the normal eight (8) hour day shall constitute an authorization from the Contractor to the District to provide inspection and testing as required outside of the normal eight (8) hour day. Contractor shall provide adequate time for inspections so as to not delay the Work. An advanced timing protocol may be established pursuant to Article 4.3.2. If the Contractor is behind Schedule then it is incumbent on the Contractor to provide advance forecast through look ahead of the anticipated date for inspection so the Inspector may plan their activities so as to not delay the Project. Contractor shall reimburse District for any additional costs associated with inspection and testing (including re-inspection and re-testing) outside the normal eight-hour day and for any retests caused by the Contractor.

It is the Contractor's responsibility to request special inspections with sufficient time so all testing may be timely completed and posted so work may proceed and the Inspector's signature is attached to the Project Inspection Card (Form 152). Specifically, timely request for special inspection under the DSA Verified Report Forms 291 (laboratory), DSA Verified Report Form 292 (Special Inspection), and DSA Verified Report 293 (geotechnical) since DSA requirements under PR 13-01 specifically gives the Special Inspections 14 days to post to the DSA website. Failure to plan and pay (if applicable) for quicker delivery of Special Inspections may be counted as Float, but is not considered Governmental Delay Float under Article 8.1.4.

4.3.6 Special Inspections, Inspections or Tests Out of State, Out of Country or Remote from Project

If Contractor has a Subcontractor or supplier that requires in plant or special inspections, inspections or tests that are out of the country, out of the state or a distance of more than 200 miles from the Project Site, the District shall provide the Special Inspector or individual performing tests time for inspection and testing during normal work hours. Contractor, however, is responsible for the cost of travel, housing, food, out of area premiums that may be in the Inspector/Testing Agreement with District, or other expenses necessary to ensure proper inspection, special inspection or testing is provided by a DSA Certified Inspector, Special Inspector, or individual performing tests. In some cases all three (DSA Inspector, Special Inspector, and Tester) may be required. In addition, if the DSA Certified Inspector, Special Inspector, or individual performing test has contractual travel clauses or special rates for out of town inspection, Contractor is responsible for all costs associated with the contractual travel costs in addition to all other costs. Arrangements for inspection and/or testing shall be made far enough in advance so as to not delay the Work.

4.4 STOP WORK ORDER

DSA may issue a Stop Work Order, or an Order to Comply, when either (1) the Work proceeds without DSA approval; (2) the Work proceeds without a DSA Inspector of Record, or (3) where DSA determines that the Work is not being performed in accordance with applicable rules and regulations, and would compromise the structural integrity of the Project or would endanger lives. If a Stop Work Order is issued, the Work in the affected area shall cease until DSA withdraws the Stop Work Order. Pursuant to Education Code section 17307.5(b), the District shall not be held liable in any action filed against the District for any delays caused by compliance with the Stop Work Order, except to the extent that an error or omission by the District is the basis for the issuance of the Stop Work Order.

Examples of Stop Work Orders that may be issued by DSA include DSA Bulletin 07-04 and Policy 10-01, the installation of automatic fire sprinkler systems without approved Plans, covering Work that has not been approved by Inspector on DSA Project Inspection Card (Form 152).

4.5 RESPONSIBILITY FOR ADDITIONAL CHARGES INCURRED BY THE DISTRICT FOR PROFESSIONAL SERVICES

If at any time prior to the completion of the requirements under the Contract Documents, the District is required to provide or secure additional professional services (including CM, Inspection, Architect, Engineering and Special Consultant Services) for any reason by any act of the Contractor, the District may seek a Deductive Change Order for any costs incurred for any such additional services, which costs shall be deducted from the next progress payment. A Deductive Change Order shall be independent from any other District remedies and shall not be considered a waiver of any District rights or remedies. If payments then or thereafter due to the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the District. Additional services shall include, but shall not be limited to, the following:

a. Services made necessary by the default of the Contractor (Article 14 or Article 2.2).

b. Services made necessary due to the defects or deficiencies in the Work of the Contractor (Article 2.2 and Article 9.6).

c. Spurious or frivolous RFI's issued that do not conform to the requirements of Article 7.4. Issuance of the same RFI after receiving an answer from the Architect or Engineer

d. Review of Schedules that are provided by Contractor that do not Conform with the Requirements of Article 8.

e. Preparation of a CCD or ICD to correct a Contractor Deficiency, or Contractor Caused Notice of Non-Compliance (See Article 7.3).

f. Review of Incomplete Shop Drawings or Submittals, including the submission of Piecemeal Shop Drawings or Submittals unless piecemeal Submittals are specifically agreed upon by District (See Article 3.9)

g. Services required by failure of the Contractor to perform according to any provision of the Contract Documents.

h. Services in connection with evaluating substitutions of products, materials, equipment, Subcontractors' proposed by the Contractor, and making subsequent revisions to Drawings, Specifications, obtaining DSA approvals, DSA costs for review of CCD's, other governmental agency review costs, and providing other documentation required (except for the situation where the specified item is no longer manufactured or available). (See Article 3.10)

i. Services for evaluating and processing Claims or Disputes submitted by the Contractor in connection with the Work outside the established Change Order process.

j. Services required by the failure of the Contractor to prosecute the Work in a timely manner in compliance within the specified time of completion.

k. Services in conjunction with the testing, adjusting, balancing and start-up of equipment other than the normal amount customarily associated for the type of Work involved.

l. Services in conjunction with more than one (1) re-review of Submittals of Shop Drawings, Product Data, samples, RFI's etc.

4.6 DISPUTES AND CLAIMS

4.6.1 Decision of Architect

"Disputes" or "Claims" as defined in Article 4.6.9.1 between District and Contractor involving money or time, including those alleging an error or omission by the Architect shall be referred initially to the Architect for action as provided in Article 4.6.2 within ten (10) days after Contractor's Article 7 request for Change is denied. If there is a CM, the CM shall receive the Dispute and may review and also assemble opinions and documents to assist the Architect. A decision by the Architect, as provided in Article 4.6.5, shall be required as a condition precedent to proceeding with remedies set forth in Article 4.6.9 as to all such matters arising prior to the date Retention Payment Application is due, regardless of whether such matters relate to execution and progress of the Work, or the extent to which the Work has reached Final Completion.

The condition precedent of an Architect decision shall be waived if: (1) the position of Architect is vacant; (2) the Architect has failed to take action required under Article 4.6.5 within the time

periods required therein; or (3) the Dispute or Claim relates to a stop notice claim not arising from any extra Change Order or Immediate Change Directive for which approval has not been provided.

4.6.2 Architect's Review

The Architect (and CM) will review the Dispute and take one or more of the following preliminary actions upon receipt of a Dispute: (1) request additional supporting data from the claimant; (2) submit a schedule to the parties indicating when the Architect expects to take action; (3) reject the Dispute in whole or in part, stating reasons for rejection; (4) recommend approval of the Dispute; or (5) suggest a compromise. The Architect may also, but is not obligated to, notify the Surety, if any, of the nature and amount of the Dispute.

4.6.2.1 *Architectural Immunity*. Architect review of Disputes and Claims shall be impartial and meant to resolve Disputes and Claims. Pursuant to the case, Huber, Hunt & Nichols, Inc. v. Moore (1977) 67 Cal.App.3d 278, the Architect is provided a quasi-judicial immunity for interpreting and deciding Disputes and Claims between the District and Contractor.

4.6.3 Documentation if Resolved

If a Dispute has been resolved, the Architect (and/or CM) will prepare a Change Order or obtain appropriate documentation to document the terms for Board approval.

4.6.4 Actions if Not Resolved

If a Dispute has not been resolved and all documentation requested pursuant to Article 4.6.2 has been provided, the Contractor shall, within ten (10) days after the Architect's initial response, assemble all the documents involved in the Dispute including copies of all back-up documentation of costs and the basis for the Dispute and take one or more of the following actions: (1) modify the initial Dispute; (2) notify the Architect that the initial Dispute stands; or (3) supplement with additional supporting data and re-submit to the Architect under Article 4.6.2.

4.6.5 Architect's Written Decision

If a Dispute has not been resolved after consideration of the foregoing and of other evidence presented by the parties or requested by the Architect, the Architect (or Architect through CM) shall provide a written decision twenty (20) days after compliance with Article 4.6.4. Upon expiration of such time period, the Architect (or Architect through CM) will render to the parties its written decision relative to the Dispute, including any change in the Contract Sum or Contract Time or both. The Architect may also request reasonable additional time to complete Architect's written decision.

If the resolution of the Dispute by the Architect is not satisfactory to the Contractor and copies of all back-up documentation of costs and the basis for the Dispute is fully articulated in a package of material that is complete, the Contractor may then submit a Claim to the District under Article 4.6.9.

4.6.6 Continuing Contract Performance

Pending final resolution of a Dispute or Claim, including, negotiation, mediation, arbitration, or litigation, the Contractor shall proceed diligently with performance of the Contract, and the District shall continue to make any undisputed payments in accordance with the Contract (less any

withholdings or offsets). If the Claim is not resolved, Contractor agrees it will neither rescind the Contract nor stop the progress of the work, but Contractor's sole remedy shall be to submit such controversy to determination by a court of competent jurisdiction in the county where the Project is located, after the Project has been completed, and not before.

4.6.6.1 *District's Option to Submit Individual Disputes to Arbitration during Claims and Disputes Process*. At the District's sole option, in order to more efficiently resolve Claims during the Project and prior to the completion of the Claims Process, pursuant to Government Code section 9201, the District may submit individual Disputes or Claims for binding arbitration and Contractor agrees to the resolution of for each individual Dispute or Claim by an Arbitrator, including resolution of time and delays. If binding arbitration is utilized for individual Disputes or Claims, such resolution is full and final as to that particular Dispute or Claim. THIS INDIVIDUAL DISPUTE ARBITRATION PROCESS IS NOT AN ARBITRATION CLAUSE AND SHALL NOT BE CONSTRUED AS AN AGREEMENT TO ARBITRATE. THIS INDIVIDUAL DISPUTES ARBITRATION PROCESS IS FOR THE SOLE PURPOSE OF STREAMLINING AND RESOLVING DISPUTES OR CLAIMS DURING CONSTRUCTION AND SHALL BE REQUESTED ON SPECIFIC INDIVIDUAL ITEMS BY THE DISTRICT PRIOR TO RETENTION PAYMENT (EVEN IF THERE ARE DEDUCTIONS MADE FROM RETENTION PAYMENT) WHICH REPRESENTS THE FINAL COMPLETION OF THE PROJECT.

a. If there is no Retention remaining on the Project, individual Disputes initiated prior to Project Final Completion shall continue until a final disposition of the Arbitration or resolution of the individual Claim or Dispute.

b. No Tolling. The Arbitration process shall not toll the Disputes or Claims process under Article 4.6 or the requirement to submit Claims to Court under Article 4.6.9.5.

4.6.7 Claims for Concealed Trenches or Excavations Greater Than Four Feet Below the Surface

When any excavation or trenching extends greater than four feet below the surface or if any condition involving hazardous substances are encountered:

a. Immediately upon discovery, The Contractor shall promptly, and before the following conditions are disturbed, notify the District, by telephone and in writing, of the condition except:

1. If such condition is a hazardous waste condition, Contractor's bid includes removal or disposal of hazardous substances. Material that the Contractor believes may be a material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, is required to be removed to a Class I, Class II, or Class III disposal site in accordance with the provisions of existing law. In such case, the notice bulletin procedures of Article 7 apply.

2. Subsurface or latent physical conditions at the Site differing from those indicated in the Drawings, Specifications, Soils Report, and from Contractor's own investigation under Article 2.1.

3. Unknown physical conditions at the Site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Contract.

b. The District shall investigate the conditions, and if District finds that the conditions do materially so differ, do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the Work shall issue a Change Order or Construction Change Document under the procedures described in the Contract.

c. In the event that a dispute arises between the public entity or District and the Contractor whether the conditions materially differ, involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the Work, the Contractor shall not be excused from any scheduled Completion Date provided for by the Contract, but shall proceed with all Work to be performed under the Contract. The Contractor shall retain any and all rights provided either by Contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

4.6.8 Dispute Concerning Extension of Time.

If Contractor and District cannot agree upon an extension of time, whether compensable or not, then Contractor must have first completed the procedures set forth in Article 8.4. Upon completion of the procedures set forth under Article 8.4, Contractor must then comply with the requirements in this Article including those set forth under Article 4.6.9.

4.6.9 Claims Procedures

Pursuant to the remedies under Public Contract Code section 9201 and Government Code section 930.2, Contractor, through execution of this Agreement, also agrees to comply with the Claims requirements of Article 4.6 to quickly and efficiently resolve Disputes and Claims. Further, to provide a level of accuracy to the records submitted, the District shall have the right to audit books and records pursuant to Article 13.11 based on the actual costs incurred and to reduce the uncertainty in resolving Disputes and Claims with limited information.

4.6.9.1 *Procedure Applicable to All Claims*

a. Definition of Claim: A "Claim" is where a Dispute between the parties rises to the level where backup documentation is assembled and provided to the District as a separate demand by the Contractor for: (1) a time extension, including, without limitation, for relief from damages or penalties for delay assessed by the District under the Contract; (2) payment by the District of money or damages arising from Work done by, or on behalf of, the Contractor pursuant to the Contract and payment for which is not otherwise expressly provided for or to which the Contractor is not

otherwise entitled to; or (3) an amount of payment disputed by the District. If the Claim is for damages associated with a DSA Stop Work Order, the Contractor shall not be entitled to a request for Compensation, but shall be entitled to utilize Governmental Delay Float (See Article 8.1.4.1.)

b. Filing Claim Is Not Basis to Discontinue Work: The Contractor shall promptly comply with Work under the Contract or Work requested by the District even though a written Claim has been filed. The Contractor and the District shall make good faith efforts to resolve any and all Claims that may arise during the performance of the Work covered by this Contract.

c. Claim Notification: The Contractor shall within seven (7) calendar days after the written decision of the Architect, or if the time period for Architect's decision has passed under Article 4.6.5, submit a notification in writing sent by registered mail or certified mail with return receipt requested, with the District (and the District's CM) stating clearly the basis for the Claim and including all relevant and required documents. If the notification is not submitted within seven (7) days after the written decision of the Architect or the passage of time under Article 4.6.5, the Contractor shall be deemed to have waived all right to assert the Claim, and the Claim shall be denied. Claims submitted after the Retention Payment date shall also be considered null and void by the District. All Claims shall be reviewed pursuant to Articles 4.6.1 through 4.6.5.

The Formal Notification of Claim must be presented as follows:

(1) The term "Claim" must be at the top of the page in no smaller than 20 point writing.

(2) All documentation submitted pursuant to Article 4.6 to the Architect shall be submitted with the "Claim."

(3) A stack of documents, copy of all Project documents, or the submission of random documents shall not constitute an adequate reference to supporting documentation.

(4) Any additional or supporting documentation that Contractor believes is relevant should be submitted at this time.

d. Reasonable Documents to Support Claim: The Contractor shall furnish reasonable documentation to support the Claim. The Contractor shall provide all written detailed documentation which supports the Claim, including but not limited to: arguments, justifications, cost, estimates, Schedule analysis and detailed documentation. The format of the required reasonable documentation to support the Claim shall include, without limitation:

1. Cover letter.

2. Summary of factual basis of Claim and amount of Claim.

3. Summary of the basis of the Claim, including the specific clause and section under the Contract under which the Claim is made.

4. Documents relating to the Claim, including:

   a. Specifications sections in question.
   b. Relevant portions of the Drawings
   c. Applicable Clarifications (RFI's)
   d. Other relevant information, including responses that were received.
   e. Contractor Analysis of Claim merit.
      (a) Contractor's analysis of any Subcontractor vendor Claims that are being passed through.
      (b) Any analysis performed by outside consultants
      (c) Any legal analysis that Contractor deems relevant
   f. Break down of all costs associated with the Claim.
   g. For Claims relating to time extensions, an analysis and supporting documentation evidencing any effect upon the critical path in conformance with the requirements of Article 8.4 chronology of events and related correspondence.
   h. Applicable Daily Reports and logs.
      (a) If the Daily Reports or Logs are not available, lost or destroyed, there shall be a presumption that the lost documentation was unfavorable to the Contractor. See California Civil Jury Instruction 204.
   i. For Claims involving overhead, cost escalation, acceleration, disruption or increased costs, a full version of job costs reports organized by category of work or Schedule of Values with budget information tracked against actual costs. Any and all supporting back-up data, including the original bid (and associated original unaltered metadata).
      (a) The metadata and bid information shall be provided confidentially and subject to a protective order to prevent dissemination to other contractors or to the public. However, the bid documentation should remain intact and available for review and inspection in case of this type of increased cost Claim.
      (b) This data on the bid shall be made available to any District attorneys or experts and shall also be utilized as evidence for any legal proceedings.
      (c) If the bid documentation is not available, lost or destroyed, there shall be a presumption that the lost bid documentation was unfavorable to the

Contractor. See California Civil Jury Instruction 204.

e. Certification: The Contractor (and Subcontractors, if applicable) shall submit with the Claim a certification under penalty of perjury:

1. That the Contractor has reviewed the Claim and that such Claim is made in good faith;

2. Supporting data are accurate and complete to the best of the Contractor's knowledge and belief;

3. The amount requested accurately reflects the amount of compensation for which the Contractor believes the District is liable.

4. That the Contractor is familiar with Government Code sections 12650 et seq. and Penal Code section 72 and that false claims can lead to substantial fines and/or imprisonment.

f. Signature of Certification: If the Contractor is not an individual, the certification shall be executed by an officer or general partner of the Contractor having overall responsibility for the conduct of the Contractor's affairs.

g. Upon receipt of a Claim and all supporting documents as required above, the District shall conduct a reasonable review of the Claim and, within a period not to exceed 45 days, shall provide the Contractor a written statement identifying what portion of the Claim is disputed and what portion is undisputed. Upon receipt of a Claim, the District and Contractor may, by mutual agreement, extend the time period provided in this paragraph.

h. If the District needs approval from its governing Board to provide the Contractor a written statement identifying the disputed portion and the undisputed portion of the Claim, and the governing Board does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a Claim sent by registered mail or certified mail, return receipt requested, the District shall have up to three days following the next duly publicly noticed meeting of the governing Board after the 45-day period, or extension, expires to provide the Contractor a written statement identifying the disputed portion and the undisputed portion.

i. Any payment due on an undisputed portion of the Claim shall be processed and made within 60 days after the District issues its written statement. If the District fails to issue a written statement, paragraph o below shall apply.

j. If the Contractor disputes the District's written response, or if the District fails to respond to a Claim issued pursuant to this Article 4.6.9 within the time prescribed, the Contractor may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the District shall schedule a meet and confer conference within 30 days for settlement of the Claim.

k. Within 10 business days following the conclusion of the meet and confer conference, if the Claim or any portion of the Claim remains in dispute, the District shall provide the Contractor a written statement identifying the portion of the Claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the Claim shall be processed and made within 60 days after the District issues its written statement. Any disputed portion of the Claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation, with the District and the Contractor sharing the associated costs equally. The District and Contractor shall mutually agree to a mediator within 10 business days after the disputed portion of the Claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the Claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the Claim remaining in dispute shall be subject to applicable procedures in Article 4.6.9.5.

l. For purposes of this Article 4.6.9, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

m. Unless otherwise agreed to by the District and the Contractor in writing, the mediation conducted pursuant to this Article 4.6.9 shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

n. This Claims process does not preclude the District from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this Article 4.6.9 does not resolve the parties' Claim. This Claims process does not preclude the District from submitting individual Disputes or Claims to binding arbitration pursuant to Article 4.6.9.4 below.

o. Failure by the District to respond to a Claim from the Contractor within the time periods described in this subdivision or to otherwise meet the time requirements of this Article 4.6.9 shall result in the Claim being deemed

rejected in its entirety. A Claim that is denied by reason of the District's failure to have responded to a Claim, or its failure to otherwise meet the time requirements of this Article 4.6.9, shall not constitute an adverse finding with regard to the merits of the Claim or the responsibility or qualifications of the Contractor.

p. If a subcontractor or a lower tier subcontractor lacks legal standing to assert a Claim against a District because privity of contract does not exist, the Contractor may present to the District a Claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that the Contractor present a Claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the Claim be presented to the District shall furnish reasonable documentation to support the Claim. Within 45 days of receipt of this written request, the Contractor shall notify the subcontractor in writing as to whether the Contractor presented the Claim to the District and, if the Contractor did not present the Claim, provide the subcontractor with a statement of the reasons for not having done so.

q. Upon receipt of a Claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable.

r. The Contractor's Claim shall be denied if it fails to follow the requirements of this Article.

4.6.9.2 *District (through CM or District's Agent or Attorney) May Request Additional Information.* Within thirty (30) days of receipt of the Claim and the information under this Article, the District may request in writing any additional documentation supporting the Claim or documentation relating to defenses to the Claim which the District may assert. If additional documents are required, the time in which the Claim is evaluated may be extended by a reasonable time so the Claim and additional documents may be reviewed.

4.6.9.3 *Claims Procedures in Addition to Government Code Claim.* Nothing in the Claims procedures set forth in this Article 4 of the General Conditions shall act to waive or relieve the Contractor from meeting the requirements set forth in Government Code section 900 et seq.

4.6.9.4 *Binding Arbitration of Individual Claim Issues.* To expedite resolution of Claims pursuant to Public Contract Code section 9201, at the District's sole option, the District may submit individual Claims to Arbitration prior to Retention Payment consistent with the requirements of Article 4.6.6.1.

4.6.9.5 *Resolution of Claims in Court of Competent Jurisdiction.* If Claims are not resolved under the procedure set forth and pursuant to Article 4.6.9, such Claim or controversy shall be submitted to a court in the County of the location of the Project after the Project has been completed, and not before.

4.6.9.6 *Warranties, Guarantees and Obligations.* The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon Contractor by the General Conditions and amendments thereto; and all of the rights and remedies available to District and Architect thereunder, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by laws or regulations by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this Article will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply.

ARTICLE 5
SUBCONTRACTORS

5.1 DEFINITIONS

5.1.1 Subcontractual Relations Bound to Same Contract Terms at General Contractor

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the same obligations and responsibilities, assumed by Contractor pursuant to the Contract Documents. Each subcontract agreement shall preserve and protect the rights of the District and the Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound. Upon written request of the Subcontractor, the Contractor shall identify to the Subcontractor the terms and conditions of the proposed subcontract agreement, which may be at variance with the Contract Documents. Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

5.1.2 Subcontractor Licenses and DIR Registration

All Subcontractors shall be properly licensed by the California State Licensing Board. All Subcontractors (of any tier) performing any portion of the Work must comply with the Labor Code sections 1725.5 and 1771.1 and must be properly and currently registered with the California Department of Industrial Relations and qualified to perform public works pursuant to Labor Code section 1725.5 throughout the duration of the Project. No portion of the Work is permitted to be performed by a Subcontractor of any tier unless the subcontractor is properly registered with DIR. Any Subcontractors of any tier not properly registered with DIR shall be substituted in accordance with Labor Code section 1771.1.

5.1.3 Substitution of Subcontractor

Substitution of Subcontractors shall be permitted only as authorized under Public Contract Code §§ 4107 et seq. Any substitutions of Subcontractors shall not result in any increase in the Contract Price or result in the granting of any extension of time for the completion of the Project.

5.1.4 Contingent Assignment of Subcontracts and Other Contracts

Each subcontract, purchase order, vendor contract or agreement for any portion of the Work is hereby assigned by the Contractor to the District provided that:

a. Such assignment is effective only after Termination of this Contract with the Contractor by the District as provided under Article 14 and only for those subcontracts and other contracts and agreements that the District accepts by notifying the Subcontractor or Materialman (as may be applicable) in writing; and

b. Such assignment is subject to the prior rights of the Surety(ies) obligated under the Payment Bond and Performance Bond.

c. The Contractor shall include adequate provisions for this contingent assignment of subcontracts and other contracts and agreements in each such document.

ARTICLE 6
CONSTRUCTION BY DISTRICT OR BY SEPARATE CONTRACTORS

6.1 DISTRICT'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

6.1.1 Separate Contracts.

6.1.1.1 District reserves the right to let other contracts in connection with this Work. Contractor shall afford other contractors reasonable opportunity for (1) introduction and storage of their materials; (2) access to the Work; and (3) execution of their work. Contractor shall properly connect and coordinate its work with that of other Contractors.

6.1.1.2 If any part of Contractor's Work depends on proper execution or results of any other contractor, the Contractor shall inspect and within seven (7) days or less, report to Architect, in writing, any defects in such work that render it unsuitable for proper execution of Contractor's Work. Contractor will be held accountable for damages to District for that Work which it failed to inspect or should have inspected. Contractor's failure to inspect and report shall constitute its acceptance of other contractors' Work as fit and proper for reception of its Work, except as to defects which may develop in other contractors' work after execution of Contractor's work.

6.1.1.3 To ensure proper execution of its subsequent Work, Contractor shall measure and inspect Work already in place and shall at once report to the Architect in writing any discrepancy between executed Work as built and the Contract Documents.

6.1.1.4 Contractor shall ascertain to its own satisfaction the scope of the Project and nature of any other contracts that have been or may be awarded by District in prosecution of the Project and the potential impact of such Work on the Baseline Schedule or Schedule updates.

6.1.1.5 Nothing herein contained shall be interpreted as granting to Contractor the exclusive occupancy at the site of Project. Contractor shall not cause any unnecessary hindrance or delay to any other contractor working on the Project Site. If execution of any contract by the District is likely to cause interference with Contractor's performance of this Contract, once Contractor provides District timely written notice and identifies the Schedule Conflict, District shall decide which contractor shall cease work temporarily and which contractor shall continue, or whether Work can be coordinated so that contractors may proceed simultaneously.

6.1.1.6 District shall not be responsible for any damages suffered or extra costs incurred by Contractor resulting directly or indirectly from award or performance or attempted performance of any other contract or contracts at the Project necessary for the performance of the Project (examples include Electrical Utility Contractor, separate offsite contractor, a separate grading contractor, furniture installation etc.)

CONTRACTOR IS AWARE THAT THIS CONTRACT MAY BE SPLIT INTO SEVERAL PHASES BASED ON DOCUMENTATION PROVIDED WITH THIS BID OR DISCUSSED AT THE JOB WALK. CONTRACTOR HAS MADE ALLOWANCE FOR ANY DELAYS OR DAMAGES WHICH MAY ARISE FROM COORDINATION WITH CONTRACTORS REQUIRED FOR OTHER PHASES.

IF ANY DELAYS SHOULD ARISE FROM ANOTHER CONTRACTOR WORKING ON A DIFFERENT PHASE, CONTRACTOR'S SOLE REMEDY FOR DAMAGES, INCLUDING DELAY DAMAGES, SHALL BE AGAINST THE CONTRACTOR WHO CAUSED SUCH DAMAGE AND NOT THE DISTRICT. CONTRACTOR SHALL PROVIDE ACCESS TO OTHER CONTRACTORS FOR OTHER PHASES AS NECESSARY TO PREVENT DELAYS AND DAMAGES TO OTHER CONTRACTORS WORKING ON OTHER PHASES OF CONSTRUCTION.

6.1.2 District's Right to Carry Out the Work

(See Article 2.2)

6.1.3 Designation as Contractor

When separate contracts are awarded to contractors on the Project Site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate District/Contractor Agreement.

6.1.4 District Notice to the Contractor of Other Contractors

The Contractor shall have overall responsibility to reasonably coordinate and schedule Contractor's activities with the activities of the District's forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the District in reviewing their construction schedules when:

a. Notice is provided in the Contract Documents of other scope of Work,

b. In the case where there is known Work to be performed by other Contractors

c. For outside contractors hired by utilities

d. Where the Contract Document provides "Work by Others" or "By Others"

e. Where specifically noted during the Pre-Bid Conference

f. Where specifically noted in the Mandatory Job Walk

g. By CO or ICD,

h. With respect to the installation of :
   1. Furniture,
   2. Electronics and networking equipment,
   3. Cabling,
   4. Low voltage,
   5. Off-site work,
   6. Grading (when by a separate contractor),

7. Environmental remediation when excluded by the Contract Documents (i.e. asbestos, lead or other hazardous waste removal)
8. Deep cleaning crews,
9. Commissioning and testing,
10. Keying and re-keying,
11. Programming

6.1.4.1 Exception where no Coordination is Required on the Part of the Contractor for Turn Key Operations. If the Contractor has specifically outlined a "Turn Key" or "Complete Delivery" of a final completed operational school in writing as part of the Baseline Schedule..

6.1.4.2 The Contractor shall make any revisions to the Baseline Schedule (or Schedule Update) and Contract Sum deemed necessary after a joint review and mutual agreement. The Baseline Schedule (or Schedule Update) shall then constitute the Schedules to be used by the Contractor, separate contractors, and the District until subsequently revised. Additionally, Contractor shall coordinate with Architect, District, and Inspector to ensure timely and proper progress of Work.

6.2 CONSTRUCTIVE OWNERSHIP OF PROJECT SITE AND MATERIAL

Upon commencement of Work, the Contractor becomes the constructive owner of the entire site, improvements, material and equipment on Project site. Contractor must ensure proper safety and storage of all materials and assumes responsibility as if Contractor was the owner of the Project site. All risk of loss or damage shall be borne by Contractor during the Work until the date of Completion. As constructive owner of the Project site, Contractor must carry adequate insurance in case of calamity and is not entitled to rely on the insurance requirements as set forth in this Agreement as being adequate coverage in case of calamity.

6.3 DISTRICT'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors, and the District as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in Article 3.12, the District may clean up and allocate the cost among those it deems responsible.

ARTICLE 7
CHANGES IN THE WORK

7.1 CHANGES

7.1.1 No Changes Without Authorization

There shall be no change whatsoever in the Drawings, Specifications, or in the Work without an executed Change Order, Change Order Request, Immediate Change Directive, or order by the Architect for a minor change in the Work as herein provided. District shall not be liable for the cost of any extra work or any substitutions, changes, additions, omissions, or deviations from the Drawings and Specifications unless the District's Governing Board or designated representative with delegated authority (subject to Board ratification) has authorized the same and the cost thereof approved in writing by Change Order or executed Construction Change Document. No extension of time for performance of the Work shall be allowed hereunder unless claim for such extension is made at the time changes in the Work are ordered, and such time duly adjusted in writing in the Change Order. The provisions of the Contract Documents shall apply to all such changes, additions, and omissions with the same effect as if originally embodied in the Drawings and Specifications. Notwithstanding anything to the contrary in this Article 7, all Change Orders shall be prepared and issued by the Architect and shall become effective when executed by the District's Governing Board, the Architect, and the Contractor.

Should any Change Order result in an increase in the Contract Price, the cost of such Change Order shall be agreed to, in writing, in advance by Contractor and District and be subject to the monetary limitations set forth in Public Contract Code section 20118.4 (Please check with the District since there are different interpretations of the limitations of Public Contract Code section 20118.4 depending on the County the Project is located). In the event that Contractor proceeds with any change in Work without first notifying District and obtaining the Architect's and District's consent to a Change Order, Contractor waives any Claim of additional compensation for such additional work and Contractor takes the risk that a Notice of Non-Compliance may issue, a critical path Project delay may occur, and the Contractor will also be responsible for the cost of preparation and DSA CCD review fees for a corrective DSA approved Construction Change Document.

CONTRACTOR UNDERSTANDS, ACKNOWLEDGES, AND AGREES THAT THE REASON FOR THIS NOTICE REQUIREMENT IS SO THAT DISTRICT MAY HAVE AN OPPORTUNITY TO ANALYZE THE WORK AND DECIDE WHETHER THE DISTRICT SHALL PROCEED WITH THE CHANGE ORDER OR ALTER THE PROJECT SO THAT SUCH CHANGE IN WORK BECOMES UNNECESSARY AND TO AVOID THE POSSIBLE DELAYS ASSOCIATED WITH THE ISSUANCE OF A NOTICE OF NON-COMPLIANCE.

7.1.2 Notices of Non-Compliance

Contractor deviation or changes from approved Plans and Specifications may result in the issuance of a Notice of Non-Compliance (See DSA Form 154). Contractor is specifically notified that deviations from the Plans and Specifications, whether major or minor, may result in the requirement to obtain a DSA Construction Change Document to correct the Notice of Non-Compliance. (See Article 7.3.1 for Definition of CCD). In some cases, the lack of a DSA approved CCD AND verification from the Inspector that a Notice of Non-Compliance has been corrected may result in a critical path delay to the next

stage of Work on the Project. Specifically, a deviation from approved Plans and Specifications may prevent approval of the category of Work listed in the DSA 152 Project Inspection Card. Any delays that are caused by the Contractor's deviation from approved Plans and Specifications shall be the Contractor's responsibility.

7.1.3 Architect Authority

The Architect will have authority to order minor changes in the Work that do not involve DSA Approval not involving any adjustment in the Contract Sum, or an extension of the Contract Time.

7.2 CHANGE ORDERS ("CO")

A CO is a written instrument prepared by the Architect and signed by the District (as authorized by the District's Governing Board), the Contractor, and the Architect stating their agreement upon all of the following:

a. A description of a change in the Work;

b. The amount of the adjustment in the Contract Sum, if any; and

c. The extent of the adjustment in the Contract Time, if any.

A CO may be comprised of ICD's, Response to RFP's and COR's

7.3 CONSTRUCTION CHANGE DOCUMENT (CCD Category A, and CCD Category B) and IMMEDIATE CHANGE DIRECTIVE (ICD)

7.3.1 Definitions

7.3.1.1 *Construction Change Document (CCD)*. A Construction Change Document is a DSA term that is utilized to address changes to the DSA approved Plans and Specifications. There are two types of Construction Change Documents. (1) DSA approved CCD Category A for Work affecting structural, access compliance or fire/ life safety of the Project which will require a DSA approval; and, (2) CCD Category B for Work NOT affecting structural safety, access compliance or fire/ life safety that will not require a DSA approval (except to confirm that no approval is required). Both CCD Category A and Category B shall be set forth in DSA Form 140 and submitted to DSA as required.

7.3.1.2 *Immediate Change Directive (ICD)*. An Immediate Change Directive is a written order to the Contractor prepared by the Architect and signed by the District (and CM if there is a CM on the Project) and the Architect, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. The District may by ICD, without invalidating the Contract, direct immediate changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions within. If applicable, the Contract Sum and Contract Time will be adjusted accordingly.

In the case of an Immediate Change Directive being issued, Contractor must commence Work immediately or delays from failure to perform the ICD shall be the responsibility of Contractor and the failure to move forward with Work immediately shall also be grounds for Termination under Article 14.

An ICD does not automatically trigger an Article 7.6 Dispute or Claim. Contractor must timely follow the procedures outlined at Article 7.6 and 4.6 where applicable.

Refer to Division 1 and Supplementary General Conditions for a copy of the proposed Immediate Change Directive form.

7.3.2 Use to Direct Change

An ICD shall be used to move work forward immediately and to avoid delay. In some cases, an ICD shall be issued in the absence of agreement on the terms of a CO, COR, or RFP. A copy of an ICD form is provided in the Supplementary General Conditions and Division 1. The anticipated not to exceed price for the Work will be inserted into the ICD. In the case of an ICD issued to correct Contractor Deficiencies or to correct a Contractor caused Notice of Non-Compliance, the ICD may be issued with $0 and no additional time. Contract may prepare a COR associated with the ICD pursuant to Article 7. However, Contractor shall proceed with all Work required under an Approved ICD immediately upon issuance. Failure to proceed with the Work under an ICD shall be grounds for Termination for Cause under Article 14 or take over the Work under Article 2.2.

If adequate time exists, an ICD may be subject of an RFP for pricing and determination if any time that may be required. However, if an RFP is not completed, Contractor shall immediately commence Work when an ICD is issued. If the RFP is incomplete, it may still be completed to be submitted for pricing purposes as long as the RFP is submitted within the timeline provided by the RFP, or within 10 days following issuance of the ICD.

7.3.3 ICD Issued Over a Notice of Non-Compliance or to Cover Work Subject to a DSA 152 Sign Off

In some cases, an ICD shall be for the purpose of proceeding with Work to keep the Project on Schedule and as an acknowledgement by the District that Contractor is proceeding with Work contrary to a Notice of Non-Compliance, prior to issuance of a DSA approved CCD Category A, or to direct the covering of Work which has not yet received a DSA 152 Inspection Approval to move forward.

7.3.3.1 *Contractor Compliance with all Aspects of an IC*D. Contractor is to undertake the ICD and comply with all aspects of the Work outlined in the ICD. Inspector is to inspect the Work pursuant to the ICD. Failure to follow the ICD may result in deduction of the ICD Work under Article 2.2 or Termination of the Contractor pursuant to Article 14.

7.3.3.2 *Exception in the Case of DSA Issued Stop Work Order*. Contractor must proceed with an ICD even if a CCD has not been approved by DSA except in the case of a DSA issued Stop Work Order. If a DSA Stop Work Order is issued, Contractor must stop work and wait further direction from the District.

7.3.3.3 *ICD Due to Contractor Deficiency or Contractor Caused Notice of Non-Compliance.* If an ICD is issued to correct a Contractor Deficiency or a Contractor caused notice of Non-Compliance, Contractor specifically acknowledges responsibility for all consequential damages associated with the Contractor Deficiency or Contractor caused Notice of Non-Compliance and all consequential damages and costs incurred to correct the deficiency under Article 4.5

7.4 REQUEST FOR INFORMATION ("RFI")

7.4.1 Definition

A RFI is a written request prepared by the Contractor requesting the Architect to provide additional information necessary to clarify or amplify an item which the Contractor believes is not clearly shown or called for in the Drawings or Specifications, or to address problems which have arisen under field conditions.

7.4.1.1 A RFI shall not be used as a vehicle to generate time extensions.

7.4.1.2 Resubmission of the same or similar RFI is not acceptable. RFI's that are similar should be addressed in Project meetings where the requestor (Contractor, Subcontractor or vendor) is able to address the particular issue with the Architect or Engineer and a resolution addressed in the minutes.

7.4.1.3 A RFI response applicable to a specific area cannot be extended to other situations unless specifically addressed in writing within the RFI or in a separate RFI.

7.4.1.4 RFI's should provide a proposed solution and should adequately describe the problem that has arisen.

7.4.2 Scope

The RFI shall reference all the applicable Contract Documents including Specification section, detail, page numbers, Drawing numbers, and sheet numbers, etc. The Contractor shall make suggestions and interpretations of the issue raised by the RFI. An RFI cannot modify the Contract Cost, Contract Time, or the Contract Documents.

7.4.3 Response Time

The Architect must respond to a RFI within a reasonable time after receiving such request. If the Architect's response results in a change in the Work, then such change shall be effected by a written CO, COR RFP or ICD, if appropriate. If the Architect cannot respond to the RFI within a reasonable time, the Architect shall notify the Contractor, with a copy to the Inspector and the District, of the amount of time that will be required to respond.

7.4.4 Costs Incurred

The Contractor shall be responsible for any costs incurred for professional services as more fully set forth in Article 4.5, which shall be subject to a Deductive Change Order, if an RFI requests an interpretation or decision of a matter where the information sought is equally available to the party making such request. District, at its sole discretion, shall issue a Deductive Change Order to Contractor for all such professional services arising from this Article.

7.5 REQUEST FOR PROPOSAL ("RFP")

7.5.1 Definition

A RFP is a written request prepared by the Architect (and/or CM) requesting the Contractor to submit to the District and the Architect an estimate of the effect of a proposed change on the Contract Price and (if applicable) the Contract Time. If Architect issues a Bulletin, the Changed items in the Bulletin shall be addressed as an RFP and all responses shall be prepared to a Bulletin as addressed in this Article 7.5. A form RFP is included in the Division 1 documents.

7.5.2 Scope

A RFP shall contain adequate information, including any necessary Drawings and Specifications, to enable Contractor to provide the cost breakdowns required by Article 7.7. The Contractor shall not be entitled to any Additional Compensation for preparing a response to an RFP, whether ultimately accepted or not.

7.5.3 Response Time

Contractor shall respond to an RFP within ten (10) days or the time period otherwise set forth in the RFP.

7.6 CHANGE ORDER REQUEST ("COR")

7.6.1 Definition

A COR is a written request prepared by the Contractor supported by backup documentation requesting that the District and the Architect issue a CO based upon a proposed change, cost, time, or cost and time that may be incurred on the Project or arising from an RFP, ICD, or CCD.

7.6.2 Changes in Price

A COR shall include breakdowns per Article 7.7 to validate any change in Contract Price due to proposed change or Claim.

7.6.3 Changes in Time

A COR shall also include any additional time required to complete the Project only if the delay is a critical path delay. Any additional time requested shall not be the number of days to make the proposed change, but must be based upon the impact to the Project Schedule as defined in Article 8. A schedule fragnet showing the time delay must be submitted with the COR. Any changes in time will be granted only if there is an impact to the critical path. If Contractor fails to request a time extension in a COR, then the Contractor is thereafter precluded from requesting or claiming a delay.

7.7 COST OF CHANGE ORDERS

7.7.1 Scope

Within ten (10) days after a request is made for a change that impacts the Contract Sum as defined in Article 9.1, the critical path, or the Contract Time as defined in Article 8.1.1, the Contractor shall provide the District and the Architect, with a written estimate of the effect of the proposed CO upon the Contract Sum and the actual cost of construction, which shall include a complete itemized cost breakdown of all labor and material showing actual quantities, hours, unit prices, and wage rates required for the change, and the effect upon the Contract Time of such CO. Changes may be made by District by an

appropriate written CO, or, at the District's option, such changes shall be implemented immediately upon the Contractor's receipt of an appropriate written Construction Change Document.

District may, as provided by law and without affecting the validity of this Agreement, order changes, modification, deletions and extra work by issuance of written CO or CCD from time to time during the progress of the Project, Contract Sum being adjusted accordingly. All such Work shall be executed under conditions of the original Agreement except that any extension of time caused thereby shall be adjusted at time of ordering such change. District has discretion to order changes on a "time and material" basis with adjustments to time made after Contractor has justified through documentation the impact on the critical path of the Project.

7.7.1.1 *Time and Material Charges.* If the District orders Work on a "time and material" basis, timesheets shall be signed daily by the Inspector or District Representative at or near the time the Work is actually undertaken and shall show the hours worked, and the Work actually completed. No time sheets shall be signed the next day. A copy shall be provided to the Person signing the document at the time the document is signed, but not before 10 am the following day.

7.7.2 Determination of Cost

The amount of the increase or decrease in the Contract Price from a CO or COR, if any, shall be determined in one or more of the following ways as applicable to a specific situation:

a. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation. If an agreement cannot be reached within fifteen (15) days after submission and negotiation of Contractor's proposal, Contractor may submit pursuant to Article 7.7.3. Submission of sums which have no basis in fact are at the sole risk of Contractor and may be a violation of the False Claims Act set forth under Government Code section 12650 et seq.);

   1. If the District objects to 7.7.2(a) as a method for submission due to inaccuracies in the submitted amount, overstatement of manpower or time required to perform the CO, or unreliability of the data provided, the District may either have the Architect or a professional estimator determine the cost for the CO, and the applicable time extension, or the Contractor shall utilize Article 7.7.2(d) or 7.7.3.

   2. Once the District provides a written objection to use of Article 7.7.2(a) due to unreliability of the estimated price, the Contractor shall no longer utilize mutual acceptance of a lump sum as a method for submission of CO's and shall provide a breakdown of estimated or actual costs pursuant to Article 7.7.2(d) or 7.7.3

b. By unit prices contained in Contractor's original bid and incorporated in the Project documents or fixed by subsequent agreement between District and Contractor;

c. Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee. However, in the case of disagreement, Contractor must utilize the procedure under Article 7.7.3; or

d. By cost of material and labor and percentage of overhead and profit. If the value is determined by this method the following requirements shall apply:

1. *Basis for Establishing Costs*

(1) Labor will be the cost for wages prevailing locally for each craft or type of workers at the time the extra Work is done, plus employer payments of payroll taxes and workers compensation insurance (exclude insurance costs as part of the overhead and profit mark-up), health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from Federal, State, or local laws, as well as assessments or benefits required by lawful collective bargaining agreements. In no case shall the total labor costs exceed the applicable prevailing wage rate for that particular classification. The use of a labor classification which would increase the extra Work cost will not be permitted unless the Contractor establishes the necessity for such additional costs. Labor costs for equipment operators and helpers shall be reported only when such costs are not included in the invoice for equipment rental.

(2) Materials shall be at invoice or lowest current price at which such materials are locally available and delivered to the Site in the quantities involved, plus sales tax, freight, and delivery. The District reserves the right to approve materials and sources of supply or to supply materials to the Contractor if necessary for the progress of the Work. No markup shall be applied to any material provided by the District.

(3) Tool and Equipment Rental. No payment will be made for the use of tools which have a replacement value of $250 or less.

Regardless of ownership, the rates to be used in determining equipment rental costs shall not exceed listed rates prevailing locally at equipment rental agencies or distributors at the time the Work is performed. Rates applied shall be appropriate based on actual equipment need and usage. Monthly, weekly or other extended use rates that results in the lowest cost shall be applied if equipment is used on site for extended periods.

The rental rates paid shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals.

Necessary loading and transportation costs for equipment used on the extra Work shall be included. If equipment is used intermittently and, when not in use, could be returned to its rental source at less expense to the District than holding it at the Work Site, it shall be returned unless the Contractor elects to keep it at the Work Site at no expense to the District.

All equipment shall be acceptable to the Inspector, in good working condition, and suitable for the purpose for which it is to be used. Manufacturer's ratings and modifications shall be used to classify equipment, and equipment shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

If tool and equipment charges are part of a Dispute or Claim, the District reserves the right to utilize actual costs for tools and equipment or a depreciation rate for equipment based on audit finding under Article 13.11 and deduct any rental charges that exceed actual or depreciated costs.

e. Other Items. The District may authorize other items which may be required on the extra work. Such items include labor, services, material, and equipment which are different in their nature from those required by the Work, and which are of a type not ordinarily available from the Contractor or any of the Subcontractors. Invoices covering all such items in detail shall be submitted with the request for payment.

f. Invoices. Vendors' invoices for material, equipment rental, and other expenditures shall be submitted with the COR. If the request for payment is not substantiated by invoices or other documentation, the District may establish the cost of the item involved at the lowest price which was current at the time of the Daily Report.

g. Overhead. Overhead, including direct and indirect costs, shall be submitted with the COR and include: field overhead, home office overhead, off-site supervision, CO preparation/negotiation/research, time delays, Project interference and disruption, additional guaranty and warranty durations, on-site supervision, additional temporary protection, additional temporary utilities, additional material handling costs, liability and property damage insurance, and additional safety equipment costs.

7.7.3 Format for COR or CO's

The following format shall be used as applicable by the District and the Contractor to communicate proposed additions to the Contract. All costs submitted shall be actual costs and labor shall be unburdened labor. Refer to Division 1 for a copy of the Construction Change Order form.

		EXTRA	CREDIT
(a)	Material (attach itemized quantity and unit cost plus sales tax)		
(b)	Labor Not to Exceed Applicable Prevailing Wage Rates (attach itemized hours and rates)		
(c)	Equipment (attach invoices)		
(d)	Subtotal		

		EXTRA	CREDIT
(e)	If Subcontractor performed work, add Subcontractor's overhead and profit to portions performed by Subcontractor, not to exceed 10% of item (d).		
(f)	Subtotal		
(g)	Contractor's Overhead and Profit: Not to exceed 10% of Item (d) if Contractor performed the work. No more than 5% of Item (d) if Subcontractor performed the work. If work was performed by Contractor and Subcontractors, portions performed by Contractor shall not exceed 10% of Item (d), and portions performed by Subcontractor shall not exceed 10% of Item (d).		
(h)	Subtotal		
(i)	Bond not to exceed one percent (1%) of Item (h)		
(k)	TOTAL		
(l)	Time/ Days		

The undersigned Contractor approves the foregoing Change Order or Immediate Change Directive as to the changes, if any, and the Contract price specified for each item and as to the extension of time allowed, if any, for completion of the entire Work on account of said Change Order or Immediate Change Directive, and agrees to furnish all labor, materials and service and perform all Work necessary to complete any additional Work specified therein, for the consideration stated herein. It is understood that said Change Order or Immediate Change Directive shall be effective when approved by the Governing Board of the District.

It is expressly understood that the value of such extra Work or changes, as determined by any of the aforementioned methods, expressly includes any and all of the Contractor's costs and expenses, both direct and indirect, resulting from additional time required on the Project or resulting from delay to the Project. Any costs, expenses, damages or time extensions not included are deemed waived.

The Contractor expressly acknowledges and agrees that any change in the Work performed shall not be deemed to constitute a delay or other basis for claiming additional compensation based on theories including, but not limited to, acceleration, suspension or disruption to the Project.

7.7.3.1 *Adjustment for Time and Compensable Delay*. A CO shall also include any additional time required to complete the Project. Any additional time requested shall not be the number of days to make the proposed change, but must be based upon the impact to the Project Schedule as defined

in Article 8 of the General Contract. A schedule fragnet showing the time delay must be submitted with the CO. Any changes in time will be granted only if there is an impact to the critical path. If Contractor fails to request a time extension in a CO, then the Contractor is thereafter precluded from requesting or claiming a delay.

7.7.4 Deductive Change Orders

All Deductive Change Order(s) must be prepared utilizing the form under Article 7.7.3 (a) – (d) only, setting forth the actual costs incurred. Except in the case of an Article 2.2 or 9.6 Deductive Change Order where no mark-up shall be allowed, Contractor will be allowed a maximum of 5% total profit and overhead.

For unilateral Deductive Change Orders, or where credits are due from Contractor for Allowances, Deductive Items, Inspection, Damage, DSA CCD review costs, Architect or Inspector costs for after hours or corrective services, Work removed from the Agreement under Article 2.2 or Article 9.6, there shall be no mark-up.

District may, any time after a Deductive Change Order is presented to Contractor by District for items under Article 2.2 or Article 9.6 or if there is disagreement as to the Deductive Change Order, issue a unilateral Deductive Change Order on the Project and deduct the Deductive Change Order from a Progress Payment, Final Payment, or Retention.

7.7.5 Discounts, Rebates, and Refunds

For purposes of determining the cost, if any, of any change, addition, or omission to the Work hereunder, all trade discounts, rebates, refunds, and all returns from the sale of surplus materials and equipment shall accrue and be credited to the Contractor, and the Contractor shall make provisions so that such discounts, rebates, refunds, and returns may be secured, and the amount thereof shall be allowed as a reduction of the Contractor's cost in determining the actual cost of construction for purposes of any change, addition, or omissions in the Work as provided herein. All CO's are subject to Audit under Article 13.11 for discounts, rebates and refunds.

7.7.6 Accounting Records

With respect to portions of the Work performed by CO's and CCD's on a time-and-materials, unit-cost, or similar basis, the Contractor shall keep and maintain cost-accounting records in a format consistent with accepted accounting standards and satisfactory to the District, which shall be available to the District on the same terms as any other books and records the Contractor is required to maintain under the Contract Documents.

Any time and material charges shall require Inspector's signature on time and material cards showing the hours worked and the Work actually completed. (See Article 7.7.1.1)

7.7.7 Notice Required

If the Contractor desires to initiate a Dispute or Claim for an increase in the Contract Price, or any extension in the Contract Time for completion, Contractor shall notify the applicable party responsible for addressing the Dispute or Claim pursuant to Article 4.6. No Claim or Dispute shall be considered unless made in accordance with this subparagraph. Contractor shall proceed to execute the

Work even though the adjustment may not have been agreed upon. Any change in the Contract Price or extension of the Contract Time resulting from such Claim shall be authorized by a CO.

7.7.8 Applicability to Subcontractors

Any requirements under this Article 7 shall be equally applicable to CO's, COR's or ICD's issued to Subcontractors by the Contractor to the same extent required by the Contractor.

7.7.9 Alteration to Change Order Language

Contractor shall not alter or reserve time in COR's, CO's or ICD's. Contractor shall execute finalized CO's and proceed under Article 7.7.7 and Article 4.6 with proper notice. If Contractor intends to reserve time without an approved CPM schedule prepared pursuant to Article 8 or without submitting a fragnet showing delay to critical path, then Contractor may be prosecuted pursuant to the False Claim Act.

7.8 ALLOWANCE(S)

7.8.1 *Inclusion of Allowance(s) in Contractor's Bid*

As indicated on the Bid Form, Contractor shall include a lump sum allowance of THIRTY THOUSAND DOLLARS ($30,000.00) for unforeseen dry rot repair. This allowance shall be included in the Contractor's bid price; however, Contractor shall not include overhead and profit on this Allowance at the time of inclusion in the Project bid price. Upon award, the allowance amount shall be shown as an individual line item on the Schedule of Values per Article 9.2.2.4

7.8.2 *Use of Allowance(s)*

If unforeseen dry rot is encountered, Contractor must submit a change order request per Article 7.7 to receive authorization for the release of funds from the Allowance. The Contractor's overhead and profit is to be included when submitting a change order request that will be pulled from an Allowance.

If the costs of the unforeseen condition(s) exceed the Allowance, Contractor must submit a change order for amounts in excess of the Allowance requesting an increase in Contract Price and/or Contract Time. Contractor shall base the change order on provable information that, beyond a reasonable doubt and to the District's satisfaction, demonstrates that the unknown and/or unforeseen condition(s) were reasonably unknown and/or unforeseen. If not, the District shall deny the change order as unsubstantiated, and the Contractor shall complete the Project without any increase in Contract Price and/or Contract Time based on that change order.

7.8.3 *Remaining Balance*

If there is any remaining balance in an Allowance fund upon completion of the Project, these remaining funds shall be returned to the District and will be deducted from the Contractor's final progress billing.

ARTICLE 8
TIME AND SCHEDULE

8.1 DEFINITIONS

8.1.1 Contract Time

Contractor shall perform and reach Substantial Completion (See Article 1.1.46) within the time specified in the Agreement Form. Moreover, Contractor shall perform its Work in strict accordance with the Project Milestones in the Contract Documents and shall proceed on a properly developed and approved Baseline Schedule, which represents the Contractor's view of the practical way in which the Work will be accomplished. Note that Contract Time includes and incorporates all Float and other Baseline inclusions as noted in Article 8.3.2.1 and as otherwise specifically noted in Article 8.

8.1.2 Notice to Proceed

District may give a Notice to Proceed within ninety (90) days of the award of the bid by District. Once Contractor has received the notice to proceed, Contractor shall complete the Work in the period of time referenced in the Contract Documents.

In the event that District desires to postpone the giving of the Notice to Proceed beyond this three-month period, it is expressly understood that with reasonable notice to the Contractor, the giving of the date to proceed may be postponed by District. It is further expressly understood by Contractor, that Contractor shall not be entitled to any claim of additional compensation as a result of the postponement of the giving of the notice to proceed

If the Contractor believes that a postponement will cause a hardship to Contractor, Contractor may terminate the Contract with written notice to District within 10 days after receipt by Contractor of District's notice of postponement. It is further understood by Contractor that in the event that Contractor terminates the Contract as a result of postponement by the District, the District shall only be obligated to pay Contractor for the Work that Contractor had performed at the time of notification of postponement and the grounds for notification and hardship shall be subject to Audit pursuant to Article 13.11. Should Contractor terminate the Contract as a result of a notice of postponement, District may award the Contract to the next lowest responsible bidder.

8.1.3 Computation of Time

The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

8.1.4 Float

Float is time the total number of days an activity may be extended or delayed without delaying the Completion Date shown in the schedule. Float will fall into three categories: (1) Rain Days; (2) Governmental Delays; and, (3) Project Float. Project Float and Rain Days are owned by the Project and may be utilized as necessary for critical path delays once the days become available for consumption (i.e. the Rain Day arrives and is not utilized since rain did not occur or Work was performed on the interior of a building). However, Governmental Delay float shall not be utilized for purposes other than to address critical path delays that arise due to approvals, Inspector approvals or verifications on governmental forms.

8.1.4.1 *Governmental Delay Float*. It is anticipated that there will be governmental generated delays. Specific to DSA approvals, it is anticipated that no less than twelve (12) days per calendar year shall be set aside as Governmental Float to be utilized on critical path delays. A pro-rated number of days shall be calculated based on length of Contract Time. (For example, a two (2) year Contract Time shall require twenty-four (24) days of Governmental Float. If the Contract Time is 182 days, then the Contract Time shall require six (6) days of Governmental Float) This Governmental Delay float must be incorporated into the schedule and should be incorporated in each critical activity as Contractor deems fit. Specifically, major categories of Work under the DSA 152 (Project Inspection Card) should be allocated Governmental Delay Float at the Contractor's discretion. Governmental Delay Float on the Project may exceed 12 days per one (1) year period, but Contractor is required to include not be less than 12 days of Governmental Delay Float during each one (1) year period.

Contractor's failure to establish a protocol for requesting inspections is not grounds to utilize Governmental Delay Float. As noted in Article 3.1.4, 48 hours advance notice of commencing Work on a new area is required after submitting form DSA 156 and under PR 13-01 Special Inspection reports are not required to be posted until at least 14 days after the Work was inspected. Failure to plan, and pay (if applicable) for quicker delivery of Special Inspections is not Governmental Delay Float under Article 8.1.4.1. If Governmental Delay Float is not utilized, this float is carried through to other DSA 152 categories of inspection and consumed over the course of the Project

Governmental Delay Float may be utilized for a DSA Stop Work Order regardless of fault as defined under Education Code section 17307.5(b).

8.1.4.2 *Inclement Weather (Rain Days)*. The Contractor will only be allowed a time extension for unusually severe weather if it results in precipitation or other conditions which in the amount, frequency, or duration is in excess of the norm at the location and time of year in question as established by NOAA weather data. No less than 22 calendar days for each calendar year for Southern California will be allotted for in the Contractor's schedule for each winter weather period or carried at the end of the schedule as Rain Float. Float for weather days in other geographical regions shall be adjusted based on NOAA weather data for the geographical location. Contractor has anticipated all the days it takes to dry out and re-prepare areas that may be affected by weather delays which extend beyond the actual weather days. The weather days shall be shown on the schedule and if not used will become float for the Project's use. The Contractor will not be allowed a day-for-day weather delay for periods noted as float in the Schedule. The Contractor is expected to work seven (7) days per week (if necessary, irrespective of inclement weather), to maintain access, and to protect the Work under construction from the effects of inclement weather. Additional days beyond the NOAA shall be considered under the same criteria that weather days are granted below.

A Rain Day shall be granted by Architect or CM if the weather prevents the Contractor from beginning Work at the usual daily starting time, or prevents the Contractor from proceeding with seventy-five (75%) of the normal labor and equipment force towards completion of the day's current controlling item on the accepted schedule for a period of at least five hours, and the crew is dismissed as a result thereof, the Architect will designate such time as unavoidable delay and grant one (1) critical path activity calendar-day extension if there is no available float for the calendar year.

8.1.4.3 *Project Float*. The Contractor may determine some activities require a lesser duration than allocated and may set aside float in the Project Schedule. There shall be no early completion. Instead, to the extent float is either addressed at the end of the Project or throughout each category of critical path work, Project float may be used as necessary during the course of the Project and allocated on a first,

come first serve basis. However, the use of float does not extend to Governmental Delay Float, which shall only be used for Governmental Delays.

8.2 HOURS OF WORK

8.2.1 Sufficient Forces

Contractors and Subcontractors shall continuously furnish sufficient forces to ensure the prosecution of the Work in accordance with the Construction Schedule.

8.2.2 Performance During Working Hours

Work shall be performed during regular working hours as permitted by the appropriate governmental agency except that in the event of an emergency, or when required to complete the Work in accordance with job progress, Work may be performed outside of regular working hours with the advance written consent of the District and approval of any required governmental agencies.

8.2.3 Costs for After Hours Inspections

If the Work done after hours is required by the Contract Documents, a Recovery Schedule, or as a result of the Contractor's failure to plan, and inspection must be conducted outside the Inspector's regular working hours, the costs of any after hour inspections, shall be borne by the Contractor.

If the District allows the Contractor to do Work outside regular working hours for the Contractor's convenience, the costs of any inspections required outside regular working hours shall be invoiced to the Contractor by the District and a Deductive Change Order shall be issued from the next Progress Payment.

If the Contractor elects to perform Work outside the Inspector's regular working hours, costs of any inspections required outside regular working hours shall be invoiced to the Contractor by the District and a Deductive Change Order from the next Progress Payment as a Deductive Change Order.

8.3 PROGRESS AND COMPLETION

8.3.1 Time of the Essence

Time limits stated in the Contract Documents are of the essence to the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

8.3.2 Baseline Schedule Requirements

8.3.2.1 *Timing*: Within ten (10) calendar days after Notice to Proceed, Contractor shall submit a practical schedule showing the order in which the Contractor proposes to perform the Work, and the dates on which the Contractor contemplates starting and completing the salient categories of the Work. This first schedule which outlines the Contractor's view of the practical way in which the Work will be accomplished is the Baseline Schedule. If the Contractor Fails to submit the Baseline Schedule within the ten (10) days noted, then District may withhold processing and approval of progress payments pursuant to Article 9.4 and 9.6.

8.3.2.2 *District Review and Approval:* District, Architect and CM will review both a paper and electronic copy of Baseline Schedule and may provide comments as noted in this Article and either approve or disapprove the Baseline Schedule. All Schedules shall be prepared using an electronic scheduling program acceptable to District. All Schedules shall be delivered in an electronic format usable by the District. All logic ties and electronic information shall be included in the electronic copy of the Baseline Schedule that is delivered to the District.

8.3.2.3 *Schedule Must Be Within the Given Contract Time.* The Baseline Schedule shall not exceed time limits set forth in the Contract Documents and shall comply with all of the scheduling requirements as set forth in the Specifications and Contract Documents.

8.3.2.4 *Submittals Must Be Incorporated (See Articles 3.7 and 3.9)*: Contractor shall include Submittals as line items in the Baseline Schedule as required under Article 3.7.2 and 3.9.6. Submittals shall not delay the Work, Milestones, or the Completion Date. Failure to include Submittals in the Baseline Schedule shall be deemed a material breach by the Contractor.

8.3.2.5 *Float Must Be Incorporated*. The Baseline Schedule must indicate the beginning and completion of all phases of construction and shall use the "critical path method" (commonly called CPM) for the value reporting, planning and scheduling, of all Work required under the Contract Documents. The Baseline Schedule must incorporate all Milestones in the Project and apply Governmental Float at each Milestone in the Contractor's discretion. The Baseline Schedule shall incorporate any Schedule provided by the District as part of the bid and shall note durations that will not be adequate or should be shortened based on Contractor's review. These changes shall be identified and incorporated into Contractor's Baseline Schedule as long as requested changes are made within 10 days after the District chooses to move forward with the Project. Scheduling is necessary for the District's adequate monitoring of the progress of the Work and shall be prepared in accordance with the time frame described in this Article 8. The Architect may disapprove of any Schedule or require modification to it if, in the opinion of the Architect or District, adherence to the any Schedule prepared by the Contractor will not cause the Work to be completed in accordance with the Agreement.

8.3.2.6 *No Early Completion.* Contractor shall not submit any Schedule showing early completion without indicating float time through the date set for Project completion by District. Contractor's Baseline Schedule shall account for all days past early completion as float which belongs to the Project. Usage of float shall not entitle Contractor to any delay Claim or damages due to delay.

8.3.2.7 *Use of Schedule Provided in Bid Documents.* In some cases, the bid will include a preliminary schedule indicating Milestones and construction sequences for the Project along with general timing for the Project. The preliminary schedule is not intended to serve as the Baseline Schedule utilized for construction. It is up to the Contractor to study and develop a Baseline Schedule to address the actual durations and sequences of Work that is anticipated while maintaining the Milestones provided by the District. Contractor shall obtain information from Contractor's Subcontractors and vendors on the planning, progress, delivery of equipment, coordination, and timing of availability of Subcontractors so a practical plan of Work is fully developed and represented in the Baseline Schedule.

8.3.2.8 *Incorrect Logic, Durations, Sequences, or Critical Path.* The District may reject or indicate durations, sequences, critical path or logic are not acceptable and request changes. The electronic copy of the Baseline Schedule shall have adequate information so logic ties, duration, sequences and critical path may be reviewed electronically. Contractor is to diligently rebuild and resubmit the Baseline Schedule to represent the Contractor's plan to complete the Work and maintain Milestones at the

next progress meeting, or before the next progress meeting. If Contractor is not able to build a Baseline Schedule that is acceptable to the District or Architect, the District reserves the right to utilize the unapproved originally submitted Baseline Schedule (See Article 8.3.2.12) and the comments submitted to hold Contractor accountable for timely delivery of Work and maintenance of Milestones. Furthermore, Contractor's representations in the Baseline Schedule, if unacceptable, may also be used as a basis for termination of the Contract under Article 14 if Contractor fails to adequately maintain the Schedule and falls significantly behind without undertaking the efforts to either submit and follow a Recovery Schedule or fail to submit a Recovery Schedule and make no effort toward recovery on the Project.

8.3.2.9 *Contractor Responsibility Even if Schedule Issues Are Not Discovered.* Failure on the Part of the District to discover errors or omissions in any Schedules submitted shall not be construed to be an approval of the error or omission and any flawed Schedule is not grounds for a time extension.

8.3.2.9 Inclusions in Baseline Schedule. In addition to scheduling requirements set forth at Article 8.3.2, Contractor is specifically directed to include (broken out separately) in Contractor's Baseline Schedule and all Schedule updates, the following items required pursuant to these General Conditions, including but not limited to:

1. Rain Day Float (excluding inclement weather) as required under Article 8.1.4.2. For example, if the NOAA provides 22 days of Rain Days, all 22 days must be incorporated and noted in the Baseline Schedule. Further, any days required to clean-up or dry out shall be included for operations that are likely to require a clean-up or dry out period. Days that are not utilized shall be considered float owned by the Project.

2. Governmental Delay Float under Article 8.1.4.1. This Governmental Delay Float shall only be utilized for Governmental Delays and shall not be considered available float owned by the Project. This float shall only be distributed to the Project upon the completion of the Project and shall be used to offset Liquidated Damages and shall not generate compensable delays.

3. Submittal and Shop Drawing schedule under Article 3.9.

4. Deferred Approvals under Article 3.9.

5. Time for separate contractors, including furniture installation and start up activities, under Article 6.1.

6. Coordination and timing of any Drawings, approvals, notifications, permitting, connection, and testing for all utilities for the Project. (See Article 2.1.4).

7. Testing, special events, or school activities

8.3.2.10 *Failure to include Mandatory Schedule Items*. District may withhold payment pursuant to Articles 9.3, 9.4 and 9.6. In lieu of withholding payment for failure to include Mandatory Schedule Items, after the District or Architect has notified the Contractor of failure to meet the Baseline

Schedule or Updated Schedule requirements and provided a written notification of this failure and provided a written notice of Schedule preparation errors, and the Contractor fails to correct the noted deficiencies or the Contractor does not provide an updated Baseline Schedule correcting the deficiencies, then Contractor shall not be granted an extension of time for failure to obtain necessary items and approvals under Article 8.3.2 and for the time required for failure to comply with laws, building codes, and other regulations (including Title 24 of the California Code of Regulations). Contractor shall maintain all required Article 8.3.2 Schedule items in the Baseline Schedule and indicate any days that have been used as allowed in Article 8. If Contractor fails to include all Article 8.3.2items in its Baseline Schedule or Schedule Updates and the District either utilizes an Unapproved Schedule under Article 8.3.2.12 or does not object to the inclusion of required scheduling items, then all mandatory Schedule inclusions, including float, shall be utilized in the District's discretion. If the Contract Time is exceeded, then Contractor shall be subject to the assessment of Liquidated Damages pursuant to Article 8.4.

8.3.2.11 *Failure to Meet Requirements*. Failure of the Contractor to provide proper Schedules as required by this Article and Article 9 is a material breach of the Contract and grounds for Termination pursuant to Article 14. The District, at its sole discretion, may choose, instead, to withhold, in whole or in part, any Progress Payments or Retention amounts otherwise payable to the Contractor.

8.3.2.12 *Use of an Unapproved Baseline Schedule*. If the Baseline Schedule submitted by the Contractor is unacceptable to the District (i.e. failing to meet the requirements of Article 8.3.2) and Contractor does not incorporate or address the written comments to the Baseline Schedule and a Baseline Schedule is not approved, but due to extreme necessity, the District moves forward without an approved Baseline Schedule, Contractor shall diligently revise and meet Schedule update requirements of Article 8 and incorporate all Article 8.3.2 comments in all updates). However, for purposes of Termination pursuant to Article 14, the unapproved Baseline Schedule initially submitted shall be treated as the Baseline Schedule with durations shortened or revised to accommodate all float, all mandatory Schedule requirements under Article 8.3.2, any requirements in the Contract Documents, and all revisions by the District or Architect.

8.3.3 Update Schedules

8.3.3.1 *Updates Shall Be Based on Approved Baseline Schedule*. Except in the case where there has not been agreement as to a Baseline Schedule, the approved Baseline Schedule shall be used to build future Schedule updates. Schedule updates shall be a CPM based Schedule consistent with the Baseline Schedule requirements of 8.3.2

In the case that no Baseline has been approved, Schedule updates shall be provided monthly and each update shall incorporate all comments and revisions noted as not complying with the requirements of Article 8.3.2. Contractor shall be held to the Article 8.3.2.12 unapproved Baseline Schedule, inclusive of all Milestones, float, comments and revisions by the District and Architect, all required Baseline Schedule Inclusions under Article 8.3.2, and any requirements in the Contract Documents.

8.3.3.2 *Schedule Updates*. Contractor shall update the approved Schedule each month to address actual start dates and durations, the percent complete on activities, actual completion dates, estimated remaining duration for the Work in progress, estimated start dates for Work scheduled to start at future times and changes in duration of Work items

8.3.3.3 *Listing of Items Causing Delays*. Schedule updates shall provide a listing of activities which are causing delay in the progress of Work and a narrative shall be provided showing a

description of problem areas, anticipated delays, and impacts on the Construction Schedule. Simply stating "District Delay" or "Architect Delay" shall be an inadequate listing. Delays shall only be listed if they meet the requirements of Article 8.4.

8.3.3.4 *Recovery Schedule*. In addition to providing a schedule update every thirty (30) days, the Contractor, if requested by the Architect or District, shall take the steps necessary to improve Contractor's progress and demonstrate to the District and Architect that the Contractor has seriously considered how the lost time, the Completion Date, or the Milestones that are required to be met within the terms of the Contract. Contractor shall immediately provide a Recovery Schedule showing how Milestones and the Completion Date will be met. In no case, shall a Recovery Schedule be provided later than ten (10) days following the request for a Recovery Schedule from the Architect or District.

a. Failure to Provide a Recovery Schedule. Shall subject Contractor to the assessment of Liquidated Damages for failure to meet the Contract Time. Refusal or failure to provide a Recovery Schedule shall be considered a substantial failure of performance and a material breach of Contract and may result in Termination of the Contract pursuant to Article 14.

b. Recovery Schedule Acceleration without Additional Cost. The District may require Contractor prepare a Recovery Schedule showing how the Project shall be accelerated, without any additional cost to the District. The District may order, without additional cost, the following:

1. Increase the number of shifts;

2. Utilize overtime to recover the approved Schedule; and/or

3. Increase the days when Work occurs, including weekends, at the Project and at any manufacturer's plant.

c. Recovery Schedule Acceleration without Additional Cost. If Contractor disputes that the Recovery Schedule acceleration shall be issued without additional costs, the Contractor shall submit concurrent with Recovery Schedule acceleration notice pursuant to Articles 8.4.3 and 8.4.4.

8.4 EXTENSIONS OF TIME - LIQUIDATED DAMAGES

8.4.1 Liquidated Damages

CONTRACTOR AND DISTRICT HEREBY AGREE THAT THE EXACT AMOUNT OF DAMAGES FOR FAILURE TO COMPLETE THE WORK WITHIN THE TIME SPECIFIED IS EXTREMELY DIFFICULT OR IMPOSSIBLE TO DETERMINE. IF THE WORK IS NOT SUBSTANTIALLY COMPLETED IN THE TIME SET FORTH IN THE AGREEMENT, IT IS UNDERSTOOD THAT THE DISTRICT WILL SUFFER DAMAGES. IT BEING IMPRACTICAL AND UNFEASIBLE TO DETERMINE THE AMOUNT OF ACTUAL DAMAGE, IT IS AGREED THE CONTRACTOR SHALL PAY TO THE DISTRICT THE AMOUNT LIQUIDATED DAMAGES SET FORTH IN THE AGREEMENT, FOR EACH CALENDAR DAY OF DELAY IN REACHING SUBSTANTIAL COMPLETION (SEE ARTICLE 1.1.46). CONTRACTOR AND ITS SURETY SHALL

BE LIABLE FOR THE AMOUNT THEREOF PURSUANT TO GOVERNMENT CODE SECTION 53069.85.

8.4.2 Delay

Except and only to the extent provided under Article 7 and Article 8, by signing the Agreement, Contractor agrees to bear the risk of delays to Completion of the Work and that Contractor's bid for the Project was made with full knowledge of this risk.

In agreeing to bear the risk of delays to complete the Work, Contractor understands that, except and only to the extent provided otherwise in Article 7 and 8, the occurrence of events that delay the Work shall not excuse Contractor from its obligation to achieve Completion of the Project within the Contract Time, and shall not entitle the Contractor to an adjustment to the Contract time.

8.4.3 Excusable Delay

Contractor shall not be charged for Liquidated Damages because of any delays in completion of Work which are not the fault or negligence of Contractor or its Subcontractors, arising from Rain Float or Project Float, including acts of God, as defined in Public Contract Code section 7105, acts of enemy, epidemics and quarantine restrictions. Any approved delays caused by acts of God, as defined in Public Contract Code section 7105, acts of enemy, epidemics, pandemics, and quarantine restrictions (collectively, "Force Majeure Events") shall be deemed non-compensable excusable delays. Contractor shall within five (5) calendar days of beginning of any such delay notify District in writing of causes of delay; thereupon District shall ascertain the facts and extent of delay and grant extension of time for completing Work when, in its judgment, the findings of fact justify such an extension. Extensions of time shall apply only to that portion of Work affected by delay, and shall not apply to other portions of Work not so affected. An extension of time may only be granted after proper compliance with Article 8.3 requiring preparation and submission of a properly prepared CPM schedule.

8.4.3.1 *Excusable Delay Is Not Compensable.* No extended overhead, general conditions costs, impact costs, out-of-sequence costs or any other type of compensation, by any name or characterization, shall be paid to the Contractor for any delay to any activity not designated as a critical path item on the latest approved Project schedule or if caused by Force Majeure Events.

8.4.3.2 *Notification.* The Contractor shall notify the Architect in writing of any anticipated delay and its cause, in order that the Architect may take immediate steps to prevent, if possible, the occurrence or continuance of delay, and may determine whether the delay is to be considered avoidable or unavoidable, how long it continues, and to what extent the prosecution and completion of the Work might be delayed thereby.

8.4.3.3 *Extension Request*. In the event the Contractor requests an extension of Contract time for unavoidable delay, such request shall be submitted in accordance with the provisions in the Contract Documents governing changes in Work (See Article 7). When requesting time, i.e., extensions, for proposed Change Orders, they must be submitted with the proposed Change Order with full justification and documentation. If the Contractor fails to submit justification with the proposed Change Order it waives its right to a time extension at a later date. Such justification must be based on the official Contract schedule as updated at the time of occurrence of the delay or execution of Work related to any changes to the scope of Work. Blanket or general claims for extra days without specific detailed information as required herein

or a blanket or general reservation of rights do not fulfill the requirements of this Article and shall be denied. The justification must include, but is not limited to, the following information:

a. The duration of the activity relating to the changes in the Work and the resources (manpower, equipment, material, etc.) required to perform these activities within the stated duration.

b. Logical ties to the official Baseline Schedule or Approved Updated Schedule for the proposed changes and/or delay showing the activity/activities in the schedule whose start or completion dates are affected by the change and/or delay. (A fragnet of any delay of over ten (10) days must be provided.)

The Contractor and District understand and expressly agree that insofar as Public Contract Code section 7102 may apply to changes in the Work or delays under this Contract, the actual delays and damages, if any, and time extensions are intended to, and shall provide, the exclusive and full method of compensation for changes in the Work and construction delays.

8.4.4 Notice by Contractor Required

The Contractor shall within five (5) calendar days of beginning of any such delay notify the District in writing of causes of delay with justification and supporting documentation. In the case of a Recovery Schedule pursuant to Article 8.3.3.4, Contractor shall submit written notice concurrent with the Recovery Schedule. District will then ascertain the facts and extent of the delay and grant an extension of time for completing the Work when, in its judgment, the findings of fact justify such an extension. Extensions of time shall apply only to that portion of the Work affected by the delay and shall not apply to other portions of the Work not so affected.

Claims relating to time extensions shall be made in accordance with applicable provisions of Article 7.

8.4.4.1 *Adjustment for Compensable Delays.* The Schedule may be adjusted for a delay if, and only if, Contractor undertakes the following:

a. Contractor submits a timely COR or CO pursuant to the requirements of Article 7.

b. Contractor submits a fragnet showing the critical path delay caused by the COR, CO, Changed Condition, CCD, or ICD

c. Contractor has addressed all required float days in the Fragnet.

d. Contractor submits a complete breakdown of all costs incurred utilizing the format of Article 7.7.3

8.4.5 No Additional Compensation for Coordinating Governmental Submittals and the Resulting Work

CONTRACTOR HAS PLANNED ITS WORK AHEAD OF TIME AND IS AWARE THAT GOVERNMENTAL AGENCIES, SUCH AS THE GAS COMPANIES, ELECTRICAL UTILITY COMPANIES, WATER DISTRICTS AND OTHER AGENCIES MAY HAVE TO APPROVE

CONTRACTOR PREPARED DRAWINGS OR APPROVE A PROPOSED INSTALLATION. CONTRACTOR HAS INCLUDED DELAYS AND DAMAGES WHICH MAY BE CAUSED BY SUCH AGENCIES IN CONTRACTOR'S BID AND HAS INCLUDED ADEQUATE TIME IN THE CONTRACTOR'S BASELINE SCHEDULE. FAILURE TO ADEQUATELY PLAN AND SCHEDULE IS NOT A BASIS TO USE GOVERNMENTAL DELAY FLOAT.

8.4.6 District Right to Accelerate the Work

The District may direct the Contractor to meet schedule requirements when the Work has been delayed. The District shall compensate the Contractor for the additional costs incurred by acceleration to the extent that such costs are directly attributable to the acceleration and are incurred through no fault or negligence of the Contractor.

8.4.6.1 *Management of Acceleration*. Contractor acceleration shall not include Work that is part of the scope of Work detailed in the Plans and Specifications. Instead, the acceleration costs shall be premium or overtime and quantifiable additional work added to the Project meant to accelerate the Project. Contractor is directed to keep consistent crews on the Project so time can be tracked. If crews are circulated off the Project or crews brought in only for overtime, the District may be charged for Contract Work and not accelerated time. In such case, the District may object to the costs submitted.

8.4.6.2 *Costs for Acceleration.* Cost for Acceleration shall be supported by backup documentation, and time sheets signed by the Inspector for each day work has been performed, at or near the time when the Work was performed. A listing on the time sheet shall document all labor, materials and services utilized that day and provide areas of work, and amount of work performed. Contractor shall comply with submission requirements of Article 7.7.

ARTICLE 9
PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

The Contract Sum or Contract Price is stated in the Agreement and, including authorized adjustments, is the total amount payable by the District to the Contractor for performance of the Work under the Contract Documents.

9.2 COST BREAKDOWN

9.2.1 Required Information

Contractor shall furnish the following:

a. Within ten (10) days after Notice to Proceed, a detailed breakdown of the Contract Price (hereinafter "Schedule of Values") for each Project, Site, building, Milestone or other meaningful method to measure the level of Project Completion as determined by the District shall be submitted as a Submittal for the Project.;

b. Within ten (10) days after the date of the Notice to Proceed, a schedule of estimated monthly payment requests due the Contractor showing the values and construction time of the various portions of the Work to be performed by it and by its Subcontractors or material and equipment suppliers containing such supporting evidence as to its correctness as the District may require;

c. Within ten (10) days after the date of the Notice to Proceed, address, telephone number, telecopier number, California State Contractors License number, classification and monetary value of all subcontracts for parties furnishing labor, material, or equipment for completion of the Project.

9.2.2 Information and Preparation of Schedule of Values

9.2.2.1 *Break Down of Schedule of Values*. Schedule of Values shall be broken down by Project, site, building, Milestone, or other meaningful method to measure the level of Project Completion as determined by the District.

9.2.2.2 *Based on Contractor Bid Costs*. The Schedule of Values shall be based on the costs from Contractor's bid to the District. However, the submission of the Schedule of Values shall not be front loaded so the Contractor is paid a greater value than the value of the Work actually performed and shall not shift funds from parts of the Project that are later to Work that is performed earlier.

9.2.2.3 Largest Dollar Value for Each Line Item. Identify Subcontractors and materials suppliers proposed to provide portions of Work equal to or greater than ten thousand dollars ($10,000) or one-half of one percent (0.5%) of their Contract Price, whichever is less.

9.2.2.4 *Allowances*. Any Allowances provided for in the Contract shall be a line item in the Schedule of Values.

9.2.2.5 *Labor and Materials Shall Be Separate*. Labor and Materials shall be broken into two separate line items unless specifically agreed in writing by the District.

9.2.3 District Approval Required

The District shall review all submissions received pursuant to Article 9.2 in a timely manner. All submissions must be approved by the District before becoming the basis of any payment.

9.3 PROGRESS PAYMENTS

9.3.1 Payments to Contractor

Unless there is a resolution indicating that the Work for the Project is substantially complex, within thirty-five (35) days after approval of the Request for Payment, Contractor shall be paid a sum equal to ninety-five percent (95%) of the value of the Work performed (as certified by Architect and Inspector and verified by Contractor) up to the last day of the previous month, less the aggregate of previous payments. In the case of a Project designated substantially complex, the sum paid to the Contractor shall be equal to ninety percent (90%) of the value of the Work performed (as certified by the Architect and Inspector and verified by Contractor). The value of the Work completed shall be the Contractor's best estimate. Work completed as estimated shall be an approximation or estimate only and no mistake, inaccuracy, error or falsification in said any approved estimate shall operate to release the Contractor, or any Surety upon any bond, from damages arising from such Work, or from the District's enforcement of each and every provision of this Contract including but not limited to the Performance Bond and Payment Bond. The District shall have the right to subsequently to correct any mistake, inaccuracy, error or falsification made or otherwise set forth in any approved Request for Payment and such correction may occur in any future Payment Application or in the Retention Payment to the Contractor. No Surety upon any bond shall be relieved, released or exonerated of its obligations under this Contract or any applicable bond when the District is unable to correct an overpayment to the Contractor due to any abandonment by the Contractor or termination by the District.

The Contractor shall not be entitled to have any payment requests processed, or be entitled to have any payment made for Work performed, so long as any lawful or proper direction given by the District concerning the Work, or any portion thereof, remains incomplete.

Notwithstanding anything to the contrary stated above, the Contractor may include in its Request for Payment the value of any structural steel, glue laminated beams, trusses, bleachers and other such custom-made materials prepared specifically for the Project and unique to the Project so long as all of the following requirements are satisfied:

a. The aggregate cost of materials stored off-site shall not exceed Twenty Five Thousand Dollars ($25,000) at any time or as otherwise agreed to be District in writing;

b. Title to such materials shall be vested in the District as evidenced by documentation satisfactory in form and substance to the District, including, without limitation, recorded financing statements, UCC filings and UCC searches;

c. With each Contractor Request for Payment, the Contractor shall submit to the District a written list identifying each location where materials are stored off-site

(which must be a bonded warehouse) and the value of the materials at each location. The Contractor shall procure insurance satisfactory to the District (in its reasonable discretion) for materials stored off-site in an amount not less than the total value thereof;

d. The consent of any Surety shall be obtained to the extent required prior to payment for any materials stored off-site;

e. Representatives of the District shall have the right to make inspections of the storage areas at any time; and

f. Such materials shall be: (1) protected from diversion, destruction, theft and damage to the reasonable satisfaction of the District; (2) specifically marked for use on the Project; and (3) segregated from other materials at the storage facility.

9.3.2 Purchase of Materials and Equipment and Cost Fluctuations

The Contractor is required to order, obtain, and store materials and equipment sufficiently in advance of its Work at no additional cost or advance payment from District to assure that there will be no delays. Contractor understands that materials fluctuate in value and shall have adequately addressed market fluctuations through agreements with Contractor vendors or by other means. Contractor further understands and incorporates into Contractor's bid cost any wage rate increases during the Project for the Contractor's labor force as well as all other Subcontractor and vendor labor forces. District shall not be responsible for market fluctuations in costs or labor rate increases during the Project. Contractor further has incorporated any and all cost increases in areas of Work where there may be schedule variations so that cost increases are not passed through to the District.

9.3.3 No Waiver

No payment by District hereunder shall be interpreted so as to imply that District has inspected, approved, or accepted any part of the Work. Contractor specifically understands that Title 24 Section 4-343 which states:

> "It is the duty of the contractor to complete the work covered by his or her contract in accordance with the approved Plans and Specifications therefore. The contractor in no way is relieved of any responsibility by the activities of the Architect, Engineer, Inspector or DSA in the performance of such duties... In no case, however, shall the instruction of the Architect or registered Engineer be construed to cause work to be done with is not in conformity with the approved Plans, Specifications, and change orders..."

Notwithstanding any payment, the District may enforce each and every provision of this Contract which includes, but is not limited to, the Performance Bond and Payment Bond. The District may correct any error subsequent to any payment. In no event shall the Contractor or the Surety be released or exonerated from performance under this Contract when the District overpays the Contractor based upon any mistake, inaccuracy, error or falsification in any estimate that is included in any Request for Payment.

9.3.4 Issuance of Certificate of Payment

The Architect shall, within seven (7) days after receipt of the Contractor's Application for Payment, either approve such payment or notify the Contractor in writing of the Architect's reasons for withholding approval in whole or in part as provided in Article 9.6. The review of the Contractor's Application for Payment by the Architect is based on the Architect's observations at the Project and the data comprising the Application for Payment that the Work has progressed to the point indicated and that, to the best of the Architect's knowledge, information, and belief, the quality of the Work is in accordance with the Contract Documents. In some cases, the Architect may act upon or rely on the evaluation of the Work by the Inspector. This review of Payment Applications is sometimes called a "Pencil Draft." District's return of a Pencil Draft shall constitute the District's dispute of the Payment Application that has been submitted. Contractor shall promptly respond to Pencil Drafts or Contractor's Payment Applications may be delayed. Contractor's failure to promptly respond to a Pencil Draft shall qualify as a delay in the prompt payment of a Request for Payment or Request for Retention. The foregoing representations are subject to: (1) an evaluation of the Work for conformance with the Contract Documents, (2) results of subsequent tests and inspections, (3) minor deviations from the Contract Documents correctable prior to completion, and (4) specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute the Contractor's verified representation that the Contractor is entitled to payment in the amount certified.

9.3.5 Payment of Undisputed Contract Payments

In accordance with Public Contract Code section 7100, payments by the District to the Contractor for any and all undisputed amounts (including all Progress Payments, Final Payments or Retention Payment) is contingent upon submission of a proper and accurate Payment Application and the Contractor furnishing the District with a release of all Claims against the District related to such undisputed amounts. Disputed Contract Claims in stated amounts may be specifically excluded by the Contractor from the operation of the release. If, however, the Contractor specifically excludes any Claims, the Contractor shall provide details such as a specific number of disputed days or costs of any such exclusion in accordance with Articles 4.6 and 7.7.

9.4 APPLICATIONS FOR PROGRESS PAYMENTS

9.4.1 Procedure

9.4.1.1 *Application for Progress.* On or before the fifth (5th) day of each calendar month during the progress of the Work, Contractor shall submit to the Architect an itemized Application for Progress Payment for operations completed. Such application shall be notarized, if required, and supported by the following or such portion thereof as Architect requires:

1. The amount paid to the date of the Payment Application to the Contractor, to all its Subcontractors, and all others furnishing labor, material, or equipment for its Contract;

2. The amount being requested under the Payment Application by the Contractor on its own behalf and separately stating the amount requested on behalf of each of the Subcontractors and all others furnishing labor, material, and equipment under the Contract;

3. The balance that will be due to each of such entities after said payment is made;

4. A certification that the As-Built Drawings and Annotated Specifications are current;

5. Itemized breakdown of Work done for the purpose of requesting partial payment;

6. An updated or approved Baseline Schedule or other Schedule updates in conformance with Article 8;

7. Failure to submit an updated Schedule for the month or any previous month;

8. The additions to and subtractions from the Contract Price and Contract Time;

9. A summary of the Retention held;

10. Material invoices, evidence of equipment purchases, rentals, and other support and details of cost as the District may require from time to time;

11. The percentage of completion of the Contractor's Work by line item;

12. An updated Schedule of Values from the preceding Application for Payment;

13. Prerequisites for Progress Payments; and

14. Any other information or documents reasonably requested by the District, Architect, Inspector or CM (if applicable).

9.4.1.2 *First Payment Request.* The following items, if applicable, must be completed before the first payment request will be accepted for processing:

1. Installation of the Project sign;

2. Receipt by Architect of Submittals;

3. Installation of field office;

4. Installation of temporary facilities and fencing;

5. Submission of documents listed in the Article 9.2 relating to Contract Price breakdown;

6. Preliminary schedule analysis, due within 10 days after Notice to Proceed;

7. Contractor's Baseline Schedule (to be CPM based in conformance with Article 8);

8. Schedule of unit prices, if applicable;

9. Submittal Schedule;

10. Copies of necessary permits;

11. Copies of authorizations and licenses from governing authorities;

12. Initial progress report;

13. Surveyor qualifications;

14. Written acceptance of District's survey of rough grading, if applicable;

15. List of all Subcontractors, with names, license numbers, telephone numbers, and scope of work;

16. All bonds and insurance endorsements; and

17. Resumes of General Contractor's Project Manager, and if applicable, job site secretary, record documents recorder, and job site Superintendent.

9.4.1.3 *Second Payment Request.* The second payment request will not be processed until all Submittals and Shop Drawings have been accepted for review by the Architect.

9.4.1.4 *All Payment Requests.* No payment requests will be processed unless Contractor has submitted copies of the certified payroll records for the Work which correlates to the payment request and a proper CPM schedule pursuant to Article 8 is submitted.

9.4.1.5 *Final Payment Application (90% or 95%).* See Article 9.11.1

9.4.1.6 *Final Payment Application (100%).* See Article 9.11.3

9.5 STOP NOTICE CLAIMS AND WARRANTY OF TITLE

The Contractor warrants title to all Work. The Contractor further warrants that all Work is free and clear of liens, claims, security interests, stop notices, or encumbrances in favor of the Contractor, Subcontractors, material and equipment suppliers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment relating to the Work. Failure to keep work free of liens, stop notices, claims, security interests or encumbrances is grounds to make a claim against Contractor's Payment and Performance Bond to immediately remedy and defend.

If a lien or stop notice of any nature should at any time be filed against the Work or any District property, by any entity which has supplied material or services at the request of the Contractor, Contractor and Contractor's Surety shall promptly, on demand by District and at Contractor's and Surety's own expense, take any and all action necessary to cause any such lien or stop notice to be released or discharged immediately therefrom.

If the Contractor fails to furnish to the District within ten (10) calendar days after written demand by the District, satisfactory evidence that a lien or stop notice has been so released, discharged, or secured, then District may discharge such indebtedness and deduct the amount required therefor, together with any and all losses, costs, damages, and attorney's fees and expense incurred or suffered by District from any

sum payable to Contractor under the Contract. In addition, any liens, stop notices, claims, security interests or encumbrances shall trigger the indemnification requirements under Article 3.15 and the Agreement Form, and shall act as a trigger under Civil Code section 2778 and 2779 requiring reimbursement for any and all costs following the District's written demand has been made. Any withholdings by the District for stop notices in accordance with Civil Code section 9358 shall not be a basis by the Contractor to make a Claim for interest penalties under Public Contract Code sections 7107 or 20104.50.

9.6 DECISIONS TO WITHHOLD PAYMENT

9.6.1 Reasons to Withhold Payment

The District may withhold payment in whole, or in part, to the extent reasonably necessary to protect the District if, in the District's opinion, the representations to the District required by Article 9.4 cannot be made. The District may withhold payment, in whole, or in part, to such extent as may be necessary to protect the District from loss because of, but not limited to:

a. Defective Work not remedied;

b. Stop notices served upon the District;

c. Liquidated Damages assessed against the Contractor;

d. The cost of Completion of the Contract if there exists reasonable doubt that the Work can be Completed for the unpaid balance of any Contract Price or by the completion date;

e. Damage to the District or other contractor;

f. Unsatisfactory prosecution of the Work by the Contractor;

g. Failure to store and properly secure materials;

h. Failure of the Contractor to submit on a timely basis, proper and sufficient documentation required by the Contract Documents, including, without limitation, acceptable monthly progress schedules, Shop Drawings, Submittal schedules, Schedule of Values, Product Data and samples, proposed product lists, executed Change Order, Construction Change Documents, and verified reports;

i. Failure of the Contractor to maintain As-Built Drawings;

j. Erroneous estimates by the Contractor of the value of the Work performed, or other false statements in an Payment Application;

k. Unauthorized deviations from the Contract Documents (including but not limited to Unresolved Notices of Deviations (DSA Form 154));

l. Failure of the Contractor to prosecute the Work in a timely manner in compliance with established progress schedules and completion dates.

m. Failure to properly pay prevailing wages as defined in Labor Code section 1720, et seq.;

n. Failure to properly maintain or clean up the Site;

o. Payments to indemnify, defend, or hold harmless the District;

p. Any payments due to the District including but not limited to payments for failed tests, or utilities changes or permits;

q. Failure to submit an acceptable Baseline Schedule or any Schedule or Schedule update in accordance with Article 8;

r. Failure to pay Subcontractor or suppliers as required by Article 9.8.1

s. Failure to secure warranties, including the cost to pay for warranties;

t. Failure to provide releases from material suppliers or Subcontractors when requested to do so;

u. Items deducted pursuant to Article 2.2;

v. Incomplete Punch List items under Article 9.9.1.1 which have gone through the Article 2.2 process; or

w. Allowances that have not been used.

9.6.2 Reallocation of Withheld Amounts

District may, in its discretion, apply any withheld amount to payment of outstanding claims or obligations as defined in Article 9.6.1 and 9.5. In so doing, District shall make such payments on behalf of Contractor. If any payment is so made by District, then such amount shall be considered as a payment made under Contract by District to Contractor and District shall not be liable to Contractor for such payments made in good faith. Such payments may be made without prior judicial determination of claim or obligation. District will render Contractor an accounting of such funds disbursed on behalf of Contractor.

If Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents or fails to perform any provision thereof, District may, after ten (10) calendar days written notice to the Contractor and without prejudice to any other remedy make good such deficiencies. The District shall adjust the total Contract price by reducing the amount thereof by the cost of making good such deficiencies. If District deems it inexpedient to correct Work which is damaged, defective, or not done in accordance with Contract provisions, an equitable reduction in the Contract Price (of at least 150% of the estimated reasonable value of the nonconforming Work) shall be made therefor.

9.6.3 Payment After Cure

When the grounds for declining approval are removed, payment shall be made for amounts withheld because of them. No interest shall be paid on any retainage or amounts withheld due to the failure of the Contractor to perform in accordance with the terms and conditions of the Contract Documents.

9.7 NONCONFORMING WORK

Contractor shall promptly remove from premises all Work identified by District as failing to conform to the Contract whether incorporated or not. Contractor shall promptly replace and re-execute its own Work to comply with the Contract without additional expense to District and shall bear the expense of making good all Work of other contractors destroyed or damaged by such removal or replacement.

If Contractor does not remove such Work which has been identified by District as failing to conform to the Contract Documents within a reasonable time, fixed by written notice, District may remove it and may store the material at Contractor's expense. If Contractor does not pay expenses of such removal within ten (10) calendar days' time thereafter, District may, upon ten (10) calendar days' written notice, sell such materials at auction or at private sale and shall account for net proceeds thereof, after deducting all costs and expenses that should have been borne by Contractor.

9.8 SUBCONTRACTOR PAYMENTS

9.8.1 Payments to Subcontractors

No later than ten (10) days after receipt, or pursuant to Business and Professions Code section 7108.5, the Contractor shall pay to each Subcontractor, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

9.8.2 No Obligation of District for Subcontractor Payment

The District shall have no obligation to pay, or to see to the payment of, money to a Subcontractor except as may otherwise be required by law.

9.8.3 Payment Not Constituting Approval or Acceptance

An approved Request for Payment, a progress payment, a Certificate of Substantial Completion, or partial or entire use or occupancy of the Project by the District shall not constitute acceptance of Work that is not in accordance with the Contract Documents.

9.8.4 Joint Checks

District shall have the right, if necessary for the protection of the District, to issue joint checks made payable to the Contractor and Subcontractors and material or equipment suppliers. The joint check payees shall be responsible for the allocation and disbursement of funds included as part of any such joint payment. In no event shall any joint check payment be construed to create any contract between the District and a Subcontractor of any tier, any obligation from the District to such Subcontractor, or rights in such Subcontractor against the District. The District may choose to issue joint checks at District's sole discretion and only after all the requirements of that particular school district and county are specifically met. Some school districts cannot issue joint checks, so the ability to issue joint checks depends on the school district and the specific circumstances.

9.9 COMPLETION OF THE WORK

9.9.1 Close-Out Procedures

9.9.1.1 *Incomplete Punch Items.* When the Contractor considers the Work Substantially Complete (See Article 1.1.46 for definition of Substantially Complete), the Contractor shall prepare and submit to the District a comprehensive list of minor items to be completed or corrected (hereinafter "Incomplete Punch Items" or "Punch List"). The Contractor and/or its Subcontractors shall proceed promptly to complete and correct the Incomplete Punch Items listed. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Contractor is aware that Title 24 Section 4-343(a) provides:

> "RESPONSIBILITIES. IT IS THE DUTY OF THE CONTRACTOR TO COMPLETE THE WORK COVERED BY HIS OR HER CONTRACT IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS THEREFOR. THE CONTRACTOR IN NO WAY IS RELIEVED OF ANY RESPONSIBILITY BY THE ACTIVITIES OF THE ARCHITECT, ENGINEER, INSPECTOR OR DSA IN THE PERFORMANCE OF SUCH DUTIES.

9.9.1.2 *Punch List Is Prepared Only After the Project Is Substantially Complete.* If any of the conditions noted in Article 1.1.46 as defining Substantial Completion are not met, the Inspector, Architect or District may reject Contractor's Incomplete Punch Items as premature. If the Architect and Inspector commence review of Incomplete Punch Items, all rights are reserved until the Project actually meets the definition of Substantially Complete. Liquidated Damages, warranties, and other contractual rights are not affected by Incomplete Punch Items unless otherwise addressed in these General Conditions.

Once the Inspector and the Architect determine the Project is Substantially Complete, a Certificate of Substantial Completion shall be issued. The Inspector and Architect shall prepare a Punch List of items which is an inspection report of the Work, if any, required in order to complete the Contract Documents and ensure compliance with the DSA Approved Plans so the Project may be Completed by the Contractor and a final DSA Close-Out is approved. When all Work for the Project is Complete, including Punch Lists and all Work complies with the approved Contract Documents and Change Orders, the Project has reached Final Completion.

9.9.1.3 *Time for Completion of Punch List.* Contractor shall only be given a period of no more than thirty (30) days to complete the Punch List for the Project. During the Punch List period, the Contractor's Superintendent and Project Manager shall remain engaged in the Project and shall not be removed or replaced. If the Punch List is not completed at the end of the Punch List time then Contractor shall issue a valued Punch List within 5 days after the date the Punch List time ends. If Contractor does not issue such a list, the District or Architect may issue a valued Punch List to the Contractor and withhold up to 150% of the value of the Punch List Work pursuant to Article 2.2 of this Agreement.

Failure to issue a timely written request for additional time to complete Punch List shall result in the deletion of the remaining Punch List Work pursuant to Article 2.2 and the issuance of a Deductive Change Order.

a. Extension of Time to Complete Punch List. If Contractor cannot finish the Punch List Work during the time period allotted under Article 9.9.1.3, the Contractor may make a written request for a Non-Compensable Punch List time extension accompanied by an estimate of the number of additional days it will take to complete the Punch List Work for a written consent from the District to allow continued Punch List Work. Punch List

time extensions are a maximum of thirty (30) days for each request and must be accompanied by an itemized valued Punch List.

b. If there is no valued Punch List accompanying any request or if Contractor intends to undertake Punch List without the continued support and supervision of its Superintendent and Project Manager (as required under Article 3.2), the District, Construction Manager or Architect may issue a valued Punch List, reject the Punch List Time Extension and deduct 150% of the valued Punch List pursuant to Article 2.2 and proceed to Close-Out the Project. Contractor shall cease work on the Project and proceed to complete Contractor's Retention Payment Application and complete the Work for the Project required pursuant to Article 9.11.3.

9.9.1.4 *District Rejection of Written Request for Punch List Time Extensions*. Following sixty (60) Days of Punch List under Article 9.9.1.3, the District has the option of rejecting Punch List Time Extension requests. The District may proceed under Article 2.2 and deduct the value of remaining Punch List Work pursuant to Article 2.2. If the District rejects the Punch List Time Extension request then Contractor shall cease Work on the Project and proceed to Final Inspection pursuant to Article 9.11.2.

9.9.1.5 *Punch List Liquidated Damages to Compensate for Added District Project Costs.* If the total time utilized for Punch List exceeds sixty (60) days [the thirty (30) day period under Article 9.9.1.3 plus an additional thirty (30) day period that has been requested in writing], and the District grants an additional written Punch List Time Extension that exceeds sixty (60) days of Punch List, then Contactor shall be charged Liquidated Damages of at least $750 per day for continued Punch List Work to partially compensate the Inspector, Architect, and Construction Manager's extended time on the Project. This Punch List Liquidated Damage number is based on anticipated cost for an Inspector on site and additional costs for the Architect and Construction Manager to reinspect Punch List items and perform the administration of the Close-out.

Contractor received thirty (30) days without any charges for Punch List Liquidated Damages and is placed on notice pursuant to this Article 9.9.1.5 that $750 is due for each day of Punch List that exceeds sixty (60) days at $750, a cost much lower than typical (and actual) costs for Inspection, Architect and Construction Manager time required during Punch List. Starting at ninety (90) days of Punch List (an excessive number of days to complete Punch List), the District shall be entitled to adjust Punch List Liquidated Damages to an estimate of the actual costs incurred to oversee, monitor and inspect the Punch List. If costs exceed $750 per day, the anticipated extended contract charges for Inspection, Architect, Construction Manager, and any other costs that will be incurred due to the extended Punch List shall be itemized and a daily rate of Punch List Liquidated Damages shall be presented in writing to the Contractor within five (5) days following the receipt of a written request for Punch List Time Extension by the Contractor that extends the Punch List time beyond ninety (90) days. This written notice of actual Punch List Liquidated Damages may be provided to the Contractor at any time following the first written request for Punch List Time extension requested under Article 9.9.1.3. The adjusted actual Punch List Liquidated Damage amount shall be applicable as Punch List Liquidated Damages commencing on the ninetieth (90^{th}) day of Punch List.

9.9.2 Close-Out Requirements for Final Completion of the Project

a. Utility Connections. Buildings shall be connected to water, gas, sewer, and electric services, complete and ready for use. Service connections shall be made and existing services reconnected

b. As-Builts Up to Date and Complete. The intent of this procedure is to obtain an exact "As-Built" record of the Work upon completion of the project. The following information shall be carefully and correctly drawn on the prints and all items shall be accurately located and dimensioned from finished surfaces of building walls on all As-Built Drawings

1. The exact location and elevations of all covered utilities, including valves, cleanouts, etc. must be shown on As-Built Drawings

2. Contractor is liable and responsible for inaccuracies in As-Built Drawings, even though they become evident at some future date.

3. Upon completion of the Work and as a condition precedent to approval of Retention Payment, Contractor shall obtain the Inspector's approval of the "As-Built" information. When completed, Contractor shall deliver corrected sepias and/or a Diskette with an electronic file in a format acceptable to the District.

4. District may withhold the cost to hire a draftsman and potholing and testing service to complete Record As-Built Drawings at substantial cost if the Contractor does not deliver a complete set of Record As-Built Drawings. This shall result in withholding of between $10,000 to $20,000 per building that does not have a corresponding Record As Built Drawing.

c. Any Work not installed as originally indicated on Drawings

d. All DSA Close-Out requirements (See DSA Certification Guide) Contractor is also specifically directed to Item 3.2 in the DSA Certification Guide and the applicable certificates for the DSA-311 form.

e. Submission of Form 6-C. Contractor shall be required to execute a Form 6-C as required under Title 24 Sections 4-343. The Contractor understands that the filing with DSA of a Form 6-C is a requirement to obtain final DSA Approval of the construction by Contractor and utilized to verify under penalty of perjury that the Work performed by Contractor complies with the DSA approved Contract Documents. The failure to file a DSA Form 6C has two consequences. First, the Construction of the Project will not comply with the design immunity provisions of Government Code section 830.6 and exposes the District and the individual Board members to personal liability for injuries that occur on the Project.

Secondly , under DSA IR A-20, since the Project cannot be Certified by DSA, no future or further Projects will be authorized so Contractor will have essentially condemned the campus from any future modernization or addition of new classrooms through their failure to file the DSA Form 6C.

1. *Execution of the DSA Form 6-C is Mandatory*. Refusal to execute the Form 6-C, which is a Final DSA Verified Report that all Work performed complies with the DSA approved Contract Documents is a violation of Education Code section 17312 and shall be referred to the Attorney General for Prosecution.

2. *Referral to the District Attorney for Extortion*. If the Contractor's refusal to execute the DSA Form 6C is to leverage a Dispute, Claim or litigation, then the matter shall also be referred to the District Attorney for prosecution for extortion.

3. *Contractor shall be Responsible for All Costs to Certify the Project*. The District may certify the Project complies with Approved Plans and Specifications by utilizing the procedures under the Project Certification Guide (located at the DSA website). All costs for professionals, inspection, and testing required for an alternate Project Certification shall be the Contractor's responsibility and the District reserves its right to institute legal action against the Contractor and Contractor's Surety for all costs to certify the Project and all costs to correct Non-Compliant Work that is discovered during the Alternate Certification Process.

f. ADA Work that must be corrected to receive DSA certification. See Article 12.2.

g. Maintenance Manuals. At least thirty (30) days prior to final inspection, three (3) copies of complete operations and maintenance manuals, repair parts lists, service instructions for all electrical and mechanical equipment, and equipment warranties shall be submitted. All installation, operating, and maintenance information and Drawings shall be bound in 8½" x 11" binders. Provide a table of contents in front and all items shall be indexed with tabs. Each manual shall also contain a list of Subcontractors, with their addresses and the names of persons to contact in cases of emergency. Identifying labels shall provide names of manufactures, their addresses, ratings, and capacities of equipment and machinery.

1. Maintenance manuals shall also be delivered in electronic media for the Project. Any demonstration videos shall also be provided on electronic media.

h. Inspection Requirements. Before calling for final inspection, Contractor shall determine that the following Work has been performed:

1. The Work has been completed;

2. All fire/ life safety items are completed and in working order;

3. Mechanical and electrical Work complete, fixtures in place, connected and tested;

4. Electrical circuits scheduled in panels and disconnect switches labeled;

5. Painting and special finishes complete;

6. Doors complete with hardware, cleaned of protective film relieved of sticking or binding and in working order;

7. Tops and bottoms of doors sealed;

8. Floors waxed and polished as specified;

9. Broken glass replaced and glass cleaned;

10. Grounds cleared of Contractor's equipment, raked clean of debris, and trash removed from Site;

11. Work cleaned, free of stains, scratches, and other foreign matter, replacement of damaged and broken material;

12. Finished and decorative work shall have marks, dirt and superfluous labels removed;

13. Final cleanup, as in Article 3.12;

14. All Work pursuant to Article 9.11.2; and

15. Furnish a letter to District stating that the District's Representative or other designated person or persons have been instructed in working characteristics of mechanical and electrical equipment.

9.9.3 Costs of Multiple Inspections

More than two (2) requests of the District to make inspections required under Article 9.9.1 shall be considered an additional service of Architect, Inspector, Engineer or other consultants shall be the Contractor's responsibility pursuant to Article 4.5 and all subsequent costs will be prepared as a Deductive Change Order.

9.10 PARTIAL OCCUPANCY OR USE

9.10.1 District's Rights

The District may occupy or use any completed or partially completed portion of the Work at any stage. The District and the Contractor shall agree in writing to the responsibilities assigned to each of them for payments, security, maintenance, heat, utilities, damage to the Work, insurance, the period for correction of the Work, and the commencement of warranties required by the Contract Documents. If District and Contractor cannot agree as to responsibilities such disagreement shall be resolved pursuant to Article 4.6. When the Contractor considers a portion complete, the Contractor shall prepare and submit a Punch List to the District as provided under Article 9.9.1.

9.10.2 Inspection Prior to Occupancy or Use

Immediately prior to such partial occupancy or use, the District, the Contractor, and the Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

9.10.3 No Waiver

Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

9.11 COMPLETION AND FINAL PAYMENT

9.11.1 Final Payment (90% Billing if Substantially Complex Finding and 95% Billing If No Finding Is Made)

The following items must be completed before the Final Payment Application will be accepted for processing at Substantial Completion of the Project:

a. Inspector sign-off of each item in the DSA 152 Project Inspection Card;

b. The Project has reached the Punch List items under Article 9.9.1.2 and the Project has been determined to be Substantially Complete under Article 1.1.46;

c. Removal of temporary facilities and services;

d. Testing, adjusting and balance records are complete;

e. Removal of surplus materials, rubbish, and similar elements;

f. Changeover of door locks;

g. Deductive items pursuant to Article 9.6 and Article 2.2; and

h. Completion and submission of all final Change Orders for the Project.

9.11.2 Final Inspection (Punch List Completion)

Contractor shall comply with Punch List procedures under Article 9.9.1.1, and maintain the presence of Project Superintendent and Project Manager (not replacement project superintendent or project manager) until the Punch List is complete to ensure proper and timely completion of the Punch List. Under no circumstances shall Contractor demobilize its forces prior to completion of the Punch List.

Upon completion of the Work under Article 9.9.1, the Contractor shall notify the District and Architect, who shall again inspect such Work. If the Architect and the District find the Work contained in the Punch List acceptable under the Contract Documents, the Work shall have reached Final Completion. Architect shall notify Contractor, who shall then submit to the Architect its Application for Retention Payment. This Application for Retention Payment shall contain any deductions under Article 9.6, including but not limited to incomplete Punch List items under Article 9.9.1.

Upon receipt and approval of Application for Retention Payment, the Architect shall issue a Form 6 stating that to the best of its knowledge, information, and belief, and on the basis of its

observations, inspections, and all other data accumulated or received by the Architect in connection with the Work, such Work has been completed in accordance with the Contract Documents. The District shall thereupon inspect such Work and either accept the Work as complete or notify the Architect and the Contractor in writing of reasons why the Work is not complete. Upon acceptance of the Work of the Contractor as fully complete (which, absent unusual circumstances, will occur when the Punch List items have been satisfactorily completed), the District shall record a Notice of Completion with the County Recorder, and the Contractor shall, upon receipt of payment from the District, pay the amounts due Subcontractors.

If the Architect and the District find that the Work contained in the Punch List is unacceptable, then Contractor shall issue a valued Punch List within 5 days after the date the Punch List time ends. If Contractor does not issue such a list, the District or Architect may issue a valued Punch List to the Contractor and withhold up to 150% of the value of the Punch List Work pursuant to Article 2.2 of this Agreement.

9.11.3 Retainage (100% Billing for the Entire Project)

The retainage, less any amounts disputed by the District or which the District has the right to withhold pursuant to the Contract Documents (including but not limited to incomplete Punch List items under Article 9.9.1), shall be paid after approval by the District of the Application for Retention Payment, after the satisfaction of the conditions set forth in Article 9, the Final Inspection under Article 9.11.2 is completed, and after thirty-five (35) days after the acceptance of the Work and recording of the Notice of Completion by District. No interest shall be paid on any retainage, or on any amounts withheld due to a failure of the Contractor to perform, in accordance with the terms and conditions of the Contract Documents, except as provided to the contrary in any escrow agreement between the District and the Contractor.

a. Procedures for Application for Retention Payment. The following conditions must be fulfilled prior to release of Retention Payment:

1. A full and final waiver or release of all stop notices in connection with the Work shall be submitted by Contractor, including a release of stop notice in recordable form, together with (to the extent permitted by law) a copy of the full and final release of all Stop Notice rights.

2. The Contractor shall have made all corrections, including all Punch List Items, to the Work which are required to remedy any defects therein, to obtain compliance with the Contract Documents or any requirements of applicable codes and ordinances, or to fulfill any of the orders or directions of District required under the Contract Documents.

3. Each Subcontractor shall have delivered to the Contractor all written guarantees, warranties, applications, releases from the Surety and warranty bonds (if applicable) required by the Contract Documents for its portion of the Work.

4. Contractor must have completed all requirements set forth in Article 9.9

5. Contractor must have issued a Form 6C for the Project.

6. The Contractor shall have delivered to the District all manuals and materials required by the Contract Documents.

7. The Contractor shall have completed final clean up as required by Article 3.12

8. Contractor shall have all deductive items under Article 9.6 and Article 2.2 submitted as part of the Retention Payment.

9.11.4 Recording of a Notice of Completion After Punch List Period and Final Inspection.

When the Work, or designated portion thereof, is complete or the District has completed the Article 9.6and/or the Article 2.2 process, whichever occurs first, the District will file either a Notice of Completion or a Notice of Completion noting valued Punch List items. Valued Punch List items will be deducted from the Retention Payment.

During the time when Work is being performed on the Punch List, the Project does not meet the definition of "Complete" under Public Contract Code section 7107(c)(1) even if there is "beneficial occupancy" of the Project since that has been no "cessation of labor" on the Project. Completion of Punch List under this Article is not "testing, startup, or commissioning by the public entity or its agent." In other words, the continuing Punch List Work is Contractor labor on the Project until each and every item of Punch List Work is complete or the time periods under Article 9.9.1 have expired.

9.11.5 Warranties

Warranties required by the Contract Documents shall commence on the date of Completion of the entire Work. Warranty periods DO NOT commence at Substantial Completion or when a particular Subcontractor work is complete. No additional charges, extras, Change Orders, or Claims may be sought for warranties commencing from the Notice of Completion.

District shall have the right to utilize equipment, test, and operate as necessary for acclimation, or testing without voiding or starting warranties. Taking beneficial occupancy shall not start warranties except in the case where the District agrees, in writing, that warranties shall commence running or where the District is taking phased occupancy of specific buildings or areas and completes separate Punch Lists as further addressed in Article 4.2.7.

9.11.6 Time for Submission of Application for Final Payment and Retention Payment (Unilateral Processing of Final and Retention Payment Application).

If Contractor submits a Final Payment Application which fails to include deductive items under Article 9.6, the District or Architect shall note this defective request for Final Payment Application. The Contractor shall be notified that specific deductive items shall be included in the Final Payment Application. If Contractor either continues to submit the Final Payment Application without deductive items under Article 9.6, or a period of 14 calendar days passes after Contractor is provided written notice of deductive items for inclusion in Final Payment Application, then District may either alter the Final

Payment Application and recalculate the math on the Final Payment Application to address the Article 9.6 deductive items or process a unilateral Final Payment Application.

9.11.7 Unilateral Release of Retention

After the recordation of the Notice of Completion, or within sixty (60) days following the completion of the Punch List or the expiration of the time for completion of Punch List under Article 9.9.1, if Contractor does not make an Application for Release of Retention, the District may unilaterally release retention less any deducts under Article 9.6 and/or Article 2.2, withholds due to stop notices, or withholdings due to other defective Work on the Project. District may also choose to unilaterally release Retention after deduction of 150% of any disputed items, which may also include items under Article 9.6 and 2.2. If a deduction pursuant to Article 9.6 is made from Retention, a letter deducting specific valued items shall be considered a notice of Default under the terms of the Escrow Agreement.

9.12 SUBSTITUTION OF SECURITIES

The District will permit the substitution of securities in accordance with the provisions of Public Contract Code section 22300 as set forth in the form contained in the Bid Documents.

ARTICLE 10
PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 Contractor Responsibility

The Contractor shall be responsible for all damages to persons or property that occur as a result of its fault or negligence in connection with the prosecution of this Contract and shall take all necessary measures and be responsible for the proper care and protection of all materials delivered and Work performed until completion and final acceptance by the District. All Work shall be solely at the Contractor's risk, with the exception of damage to the Work caused by "acts of God" as defined in Public Contract Code section 7105(b)(2).

Contractor shall take, and require Subcontractor to take, all necessary precautions for safety of workers on the Work and shall comply with all applicable federal, state, local and other safety laws, standards, orders, rules, regulations, and building codes to prevent accidents or injury to persons on, about, or adjacent to premises where Work is being performed and to provide a safe and healthful place of employment. In addition to meeting all requirements of OSHA, Cal-OSHA, state, and local codes, Contractor shall furnish, erect and properly maintain at all times, as directed by District or Architect or required by conditions and progress of Work, all necessary safety devices, safeguards, construction canopies, signs, audible devices for protection of the blind, safety rails, belts and nets, barriers, lights, and watchmen for protection of workers and the public, and shall post danger signs warning against hazards created by such features in the course of construction. Contractor shall designate a responsible member of its organization on the Work, whose duty shall be to post information regarding protection and obligations of workers and other notices required under occupational safety and health laws, to comply with reporting and other occupational safety requirements, and to protect the life, safety and health of workers. The name and position of person so designated shall be reported to District by Contractor. Contractor shall correct any violations of safety laws, rules, orders, standards, or regulations. Upon the issuance of a citation or notice of violation by the Division of Occupational Safety and Health, such violation shall be corrected promptly.

10.1.2 Subcontractor Responsibility

Contractor shall require that Subcontractors participate in, and enforce, the safety and loss prevention programs established by the Contractor for the Project, which will cover all Work performed by the Contractor and its Subcontractors. Each Subcontractor shall designate a responsible member of its organization whose duties shall include loss and accident prevention, and who shall have the responsibility and full authority to enforce the program. This person shall attend meetings with the representatives of the various Subcontractors employed to ensure that all employees understand and comply with the programs.

10.1.3 Cooperation

All Subcontractors and material or equipment suppliers shall cooperate fully with Contractor, the District, and all insurance carriers and loss prevention engineers.

10.1.4 Accident Reports

Subcontractors shall immediately, within two (2) days, report in writing to the Contractor all accidents whatsoever arising out of, or in connection with, the performance of the Work, whether on or off the Site, which caused death, personal injury, or property damage, giving full details and statements of witnesses. In addition, if death or serious injuries or serious damages are caused, the accident shall be reported within four (4) days by telephone or messenger. Contractor shall thereafter immediately, within two (2) days, report the facts in writing to the District and the Architect giving full details of the accident.

10.1.5 First-Aid Supplies at Site

The Contractor will provide and maintain at the Site first-aid supplies which complies with the current Occupational Safety and Health Regulations.

10.1.6 Material Safety Data Sheets and Compliance with Proposition 65

Contractor is required to have material safety data sheets available in a readily accessible place at the job site for any material requiring a material safety data sheet per the Federal "hazard communication" standard, or employees' "right-to-know law." The Contractor is also required to properly label any substance brought into the job site, and require that any person working with the material, or within the general area of the material, is informed of the hazards of the substance and follows proper handling and protection procedures.

Contractor is required to comply with the provisions of California Health and Safety Code section 25249, et seq., which requires the posting and giving of notice to persons who may be exposed to any chemical known to the State of California to cause cancer. The Contractor agrees to familiarize itself with the provisions of this Section, and to comply fully with its requirements.

10.1.7 Non-Utilization of Asbestos Material

NO ASBESTOS OR ASBESTOS-CONTAINING PRODUCTS SHALL BE USED IN THIS CONSTRUCTION OR IN ANY TOOLS, DEVICES, CLOTHING, OR EQUIPMENT USED TO EFFECT THIS CONSTRUCTION.

Asbestos and/or asbestos-containing products shall be defined as all items containing, but not limited to, chrysotile, amosite, anthophyllite, tremolite, and antinolite.

Any or all material containing greater than one-tenth of one percent (>.1%) asbestos shall be defined as asbestos-containing material.

All Work or materials found to contain asbestos or Work or material installed with asbestos-containing equipment will be immediately rejected and this Work will be removed at no additional cost to the District.

Decontamination and removal of Work found to contain asbestos or Work installed with asbestos-containing equipment shall be done only under supervision of a qualified consultant, knowledgeable in the field of asbestos abatement and accredited by the Environmental Protection Agency.

The asbestos removal contractor shall be an EPA accredited contractor qualified in the removal of asbestos and shall be chosen and approved by the asbestos consultant, who shall have sole discretion and final determination in this matter.

The asbestos consultant shall be chosen and approved by the District, who shall have sole discretion and final determination in this matter.

The Work will not be accepted until asbestos contamination is reduced to levels deemed acceptable by the asbestos consultant.

Interface of Work under this Contract with Work containing asbestos shall be executed by the Contractor at his risk and at his discretion, with full knowledge of the currently accepted standards, hazards, risks, and liabilities associated with asbestos work and asbestos-containing products. By execution of this Contract, the Contractor acknowledges the above and agrees to hold harmless District and its assigns for all asbestos liability which may be associated with this work and agrees to instruct his employees with respect to the above-mentioned standards, hazards, risks, and liabilities.

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.1 The Contractor

The Contractor shall take reasonable precautions for the safety of, and shall provide reasonable protection to prevent damage, injury, or loss to:

a. Employees on the Work and other persons who may be affected thereby;

b. The Work, material, and equipment to be incorporated therein, whether in storage on or off the Site, under the care, custody, or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

c. Other property at the Site or adjacent thereto such as trees, shrubs, lawns, walks, pavement, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

Contractor is constructive owner of Project site as more fully discussed in Article 6.2.

10.2.2 Contractor Notices

The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on the safety of persons or property or their protection from damage, injury, or loss.

10.2.3 Safety Barriers and Safeguards

The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent sites and utilities.

10.2.4 Use or Storage of Hazardous Material

When use or storage of explosives, other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel. The Contractor shall notify the District

any time that explosives or hazardous materials are expected to be stored on Site. Location of storage shall be coordinated with the District and local fire authorities.

10.2.5 Protection of Work

The Contractor and Subcontractors shall continuously protect the Work, the District's property, and the property of others, from damage, injury, or loss arising in connection with operations under the Contract Documents. The Contractor and Subcontractors, at their own expense, shall make good any such damage, injury, or loss, except such as may be solely due to, or caused by, agents or employees of the District.

The Contractor, at Contractor's expense, will remove all mud, water, or other elements as may be required for the proper protection and prosecution of its Work.

Contractor shall take adequate precautions to protect existing roads, sidewalks, curbs, pavements, utilities, adjoining property and structures (including, without limitation, protection from settlement or loss of lateral support), and to avoid damage thereto, and repair any damage thereto caused by construction operations. All permits, licenses, or inspection fees required for such repair Work shall be obtained and paid for by Contractor.

10.2.6 Requirements for Existing Sites

Contractor shall (unless waived by the District in writing):

a. When performing construction on existing sites, become informed and take into specific account the maturity of the students on the Site; and perform Work which may interfere with school routine before or after school hours, enclose working area with a substantial barricade, and arrange Work to cause a minimum amount of inconvenience and danger to students and faculty in their regular school activities. The Contractor shall comply with Specifications and directives of the District regarding the timing of certain construction activities in order to avoid unnecessary interference with school functioning.

b. Avoid performing any Work that will disturb students during testing.

c. Provide substantial barricades around any shrubs or trees indicated to be preserved.

d. Deliver materials to building area over route designated by Architect.

e. Take preventive measures to eliminate objectionable dust, noise, or other disturbances.

f. Confine apparatus, the storage of materials, and the operations of workers to limits indicated by law, ordinances, permits or directions of Architect; and not interfere with the Work or unreasonably encumber premises or overload any structure with materials; and enforce all instructions of District and Architect regarding signs, advertising, fires, and smoking and require that all workers comply with all regulations while on the Project site.

g. Take care to prevent disturbing or covering any survey markers, monuments, or other devices marking property boundaries or corners. If such markers are

disturbed by accident, they shall be replaced by an approved land surveyor or civil engineer and all maps and records required therefrom shall be filed with county and local authorities, at no cost to the District. All filing and plan check fees shall be paid by Contractor.

h. Provide District on request with Contractor's written safety program and safety plan for each site.

10.2.7 Shoring and Structural Loading

The Contractor shall not impose structural loading upon any part of the Work under construction or upon existing construction on or adjacent to the Site in excess of safe limits, or loading such as to result in damage to the structural, architectural, mechanical, electrical, or other components of the Work. The design of all temporary construction equipment and appliances used in construction of the Work and not a permanent part thereof, including, without limitation, hoisting equipment, cribbing, shoring, and temporary bracing of structural steel, is the sole responsibility of the Contractor. All such items shall conform with the requirements of governing codes and all laws, ordinances, rules, regulations, and orders of all authorities having jurisdiction. The Contractor shall take special precautions, such as shoring of masonry walls and temporary tie bracing of structural steel Work, to prevent possible wind damage during construction of the Work. The installation of such bracing or shoring shall not damage the Work in place or the Work installed by others. Any damage which does occur shall be promptly repaired by the Contractor at no cost to the District.

10.2.8 Conformance within Established Limits

The Contractor and Subcontractors shall confine their construction equipment, the storage of materials, and the operations of workers to the limits indicated by laws, ordinances, permits, and the limits established by the District or the Contractor, and shall not unreasonably encumber the premises with construction equipment or materials.

10.2.9 Subcontractor Enforcement of Rules

Subcontractors shall enforce the District's and the Contractor's instructions, laws, and regulations regarding signs, advertisements, fires, smoking, the presence of liquor, and the presence of firearms by any person at the Site.

10.2.10 Site Access

The Contractor and the Subcontractors shall use only those ingress and egress routes designated by the District, observe the boundaries of the Site designated by the District, park only in those areas designated by the District, which areas may be on or off the Site, and comply with any parking control program established by the District, such as furnishing license plate information and placing identifying stickers on vehicles.

10.2.11 Security Services.

The Contractor shall be responsible for providing security services for the Site as needed for the protection of the Site and as determined in the District's sole discretion.

10.3 EMERGENCIES

10.3.1 Emergency Action

In an emergency affecting the safety of persons or property, the Contractor shall take any action necessary, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 7.

10.3.2 Accident Reports

The Contractor shall promptly report in writing to the District all accidents arising out of or in connection with the Work, which caused death, personal injury, or property damage, giving full details and statements of any witnesses in conformance with Article 10.1.4. In addition, if death, serious personal injuries, or serious property damages are caused, the accident shall be reported in accordance with Article 10.1.4, immediately by telephone or messenger to the District.

10.4 HAZARDOUS MATERIALS

10.4.1 Discovery of Hazardous Materials

In the event the Contractor encounters or suspects the presence on the job site of material reasonably believed to be asbestos, polychlorinated biphenyl (PCB), or any other material defined as being hazardous by § 25249.5 of the California Health and Safety Code, which has not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the District and the Architect in writing, whether or not such material was generated by the Contractor or the District. The Work in the affected area shall not thereafter be resumed, except by written agreement of the District and the Contractor, if in fact the material is asbestos, polychlorinated biphenyl (PCB), or other hazardous material, and has not been rendered harmless. The Work in the affected area shall be resumed only in the absence of asbestos, polychlorinated biphenyl (PCB), or other hazardous material, or when it has been rendered harmless by written agreement of the District and the Contractor.

10.4.2 Hazardous Material Work Limitations

In the event that the presence of hazardous materials is suspected or discovered on the Site (except in cases where asbestos and other hazardous material Work in the Contractor's responsibility), the District shall retain an independent testing laboratory to determine the nature of the material encountered and whether corrective measures or remedial action is required. The Contractor shall not be required pursuant to Article 7 to perform without consent any Work in the affected area of the Site relating to asbestos, polychlorinated biphenyl (PCB), or other hazardous material, until any known or suspected hazardous material has been removed, or rendered harmless, or determined to be harmless by District, as certified by an independent testing laboratory and approved by the appropriate government agency.

10.4.3 Indemnification by Contractor for Hazardous Material Caused by Contractor

In the event the hazardous materials on the Project Site is caused by the Contractor, the Contractor shall pay for all costs of testing and remediation, if any, and shall compensate the District for any additional costs incurred as a result of Contractor's generation of hazardous material on the Project Site. In addition, the Contractor shall defend, indemnify and hold harmless District and its agents, officers,

and employees from and against any and all claims, damages, losses, costs and expenses incurred in connection with, arising out of, or relating to, the presence of hazardous material on the Project Site.

10.4.4 Terms of Hazardous Material Provision

The terms of this Hazardous Material provision shall survive the completion of the Work and/or any termination of this Contract.

10.5 SITE SAFETY PLAN

10.5.1 Requirements

A condition precedent of receiving the Notice to Proceed (NTP), the Contractor must submit to the District a Site Safety Plan (SSP) in compliance with DSA Bulletin BU 24-05. At a minimum, the SSP shall include the following information required in California Fire Code (CFC) Section 3303.1.1

- Name and contact information of site safety director.
- Documentation of training of the site safety director and fire watch personnel.
- Procedures for reporting emergencies.
- Fire department vehicle access routes.
- Locations of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
- Smoking and cooking policies, designated areas to be used where approved, and signage locations in accordance with CFC Section 3305.8.
- Location and safety considerations for temporary heating equipment.
- Hot work (welding, roofing, etc.) plan.
- Plans for control of combustible waste.
- Locations and methods for storage and use of flammable and combustible liquids and other hazardous materials.
- Provisions of site security.
- Changes that affect this plan.
- Other site-specific information requested by the local fire authority (LFA).

ARTICLE 11
INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

11.2 WORKERS' COMPENSATION INSURANCE

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

11.3 BUILDER'S RISK/ "ALL RISK" INSURANCE

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

11.4 FIRE INSURANCE

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

11.5 AUTOMOBILE LIABILITY

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

11.6 OTHER INSURANCE

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

11.7 PROOF OF INSURANCE

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

11.8 COMPLIANCE

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

11.9 WAIVER OF SUBROGATION

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

11.10 PERFORMANCE AND PAYMENT BONDS

11.10.1 Bond Requirements

Unless otherwise specified in the Supplemental Conditions, prior to commencing any portion of the Work, the Contractor shall furnish separate Payment and Performance Bonds for its portion of the Work which shall cover 100% faithful performance of and payment of all obligations arising under the Contract Documents and/or guaranteeing the payment in full of all claims for labor performed and materials supplied for the Work. All bonds shall be provided by a corporate Surety authorized and admitted to transact business in California as sureties.

To the extent, if any, that the Contract Price is increased in accordance with the Contract Documents, the Contractor shall, upon request of the District, cause the amount of the bonds to be increased accordingly and shall promptly deliver satisfactory evidence of such increase to the District. To the extent available, the bonds shall further provide that no change or alteration of the Contract Documents (including, without limitation, an increase in the Contract Price, as referred to above), extensions of time, or modifications of the time, terms, or conditions of payment to the Contractor will release the Surety. If the Contractor fails to furnish the required bonds, the District may terminate the Contract for cause.

11.10.2 Surety Qualification

Only bonds executed by admitted Surety insurers as defined in Code of Civil Procedure § 995.120 shall be accepted. Surety must be a California-admitted Surety and listed by the U.S. Treasury with a bonding capacity in excess of the Project cost.

11.10.3 Alternate Surety Qualifications

If a California-admitted Surety insurer issuing bonds does not meet these requirements, the insurer will be considered qualified if it is in conformance with § 995.660 of the California Code of Civil Procedure and proof of such is provided to the District.

ARTICLE 12
UNCOVERING AND CORRECTION OF WORK

12.1 COMPLIANCE WITH TITLE 24 INSTALLATION REQUIREMENTS

Contractor is aware of the requirements governing Contractor's Work under title 24 Section 4-343 which provides, in pertinent part:

4-343. Duties of the Contractor.

(a) **Responsibilities**. It is the duty of the contractor to complete the Work covered by his or her contract in accordance with the approved Plans and Specifications therefore. The contractor in no way is relieved of any responsibility by the activities of the architect, engineer, Inspector or DSA in the performance of such duties.

(b) **Performance of the Work.** The contractor shall carefully study the approved Plans and Specifications and shall plan a schedule of operations well ahead of time. If at any time it is discovered that Work is being done which is not in accordance with the approved Plans and Specifications, the contractor shall correct the Work immediately. All inconsistencies or items which appear to be in error in the Plans and Specifications shall be promptly called to the attention of the architect or registered engineer, through the Inspector, for interpretation or correction. In no case, however, shall the instruction of the architect or registered engineer be construed to cause Work to be done which is not in conformity with the approved Plans, Specifications, and Change Orders. The contractor must notify the Project Inspector, in advance, of the commencement of construction of each and every aspect of the Work.

12.1.1 Issuance of Notices of Non-Compliance

The Inspector may issue a Notice of Non-Compliance on the Project indicating deviation from Plans and Specifications. It is Contractor's responsibility to correct all deviations from the approved Plans and Specifications unless the District has issued an Immediate Change Directive. In such case, the Contractor shall proceed with the Work with the understandings of the District as set forth in the ICD and as specifically noted in Article 7.3.

12.2 SPECIAL NOTICE OF AMERICAN'S WITH DISABILITIES ACT

Some of the requirements in the Plans and Specifications are meant to comply with the Americans with Disabilities Act ("ADA"). The requirements of the ADA are technical in nature and may appear to be minor in nature (i.e. whether a walkway or ramp has a 2% cross-slope). Contractor is warned that even the slightest deviation from the specific requirements from the ADA is considered a Civil Rights violation and subjects the District to fines of three times actual damages sustained by a handicap individual or up to $4,000 per violation and attorney's fees required to enforce the ADA violation. As a result of the significant liability and exposure associated with ADA aspects of the Contract, Contractor shall take special care to meet all ADA requirements detailed in the Plans and Specifications. Failure to comply with ADA rules that results in a Notice of Non-Compliance shall be repaired to meet ADA requirements promptly. In addition, any ADA violations that are not identified by Inspector or Architect that are later identified shall be repaired and charged back to the Contractor through a Deductive Change Order.

12.2.1 Indemnification of ADA Claims

Contractor shall indemnify, hold harmless and defend the District from ADA claims arising from the failure to comply with the Plans and Specifications. Further, any withholdings for ADA violations under Article 9.6 shall include potential redesign costs and an accelerated repair costs due to the potential for ADA claims arising from DSA posting of ADA violations on the Project.

12.3 UNCOVERING OF WORK

12.3.1 Uncovering Work for Required Inspections

Work shall not be covered without the Inspector's review and the Architect's knowledge that the Work conforms with the requirements of the approved Plans and Specifications (except in the case of an ICD under Article 7.3). Inspector must be timely notified of inspections and of new areas so Work can be inspected at least 48 hours before opening a new area (For example, see DSA Form 156 for Commencement/Completion of Work Notification which requires "at least 48 hour" advance notification of a new area). An Inspector must comply with DSA protocols for signing each category or phase of Work under DSA Form 152 (in compliance with the Form 152 Manual) or a Notice of Deviation (DSA Form 154) will be issued requiring the Work that was not inspected be uncovered for inspection. Thus, if a portion of the Work is covered without inspection or Architect approval, is subject to a Notice of Non-Compliance for being undertaken without inspection, or otherwise not in compliance with the Contract Documents, after issuance of a Written Notice of Non-Compliance (Form 154) or a written notice to uncover Work, Contractor shall promptly uncover all Work (which includes furnishing all necessary facilities, labor, and material) for the Inspector's or the Architect's observation and such Work shall be replaced at the Contractor's expense without change in the Contract Sum or Time.

12.3.2 Costs for Inspections Not Required

If a portion of the Work has been covered is believed to be Non-Conforming to the Plans and Specifications, even if the Form 152 for the category of Work has been signed by the Inspector, the Inspector or the Architect may request to see such Work, and it shall be promptly uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncover and replacement shall, by appropriate Change Order and shall, be charged to the District. If such Work is not in accordance with Contract Documents, the Contractor shall be responsible for all costs to uncover the Work, delays incurred to uncover the Work, and Contractor shall pay all costs to correct the Non-Conforming construction condition unless the condition was caused by the District or a separate contractor, in which event the District shall be responsible for payment of such costs to the Contractor.

12.4 CORRECTION OF WORK

12.4.1 Correction of Rejected Work

The Contractor shall promptly correct the Work rejected by the Inspector or the District upon recommendation of the Architect as failing to conform to the requirements of the Contract Documents, whether observed before or after Completion and whether or not Fabricated, installed, or completed. The Contractor shall bear costs of correcting the rejected Work, including cost for delays that may be incurred by Contractor or Subcontractors, the cost for additional testing, inspections, and compensation for the Inspector's or the Architect's services and expenses made necessary thereby (including costs for preparing a CCD, DSA CCD review fees, and additional inspection and special inspection costs).

12.4.2 One-Year Warranty Corrections

If, within one (1) year after the date of Completion of the Work or a designated portion thereof, or after the date for commencement of warranties established under Article 9.9.1, or by the terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the District to do so unless the District has previously given the Contractor a written acceptance of such condition. This period of one (1) year shall be extended with respect to portions of the Work first performed after Completion by the period of time between Completion and the actual performance of the Work. This obligation under this Article 12.4.2 shall survive acceptance of the Work under the Contract and termination of the Contract. The District shall give such notice promptly after discovery of the condition.

12.4.3 District's Rights if Contractor Fails to Correct

If the Contractor fails to correct nonconforming Work within a reasonable time, the District may correct the Work and seek a Deductive Change Order, pursuant to Article 9.6 or Article 2.2.

ARTICLE 13
MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located.

13.2 SUCCESSORS AND ASSIGNS

The District and the Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

13.3 WRITTEN NOTICE

In the absence of specific notice requirements in the Contract Documents, written notice shall be deemed to have been duly served if delivered in person to the individual, member of the firm or entity, or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice.

13.4 RIGHTS AND REMEDIES

13.4.1 Duties and Obligations Cumulative

Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

13.4.2 No Waiver

No action or failure to act by the Inspector, the District, or the Architect shall constitute a waiver of a right or duty afforded them under the Contract Documents, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

13.5 TESTS AND INSPECTIONS

13.5.1 Compliance

Tests, inspections, and approvals of portions of the Work required by the Contract Documents will comply with Division 1, Title 24, and with all other laws, ordinances, rules, regulations, or orders of public authorities having jurisdiction.

13.5.2 Independent Testing Laboratory

The District will select and pay an independent testing laboratory to conduct all tests and inspections. Selection of the materials required to be tested shall be made by the laboratory or the District's representative and not by the Contractor. See Articles 3.13.1 and 4.3.6 regarding costs or expenses of inspection or testing outside of the Project Site.

13.5.3 Advance Notice to Inspector

The Contractor shall notify the Inspector a sufficient time in advance of its readiness for required observation or inspection so that the Inspector may arrange for same. The Contractor shall notify the Inspector a sufficient time in advance of the manufacture of material to be supplied under the Contract Documents which must, by terms of the Contract Documents, be tested in order that the Inspector may arrange for the testing of the material at the source of supply.

13.5.4 Testing Off-Site

Any material shipped by the Contractor from the source of supply, prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said Inspector that such testing and inspection will not be required, shall not be incorporated in the Work.

13.5.5 Additional Testing or Inspection

If the Inspector, the Architect, the District, or public authority having jurisdiction determines that portions of the Work require additional testing, inspection, or approval not included under Article 13.5.1, the Inspector will, upon written authorization from the District, make arrangements for such additional testing, inspection, or approval. The District shall bear such costs except as provided in Articles 13.5.6 and 13.5.7.

13.5.6 Costs for Retesting

If such procedures for testing, inspection, or approval under Articles 13.5.1 and 13.5.2reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, the Contractor shall bear all costs arising from such failure, including those of re-testing, re-inspection, or re-approval, including, but not limited to, compensation for the Architect's services and expenses. Any such costs shall be paid by the District, invoiced to the Contractor, and deducted from the next Progress Payment.

13.5.7 Costs for Premature Test

In the event the Contractor requests any test or inspection for the Project and is not completely ready for the inspection, the Contractor shall be invoiced by the District for all costs and expenses resulting from that testing or inspection, including, but not limited to, the Inspector's and Architect's fees and expenses, and the amount of the invoice shall be deducted from the next Progress Payment.

13.6 TRENCH EXCAVATION

13.6.1 Trenches Greater Than Five Feet

Pursuant to Labor Code section 6705, if the Contract Price exceeds $25,000 and involves the excavation of any trench or trenches five (5) feet or more in depth, the Contractor shall, in advance of

excavation, submit to the District or a registered civil or structural engineer employed by the District or Architect, a detailed plan showing the design of shoring for protection from the hazard of caving ground during the excavation of such trench or trenches.

13.6.2 Excavation Safety

If such plan varies from the Shoring System Standards established by the Construction Safety Orders, the plan shall be prepared by a registered civil or structural engineer, but in no case shall such plan be less effective than that required by the Construction Safety Orders. No excavation of such trench or trenches shall be commenced until said plan has been accepted by the District or by the person to whom authority to accept has been delegated by the District.

13.6.3 No Tort Liability of District

Pursuant to Labor Code § 6705, nothing in this Article shall impose tort liability upon the District or any of its employees.

13.6.4 No Excavation without Permits

The Contractor shall not commence any excavation Work until it has secured all necessary permits including the required CAL OSHA excavation/shoring permit. Any permits shall be prominently displayed on the Site prior to the commencement of any excavation.

13.7 WAGE RATES, TRAVEL, AND SUBSISTENCE

13.7.1 Wage Rates

Pursuant to the provisions of Article 2 (commencing at § 1720), Chapter 1, Part 7, Division 2, of the Labor Code, the District has obtained the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this public works project is to be performed for each craft, classification, or type of worker needed for this Project from the Director of the Department of Industrial Relations ("Director"). These rates are on file at the administrative office of the District and are also available from the Director of the Department of Industrial Relations. Copies will be made available to any interested party on request. The Contractor shall post a copy of such wage rates at appropriate, conspicuous, weatherproof points at the Site.

Any worker employed to perform Work on the Project, but such Work is not covered by any classification listed in the published general prevailing wage rate determinations or per diem wages determined by the Director of the Department of Industrial Relations, shall be paid not less than the minimum rate of wages specified therein for the classification which most nearly corresponds to the employment of such person in such classification.

13.7.2 Holiday and Overtime Pay

Holiday and overtime work, when permitted by law, shall be paid for at the rate set forth in the prevailing wage rate determinations issued by the Director of the Department of Industrial Relations or at least one and one-half (1½) times the specified basic rate of per diem wages, plus employer payments, unless otherwise specified in the Contract Documents or authorized by law.

13.7.3 Wage Rates Not Affected by Subcontracts

The Contractor shall pay and shall cause to be paid each worker engaged in the execution of the Work on the Project not less than the general prevailing rate of per diem wages determined by the Director, regardless of any contractual relationship which may be alleged to exist between the Contractor or any Subcontractor and such workers.

13.7.4 Per Diem Wages

The Contractor shall pay and shall cause to be paid to each worker needed to execute the Work on the Project per diem wages including, but not limited to, employer payments for health and welfare, pensions, vacation, travel time and subsistence pay as provided for in Labor Code §1773.1.

13.7.5 Forfeiture and Payments

Pursuant to Labor Code §1775, the Contractor shall forfeit to the District, not more than Two Hundred Dollars ($200.00) for each calendar day, or portion thereof, for each worker paid less than the prevailing wages rates as determined by the Director of the Department of Industrial Relations, for the work or craft in which the worker is employed for any Work done under the Agreement by the Contractor or by any Subcontractor under it. The amount of the penalty shall be determined by the Labor Commissioner and shall be based on consideration of: (1) whether the Contractor or Subcontractor's failure to pay the correct rate of per diem wages was a good faith mistake and, if so, the error was promptly and voluntarily corrected upon being brought to the attention of the Contractor or Subcontractor; and (2) whether the Contractor or Subcontractor has a prior record of failing to meet its prevailing wage obligations.

13.7.6 Monitoring and Enforcement by Labor Commissioner

Monitoring and enforcement of the prevailing wage laws and related requirements will be performed by the Labor Commissioner/ Department of Labor Standards Enforcement (DLSE). The Contractor and all subcontractors shall be required to furnish, at least "monthly" as defined by Labor Code section 1771.4(a)(3)(A)(i), certified payroll records directly to the Labor Commissioner in accordance with Labor Code section 1771.4. All payroll records shall be furnished in an electronic format and in the manner required by the Labor Commissioner. The Contractor and all subcontractors must sign up for, and utilize, the Labor Commissioner's electronic certified payroll records submission system. The District will have direct and immediate access to all CPRs for the Project that are submitted through the Labor Commissioner's system. The District can use this information for any appropriate purpose, including monitoring compliance, identifying suspected violations, and responding to Public Records Act requests.

The Labor Commissioner/ DLSE may conduct various compliance monitoring and enforcement activities including, but not limited to, confirming the accuracy of payroll records, conducting worker interviews, conducting audits, requiring submission of itemized statements prepared in accordance with Labor Code section 226, and conducting random in-person inspections of the Project site ("On-Site Visits"). On-Site Visits may include inspections of records, inspections of the Work site and observation of work activities, interviews of workers and others involved with the Project, and any other activities deemed necessary by the Labor Commissioner/DLSE to ensure compliance with prevailing wage requirements. The Labor Commissioner/DLSE shall have free access to any construction site or other place of labor and may obtain any information or statistics pertaining to the lawful duties of the Labor Commissioner/DLSE.

Any lawful activities conducted or any requests made by the Labor Commissioner/DLSE shall not be the basis for any delays, claims, costs, damages or liability of any kind against the District by

the Contractor. Contractor and all subcontractors shall cooperate and comply with any lawful requests by the Labor Commissioner/ DLSE. The failure of the Labor Commissioner, DLSE, or any other entity related to the Department of Industrial Relations to comply with any requirement imposed by the California Code of Regulations, Title 8, Chapter 8 shall not of itself constitute a defense to the failure to pay prevailing wages or to comply with any other obligation imposed by Division 2, Part 7, Chapter 1 of the Labor Code.

Prior to commencing any Work on the Project, the Contractor shall post the required notice/poster required under the California Code of Regulations and Labor Code section 1771.4 in both English and Spanish at a conspicuous, weatherproof area at the Project site. The required notice/poster is available on the Labor Commissioner's website.

13.8 RECORDS OF WAGES PAID

13.8.1 Payroll Records

a. Pursuant to §1776 of the Labor Code, the Contractor and each Subcontractor shall keep an accurate payroll record showing the name, address, social security number, work classification and straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker or other employee employed by him or her in connection with the Project.

b. All payroll records, as specified in Labor Code §1776, of the Contractor and all Subcontractors shall be certified and furnished directly to the Labor Commissioner in accordance with Labor Code §1771.4(a)(3) once every thirty (30) days while Work is being performed on the Project and within thirty (30) days after the final day of Work performed on the Project (or more frequently if required by the District or the Labor Commissioner). The Contractor and all Subcontractors shall submit their own payroll records to the Labor Commissioner on the internet website of the Department of Industrial Relations and such payroll records shall be in an electronic format prescribed by the Labor Commissioner. Pursuant to Labor Code §1771.4(a)(3)(B), the Contractor and any Subcontractor who fails to furnish payroll records in accordance with Labor Code §1771.4(a)(3), relating to their own employees, shall be subject to a penalty by the Labor Commissioner. The amount of the penalty shall be One Hundred Dollars ($100.00) for each calendar day in which such party is in violation of Labor Code §1771.4(a)(3), not to exceed a total penalty of Five Thousand Dollars ($5,000.00) per project. Payroll records as specified in Labor Code §1776 shall also be certified and submitted to the District with each application for payment.

All payroll records shall be available for inspection at all reasonable hours at the principal office of the Contractor on the following basis:

1. A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request.

2. A certified copy of all payroll records shall be made available for inspection or furnished upon request to a representative of District, the

Division of Labor Standards Enforcement or the Division of Apprenticeship Standards of the Department of Industrial Relations.

3. A certified copy of all payroll records shall be made available upon request by the public for inspection or for copies thereof. However, a request by the public shall be made through the District, the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to Paragraph (2) above, the requesting party shall, prior to being provided the records, reimburse the costs, according to law for the preparation by the Contractor, Subcontractor(s), and the entity through which the request was made. The public shall not be given access to such records at the principal office of the Contractor.

c. The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the Division of Labor Standards Enforcement.

d. The Contractor or Subcontractor(s) shall file a certified copy of all payroll records with the entity that requested such records within 10 calendar days after receipt of a written request.

e. Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the District, the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement shall be marked or obliterated to prevent disclosure of an individual's name, address and social security number. The name and address of the Contractor awarded the Contract or the Subcontractor(s) performing the Contract shall not be marked or obliterated. Any copy of records made available for inspection by, or furnished to, a joint labor-management committee established pursuant to the federal Labor Management Cooperation Act of 1978 (Section 175a of Title 29 of the United States Code) shall be marked or obliterated only to prevent disclosure of an individual's name and social security number. Notwithstanding any other provision of law, agencies that are included in the Joint Enforcement Strike Force on the Underground Economy established pursuant to Section 329 of the Unemployment Insurance Code and other law enforcement agencies investigating violations of law shall, upon request, be provided non-redacted copies of certified payroll records.

f. The Contractor shall inform the District of the location of all payroll records, including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.

g. The Contractor or Subcontractor(s) shall have 10 calendar days in which to comply subsequent to receipt of a written notice requesting payroll records. In the event that the Contractor or Subcontractor(s) fails to comply within the 10-day period, the Contractor or Subcontractor(s) shall, as a penalty to the District, forfeit One Hundred Dollars ($100.00) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of

Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due.

Responsibility for compliance with this Article shall rest upon the Contractor.

13.8.2 Withholding of Contract Payments & Penalties

The District may withhold or delay contract payments to the Contractor and/or any Subcontractor if:

a. The required prevailing rate of per diem wages determined by the Director of the Department of Industrial Relations is not paid to all workers employed on the Project; or

b. The Contractor or Subcontractor(s) fail to submit all required certified payroll records to the Labor Commissioner in accordance with Labor Code §1771.4(a)(3); or

c. The Contractor or Subcontractor(s) fail to submit all required certified payroll records with each application for payment, but not less than once per month; or

d. The Contractor or Subcontractor(s) submit incomplete or inadequate payroll records; or

e. The Contractor or Subcontractor(s) fail to comply with the Labor Code requirements concerning apprentices; or

f. The Contractor or Subcontractor(s) fail to comply with any applicable state laws governing workers on public works projects.

13.9 APPRENTICES

13.9.1 Apprentice Wages and Definitions

All apprentices employed by the Contractor to perform services under the Contract shall be paid the standard wage paid to apprentices under the regulations of the craft or trade for which he or she is employed, and as determined by the Director of the Department of Industrial Relations, and shall be employed only at the craft or trade to which he or she is registered. Only apprentices, as defined in §3077 of the Labor Code, who are in training under apprenticeship standards that have been approved by the Chief of the Division of Apprenticeship Standards and who are parties to written apprenticeship agreements under Chapter 4 (commencing with §3070) of Division 3, are eligible to be employed under this Contract. The employment and training of each apprentice shall be in accordance with the apprenticeship standards and apprentice agreements under which he or she is training, or in accordance with the rules and regulations of the California Apprenticeship Council.

13.9.2 Employment of Apprentices

Contractor agrees to comply with the requirements of Labor Code §1777.5. The Contractor awarded the Project, or any Subcontractor under him or her, when performing any of the Work under the Contract or subcontract, employs workers in any apprenticeable craft or trade, the Contractor and

Subcontractor shall employ apprentices in the ratio set forth in Labor Code §1777.5. The Contractor or any Subcontractor must apply to any apprenticeship program in the craft or trade that can provide apprentices to the Project site for a certificate approving the contractor or subcontractor under the apprenticeship standards for the employment and training of apprentices in the area or industry affected. However, the decision of the apprenticeship program to approve or deny a certificate shall be subject to review by the Administrator of Apprenticeship. The apprenticeship program or programs, upon approving the Contractor or Subcontractor, shall arrange for the dispatch of apprentices to the Contractor or Subcontractor upon the Contractor's or Subcontractor's request. "Apprenticeable craft or trade" as used in this Article means a craft or trade determined as an apprenticeable occupation in accordance with the rules and regulations prescribed by the California Apprenticeship Council. The ratio of work performed by apprentices to journeyman employed in a particular craft or trade on the Project shall be in accordance with Labor Code §1777.5.

13.9.3 Submission of Contract Information

Prior to commencing Work on the Project, the Contractor and Subcontractors shall submit contract award information to the applicable apprenticeship program(s) that can supply apprentices to the Project and make the request for the dispatch of apprentices in accordance with the Labor Code. The information submitted shall include an estimate of journeyman hours to be performed under the Contact, the number of apprentices proposed to be employed, and the approximate dates the apprentices would be employed. A copy of this information shall also be submitted to the District if requested. Within 60 days after concluding Work on the Project, the Contractor and Subcontractors shall submit to the District, if requested, and to the apprenticeship program a verified statement of the journeyman and apprentice hours performed on the Project.

13.9.4 Apprentice Fund

The Contractor or any Subcontractor under him or her, who, in performing any of the Work under the Contract, employs journeymen or apprentices in any apprenticeable craft or trade shall contribute to the California Apprenticeship Council the same amount that the Director determines is the prevailing amount of apprenticeship training contributions in the area of the Project. The Contractor and Subcontractors may take as a credit for payments to the California Apprenticeship Council any amounts paid by the Contractor or Subcontractor to an approved apprenticeship program that can supply apprentices to the Project. The Contractor and Subcontractors may add the amount of the contributions in computing his or her bid for the Contract.

13.9.5 Prime Contractor Compliance

The responsibility of compliance with Article 13 and §1777.5 of the Labor Code for all apprenticeable occupations is with the Prime Contractor. Any Contractor or Subcontractor that knowingly violates the provisions of this Article or Labor Code §1777.5 shall be subject to the penalties set forth in Labor Code §1777.7.

13.10 ASSIGNMENT OF ANTITRUST CLAIMS

13.10.1 Application

Pursuant to Government Code § 4551, in entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or

Subcontractor offers and agrees to assign to the District all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act, (15 U.S.C. § 15) or under the Cartwright Act (Chapter 2 [commencing with § 16700] of Part 2 of Division 7 of the Business and Professions Code), arising from the purchase of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders Retention Payment to the Contractor, without further acknowledgment by the parties. If the District receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under Chapter 11 (commencing with § 4550) of Division 5 of Title 1 of the Government Code, the assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the District any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the District as part of the bid price, less the expenses incurred in obtaining that portion of the recovery.

13.10.2 Assignment of Claim

Upon demand in writing by the assignor, the District shall, within one (1) year from such demand, reassign the cause of action assigned pursuant to this Article if the assignor has been or may have been injured by the violation of law for which the cause of action arose and the District has not been injured thereby or the District declines to file a court action for the cause of action.

13.11 STATE AND DISTRICT CONDUCTED AUDITS

Pursuant to and in accordance with the provisions of Government Code § 10532, or any amendments thereto, all books, records, and files of the District, the Contractor, or any Subcontractor connected with the performance of this Contract involving the expenditure of state funds in excess of Ten Thousand Dollars ($10,000.00), including, but not limited to, the administration thereof, shall be subject to the examination and audit of the Office of the Auditor General of the State of California for a period of five (5) years after Retention Payment is made or a Notice of Completion is Recorded, whichever occurs first. Contractor shall preserve and cause to be preserved such books, records, hard drives, electronic media, and files for the audit period.

Pursuant to the remedies under Public Contract Code section 9201 and Government Code section 930.2, Contractor, through execution of this Agreement, also agrees the District shall have the right to review and audit, upon reasonable notice, the books and records of the Contractor concerning any monies associated with the Project. The purpose of this "Audit" is to quickly and efficiently resolve Disputes or Claims based on the actual costs incurred and to reduce the uncertainty in resolving Disputes or Claims with limited information. The District shall perform any audits at its own cost and any such audit shall be performed by an independent auditor, having no direct or indirect relationship with the functions or activities being audited or with the business conducted by the Contractor or District. In the event the independent auditor determines that Change Orders, response to Request for Proposals, Disputes, Claims, or other requests for payment are in error, or have has any other concerns or questions, the Auditor shall report the results of the Audit findings to the District and provide a copy to the Contractor after giving the District Board the opportunity for at least 10 days review. If the Contractor disputes the findings of the independent auditor, such dispute shall be handled in the manner set forth under Article 4.6.2.

If Contractor having agreed to the terms of this Contract fails to produce books or records requested by Auditor, such failure to produce books or records that were required to be preserved for audit, it shall be presumed that the information contained in the withheld books or records were unfavorable to the Contractor and the Auditor shall note this refusal in the results of the Audit findings for further

evaluation by the District and the District's Board. The refusal to release records that are concerning monies associated with the Project may be used as a grounds to debar the Contractor under Article 15 for failure to preserve records under Article 13.11 and the failure to produce required audit records may also be used as a grounds for a negative finding against the Contractor depending on the significance of the records that are withheld by Contractor. Failure to produce job cost data tied to job cost categories and budgets shall be presumed an intentional failure to produce key audit records. Similarly, failure to produce Daily Reports (prepared at or near the time of the Work actually took place (See Article 3.16) shall be presumed an intentional failure to produce key audited records.

If Contractor is seeking costs for inefficiency, home office overhead, or unanticipated increased costs due to delays or acceleration, Contractor shall also produce copies of the original bid tabulation utilized in submitting Contractor's bid for the Project. This document shall be considered confidential and shall not be subject to disclosure through a Public Records Act and shall not be distributed to anyone other than the District and the District's counsel. This bid tabulation shall only be used in litigation, arbitration, evaluation of Claims or Disputes, Audit, and trial. If the records for the bid tabulation are kept on a computer, the Contractor shall also produce all metadata (in native format) that accompanies the bid tabulation for inspection to prove the authenticity of the underlying bid tabulation. Failure to produce the bid tabulation for review of inefficiency, home office overhead, or unanticipated increased costs due to delays or accelerations shall be considered material evidence that the bid tabulation was not favorable to the Contractor. This evidence shall be entered as a jury instruction for trial that the bid tabulation was not produced and the bid tabulation information was unfavorable to the Contractor. The evidence may also be used in debarment proceedings, and noted as an exception to an Audit findings.

Upon notification of Contractor concerning the results of the audit and a reasonable time has passed for Contractor to respond to the Audit findings and if either there is no Dispute of the Audit findings under Article 4.6 or if the result after utilizing the Disputes Clause confirms the Audit findings, the District may seek reimbursement for overstated Disputes, Claims, or Change Orders and may also undertake debarment proceedings under Article 15 of these General Conditions.

13.12 STORM WATER POLLUTION PREVENTION

13.12.1 Application

This Section addresses the preparation, implementation and monitoring of a Storm Water Pollution Prevention Plan (SWPPP) for the purpose of preventing the discharge of pollutants from the construction site. This includes the elimination of pollution discharges such as improper dumping, spills or leakage from storage tanks or transfer areas. The District will not issue a Notice to Proceed until Contractor has prepared by a qualified individual and obtained approval of the Permit Registration Documents ("PRDs") that include a Notice of Intent, Construction Risk Calculation, Site Map, SWPPP, Annual Fee and any additional required documents from all applicable Local Governing Agencies including the Regional Water Quality Control Board. The Contractor shall also secure a certification that the Project has met all of the conditions of the General Construction Activity Storm Water Permit (GCASP) and comply with all applicable local, state and federal regulations governing storm water pollution prevention.

13.12.2 References and Materials

- California Stormwater Quality Association New Development and Redevelopment Best Management Practice Handbook

- 2009 California Stormwater Quality Association Construction BMP Handbook .

- State Water Resources Control Board (2009). Order 2009-0009-DWQ, NPDES General Permit No. CAS000002: Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbing Activities. Available on-line at:

- http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.- Use materials of a class, grade and type needed to meet the performance described in the BMP Handbook.

13.12.3 Preparation and Approval

The Contractor shall prepare by a qualified individual the PRDs that include a Notice of Intent, Construction Risk Calculation, Site Map, SWPPP, Annual Fee and any additional required documents. The Contractor's Qualified SWPPP Developer ("QSD") shall prepare the Storm Water Pollution Prevention Plan (SWPPP) as required to comply with storm water pollution regulations for project sites with storm water discharges associated with construction activity such as clearing or demolition, grading, excavation and other land disturbances. The SWPPP shall apply to all areas that are directly related to construction activity, including but not limited to staging areas, storage yards, material borrow areas, and access roads.

13.12.3.1 The Contractor shall prepare and submit to the Local Governing Agencies and the District the SWPPP for review and approval if the project sites, new or existing, with land disturbance of 1 or more acres (or less than 1 acres if part of a common plan of development); the construction activity that results in land surface disturbances of less than one acre is part of a larger common plan of development or sale of one or more acres of disturbed land surface; or the construction activity associated with Linear Underground/Overhead Projects ("LUPs") including, but not limited to, those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities) and include, but are not limited to, underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/tower pad and cable/wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/or pavement repair or replacement, and stockpile/borrow locations.

13.12.3.2 The Contractor shall also pay annual renewal fee(s) until the contract is completed and make all such checks payable to the State Water Resources Control Board. The Notice of Intent must be submitted at least two weeks prior to the commencement of construction activities.

13.12.3.3 The Contractor shall prepare the SWPPP by following the format in Sections 2, 3, 4 and Appendices A through F of the California Stormwater BMP Handbook - Construction, January 2009 edition, published by the California Stormwater Quality Association. The publication is available from:

California Stormwater
Quality Association
P.O. Box 2105
Menlo Park, CA 94026-2105
Phone: (650) 366-1042
E-mail: info@casqa.org

or

https://www.casqa.org/store/products/tabid/154/p-167-construction-handbookportal-initial-subscription.aspx

13.12.3.4 Where land disturbance is less than 1 acre, any BMPs indicated in the BMP Handbook needed to prevent or minimize storm water pollution shall be implemented at no extra cost to the District.

13.12.3.5 Within two weeks after Award of Contract by the District, the Contractor shall submit to the District's Civil Engineer one copy of the PRDs including the SWPPP for review. After the District's approval, the Contractor shall provide approved copies of the SWPPP as follows: one copy each to the Project Inspector, Construction Manager, Architect, Commissioned Architect and District's Civil Engineer.

13.12.4 Implementation

The Contractor shall implement the Storm Water Pollution Prevention Plan by doing the following:

a. Obtain a Waste Discharger Identification (WDID) number from the SWRCB before beginning construction. This number will be issued once your PRDs are administratively accepted and fee is received.

b. Keep the SWPPP, REAPs, monitoring data on the construction site.

c. Employ a Qualified SWPPP Practitioner (QSP) to implement the SWPPP during construction and develop Rain Event Action Plans ("REAPs").

d. Install, inspect, maintain and monitor BMPs required by the General Permit.

e. Install perimeter controls prior to starting other construction work at the site.

f. Contain on-site storm water at the jobsite. Do not drain on-site water directly into the storm drain.

g. Implement the SWPPP.

h. Provide SWPPP and BMP implementation training for those responsible for implementing the SWPPP.

i. Designate trained personnel for the proper implementation of the SWPPP.

j. Conduct monitoring, as required, and assess compliance with the Numeric Action Levels (NALs) or Numeric Effluent Limitations (NELs) appropriate to your project.

k. Report monitoring data:

1. Maintain a paper or electronic copy of all required records for three years from the date generated or date submitted, whichever is last. These records must be available at the construction site until construction is completed.

2. Have a QSD revise the SWPPP as needed to reflect the phases of construction and to suit changing site conditions and instances when properly installed systems are ineffective.

3. Assist the District with entering any necessary data or information into the Stormwater Multi-Application and Reporting System ("SMARTS") system.

l. At the end of Construction Contract:

1. Submit Notice of Termination (NOT) into the SMARTS when construction is complete and conditions of termination listed in the NOT have been satisfied. A copy of the NOT can be found at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.

2. Leave in place storm water pollution prevention controls needed for post-construction storm water management and remove those that are not needed as determined by the District. Thereafter, left-in-place controls will be maintained by the District.

3. Provide Site Monitoring Reports, SWPPP revisions, Compliance Certifications and related documents to the District. Post-construction storm water operation and management plan as mentioned in the compliance certifications are considered to be in place at the end of the Construction Contract.

13.12.5 Monitoring

The Contractor shall conduct examination of storm water pollution prevention controls as required by the State Water Resources Control Board (2009). Order 2009-0009-DWQ, NPDES General Permit No. CAS000002: Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbing Activities. This includes properly qualified personnel performing all required monitoring, testing, inspections and monitoring. The Contractor shall also conduct examination of storm water pollution prevention controls, as well as before and after each storm event in compliance with the State Water Resources Control Board Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System General Permit No. CAS000002, Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities (General Permit) (SWRCB, 2009).and at least once each 24-hour period during extended storm events to identify BMP effectiveness and implement repairs or BMP changes as soon as feasible. All maintenance related to a storm event should be completed within 48 hours of the storm event. The Contactor shall also prepare and maintain, at the jobsite, a log of each inspection using Site Monitoring Report forms.

13.12.6 Liabilities and Penalties

a. Review of the SWPPP and inspection logs by the District shall not relieve the Contractor from liabilities arising from non-compliance with storm water pollution regulations.

b. Payment of penalties for non-compliance by the Contractor shall be the sole responsibility of the Contractor and will not be reimbursed by the District.

c. Compliance with the Clean Water Act pertaining to construction activity is the sole responsibility of the Contractor. For any fine(s) levied against the District due to non-compliance by the Contractor, the District will deduct from the final payment due the Contractor the total amount of the fine(s) levied on the District, plus legal and associated costs.

d. The Contractor shall submit to the District a completed NOI for change of information (Construction Site Information and Material Handling/Management Practices).

ARTICLE 14
TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR FOR CAUSE

14.1.1 Grounds for Termination

The Contractor may terminate the Contract if the Work is stopped for a period of thirty (30) consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons performing portions of the Work for whom the Contractor is contractually responsible, for only the following reasons:

a. Issuance of an order of a court or other public authority having jurisdiction; or

b. An act of the United State or California government, such as a declaration of national emergency.

14.1.2 Notice of Termination

If one of the above reasons exists, the Contractor may, upon written notice of seven (7) additional days to the District, terminate the Contract and recover from the District payment for Work executed and for reasonable costs verified by the Architect with respect to materials, equipment, tools, construction equipment, and machinery, including reasonable overhead, profit, and damages.

14.2 TERMINATION BY THE DISTRICT FOR CAUSE

14.2.1 Grounds for Termination

The District may terminate the Contractor and/or this Contract for the following reasons:

a. Persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

b. Persistently or repeatedly is absent, without excuse, from the job site;

c. Fails to make payment to Subcontractors, suppliers, materialmen, etc.;

d. Persistently disregards laws, ordinances, rules, regulations, or orders of a public authority having jurisdiction;

e. Fails to provide a schedule or fails or refuses to update schedules required under the Contract;

f. Falls behind on the Project and refuses or fails to undertake a Recovery Schedule;

g. If the Contractor has been debarred from performing Work

h. Becomes bankrupt or insolvent, including the filing of a general assignment for the benefit of creditors; or

i. Otherwise is in substantial breach of a provision of the Contract Documents.

14.2.2 Notification of Termination

When any of the above reasons exist, the District may, without prejudice to any other rights or remedies of the District and after giving the Contractor and the Contractor's Surety written notice of seven (7) days, terminate the Contractor and/or this Contract and may, subject to any prior rights of the Surety:

a. Take possession of the Project and of all material, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

b. Accept assignment of Subcontracts. Contractor acknowledges and agrees that if the District (in its sole and absolute discretion) decides to takeover completion of the Project, the Contractor agrees to immediately assign all subcontracts to the District which the District has chosen to accept;

c. Complete the Work by any reasonable method the District may deem expedient, including contracting with a replacement contractor or contractors; and,

d. Agree to accept a takeover and completion arrangement with Surety that is acceptable to the District Board.

14.2.3 Takeover and Completion of Work after Termination for Cause

A Termination for Cause is an urgent matter which requires immediate remediation since Project Work is open and incomplete, the site is subject to vandalism and theft, the Project site is considered a public nuisance, and there is a possibility of injury and deterioration of the Project Work and materials. Thus, the District shall be entitled to enter a takeover contract to either remediate the unfinished condition or complete the Work for this Project.

14.2.4 Payments Withheld

If the District terminates the Contract for one of the reasons stated in Article 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is complete. All costs associated with the termination and completion of the Project shall be the responsibility of the Contractor and/or its Surety.

14.2.5 Payments upon Completion

If the unpaid balance of the Contract Sum exceeds costs of completing the Work, including compensation for professional services and expenses made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor and its Surety shall pay the difference to the District. The amount to be paid to the Contractor, or District, as the case may be, shall be certified by the Architect upon application. This payment obligation shall survive completion of the Contract.

14.2.6 Conversion of Termination Upon Determination by Any Court or Other Tribunal

In the event the Contract or Contractor's performance of the Contract is terminated under Article 14.2, and it is finally determined by an arbitrator, court, jury or other tribunal having jurisdiction, for any reason, that the Contractor was not in default under the provisions hereof, or that the District's exercise of its rights under Article 14.2 was defective, deficient, ineffective, invalid or improper for any reason, the termination shall be deemed a Termination for Convenience by the District and thereupon, the rights and obligations of the District and the Contractor shall be determined in accordance with Article 14.3 .1 hereof.

14.3 TERMINATION OF CONTRACT BY DISTRICT (CONTRACTOR NOT AT FAULT)

14.3.1 Termination for Convenience

District may terminate the Contract upon fifteen (15) calendar days of written notice to the Contractor and use any reasonable method the District deems expedient to complete the Project, including contracting with replacement contractor or contractors, if it is found that reasons beyond the control of either the District or Contractor make it impossible or against the District's interest to complete the Project. In such a case, the Contractor shall have no Claims against the District except for: (1) the actual cost for approved labor, materials, and services performed in accordance with the Contract Documents which have not otherwise been previously paid for and which are supported and documented through timesheets, invoices, receipts, or otherwise; and (2) profit and overhead of ten percent (10%) of the approved costs in item (1); and (3) termination cost of five percent (5%) of the approved costs in item (1). Contractor acknowledges and agrees that if the District (in its sole and absolute discretion) decides to takeover completion of the Project, the Contractor agrees to immediately assign all subcontracts to the District which the District has chosen to accept.

14.3.2 Non-Appropriation of Funds/ Insufficient Funds

In the event that sufficient funds are not appropriated to complete the Project or the District determines that sufficient funds are not available to complete the Project, District may terminate or suspend the completion of the Project at any time by giving written notice to the Contractor. In the event that the District exercises this option, the District shall pay for any and all work and materials completed or delivered onto the site for which value is received, and the value of any and all work then in progress and orders actually placed which cannot be canceled up to the date of notice of termination. The value of work and materials not otherwise already paid for by the District up to the time of termination under this Paragraph shall include a factor of fifteen percent (15%) for the Contractor's overhead and profit and there shall be no other costs or expenses paid to Contractor. All work, materials and orders paid for pursuant to this provision shall become the property of the District. District may, without cause, order Contractor in writing to suspend, delay or interrupt the Project in whole or in part for such period of time as District may determine. Adjustment shall be made for increases in the cost of performance of the Agreement caused by suspense, delay or interruption.

14.4 REMEDIES OTHER THAN TERMINATION

If a default occurs, the District may, without prejudice to any other right or remedy, including, without limitation, its right to terminate the Contract pursuant to Article 14.2, do any of the following:

a. Permit the Contractor to continue under this Contract, but make good such deficiencies or complete the Contract by whatever method the District may deem expedient, and the cost and expense thereof shall be deducted from the Contract Price or paid by the Contractor to the District on demand;

b. If the workmanship performed by the Contractor is faulty or defective materials are provided, erected or installed, then the District may order the Contractor to remove the faulty workmanship or defective materials and to replace the same with work or materials that conform to the Contract Documents, in which event the Contractor, at its sole costs and expense, shall proceed in accordance with the District's order and complete the same within the time period given by the District in its notice to the Contractor; or

c. Initiate procedures to declare the Contractor a non-responsible bidder for a period of two (2) to five (5) years thereafter.

All amounts expended by the District in connection with the exercise of its rights hereunder shall accrue interest from the date expended until paid to the District at the maximum legal rate. The District may retain or withhold any such amounts from the Contract Price. If the Contractor is ordered to replace any faulty workmanship or defective materials pursuant to Paragraph (b) above, the Contractor shall replace the same with new work or materials approved by the Architect and the District, and, at its own cost, shall repair or replace, in a manner and to the extent the Architect and the District shall direct, all Work or material that is damaged, injured or destroyed by the removal of said faulty workmanship or defective material, or by the replacement of the same with acceptable work or materials. In no event shall anything in this Article be deemed to constitute a waiver by the District of any other rights or remedies that it may have at law or in equity, it being acknowledged and agreed by the Contractor that the remedies set forth in this Article are in addition to, and not in lieu of, any other rights or remedies that the District may have at law or in equity.

ARTICLE 15
DEBARMENT

15.1 DEBARMENT MEANS THERE HAS BEEN A FINDING THAT THE CONTRACTOR IS NOT RESPONSIBLE.

During the course of the Project, or if it is determined through Change Orders, Claims, or Audit that a Contractor is not responsible, the District may, in addition to other remedies provided in the Contract, debar the Contractor from bidding or proposing on, or being awarded, and/or performing work on District contracts for a specified period of time, which generally will not exceed five (5) years, but may exceed five (5) years or be permanent if the circumstances warrant such debarment. In addition to the debarment proceeding, a finding that a Contractor is to be debarred shall result in the termination of any or all existing Contracts the Contractor may have with the District.

15.2 BOARD FINDING

The District may debar a Contractor if the Board, or the Board's delegatee, in its discretion, finds the Contractor has done any of the following:

15.2.1 Intentionally or with reckless disregard, violated any term of the Contract with the District

15.2.2 Committed an acts or omission which reflects on the Contractor's quality, fitness or capacity to perform Work for the District;

15.2.3 Committed an act or offense which indicates a lack of business integrity or business honesty; or,

15.2.4 Made or submitted a false claim against the District or any other public entity.

15.3 HEARING AND PRESENTATION OF EVIDENCE

If there is evidence that the Contractor may be subject to debarment, the District shall notify the Contractor in writing of the evidence which is the basis for the proposed debarment and shall advice the Contractor of the scheduled date for a debarment hearing before the District Board or its delegated designee.

The District Board, or designee, shall conduct a hearing where evidence on the proposed debarment is presented. The Contractor or the Contractor's representative shall be given an opportunity to submit evidence at the hearing. The Contractor shall be provided an adequate amount of time to prepare and object to evidence presented. A tentative proposed decision shall be issued as a tentative decision and the District shall be entitled to modify, deny or adopt the proposed decision. The proposed decision shall contain a recommendation regarding whether the Contractor should be debarred, and, if so, the appropriate length of time of the debarment. The Contractor and the District shall be provided an opportunity to object to the tentative proposed decision for a period of 15 days. If additional evidence is presented, the District shall evaluate this evidence and either issue an amended ruling, issue the same ruling, or call a further hearing.

If a Contractor has been debarred for a period of longer than five (5) years, that Contractor may after the debarment has been in effect for at least five (5) years, submit a written request for review of the debarment determination to reduce the period of debarment or terminate the debarment. The District may,

in its discretion, reduce the period of debarment or terminate the debarment if it finds that the Contractor has adequately demonstrated one or more of the following: (1) elimination of the grounds for which the debarment was imposed; (2) a bona fide change in ownership or management; (3) material evidence discovered after debarment was imposed; or (4) any other reason that is in the best interests of the District.

The District will consider a request for review of a debarment determination only where: (1) the Contractor has been debarred for a period longer than five (5) years; (2) the debarment has been in effect for at least five (5) years; and (3) the request is in writing, states one or more of the grounds for reduction of the debarment period or termination of the debarment, and includes supporting documentation. Upon receiving an appropriate request, the District will provide notice of the hearing on the request. At the hearing, the District shall review evidence on the proposed reduction of debarment period. This hearing shall be conducted and the request for review decided by the District pursuant to the same procedures as for a debarment hearing.

The District's proposed decision shall contain a recommendation on the request to reduce the period of debarment or terminate the debarment.

The terms shall also apply to Subcontractors of Contractor.

SECTION 01 33 00

SUBMITTALS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Submittals for review, and information.

B. Submittal procedures.

1.02 PROJECT COORDINATION

A. Project Coordinator: Construction Manager.

B. Construction, fabrication, or ordering of materials must not begin until Contractor has received final submittals reviewed by the Architect/Engineer governing all aspects of the intended work.

C. Make the submittals to the Architect through the Project Coordinator.

1.03 SHOP DRAWINGS

A. Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

B. Identify details on Shop Drawings by reference to sheet and detail numbers of Contract Drawings and/or specific reference to Sections and Paragraphs of the Specifications.

1.04 PRODUCT DATA

A. Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the Work.

B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data must:

1. Have each copy clearly marked to identify pertinent materials, products, finishes, etc.

2. Show clearly all standard options included.

3. Show dimensions and clearances required.

4. Show performance characteristics and capacities.

5. Show wiring diagrams and controls and necessary rough-in requirements for utility services and connections (where applicable).

C. Identify each item of Product Data by reference to sheet and detail numbers of Contract Drawings and/or specific reference to Sections and Paragraphs of the Specifications.

D. Where Product Data, as submitted, contains extraneous information, unmarked options, or is incomplete, it must be returned to the Contractor without review.

1.05 MILL CERTIFICATES

A. Mill Certificates are documents that provide testing data regarding the fabrication and strength of metal products. Mill Certificates must be less than 1 year old.

1.06 SAMPLES

A. Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

B. Where samples are required of materials which inherently show a range of size, color, texture or finish, submit Samples in sufficient quantity to show this range.

C. Samples must be tagged or otherwise clearly identified as to pertinent information illustrated and specific relationship to the Work, and must show the name and address of the Subcontractor or agency submitting them, the date, and the name of the Work for which they are intended.

D. Unless the Architect determines that Samples must be retained for reference purposes, Samples will be returned when so requested by the Contractor. No Sample must be incorporated into the Work unless specific approval is given by the Architect/Engineer.

E. Charges for submission of Samples and for their return must be borne by the Contractor.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 SUBMITTAL PROCEDURES

A. Transmit each submittal with approved form.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

C. Document: Submit one electronic copy in pdf or word format. Illegible files will be rejected. If a printed copy is required to be returned, submit two printed sets for review.

D. Submittals must contain:

1. The date of submission and the dates of any previous submissions.

2. The Project title and number.

3. Contract identification.

4. The names of Contractor, Supplier, Manufacturer

5. Identification of the product

6. Field dimensions, clearly identified as such.

7. Relation to adjacent or critical features of the Work or materials.

8. Applicable standards, such as ASTM or Federal Specifications numbers.

9. Identification of deviations from Contract Documents and Product

10. Identification of revisions on resubmittals.

11. An 8 inches x 3 inches blank space for Contractor and Architect/Engineer stamps.

12. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the Work and of Contract Documents.

E. Make submittals promptly in accordance with an approved submittal schedule, as put forth by the General Contractor, and in such sequence as to cause no delay in the work or in the work of any other contractor.

F. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

G. The General Contractor must review each submittal and only forward to the Architect/Engineer after verifying that the submittal 1) is complete, 2) is requested by and is based on the current edition of the contract documents including all supplements, addenda, RFI's, etc., 3) has been coordinated among all trades, 4) has revisions clouded, and 5) does not include substitution requests. Submittals not meeting these requirements will be returned for revision and resubmittal. The applicable work must not proceed until the submittal is returned without a required resubmittal.

3.02 RESUBMISSION REQUIREMENTS

A. Make any corrections or changes in the submittals required by the Architect/Engineer and resubmit.

B. Shop Drawings and Product Data

1. Revise initial drawings or data and resubmit as specified for the initial submittal.

2. Indicate any changes which have been made other than those requested by the Architect/Engineer.

C. Samples: Submit new Samples as required for initial submittal.

3.03 DISTRIBUTION

A. Distribute copies of Shop Drawings and Product Data which carry the Architect/Engineer stamp to:

1. Job site file.

2. Record Documents file.

3. Other affected contractors.

4. Subcontractors.

5. Supplier or Fabricator.

B. Distribute Samples that carry the Architect stamp as directed by the Architect.

END OF SECTION 01 33 00

SECTION 02 41 00

DEMOLITION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of designated structures and removal of materials from site.

B. Selective demolition of building elements for alteration purposes.

C. Abandonment and removal of existing utilities and utility structures.

1.02 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 10 00 - Summary: Sequencing and staging requirements.

C. Section 01 10 00 - Summary: Description of items to be salvaged or removed for re-use by Contractor.

D. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

E. Section 01 60 00 - Product Requirements: Handling and storage of items removed for salvage and relocation.

F. Section 02 65 00 - Underground Storage Tank Removal.

G. Section 31 23 23 - Structural Fill

1.03 REFERENCE STANDARDS

A. ANSI/ASSE A10.6 - Safety Requirements for Demolition Operations; American National Standards Institute, Inc.

1.04 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Company specializing in the type of work required.

1. Minimum of 5 years of documented experience. In the case of building demolition must demonstrate experience in the demolition of a minimum of one building of comparable height and construction type.

B. Codes and Standards: Comply with all applicable codes including the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:

1. ANSI/ASSE A10.6

2. State of California, California Administrative Code, Title 8, Industrial Relations, Chapter 4, “Construction Safety Order.”

C. Permits: The Contractor must secure and pay for all required permits, licenses and certificates and give notices as required for building demolition prior to beginning work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Fill Material: As specified in Section 31 23 23 - Structural Fill

PART 3 - EXECUTION

3.01 SCOPE

A. Remove existing slabs on grade where indicated in the contract documents.

B. Remove fences and gates in conflict with new construction.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.

1. Obtain required permits.

2. Use of explosives is not permitted.

3. Make such explorations and probes necessary to ascertain required protective measures before proceeding with building demolition and removal work.

4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures. Cease operations immediately if adjacent structures appear to be in danger.

5. Provide, erect, and maintain temporary barriers, security devices, catch platforms, lights, weather protection, warning signs and other items as required for protection of workmen engaged in building demolition operations, public, adjacent construction and adjacent building occupants.

6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.

7. Do not close or obstruct roadways or sidewalks without permit.

8. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.

9. Protect public and private property adjacent to and on jobsite, including platforms, vents, utility lines, streets, sidewalks, light standards, hydrants, street signs, mail boxes and fire alarm boxes.

10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Protect existing structures and other elements that are not to be removed.

1. Provide bracing and shoring.

2. Prevent movement or settlement of adjacent structures.

3. Stop work immediately if adjacent structures appear to be in danger. Notify Owner's Representative and do not resume operations until directed by Owner's Representative.

D. Sprinkle work with water to minimize dust. Provide hoses and water connections for this purpose.

E. Special care must be exercised to prevent damage to existing curbs, walks, underground utilities, etc., which are to remain, during execution of this work. The Contractor at no cost to the Owner must repair any damage to new condition.

F. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.03 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Unused underground piping may be abandoned in place, provided it is completely drained and capped; remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.

1. Verify that construction and utility arrangements are as shown.

2. Report discrepancies to Architect before disturbing existing installation.

3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from other areas that are still occupied.

1. Provide, erect, and maintain temporary dustproof partitions of construction.

2. Provide sound retardant partitions of construction indicated on drawings in locations indicated on drawings.

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

D. Remove existing work as indicated and as required to accomplish new work.

1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.

2. Remove items indicated on drawings.

E. Protect existing work to remain.

1. Prevent movement of structure; provide shoring and bracing if necessary.

2. Perform cutting to accomplish removals neatly and as specified for cutting new work.

3. Repair adjacent construction and finishes damaged during removal work.

4. Patch as specified for patching new work.

3.05 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION 02 41 00

SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Formwork for concrete, with shoring, bracing and anchorage.

1.02 RELATED REQUIREMENTS

A. Section 03 20 00 - Concrete Reinforcing

B. Section 03 30 00 - Cast-in-Place Concrete

C. Section 03 37 13 - Shotcrete

D. Section 03 38 00 - Post-Tensioned Concrete

1.03 REFERENCE STANDARDS (Editions adopted by current governing California Building Code)

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.

B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute.

C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute.

D. ACI 347 - Guide to Formwork for Concrete; American Concrete Institute.

E. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.

F. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

G. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).

H. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

1.04 SUBMITTALS

A. See Section 01 30 00 - Shop Drawings, Product Data and Samples, for submittal procedures.

B. Product Data: Provide data on formwork release agent or form liner proposed for use with each formed surface.

C. Formwork Facing Materials: Data on form-facing materials proposed for smooth-form finish if different from that specified in Part 2.02.

D. Construction and Contraction Joints: Location of construction and contraction joints proposed if different from those indicated in the Contract Documents.

1.05 QUALITY ASSURANCE

A. Codes and Standards: Comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified.

1. California Building Code, current governing edition

2. ACI 318

3. ACI 347

PART 2 - PRODUCTS

2.01 FORMWORK - GENERAL

A. Maximum deflection of facing materials reflected on concrete surfaces exposed to public view must be 1/240 of the span between structural members of the formwork.

B. Formed Construction and Contraction Joints

1. Locate and form construction joints that least impair strength of the structure and meet the requirements of “Construction Joints” Section 03 30 00 - Cast-in-Place Concrete.

2. Unless otherwise specified or permitted, locate and detail formed construction joints to the following requirements:

a. Locate joints foundations and grade beams within the middle third of the distance between column and in walls and columns at the underside of slabs, beams, or girders and at the tops of footings or slabs; and

b. Make joints perpendicular to the main reinforcement.

3. Provide keyways at all construction joints unless shown otherwise in the Contract Documents. Unless otherwise specified, longitudinal keyways indicated on the Contract Documents, must be a minimum of 1-1/2 in. deep in joints in walls and between walls and slabs or footings.

4. Provide construction and contraction joints where indicated on the Contract Documents. Submit for acceptance the location of construction and contraction joints differing from those indicated on the Contract Documents.

2.02 FORM MATERIALS

A. Form-facing materials: Materials for form faces in contact with concrete must meet the requirements of "Concrete Finishing" Section 03 30 00 - Cast-in-Place Concrete and the following requirements unless otherwise specified in Contract Documents.

1. For smooth-form finish, use plywood, tempered concrete-form-grade hardboard, metal, plastic, paper, or other acceptable materials capable of producing the desired finish for form-facing materials. Form-facing materials must produce a smooth, uniform texture on the concrete. Do not use form-facing materials with raised grain, torn surfaces, worn edges, dents, or other defects that will impair the texture of concrete surfaces. Facing materials must be supported with studs or other backing capable of maintaining deflections within the tolerances specified in Part 2.01.

2.03 FORMWORK ACCESSORIES

A. Use commercially manufactured accessories for formwork accessories that are partially or wholly embedded in concrete, including ties and hangers. Do not use nonfabricated wire form ties. Where indicated in the Contract Documents, use form ties with integral water barrier plates in walls or other acceptable positive water barriers.

2.04 FORMWORK RELEASE AGENT

A. Use commercially manufactured formwork release agents that prevent formwork absorption of moisture, prevent bond with concrete, and do not stain the concrete surfaces.

2.05 EXPANSION JOINT FILLER

A. Premolded expansion joint filler must conform to ASTM D994 or ASTM D1751.

2.06 FABRICATION AND MANUFACTURE

A. Formwork must be tight to prevent loss of mortar from concrete.

B. Place 3/4 inch chamfer strips in the corners of formwork to produce beveled edges on permanently exposed surfaces unless otherwise specified. Do not bevel reentrant corners or edges of formed joints of concrete unless specified in the Contract Documents.

C. Inspect formwork and remove deleterious material immediately before concrete is placed. Provide temporary openings where needed at the base of column and wall formwork to facilitate cleaning and inspection.

D. Fabricate form ties so ends or end fasteners can be removed with minimum spalling at the faces of concrete.

E. Locate waterstops in joints where indicated on Contract Documents. Use pieces of premolded waterstop with a maximum practicable length to create the minimum number of end joints. Make joints in waterstops in accordance with the manufacturer's recommendations. Ensure that joints develop effective watertightness equal to the continuous waterstop material, permanently develop not less than 50% of the strength of the parent section and permanently retain flexibility.

PART 3 - EXECUTION

3.01 EARTH FORMS

A. Where sides of excavations have been cut neat and accurate to size for pouring of concrete directly against the excavation, forms for footings will not be required. Remove loose soil prior to placing concrete.

3.02 CONSTRUCTION AND ERECTION OF FORMWORK

A. At construction joints, lap contact surface of the form sheathing for flush surfaces exposed to view over the hardened concrete in the previous placement. Ensure formwork is sealed against hardened concrete to prevent offsets or loss of mortar at construction joints and to maintain a true surface.

B. Provide positive means of adjustment (such as wedges or jacks) of shores and struts. Do not make adjustments in the formwork after concrete has reached its time of initial setting. Brace formwork securely against lateral deflection and lateral instability.

C. Fasten form wedges in place after final adjustment of forms and before concrete placement.

D. Anchor formwork to shores, supporting surfaces, or members to prevent upward or lateral movement of the formwork system during concrete placement. Form supports must be placed on adequate foundations and have sufficient strength and bracing to prevent settlement or distortion from the weight of the concrete or other cause. Support must rest on double wedged shim, or other approved means, so that the forms will be maintained at the proper grade.

E. Construct formwork for wall openings to facilitate removal and to counteract swelling of wood formwork.

F. Provide runways for moving equipment and support runways directly on the formwork or structural member without resting on the reinforcing steel.

G. All formed joints on concrete surfaces to be exposed must be taped and must align so joints will not be apparent on the concrete surfaces.

H. Any movement or bellying of forms during construction must be considered just cause for their removal and, in addition, the concrete work so affected.

I. Bolts, rods, or other approved devices must be used for internal form ties and must be of sufficient quantities to prevent spreading of the forms. The ties must be placed at least 1 inch away from the finished surface of the concrete. Bolts and rods that are to be completely withdrawn must be coated with grease.

J. Boards or other form materials that have been damaged or checked or warped prior to placing of concrete must be removed from the forms and replaced with approved materials or otherwise corrected to the satisfaction of the engineer.

K. Assign a sufficient number of workers to keep watch on and maintain the forms during placing of concrete. Satisfactorily remedy any displacement or looseness of forms or reinforcement before placing of concrete. No form must be moved or altered except as may be specifically directed.

3.03 APPLICATION - FORM RELEASE AGENT

A. Cover surfaces of formwork with an acceptable material that will prevent bond with the concrete. A field-applied formwork release agent or a factory-applied liner may be used. If a formwork release agent is used, apply to the surfaces of the formwork in accordance with the manufacturer's recommendations before placing reinforcing steel. Do not allow formwork release agent to puddle in the forms. Do not allow formwork release agent to contact reinforcing steel or hardened concrete against which fresh concrete is to be placed.

3.04 INSERTS, EMBEDDED PARTS, BURIED PARTS, AND OPENINGS

A. Position and support expansion joint materials, waterstops, and other embedded items to prevent displacement. Fill voids in sleeves, inserts, and anchor slots temporarily with readily removable material to prevent entry of concrete into voids.

B. Place sleeves, inserts, anchors, and embedded items required for adjoining work or for support of adjoining work before concrete placement. Holes, notches, conduits, pipes, etc. are not allowed in concrete slabs, walls, members, etc. unless shown on the structural drawings or requested and specifically accepted by the Engineer. Conduits, pipes, etc. are not allowed to be buried below slabs or footings resulting in a loss of capacity of the soil support of the slab or footing.

3.05 FORM CLEANING

A. Clean surfaces of formwork and embedded materials of mortar, grout, and foreign materials before concrete is placed.

3.06 FORMWORK TOLERANCES

A. Unless otherwise specified in the Contract Documents, construct formwork so concrete surfaces conform to the tolerance limits of ACI 117. The class of surface must conform to Part 2.02.

B. To maintain specified tolerances, camber formwork to compensate for anticipated deflections in formwork during concrete placement. Set formwork and intermediate screed strips for slabs accurately to produce designated elevations and contours of the finished surface before removal of formwork. Ensure that edge forms and screed strips are strong enough to support vibrating screeds or roller pipe screeds when the finish specified requires the use of such equipment.

C. When formwork is cambered, set screeds to the same camber to maintain specified concrete thickness.

3.07 FIELD QUALITY CONTROL

A. The Contractor must verify accuracy of items, furnished under other sections of these specifications and installed under this section.

3.08 FORM REMOVAL

A. Remove top forms on sloping surfaces of concrete as soon as removal will not allow concrete to sag. Perform needed repairs or treatment required at once and follow immediately with specified curing.

B. Do not damage concrete during removal of formwork for columns, walls, slabs, sides of beams, and other parts not supporting the weight of the concrete. Perform needed repair and treatment required on vertical surfaces at once and follow immediately with specified curing.

C. Contractor must request to have field cured compression test specimen taken where it is planned to remove formwork and shoring sooner than indicated above and submit detailed plans for review and acceptance. Mold cylinders in accordance with ASTM C31, and cure them under the same conditions for moisture and temperature as used for the concrete they represent. Test cylinders in accordance with ASTM C39.

D. In removing plywood forms, no metal pinch bars must be used and special care to be taken in stripping. Start at top edge or vertical corner where it is possible to insert wooden wedges. Wedging must be done gradually and must be accompanied by light tapping of the plywood panels to crack them loose. Do not remove forms with a single jerk after it has been started at one end.

E. Nothing herein must be construed as relieving the contractor of any responsibility of the safety of the structure.

END OF SECTION 03 10 00

SECTION 03 20 00

CONCRETE REINFORCING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for concrete, shotcrete and masonry.

B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

A. Section 01 33 00 - Submittals

B. Section 03 10 00 - Concrete Forming and Accessories.

C. Section 03 30 00 - Cast-in-Place Concrete.

D. Section 03 37 13 - Shotcrete: Reinforcement for shotcrete.

E. Section 03 38 00 - Post-Tensioned Concrete.

F. Section 03 41 00 - Structural Precast Concrete: Reinforcement for precast concrete panels.

G. Section 03 47 13 - Tilt-Up Concrete: Reinforcement for tilt-up concrete panels.

H. Section 04 22 00 - Concrete Unit Masonry: Reinforcement for masonry.

I. Section 31 63 29 - Drilled Concrete Piers and Shafts: Reinforcement for drilled pier foundations.

1.03 REFERENCE STANDARDS (Editions adopted by current governing California Building Code)

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; American Concrete Institute International.

B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International.

C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International.

D. ACI SP-66 - ACI Detailing Manual; American Concrete Institute International.

E. ASTM A1064 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.

F. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

G. ASTM A185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

H. ASTM A615-22 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

I. ASTM A 641 - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

J. ASTM A706-22a with Supplementary Requirement S1 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.

K. ASTM A767 - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.

L. ASTM A775 - Standard Specification for Epoxy-Coated Steel Reinforcing Bars.

M. ASTM A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

N. ASTM A884 - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement.

O. ASTM A934 - Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars.

P. ASTM D3963 - Standard Specification for Fabrication and Jobsite Handling of Epoxy Coated Reinforcing Steel Bars.

Q. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.

R. AWS D1.4 - Structural Welding Code - Reinforcing Steel; American Welding Society.

S. CRSI (DA4) - Manual of Standard Practice; Concrete Reinforcing Steel Institute.

1. Laboratory test reports must be signed by a principal of the testing agency who is a registered Civil Engineer in the State of California.

2. When required by other portions of these specifications, laboratory test reports must be submitted for each size of bar tested for each heat to show compliance with appropriate ASTM Standards and these specifications.

1.04 SUBMITTALS

A. See Section 01 30 00 - Shop Drawings, Product Data and Samples, for submittal procedures.

B. Shop Drawings (Placing drawings)

1. Comply with requirements of ACI SP-66. Shop drawings must also show details for congested areas and connections. Shop drawings used in field must be reviewed copies.

C. Mill Certificates

1. The Contractor must provide Mill Certificates for each size of bar for each heat to be used on project and certify that reinforcing steel supplied for this project meet or exceed specified requirements.

2. Mill Certificates must include name of mill, date of rolling, date of shipping to fabricator and must be signed by fabricator certifying that each material complies with or exceeds the specified requirements. A Mill Certificate must be furnished with each lot of material delivered to the project and the lot must be clearly identified in the Certificate.

3. When Mill Certificates cannot be provided, the Contractor must hire a professional testing laboratory to verify compliance and provide laboratory test reports. The Contractor must pay for the cost of testing.

D. Laboratory Test Reports

1. Laboratory test reports must be signed by a principal of the testing agency who is a registered Civil Engineer in the State of California.

2. When required by other portions of these specifications, laboratory test reports must be submitted for each size of bar tested for each heat to show compliance with appropriate ASTM Standards and these specifications.

E. Welder's Certificates and WPS: Submit description of reinforcement weld locations, welding procedures, and welder certification when welding is permitted.

1.04 QUALITY ASSURANCE

A. Perform work of this section in accordance with the current governing edition of CBC, ACI 301, ACI SP-66, ACI 318, and AWS D1.4 except as modified by the contract documents.

B. Sampling and Testing:

1. General

a. If the Owner's agent, through oversight or otherwise, has accepted material or work which is defective or contrary to specifications, this material or work, regardless of state of completion, may be rejected.

b. Testing agencies must meet the requirements of ASTM E329. Testing agencies must be accepted by the Architect/Engineer before performing any work.

2. Testing responsibilities of Contractor:

a. Submit data on qualifications of proposed testing agency for acceptance. Use of testing services will not relieve the Contractor of the responsibility to furnish materials and construction in compliance with the Contract Documents.

b. Cooperate with and notify owner's agent at least 24 hours in advance of inspections required and must provide samples, test pieces, and facilities for inspection at no cost to the owner.

c. Identify each lot of fabricated reinforcing steel to be shipped to the site by assigning an individual lot number that identifies steel by heat number and must be tagged in such a manner that each such lot can be accurately identified at the job site.

d. Remove all unidentified reinforcing steel, anchorage assemblies and bar couplers received at the site.

1.05 STORAGE OF MATERIALS

A. Store reinforcement during fabrication and at site to avoid excessive rusting or coating with grease, oil, soil, or other objectionable materials. Epoxy-coated and galvanized reinforcement must be handled and stored by methods that will not damage the coating. Bundles must not be dropped or dragged. Reinforcing steel must be transported and stored in a manner that will not damage any applied coating. Since the epoxy coating is flammable, the coated reinforcement must not be exposed to any fire or flame.

1.06 SEQUENCING AND SCHEDULING

A. Coordinate work with all trades so as not to interfere with the work of other trades. Bring interferences between trades to Architect's attention and resolve before any concrete is placed.

PART 2 - PRODUCTS

2.01 REINFORCING BARS

A. Reinforcing Steel:

1. Bars for reinforcement must conform to the requirements of ASTM A706-22a with Supplementary Requirement S1, Grade 60 deformed low-alloy steel bars.

2. Uncoated steel unless otherwise noted.

2.02 WIRE

A. All wire for concrete reinforcement must conform to ASTM A1064.

2.03 REINFORCEMENT ACCESSORIES

A. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement. Reinforcement supports must conform to the requirements of ACI 301.

2.04 OTHER MATERIALS

A. All other materials, not specifically described by these specifications but required for complete and proper placement of reinforcement must be new, first quality of their respective kinds, and subject to the approval of the Architect/Engineer.

2.05 FABRICATION

A. Welding of reinforcement is permitted only with the approval of Engineer. Perform welding in accordance with AWS D1.4. Do not weld crossing bars (tack welds) for assembly of reinforcement, supports, or embedded items. After completing welds on galvanized or epoxy-coated reinforcement, repair coating damage with patching material conforming to ASTM A775.

PART 3 - EXECUTION

3.01 EXISTING CONDITIONS

A. Prior to all work of the section, carefully inspect the installed work of other trades and verify that all work is sufficiently complete to permit the start of work under this section and that the completed work of this section will be in complete accordance with the original design and the reviewed shop drawings. In the event of discrepancy, immediately notify the Architect/Engineer in writing.

B. In the event conduits, pipes, inserts, sleeves, or any other items interfere with placing the reinforcement as indicated on the drawings or approved shop drawings, or as otherwise required, immediately notify the Architect/Engineer and obtain approval on procedure before placement of reinforcement is started.

3.02 BENDING

A. Bends for reinforcing steel must meet ACI 301 and ACI 318. Cold bend bar sizes No. 3 through 5 only one time, provided reinforcing bar temperature is above 32 degree F. Do not field bend reinforcing steel in a manner that will injure material, cause the bars to be bent on too tight a radius, or that is not indicated as allowed on drawings or permitted by Engineer. Do not straighten bent or kinked bars without approval of Engineer. Replace bars with kinks or bends not shown on the drawings.

3.03 PLACING

A. All reinforcement must be placed in conformance with the requirements of the Contract Drawings, both as to location, position and spacing of members. It must be supported and secured against displacement by the use of adequate and proper wire supporting and spacing devices, tie wires, etc. so that it will remain in its proper position in the finished structure. Reinforcement may not be wet set in concrete pours.

B. Tolerances: Do not exceed the placing tolerances specified in ACI 318 and ACI 117, whichever is more stringent. Placing tolerances must not reduce cover requirements except as specified in ACI 117.

C. Concrete cover for reinforcement and couplers must be as indicated in the Contract Drawings. Concrete cover is measured from the theoretical excavation line, not the line of any over excavation. Where less than 3 inches cover is noted and concrete will be placed against soil, increase the section thickness to attain 3 inches cover.

D. Preserve clear space between parallel bars of not less than 1-1/2 times the nominal diameter of bars and in no case let the clear distance be less than 1-1/2 inches nor less than 1-1/3 times the maximum size of aggregate.

E. Splice locations not shown on the Contract Documents must be approved by the Engineer. Lap splices must be contact lap splices in accordance with ACI 318 unless otherwise noted on the Contract Drawings. Bars must be wired together at laps. Wherever possible, stagger splices in adjacent bars. Splice bars in members such as spandrels, beams, etc, as follows: Top bars at centerline of span, bottom bars at the support.

F. Butt splices must be accomplished by mechanical anchorage devices. Stagger these devices 2 feet, unless noted otherwise on the Contract Documents.

G. Bars must not be cut by gas torch.

3.04 CLEANING REINFORCEMENT

A. Take all means necessary to ensure that steel reinforcement, at the time concrete is placed around it, is completely free from rust, soil, loose mill scale, oil, paint and all coatings which will destroy or reduce the bond between steel and concrete.

END OF SECTION 03 20 00

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Cast-in-place structural concrete.

B. Grouting under base plates.

C. Underslab vapor retarder/barrier.

1.02 RELATED REQUIREMENTS

A. Section 03 10 00 - Concrete Forming and Accessories.

B. Section 03 20 00 - Concrete Reinforcing.

C. Section 03 38 00 - Post-Tensioned Concrete

D. Section 05 12 00 - Structural Steel Framing

E. Section Mechanical and Electrical Division 21 through 28: Mechanical and electrical items for casting into concrete.

F. Section 31 23 16 - Structural Excavation

G. Section 31 23 23 - Structural Fill

1.03 REFERENCE STANDARDS (Editions adopted by current governing California Building Code)

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; American Concrete Institute International.

B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International.

C. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International.

D. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International.

E. ACI 306.1 - Cold Weather Concreting; American Concrete Institute International.

F. ACI 308R - Guide to Curing Concrete; American Concrete Institute International.

G. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International.

H. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field

I. ASTM C33 - Standard Specification for Concrete Aggregates.

J. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

K. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

L. ASTM C94 - Standard Specification for Ready-Mixed Concrete.

M. ASTM C143 - Standard Test Method for Slump of Hydraulic-Cement Concrete.

N. ASTM C150 - Standard Specification for Portland Cement.

O. ASTM C157 - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.

P. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.

Q. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

R. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.

S. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

T. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.

U. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.

V. ASTM C567 - Standard Test Method for Determining Density of Structural Lightweight Concrete

W. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

X. ASTM C881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

Y. ASTM C 979 - Standard Specification for Pigments for Integrally Colored Concrete.

Z. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

AA. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

BB. ASTM C1116 - Standard Specification for Fiber-Reinforced Concrete.

CC. ASTM C1218 - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.

DD. ASTM C1602 - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.

EE. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

FF. ASTM E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs.

GG. ASTM D4832 - Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.

HH. ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers.

II. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

JJ. COE CRD-C513 - COE Specifications for Rubber Waterstops; Corps of Engineers.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals

B. Product Data
   1. Manufacturer's catalog sheets including instructions for use and description of application must be provided on each of the following materials:
      a. Epoxies
      b. Grout
      c. Admixtures
      d. Curing Compounds
      e. Chemical Hardener
      f. Waterstops
      g. Vapor Retarder/Barrier
      h. Adhesive Anchoring System

C. Mix Designs

   1. Mix designs must be submitted for each class of concrete on the job and must show names and brands of all materials, proportions, slump, strength, gradation of coarse and fine aggregates, and location to be used on job. Field test records or test data that is used to establish the average compressive strength of the mixture must be submitted. The use of alternate materials requires resubmittal and review of the revised mix design.

D. Concrete Placement Schedule: The Contractor must submit a concrete placement schedule which must show all proposed construction joint locations, limits of each placement sequence, order of placement and type of joint proposed at each joint location.

E. Samples: Submit to testing agency of Owner's choice sample of materials as specified and as otherwise required by Architect, including names, sources and descriptions. Select samples to fairly represent average quality and grading of aggregates proposed for the work.

F. Certificates of Compliance

1. The Contractor must provide Certificate of Compliance for each type of aggregate, cementitious material and admixture to be used in each class of concrete or a Certificate of Compliance for each class of concrete.

2. Certificates of Compliance for cementitious materials must include type, manufacturing location, shipping location; for aggregates: type, pit or quarry location, producers' name, grading, specific gravities and certification evidence not more than 90 days old; for admixtures: type, brand name, producer, manufacturer's technical data sheet, and certification data; and for water: source of supply that are used in each class of concrete and must be signed by the concrete supplier certifying that each material item complies with, or exceeds the specified requirements. Certificates of Compliance must be furnished 60 days in advance of any concrete pours.

3. When Certificates of Compliance cannot be provided, the Contractor must hire a professional testing laboratory to verify compliance of each type of material to be used in each Class of Concrete. The cost of testing must be paid for by the Contractor.

4. The Contractor must provide a certificate of compliance for the vapor retarder/barrier material. When a Certificate of Compliance cannot be provided, laboratory test reports must be provided. The cost of testing must be paid for by the Contractor.

5. Certificates of Compliance for vapor retarder/barrier must include the name, and description of the product and must state that the product complies with ASTM E1745 and ASTM E154.

G. Weight and Batch Tags:

1. The special inspector must be provided with a weight and batch tag upon delivery of each load of concrete. The batch tag must show weight of all materials.

1.05 QUALITY ASSURANCE

A. Comply with the provisions of the current governing CBC, ACI 301, and ASTM C94 except where more stringent requirements are shown or specified.

B. Sampling, Testing and Inspection:

1. General:

a. If the Owner's agent, through oversight or otherwise, has accepted material or work which is defective or contrary to specifications, this material or work, regardless of state of completion, may be rejected.

b. Testing agencies must meet the requirements of ASTM C1077. Testing agencies must be accepted by the Architect/Engineer before performing any work.

2. Contractor:

a. The Contractor must cooperate with and notify Owner's agent at least 24 hours in advance of inspection required and must provide samples and facilities for inspection without extra charge.

b. The Contractor must provide and maintain adequate facilities on the project site for safe storage and initial curing of concrete test specimens as required by ASTM C31 for the sole use of the testing agency.

c. Each mix design must be verified by trial batch tests or field test records and certified to by a principal of a testing agency who is a registered Civil Engineer in the State of California and submitted to the Architect/Engineer for review. Agency field test records, in order to be acceptable, must satisfy the requirement of ACI 318 section 26.12 otherwise trial mixture meeting the requirements of ACI 318 section 26.12 must be made. The Contractor must submit data on qualifications of proposed testing agency for acceptance and hire the accepted testing agency to provide trial mixture test data for each type of concrete on the job.

1.06 SEQUENCING AND SCHEDULING

A. Obtain information and instructions from other trades and suppliers in ample time to schedule and coordinate the installation of items furnished by them to be embedded in concrete so provision for their work can be made without delaying the project.

B. Perform any coring and infill of cored holes that were required by failed test results from test panels, failure or delay in complying with these requirements, at no cost to Owner.

PART 2 - PRODUCTS

2.01 FORMWORK

A. Comply with requirements of Section 03 10 00.

2.02 REINFORCEMENT

A. Comply with requirements of Section 03 20 00.

2.03 CEMENTITIOUS MATERIALS

A. Portland Cement: ASTM C150, Type II or ASTM C595 Type IL with moderate (MS) or high (HS) sulfate resistance.

B. Fly Ash: ASTM C618, Class F.

1. Fly ash may substitute for portland cement up to a maximum of 25% of total cementitious materials by weight.

a. Substitutions that combine fly ash and ground granulated blast-furnace slag are limited to a combined total of 50% of the total cementitious material by weight with fly ash no more than 25% of the total cementitious materials by weight.

b. Reduce slag and fly ash substitution rates by at least 50% for cold weather concreting as defined in ACI 306.1.

C. Ground-granulated Blast-furnace Slag: ASTM C989 grades 100 or 120

1. Ground-granulated Blast-furnace Slag may substitute for portland cement up to a maximum of 50% of the total cementitious material by weight.

D. Use cementitious materials that are of the same brand and type and from the same plant of manufacture as the cementitious materials used in the concrete represented by the submitted field test records or used in the trial mixtures.

E. Color Additives: ASTM C979, synthetic or natural mineral-oxide pigments or liquid coloring admixtures, temperature stable and nonfading.

F. Fiber Reinforcement: Synthetic Fiber; fibrillated polypropylene fibers designed for use in concrete, complying with ASTM C1116, Type III, 1/2 inch to 1-1/2 inch in length.

2.04 AGGREGATES

A. Aggregates for hardrock concrete must conform to ASTM C33.

B. Lightweight Aggregate: ASTM C330.

C. Aggregates used for entire project must be obtained from the same sources and have the same size ranges as the aggregates used in the concrete represented by submitted historical data or used in trial mixtures.

2.05 WATER

A. Mixing Water for concrete must be clean and free from deleterious amounts of chlorides, acids, alkalis or organic materials.

2.06 CHEMICAL ADMIXTURES

A. Do not use chemicals that contain calcium chloride or will result in total soluble chloride ions in hardened concrete at ages from 28 to 42 days contributed from water, aggregates, cementitious materials, and admixtures in excess of 0.30 percent by weight of cement for reinforced concrete and 0.06 percent by weight of cement for prestressed concrete. Measure water-soluble chloride-ion content in accordance with ASTM C1218. Admixtures containing chloride salts must not be used where concrete is placed on metal deck. Calcium chloride or any admixture containing chloride ions must not be used in drilled piers.

B. Air Entrainment Admixture: ASTM C260.

1. Acceptable Products subject to compliance with requirements:
   a. Sika Aer; Sika Corporation.
   b. MB-VR or MB-AE; Master Builders.
   c. Darex AEA; W.R. Grace.

C. High Range Water Reducing and Retarding Admixture: ASTM C 494 Type G.
D. High Range Water Reducing Admixture (Super Plasticizer): ASTM C494 Type F.

1. Acceptable Products subjected to compliance with requirements:
    a. WRDA19; W.R. Grace..
    b. Sikament; Sika Chemical Corporation..
    c. Pozzolith 400; Master Builders..

E. Water Reducing and Retarding Admixture: ASTM C494 Type D.
1. Acceptable Products subjected to compliance with requirements:
    a. Pozzolith 300-R; Master Builders.
    b. Daratard; W.R. Grace.
    c. Plastiment; Sika Chemical Corporation.

F. Water Reducing Admixture: ASTM C494 Type A.
1. Acceptable Products subjected to compliance with requirements:
    a. Eucon WR-75; Euclid Chemical Company.

G. Admixtures used in concrete must be the same as those used in the concrete represented by the submitted field test records or used in the trial mixtures.

2.07 ACCESSORY MATERIALS

Underslab Vapor Retarder Sheeting: Thickness must be no less than 10 mil and comply with ASTM E1745, Class A stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Seal edges with vapor retarder manufacturer's recommended tape and adhesive. Install vapor retarder/barrier in accordance with manufacturer's instructions and ASTM E1643 including repair of all penetrations and punctures.

Accessory Products: Mastic adhesive or pressure-sensitive adhesive tape or vapor retarder manufacturer's recommended tape and adhesive.
1. Acceptable Products:
    a. Vapor Retarder
        1) 10 mil Stego Wrap; STEGO Industries.
        2) Moistop Ultra 10; Fortfiber Corp.
        3) Giffolyn 10 Mil Green; Griffolyn Co.
        4) Vapor Block 10; Raven Industries or approved equal.

B. Non-Shrink Grout:
1. ASTM C1107 Grade B or C, pre-mixed, high strength, Metallic or non-metallic flowable grout, which does not shrink as it cures. Water-soluble chloride ion content of grout must have less than 0.06 percent chloride ion by weight of cement when tested in accordance with ATM C1218.
    a. Minimum Compressive Strength at 7 Days: 5000 psi.
    b. Subject to compliance with requirements provide one of the following:
        1) Metallic:
        2) Non-metallic

C. Cast-In-Place Anchors:

1. Anchor Rods and Nuts: ASTM F1554 Grade 36 Class 2A (Grade 105 Class 2A where High Strength is noted) with matching finish ASTM A563 nuts. Rods embedded in concrete, grout or adhesive must be galvanized or non-lubricated unless noted otherwise. Embedded rods must be threaded full length unless noted otherwise. Rods, nuts and washers in contact with preservative-treated wood must be hot-dipped galvanized.

D. Waterproofing Paper: ASTM C171.

E. Liquid Membrane Curing Compound: ASTM C309 or ASTM C1315.

2.08 BONDING AND JOINTING PRODUCTS

A. Joint Filler: 1/2 inch thick unless noted on the drawings, with removable top section that will form 1/2 inch deep sealant pocket after removal.

2.09 CURING MATERIALS

A. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound, that dissipates within 3 to 5 weeks; complying with ASTM C309.

B. Curing and Sealing Compound, Low Gloss: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C1315 Type 1 Class A.

C. Curing and Sealing Compound, High Gloss: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C1315 Type 1 Class A.

D. Moisture-Retaining Sheet: ASTM C171.

2.10 CONCRETE MIX DESIGN

A. Admixtures: Where admixtures are used they must be added as recommended in ACI 211.1 for normal weight concrete and at rates recommended by manufacturer. Admixtures are subject to the Engineer's review.

B. Fiber Reinforcement: Add to mix at rate of 1.5 pounds per cubic yard, or as recommended by manufacturer for specific project conditions.

C. Normal Weight Concrete Mix Requirements:

1. Must be made with aggregates for hardrock concrete.

2. Minimum Compressive Strength, f'c, when tested in accordance with ASTM C39 at 28 days: As scheduled below.

3. Minimum Cementitious Material Content:
   a. For concrete (f'c = 3000 psi and greater) used in floors and slab-on-grades, cementitious material content must not be less than indicated in the following table:

Nominal maximum size of aggregate	Minimum cementitious material content, sacks
1	5.5
¾	6
3/8 to ½	6.5

4. Maximum Water-Cement Ratio: As scheduled below. Significant volume of liquid admixtures should be considered as part of the mixing water.

5. Maximum Aggregate Size: Nominal maximum size of coarse aggregate must not exceed three-fourths of the minimum clear spacing between reinforcing bars, one-fifth of the narrowest dimension between sides of forms, or one-third of the thickness of slabs or toppings.

Concrete Class	Min. 28 day Compressive Strength, f'c	Maximum Water/Cementitious Material Ratio by Weight
Class A	3000 psi	0.55
Class B	2500 psi	0.60
Lean Concrete	300 psi	

D. Controlled Low Strength Material (CLSM) Mix Requirements:

1. Must be made with aggregates conforming to ASTM C33.

2. Compressive Strength tested in accordance with ASTM D4832: As scheduled above.

3. Maximum Water-Cement Ratio: Sufficient to produce a fluid workable mixture without segregation of the aggregate when placed.

E. Concrete Mix Designs: The aggregate and slump for each type of concrete, must be as follows:

oncrete Element	Class of Concrete	Max. Size Aggregate	Slump (inch) at point of discharge
Curbs and Slabs on Grade	A	1	**
Structural Backfill	Lean	1.5	6 min
Yard Concrete Walks & Curbs	B	3/4	**

** Determine the slump by ASTM C143 at the point of truck discharge. Slump must not exceed 3" for any concrete placement where top of surface slopes more than 2%. When an ASTM C1017 Type I or II plasticizing admixture or an ASTM C494 Type F or G high-range water-reducing admixture is used, concrete must have a slump of 2 to 4 in. before the admixture is added and a maximum slump of 8 in. at the point of truck discharge after the admixture is added unless otherwise specified.

F. Returned Plastic Concrete (RPC) may not be used for structural concrete.

2.11 MIXING

A. Use ready-mixed concrete complying with ASTM C94 and with the requirements of Contract Documents. Mix for a period of not less than ten (10) minutes; at least three (3) minutes of the mixing period must be immediately prior to discharging at the job.

B. CLSM must be placed in the work within 3 hours after introduction of the cement to the aggregates.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Vapor retarder/barrier: Install vapor retarder/barrier under slabs on grade where required by Contract Drawings in accordance with manufacturer's instructions and ASTM E1643.

3.03 WEATHER REQUIREMENTS

A. Reinforcement, forms and ground which concrete will contact must be completely free of frost.

B. When the average of the highest and lowest temperature during the period from midnight to midnight is expected to drop below 40° F for more than three successive days, deliver concrete to meet the following minimum temperatures immediately after placement:

1. 55° F for sections less than 12 in. in the least dimension;
2. 50° F for sections 12 to 36 in. in the least dimension;
3. 45° F for sections 36 to 72 in. in the least dimension; and
4. 40° F for sections greater than 72 in. in the least dimension.

The temperature of concrete as placed must not exceed these values by more than 20° F. These minimum requirements may be terminated when temperatures above 50° F occur during more than half of any 24 h duration.

C. The temperature of concrete as placed must not exceed 90° F. When temperature of steel reinforcement, embedments, or forms is greater than 120° F, fog steel reinforcement, embedments, and forms with water immediately before placing concrete. Remove standing water before placing concrete.

D. Do not begin to place or continue to place concrete while rain, sleet, or snow is falling unless adequate protection is provided and, when required, acceptance of protection is obtained. Do not allow rain water to increase mixing water or to damage the surface of the concrete.

3.04 CONVEYING AND PLACING CONCRETE

A. All concrete must be mixed, delivered and discharged in accordance with the requirements of ASTM C94. All concrete must be placed, finished and cured and all other pertinent construction practices must be in accordance with the requirements of ACI 301.

B. Notify Architect not less than 48 hours prior to commencement of placement operations.

C. Before placing, clean mixing and conveying equipment, clean forms and space to be occupied by concrete and wet forms. Remove ground water until completion of work.

D. Place no concrete in any unit of work until all formwork has been completely constructed, all reinforcements secured in place, all items to be built into concrete are in place, form ties at constructions joints tightened and all preparation have been checked by the Inspector. A placing record must be kept on the site of the time and date of placing the concrete in each portion of the structure until the completion of the structure and must be open to the Inspector.

E. Slabs and beams must not be subjected to occupant or storage loads exceeding 20 psf until specified strength is reached (28 days minimum).

F. Concrete must be placed so that a uniform appearance of surfaces will be obtained. The concrete will be free of all rock pockets, honeycombs and voids.

G. The subgrade must be moist when the concrete is placed for floor slab to prevent excessive loss of water from the concrete mix.

H. Pumping of concrete may require admixtures to increase slump beyond the maximum slump listed. Admixtures are subject to the engineer's review.

I. Carry on concreting, once started, as a continuous operation until the section of approved size and shape is completed. Make pour cut-offs of approved detail and location.

J. Handle concrete as rapidly as practicable from mixer to place of deposit by methods which prevent separation or loss of ingredients. Deposit as nearly as practicable in final position to avoid rehandling or flowing. Do not drop concrete freely where reinforcing bars will cause segregation, impact the soil face of excavations nor drop freely more than eight feet. Use hoppers, chutes or trunks of varying length so that the free unconfined fall of concrete must not exceed eight feet. Deposit to maintain a plastic surface approximately horizontal. In walls, deposit in horizontal layers not over eighteen inches deep. In pouring columns, walls or thin sections of considerable heights, use openings in forms, elephant trunks, tremies or other approved devices which permit concrete to be placed without segregation or accumulation of hardened concrete on forms or metal reinforcement above the level of the concrete. Install so concrete will be dropped vertically.

K. Consolidating: All concrete must be placed with mechanical vibration unless otherwise noted. Employ as many vibrators as necessary to secure the desired results. Minimum of one per each 20 cubic yards of concrete placed per hour. Do not push concrete with vibrator. Do not vibrate forms of allow vibrator to vibrate against reinforcing steel where steel projects into green concrete. Vibrators must function at a minimum frequency of 3600 cycles per minute when submerged in concrete. Supplement vibration by forking and spading along the surfaces of the forms and between reinforcing whenever flow is restricted.

3.05 SLAB CONTROL JOINTS

A. Saw Cut Control Joints: Saw cut joints with the Soff-Cut system or approved equal as soon as the surface is firm enough so that it will not be damaged by the blade, usually within 4 to 6 hours after final finishing (no later than 4 hours in hot weather, 12 hrs in cold weather); use 3/16 inch thick blade and cut at least 1 inch deep but not less than 1/4 the depth of the slab.

3.06 CONSTRUCTION JOINTS

A. Location and details of construction joints must be as indicated on drawings, specified, or as approved by the Engineer. Locate so as not to impair the strength of the structure.

B. Roughen the entire surface of construction joints to 1/4” amplitude unless otherwise noted. Prior to subsequent concrete placement, abrasive blast or waterblast the surface to uniformly expose coarse aggregate solidly embedded in the mortar matrix. Clean forms and reinforcement of drippings. Clear away debris by compressed air. Immediately before new concrete is placed, prewet the construction joint and remove standing water.

3.07 CONCRETE FINISHING

A. Finishing Formed Surfaces: Finish per Architect specifications and requirements of ACI 301.

1. If the type of finish is not specified by Architect, use grout-cleaned finish for permanently exposed formed surfaces except foundation surfaces and smooth-rubbed finish for exposed foundation surfaces.

B. Finishing Unformed Surfaces: Finish per Architect specifications and requirements of ACI 301. Start finishing after bleeding of concrete is finished. The presence of bleed water is detected visually but when concrete surface is getting dry fast and rate of evaporation is so high, place a

clear plastic sheet over a section of the concrete to block evaporation and to allow observation of bleeding.

3.08 CURING AND PROTECTION

A. Comply with requirements of ACI 301. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at above 50° F for the period of time necessary for hydration of cement and hardening of concrete.
   1. Normal concrete: At least the first 7 days after placement.
   2. High early strength concrete: At least the first 3 days after placement.

C. Curing methods must comply with ACI 308R.

D. Curing compounds conforming to ASTM C309 or ASTM C1315 must be applied in accordance with the recommendations of the manufacturer and must not be used on any surface against which additional concrete or other cementitious finishing materials are to be bonded, where epoxy flooring is called for, where concrete topping is to receive waterproofing membrane, where not recommended by integral color maker, nor on surfaces where such curing is prohibited by the project specifications.

E. Unformed concrete surfaces: Start curing as soon as the bleed water sheen has disappeared and before surface is dry.

   1. Initial Curing: If surface drying starts before initial set of concrete, keep concrete continuously moist up to final set of concrete by fog spray. Time of initial set is also known as the vibration limit where concrete cannot be properly consolidated after reaching initial set. Before initial set, the concrete is not stiff enough to support the weight of a finisher or finishing machine. Water from fogging should be removed or allowed to evaporate before finishing.

   2. Final Curing: Begin immediately after finishing. If finishing is completed but concrete has not reached final set, keep concrete continuously moist by fog spray, a liquid-applied evaporation reducer spray, or liquid membrane-forming curing compound spray. Water from fogging should be removed or allowed to evaporate before finishing. After final set of concrete, curing must be accomplished by one of the following materials or method:
      a. Ponding, continuous fogging, or continuous sprinkling;
      b. Application of a curing compound.
      c. Application of mats or fabric kept continuously wet.
      d. Application of moisture-retaining sheet conforming to ASTM C171.
      e. Other moisture-retaining covering as reviewed by Architect.

F. Formed concrete surfaces: Steel forms and all wood forms in contact with the concrete must be kept wet until they are removed. After formwork removal cure concrete by one of the method in final curing.

G. Remove protection in such a manner that the maximum decrease in temperature measured at the surface of the concrete in a 24 hr period must not exceed the following:
   1. 50° F for sections less than 12 in. in the least dimension;
   2. 40° F for sections from 12 to 36 in. in the least dimension;
   3. 30° F for sections 36 to 72 in. in the least dimension; or

4. 20° F for sections greater than 72 in. in the least dimension.

H. Measure concrete temperature using a method acceptable to the Architect/Engineer, and record the concrete temperature. When the surface temperature of the concrete is within 20° F of the ambient or surrounding temperature, protection measures may be removed.

3.09 PATCHING AND CLEANING

A. After forms are removed, remove projecting fins, form ties, nails, etc. not necessary for the work or cut back one inch from the surface. Joint marks and fins in exposed work must be smoothed off and cleaned as directed by the Architect.

B. Repair defects in concrete work as directed by the Engineer and per ACI 301. Chip voids and stone pockets to a depth of one inch or more as required to remove all unsound material. Voids, surface irregularities, chipped areas, etc., must be filled by patching, gunite or rubbing, as directed by the Architect/Engineer. Repaired surfaces must duplicate appearance of unpatched work.

C. Clean exposed concrete surfaces and adjoining work stained by leakage of concrete to approval of Architect.

3.10 CLEANUP

A. Clean up all concrete and cement work on completion of this portion of the work, except protective coatings or building papers must remain until floors have completely cured or until interior partitions are to be installed.

3.11 FIELD QUALITY CONTROL

A. Engineer Review: The Engineer must inspect the surfaces between plates and channels bearing on masonry and concrete to determine if grouting of space is necessary. If grouting of space is necessary, the Owner's agent must inspect the grouting procedure.

B. Acceptance of concrete strength is in accordance with ACI 318 section 26.12 unless noted otherwise.

C. When the strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing in-place concrete.

D. Field Acceptance of concrete: Concrete not within the specified limits of air-entrainment, slump and temperature must not be used in the work.

E. Additional Tests: The Owner's agent will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure or deficiencies in protection and curing has occurred, as directed by Engineer. Owner's agent may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed. Contractor must pay for such tests conducted, other additional testing as may be required, and cost of repairing areas of structure tested when unacceptable concrete is verified.

3.12 DEFECTIVE CONCRETE

A. General: Work considered to be defective may be ordered by the Architect/Engineer to be replaced in which case the Contractor must remove the defective work at his expense. Work considered to be defective must include, but not be limited to, the following:
   1. Concrete in which defective or inadequate reinforcing steel has been placed.
   2. Concrete in incorrectly formed, or not conforming to details and dimensions on the drawings or with the intent of these documents, or concrete the surfaces of which are out of plumb or level.
   3. Concrete below specified strength.
   4. Concrete not meeting the maximum allowable drying shrinkage requirements.
   5. Concrete containing wood, cloth, or other foreign matter, rock pockets, voids, honeycombs, cracks or cold joints not scheduled or indicated on the drawings.

3.13 CORRECTION OF DEFECTIVE WORK

A. The Contractor must, at his expense, make all such corrections and alleviation measures as directed by the Engineer.

B. Concrete work containing rock pockets, voids, honeycombs, cracks or cold joints not scheduled or indicated on the drawings, must be chipped out until all unconsolidated material is removed.

C. Secure approval of chipped-out areas before patching. Patch per ACI 301-latest governing edition.

END OF SECTION 03 30 00

SECTION 31 40 00

BRACING, SHORING, AND UNDERPINNING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Design of bracing, shoring, and underpinning.

B. Selection of construction sequence.

C. Temporary bracing of the structure or portions of the structure as required to prevent the structure from becoming unsafe during construction.

D. Temporary shoring of portions of the structure as required to prevent the structure from becoming unsafe during construction.

E. Temporary shoring of excavations.

F. Construction and removal of all posts, timbers, lagging, braces, etc. required in connection with bracing, shoring, and underpinning the structure during construction.

G. Excavation, concrete placement and backfilling required in connection with underpinning foundations.

1.02 RELATED REQUIREMENTS

A. Section 03 80 00 - Drilling, Sawcutting and Removal of Concrete

B. Section 03 30 00 - Cast-in-Place Concrete

1.03 SUBMITTALS

A. General Requirements

1. See Section 01 33 00 - Submittals.

2. The working drawings will be reviewed only in so far as the details affect the character of the finished work, but the details of design will be left to the contractor who must be responsible for the successful construction of the work. The working drawings and calculations will not be reviewed for completeness or adequacy.

3. It is expressly understood that review of the contractor's working drawings must not relieve the contractor of any of his responsibility under the contract for the successful completion of the work in conformance with the plans and specifications.

4. No work related to bracing, shoring, or underpinning must take place until the Contractor has received reviewed working drawings as required below.

B. Working Drawings

1. The working drawings must show layout, size of members, connection details, and construction sequence for all bracing and shoring systems. The working drawings must also show width, depth, reinforcing steel details, and construction sequence for underpinning of foundations.

1.04 QUALITY ASSURANCE

A. Codes and Standards: Comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified.

1. California Building Code, current governing edition.

2. State of California Department of Transportation Standard Specifications, current governing edition and the Falsework Manual.

3. CAL-OSHA the Division of Occupational Safety and Health.

B. Qualifications: working drawings of any proposed bracing, shoring, and underpinning of the structure must be prepared, stamped, and signed by a registered Civil Engineer of the State of California.

C. Design Requirements:

1. General: The stability and integrity of the structure during construction must be maintained at levels generally acceptable within the construction industry by the use of bracing, shoring, and underpinning. In no case must the structure be allowed to become unsafe during construction as defined by the local governing jurisdiction.

2. Bracing and shoring for the structure:

a. The bracing and shoring systems required to provide temporary support of the structure or portions of the structure during construction must be designed to support the dead, live, soil, earthquake and wind loads that may be imposed on the structure during construction in accordance with industry standards and generally accepted engineering principles.

b. In no case must the structure or portions of the structure be allowed to become unsafe during construction as defined by the local governing jurisdiction.

c. The proposed bracing and shoring systems must have foundations which are designed for allowable soil bearing pressures in accordance with the geotechnical investigation prepared for the project.

3. Shoring of excavations and underpinning:

a. The proposed shoring and underpinning systems must be designed for earth pressures and allowable soil bearing values as applicable in accordance with the geotechnical investigation prepared for the project.

b. Where applicable, to account for surcharge due to traffic, shoring must be designed for the equivalent of a 2-foot soil surcharge.

c. The shoring system must be free standing and not derive its support from struts to the existing structure or portions thereof.

d. Where the shoring system interferes with, blocks, or forces removal of the existing surface drainage facilities, temporary facilities must be provided to intercept surface drainage and carry it to existing storm facilities.

1.05 PERMITS

A. The Contractor must be responsible for obtaining and paying for any permits required prior to construction of the bracing, shoring, and underpinning systems.

PART 2 - PRODUCTS

2.01 MATERIALS FOR SHORING AND BRACING

A. Materials for shoring and bracing must be undamaged, high quality materials.

2.02 CONCRETE FOR UNDERPINNING

A. Concrete for underpinning must meet the requirements of Section 03 30 00, "Cast-in-Place Concrete," of these specifications.

PART 3 - EXECUTION

3.01 CONSTRUCTION

A. Construction of bracing, shoring and underpinning must be in accordance with the reviewed drawings prepared by the Contractor's Engineer.

3.02 REMOVAL OF BRACING AND SHORING

A. Bracing and shoring must not be removed until all new members have acquired sufficient strength to support their weight and the loads superimposed thereon safely. In no case may any bracing or shoring be removed until the time and sequence has been approved by the Engineer responsible for bracing and shoring and reviewed by the Design Engineer.

B. In general, bracing and shoring of concrete must remain in place for at least ten (10) days and until the concrete has achieved at least 80% of the 28-day compressive strength.

END OF SECTION 31 40 00

SECTION 03 80 00

DRILLING, SAWCUTTING AND REMOVAL OF CONCRETE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Drilling and coring of concrete.

B. Sawcutting concrete.

C. Removing concrete.

1.02 RELATED REQUIREMENTS

A. Section 31 40 00 - Bracing, Shoring, and Underpinning

B. Section 03 20 00 - Concrete Reinforcing

C. Adhesive Doweling; Section 03701

D. Section 05 12 00 - Structural Steel Framing

PART 2 - PRODUCTS

2.01 SEE OTHER PORTIONS OF SPECIFICATIONS

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

A. The Contractor must make provisions to control dust, residue and water from drilling and sawcutting operations by vacuum, water spray or other shield methods approved by the Architect. The Contractor must not allow water to enter the structure that may cause damage to any portion to remain.

3.02 DRILLING

A. Drilling of holes in concrete must be accomplished by drilling or coring. Contractor must protect existing reinforcing during all drilling and coring operations unless specifically directed otherwise by the contract drawings.

3.03 SAWCUTTING

A. No sawcutting of concrete must proceed until bracing, shoring, and underpinning has been installed and inspected as required by Section 31 40 00, "Bracing, Shoring, and Underpinning" of these specifications.

B. Sawcutting must be accomplished by diamond tip blades and must be made to the lines and dimensions as shown on the drawings. No overcutting will be allowed.

C. Provisions must be made to remove the sawcut portions of masonry or concrete in such a way so as not to damage that portion of the masonry or concrete to remain and in no case must the masonry or concrete to be removed be allowed to free fall to the ground or other surface.

3.04 CLEAN UP

A. Clean up must be in accordance with the requirements of the General Conditions.

END OF SECTION 03 80 00

SECTION 03 90 00

POST-INSTALLED ANCHORING SYSTEMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Adhesive anchoring systems.

B. Expansion anchors.

C. Screw anchors.

1.02 RELATED REQUIREMENTS

A. Section 03 10 00 - Concrete Forming and Accessories.

B. Section 03 20 00 - Concrete Reinforcing.

C. Section 03 38 00 - Post-Tensioned Concrete

1.03 REFERENCE STANDARDS (Editions adopted by current governing California Building Code)

PART 2 - PRODUCTS

2.01 MATERIALS

A. Adhesive anchoring system

1. Adhesive anchoring system in concrete must be HILTI-HY 200 V3 (ESR-4878) or Simpson SET-3G (ESR-4057) or approved equal with a current ICC/IAPMO evaluation report.

B. Expansion anchors and screw anchors

1. Expansion anchors must be HILTI KWIK BOLT-TZ2 (ESR-4266), or approved equal with a current ICC/IAPMO evaluation report.

2. Screw anchors must be Simpson Titen HD (ESR-2713) or approved equal with a current ICC/IAPMO evaluation report.

PART 3 - EXECUTION

A. Anchor minimum edge distances defined by the current ICC/IAPMO evaluation report must be met at edges, control joints and cracks greater than 0.015 inches wide. Installation of anchors and adhesive including drilling, cleaning of holes and torque must be in accordance with the

current ICC/IAPMO evaluation report. Verify whether the evaluation report requires a maximum or minimum torque. Confirm torque with a torque wrench calibrated to the inspector's torque wrench. Post-installed anchors must be used only in applications permitted by the Evaluation Report. Anchors must use washer sized to prevent crushing of the attached member at installation torque.

B. Provide stainless steel anchors for exterior use or when exposed to weather or in chemically corrosive environments unless a specific corrosion resistant coating is noted on the Drawings.

C. If reinforcement is encountered during drilling, abandon and shift the hole location to avoid the reinforcement. Provide a minimum of 2 anchor diameters or 1 inch, whichever is larger, of sound concrete between the anchor and the abandoned hole. Fill the abandoned hole with non-shrink grout. If the anchor or dowel may not be shifted as noted above, the Engineer will determine a new location.

D. Adhesive Anchors:

1. Insert the anchor or dowel in the hole with a twisting motion to the required embedment depth. Do not pump the anchor or dowel in and out of the hole.

2. Wedge bars tight and centered in the hole with wooden wedges (golf tees) to hold it in place until the adhesive sets.

3. Adhesive anchoring systems in unreinforced brick masonry require screen tubes.

E. Expansion Anchors and Screw Anchors:

1. Install per the ICC/IAPMO report to the nominal embedment depth shown on the plans. Tightening of expansion anchors must not reduce the embedment below that specified on the plans by more than eight threads. Projecting portions of expansion anchors must not be cut off before inspection is complete.

END OF SECTION 03 90 00

SECTION 05 40 00

COLD FORMED METAL FRAMING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Formed steel stud exterior wall and interior wall framing.

B. Formed steel joist and purlin framing and bridging.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Grout under base plate, bearing plates and channels.

B. Section 05 12 00 - Structural Steel Framing.

C. Section 05 31 00 - Steel Deck.

1.03 REFERENCE STANDARDS (Editions adopted by current governing California Building Code)

A. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; American Institute of Steel Construction, Inc.

B. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute.

C. ASTM A36 - Standard Specification for Carbon Structural Steel.

D. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

E. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

F. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

G. ASTM A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

H. ASTM A1003 - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members

I. ASTM C955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases.

J. ASTM C1513 - 10 Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections

K. ASTM C1513 - Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.

L. AWS D1.1 - Structural Welding Code - Steel; American Welding Society.

M. AWS D1.3 - Structural Welding Code - Sheet Steel; American Welding Society.

N. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals.

B. Product Data

1. Provide Manufacturer's product information and installation instructions for each item of metal framing and accessories.

C. Shop Drawings

1. Show layout, spacing, sizes, thicknesses, and types of cold-formed metal framing, fabrication, fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment of other work.

1.05 QUALITY ASSURANCE

A. Codes and Standards: The fabrication and erection of cold-formed metal framing must comply with all the applicable provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:

1. AISI S100

2. AISC 303

3. AWS D1.3

4. AWS D1.1

B. Qualifications: Welding processes and welding operators must be qualified in accordance with AWS D1.1 and D1.3. Welders to be employed are to provide AWS certification for the type of welding necessary.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect metal framing units from rusting and damage.

B. Deliver to Project site in manufacturer's unopened containers or bundles, identified with name, brand, type and grade.

C. Store off ground in a dry ventilated space or protect with suitable waterproof covering.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Metal Framing, Connectors, and Accessories:

1. American Studco, Inc., Angeles Metal Systems, California Metal Systems, Inc., Consolidated Fabricators Corp., Design Shapes in Steel, Dietrich Industries, Inc., Knorr Steel Framing Systems, The Steel Network, Inc., Unimast, Inc., United Construction Supply, Western Metal Lath Co. or approved equal.

2.02 FRAMING MATERIALS

A. Base metal for all members and accessories: Unless otherwise noted, ASTM A1003 steel sheet, galvanized in accordance with ASTM A653 G60 coating.

1. Structural Grade 33 type H for 33 mil and 43 mil members.

2. Structural Grade 50 type H for 54 mil and thicker members.

B. Tracks: Unless otherwise noted, ASTM C955; Manufacturer's standard U-shaped (T type) steel track, unpunched, with straight flanges (unstiffened flanges).

1. Size: Match steel studs.

2. Gage: Match steel studs (54 mil minimum thickness).

C. Studs: Unless otherwise noted, ASTM C955; Manufacturer's standard C-shaped (S type) steel studs, punched with minimum 1-5/8 inch lipped flanges (stiffened flanges) unless noted otherwise on plans.

1. Gage and size: As indicated on the drawings.

D. Headers: Manufacturer's standard C-shapes (S type) used to from header beams, punched, with minimum 1-5/8 inch lipped flanges (stiffened flanges) unless noted otherwise on plans.

1. Gage and size: As indicated on the drawings.

E. Joists and Purlins: ASTM C955; Manufacturer's standard C-shaped (S type) steel studs, with minimum 1-5/8 inch lipped flanges (stiffened flanges) unless noted otherwise on plans.

1. Gage and size: As indicated on the drawings.

2.03 ACCESSORIES

A. Framing Connectors: Factory-made formed steel sheet, thickness determined for conditions encountered, finish to match framing components and factory punched holes.

B. Structural Steel Shapes and Clips: ASTM A36, zinc coated by the hot-dip process according to ASTM A123.

C. Bracing, Furring, Bridging: Formed steel sheet, thickness determined for conditions encountered; finish to match framing components.

D. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, with dry film containing a minimum of 94% zinc dust by content, complying with VOC limitations of authorities having jurisdiction.

2.04 FASTENERS

A. Self-Drilling, Self-Tapping Screws: ASTM C1513, Screws may be Grabber, Hilti, Simpson Strong-Tie, or approved equal with application and installation in accordance with the manufacturer’s recommendations. For exterior use in a low-corrosivity environment, only Hilti S-MD KF, Simpson XE self-drilling screws or approved equal may be used. For more severe exposure, only Simpson XE self-drilling screws or approved equal may be used.

B. Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153.

C. Power-Actuated Fastener (PAF): Hilti X-U fastener (ESR-2269) or approved equal for dry-interior use and Hilti X-CR (ESR-1663) or approved equal for exterior use. Install per current ICC/IAPMO report and Manufacturer's recommendations.

D. Welding and Electrodes: In conformance with AISI Manual, AWS D1.1 and AWS D1.3.

E. Slide Clips: Unless otherwise noted, Simpson Strong-Tie bypass or head clips, or approved eaqual, capable of accommodating 1/2 inch (upward and downward) vertical displacement and/or 1/2 inch lateral drift of structural roof or floor using slotted holes, screws and anti-friction bushings, while maintaining structural performance of framing. Products must have a valid ICC/ IAPMO evaluation report.

2.05 GROUT

A. As specified in Section 03 30 00.

2.06 FABRICATION

A. Fabricate cold-formed metal framing and accessories plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations and ASTM C1007 requirements except where more stringent requirements are shown or specified.

1. Fabricate framing assemblies in jig templates.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or distortion.

C. Fabrication Tolerances: Fabricate assemblies to a maximum allowable tolerance variation per ASTM C1007.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements, including installation tolerances and other conditions affecting performance of cold-formed metal framing. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARARTION

A. Grout bearing surfaces uniform and level to ensure full contact of bearing flanges or track webs on supporting concrete or masonry construction.

3.03 INSTALLATION OF STUDS

A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements except where more stringent requirements are shown or specified.

B. Cold-formed metal framing may be shop or field fabricated for installation or it may be field assembled.

C. Install framing members in one-piece lengths, unless splice connections are indicated for track or tension members.

D. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

E. Erection Tolerances: Install cold-formed metal framing to a maximum allowable tolerance variation per ASTM C1007.

F. Install continuous top and bottom tracks. Align tracks accurately and securely anchor at corners and ends, and at 24-inches on center for powder-driven anchors, 32-inches on center for expansion anchors unless noted otherwise on contract drawings.

G. Set studs plumb, except as required for diagonal bracing for nonplumb walls or warped surfaces.

H. Align studs vertically where wall framing continuity is interrupted by floor framing. Where studs cannot be aligned, continuously reinforce track to transfer loads.

I. Anchor studs abutting structural columns or walls to supporting structure.

J. Install headers over wall openings wider than the stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes, complete with clip-angle connectors, web stiffeners, or gusset plates.

1. Frame wall openings with not less than a double stud at each jamb of frame.

2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full height wall studs.

K. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, furnishings, and similar work requiring attachment to framing.

L. Install slide clips or deep leg track where studs are attached to building structure to allow for building floor or roof deflection without transmitting forces to metal studs.

M. Install horizontal bridging in stud system, spaced in rows not more than 48-inches apart. Fasten at each stud intersection.

N. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall framing system.

3.04 FABRICATED WALL PANEL INSTALLATION

A. Install fabricated wall panels and securely anchor to supporting structure.

B. Erection Tolerances: Bolt or weld wall panels at horizontal and vertical junctures to produce flush, even, true to line joints.

1. Maximum variation in plane and true position between prefabricated assemblies must not exceed 1/16-inch.

3.05 REPAIRS AND PROTECTION

A. Galvanizing Repair: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A780.

B. Provide final protection and maintain conditions in a manner acceptable to manufacturer and installer to ensure that cold formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 40 00

SECTION 084113
ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Storefront framing.
2. Curtain wall framing.
3. Exterior manual-swing entrance doors.

B. Related Sections:

1. Division 08 - "Glazing" Section for glass for glazing of aluminum storefront systems.
2. Division 08 - "Door Hardware" Section for door hardware aluminum entrance doors.

1.3 PERFORMANCE REQUIREMENTS

A. Wind Loading: Provide assemblies capable of resisting Exposure C, 70 mph basic wind speed and capable of withstanding a uniform pressure of 20 psf inward and 20 psf outward minimum when tested in accordance with ASTM E 330.

B. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of not more than 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft.

C. Water Penetration: Provide framing systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.

D. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from a maximum change (range) in ambient temperature of 120 degrees F and surface temperature change of 180 degrees F.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.

B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.

1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.

C. Governing Agency Deferred Approval: Where projects are governed by the Division of the State Architect, storefront window system member spans greater than 10 feet are to have the design of framing members reviewed and approved by the Division of the State Architect through a Deferred Approval.

1. Window system Deferred Approval submittal shall include necessary shop drawings, details, and structural calculations prepared, stamped, and signed by a structural engineer licensed in the State of California. The storefront supplier or installer shall be responsible for the design and engineering calculations and drawings, and shall be responsible for responding to and resolving any comments from the DSA.
2. The Deferred Approval submittal shall be submitted to the Architect through the General Contractor. The Architect will transmit the Deferred Approval submittal to the Division of the State Architect.

D. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.

F. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

G. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.

C. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines, ICC/ANSI A117.1, and the California Building Code.

D. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.

E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code - Aluminum."

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide indicated products as manufactured by the EFCO Corporation.

1. Subject to compliance with requirements, provide products indicated or comparable products by one of the following:

a. Kawneer North America; an Alcoa company.
b. United States Aluminum.
c. Vistawall Architectural Products; The Vistawall Group; a Bluescope Steel company.

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B 209.
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Structural Profiles: ASTM B 308/B 308M.
5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 FRAMING SYSTEMS

A. General: Manufacturer's standard extruded-aluminum framing members of type and size indicated and as required to support imposed loads.

B. Storefront Framing:

1. Basis of Design: EFCO, 403-I Thermally Improved Series Storefront framing.

a. Size: 2-1/4 by 4-1/2 inches.
b. Wall Thickness: Not less than 0.125 inches.
c. Glazing: Center glazed, glazing may be installed from inside or outside, glazing thickness as indicated on drawings.
d. Thermal Conductance: U-factor of not more than 0.65 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.
e. Finish: Clear anodized

C. Curtain Wall Framing:

1. Basis of Design: EFCO, 5600 Series Thermally Improved Curtain wall framing.

a. Size: 2-1/4 by 6 inches.
b. Wall Thickness: 0.093 inch to 0.125 inch.
c. Glazing: Glazing thickness as indicated on drawings.
d. Thermal Conductance: U-factor of not more than 0.49 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.
e. Finish: Clear anodized

D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

E. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.
3. Where fasteners must be exposed, use countersunk Phillips flat head screws finished to match framing system or fabricated from stainless steel.

F. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

G. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.

2.4 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation fabricated from extruded-aluminum tubular stiles rails.

1. Basis of Design: EFCO, Series D518 DuraStile, Heavy Duty, Wide Stile Entrance Doors.

a. Width and Height: As indicated on Drawings.
b. Overall Thickness: 2-inches.
c. Material Thickness: 0.188 inch thick, extruded-aluminum tubular rail and stile members
d. Stiles: 5 inches wide.
e. Top Rail: 6 inches wide minimum.
f. Mid Rail: 7-1/2 inches, provide where indicated on drawings.
g. Bottom Rail: 10 inches wide minimum.
h. Glazing: As indicated on Drawings.
i. Finish: Clear anodized

B. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.

1. Provide nonremovable glazing stops on outside of door.

C. Entrance Door Hardware: As specified in Division 08 Section "Door Hardware."

2.5 GLAZING SYSTEMS

A. Glazing: As specified in Division 08 Section "Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

2.6 ACCESSORY MATERIALS

A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants."

B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil thickness per coat.

2.7 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
4. Physical and thermal isolation of glazing from framing members.
5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
6. Provisions for field replacement of glazing from interior.
7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Storefront Framing: Fabricate components for assembly using shear-block system.

F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. At exterior doors, provide compression weather stripping at fixed stops.

G. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
2. At exterior doors, provide weather sweeps applied to door bottoms.

H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
6. Seal joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

D. Set continuous sill members and flashing in full sealant bed as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

E. Install components plumb and true in alignment with established lines and grades, and without warp or rack.

F. Install glazing as specified in Division 08 Section "Glazing."

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

H. Install perimeter joint sealants as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

3.3 ERECTION TOLERANCES

A. Install aluminum-framed systems to comply with the following maximum erection tolerances:

1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.
2. Alignment:

a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch.
b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.

B. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

3.4 FIELD QUALITY CONTROL

A. Testing: Testing and inspecting of representative areas of installed work shall take place as follows.

1. Testing shall be performed by the Contractor in the presence of the Owner's Inspector. The Owner's Inspector shall be responsible for observing and reporting results of testing.

2. Water Spray Test: Before installation of interior finishes has begun, areas designated by the Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.

a. Test Area: A minimum area of 75 square feet of aluminum-framed systems for each building.

B. Repair or remove work if test results and inspections indicate that it does not comply with specified requirements.

C. Inspection Reports: Inspection reports shall be prepared by the Owner's Inspector.

3.5 ADJUSTING

A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer and as specified in Division 8 Section "Door Hardware."

END OF SECTION 084113

SECTION 087100
DOOR HARDWARE

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions of Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.

B. This Section includes the following, but is not necessarily limited to:

1. Door Hardware, including electric hardware.
2. Storefront and Entrance door hardware.
3. Gate Hardware.
4. Digital keypad access control devices.
5. Hold-open closers with smoke detectors.
6. Wall or floor-mounted electromagnetic hold-open devices.
7. Power supplies for electric hardware.
8. Low-energy door operators plus sensors and actuators.
9. Cabinet locks & padlocks.
10. Thresholds, gasketing and weather-stripping.
11. Door silencers or mutes.

1.03 REFERENCES (Use date of standard in effect as of Bid date.)

A. ADAAG - Americans with Disabilities Act (ACT) Accessibility Guidelines for Buildings and Facilities.

B. BHMA - Builders' Hardware Manufacturers Association.

C. CCR - California Code of Regulations, Tile 24, Part 2, California State Accessibility Standards.

D. DHI - Door and Hardware Institute.

E. NFPA - National Fire Protection Association.

1. NFPA 80 - Fire Doors and Windows
2. NFPA 101 - Life Safety Code
3. NFPA 105 - Smoke and Draft Control Door Assemblies

F. CBC - California Building Code.

G. UL - Underwriters Laboratories.
    1. UL 10C - Fire Tests of Door Assemblies
    2. UL 305 - Panic Hardware

H. WHI - Warnock Hersey Incorporated

I. SDI - Steel Door Institute

1.04 SUBMITTALS & SUBSTITUTIONS

A. General: Submit in accordance with Conditions of the Contract and Division 1 Specification sections.

B. Submit product data (catalog cuts) including manufacturers' technical product information for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

C. Submit six (6) copies of schedule organized vertically into “Hardware Sets” with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:

    1. Type, style, function, size and finish of each hardware item.
    2. Name, part number and manufacturer of each item.
    3. Fastenings and other pertinent information.
    4. Location of hardware set coordinated with floor plans and door schedule.
    5. Explanation of all abbreviations, symbols and codes contained in schedule.
    6. Mounting locations for hardware.
    7. Door and frame sizes and materials.
    8. List of manufacturers used and their nearest representative with address and phone number.
    9. Keying information.

D. Make substitution requests in accordance with Division 1. Substitution requests must be made prior to bid date. Include product data and indicate benefit to the project. Furnish samples of any proposed substitution.

E. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

F. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

G. Furnish as-built/as-installed schedule with close-out documents, including keying schedule, wiring/riser diagrams, manufacturers’ installation, adjustment and maintenance information.

1.05 QUALITY ASSURANCE

A. Obtain each type of hardware (latch and lock sets, hinges, closers, exit devices, etc.) from a single manufacturer.

B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.

1. Responsible for detailing, scheduling and ordering of finish hardware.
2. Meet with Owner to finalize keying requirements and to obtain final instructions in writing.
3. Stock parts for products supplied and be capable of repairing and replacing hardware items found defective within warranty periods.

C. Hardware Installer: Company specializing in the installation of commercial door hardware with five years documented experience.

D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the Hardware Schedule or not.

1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide UL label on exit devices indicating "Fire Exit Hardware".

E. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.

1.06 DELIVERY, STORAGE AND HANDLING

A. Coordinate delivery of packaged hardware items to the appropriate locations (shop or field) for installation.

B. Hardware items shall be individually packaged in manufacturers’ original containers, complete with proper fasteners. Clearly mark packages on outside to indicate contents and locations in hardware schedule and in work.

C. Provide locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, etc.

D. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

E. Ship all permanent keys, cylinders and/or cores directly from lock manufacturer to Owner.

1.07 WARRANTY

A. Provide warranties of respective manufacturers’ regular terms of sale from day of final acceptance as follows:

1. Closers: Ten (10) years, except electronic closers which shall be two (2) years.
2. Exit devices: Three (3) years.
3. Locksets: Seven (7) years

4. All other hardware: Two (2) years.

1.08 MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

1.09 PRE-INSTALLATION CONFERENCE

A. Convene a pre-installation conference at least one week prior to beginning work of this section.

B. Attendance: Architect, Construction Manager, Contractor, hardware supplier, installer, key District personnel, and Project Inspector.

C. Agenda: Review hardware schedule, products, installation procedures and coordination required with related work. Review District's keying standards.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

	Item	Manufacturer	Match Existing Standards
A.	Hinges	Ives	Matches existing standard
B.	Locks, Latches & Cylinders	Schlage	Matches existing standard
C.	Exit Devices	Von Duprin	Matches existing standard
D.	Closers	LCN	Matches existing standard
E.	Push, Pulls & Protection Plates	Ives	Matches existing standard
F.	Flush Bolts	Ives	Matches existing standard
G.	Dust Proof Strikes	Ives	Matches existing standard
H.	Coordinators	Ives	Matches existing standard
I.	Stops	Ives	Matches existing standard
J.	Thresholds	National Guard	Pemko
K.	Seals & Bottoms	National Guard	Pemko

2.02 MATERIALS

A. Continuous Hinges: As manufactured by Ives. UL rated as required.

B. Heavy Duty Cylindrical Locks and Latches: Schlage "ND" Series as scheduled with "Rhodes" Lever design fastened with through-bolts.

1. Chassis: Cylindrical design, zinc plated for corrosion-resistance.
2. Latch Bolt: Steel, ½" (12mm) throw, deadlocking on keyed and exterior functions. ¾" (19mm) throw anti-friction latch available for pairs of fire doors.
3. Faceplate: Brass, bronze or stainless steel. 1-1/8" x 2-1/4" square corner, beveled.
4. Lever Trim: Accessible design, pressure cast zinc, plated to match finish symbols. Roses: brass
5. Locks shall be of such construction that when locked, the door may be opened from within by using lever and without the use of a key or special knowledge.
6. Vandlgard Function: 7 year warranty, outside lever is disengaged when in the locked mode.
7. Rosettes: Minimum 3-7/16" diameter for coverage of ANSI/DHI A115.18, 1994 door preparation, through-bolt lugs on both spring cages to fully engage this pattern.
8. Springs: Full compression type.
9. Strikes: 16 gage curved steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.

C. Exit devices: Von Duprin as scheduled with push-through pad design, no exposed touch bar fasteners, no exposed cavities when operated.

1. Provide certificate by independent testing laboratory that device has completed over 1,000,000 cycles and can still meet ANSI/BHMA A156.3 - 1994 standards.
2. All internal parts shall be of cold-rolled steel with zinc dichromate coating.
3. Mechanism case shall have an average thickness of .140".
4. Compression spring engineering.
5. Non-handed basic device design with center case interchangeable with all functions.
6. All devices shall have quiet return fluid dampeners.
7. All latchbolts shall be deadlocking with ¾" throw and have a self-lubricating coating to reduce friction and wear.
8. Device push bar must release when a force of 32 pounds, or less, of pressure is applied when a force of 250 pounds is applied to the door.
9. Device shall bear UL label for fire and or panic as may be required.
10. All surface strikes shall be roller type and utilize a plate underneath to prevent movement.
11. Lever Trim: "Breakaway" design, forged brass or bronze escutcheon with a minimum of .130" thickness, match lockset lever design.
12. Removable Mullions: Removable with single turn of building key. Securely reinstalled without need for key.
13. Furnish glass bead kits for vision lites where required.
14. All Exit Devices to be sex-bolted to the doors.
15. Panic Hardware shall comply with **CBC 11B-404.2.7 Door and Gate hardware,** mounted between 30" and 44" above the finished floor surface. The unlatching force shall not exceed 15 lbs. applied in the direction of travel. Panic hardware shall comply with CBC Section **1010.2.9 Panic and Exit Hardware**

D. Closers: LCN as scheduled. Place closers inside building, stairs, room, etc.

1. Door closer cylinders shall be of high strength cast iron construction with double heat treated pinion shaft to provide low wear operating capabilities of internal parts throughout the life of the installation. All door closers shall be tested to ANSI/BHMA

A156.4 test requirements by a BHMA certified testing laboratory. A written certification showing successful completion of a minimum of 10,000,000 cycles must be provided.

2. All door closers shall be fully hydraulic and have full rack and pinion action with a shaft diameter of a minimum of 11/16 inch and piston diameter of 1 inch to ensure longevity and durability under all closer applications.
3. All parallel arm closers shall incorporate one piece solid forged steel arms with bronze bushings. 1-9/16" steel stud shoulder bolts, shall be incorporated in regular arms, hold-open arms, arms with hold open and stop built in. All other closers to have forged steel main arms for strength, durability, and aesthetics for versatility of trim accommodation, high strength and long life.
4. All parallel arm closers so detailed shall provide advanced backcheck for doors subject to severe abuse or extreme wind conditions. This advanced backcheck shall be located to begin cushioning the opening swing of the door at approximately 45 degrees. The intensity of the backcheck shall be fully adjustable by tamper resistant non-critical screw valve.
5. Closers shall be installed to permit doors to swing 180 degrees.
6. All closers shall utilize a stable fluid withstanding temperature range of 120 degrees F. to -30 degrees F. without requiring seasonal adjustment of closer speed to properly close the door.
7. Drop brackets are required at narrow head rails.
8. Maximum effort to operate doors shall not exceed 5 lbs. for exterior doors and 5 lbs. for interior doors, such pull or push effort being applied at right angles to hinged doors. Compensating devices or automatic door operators may be utilized to meet the above standards. When fire doors are required, the maximum effort to operate the door may be increased to min. allowable by appropriate admin authority not to exceed 15 lbs. 11B-404.2.9 All closers shall be adjusted to operate with the minimum amount of opening force and still close and latch the door. Reference CBC 11B -404.2.8.1;11B-404.2.9. Doors closers and gate closers shall be adjusted so that from an open position of 90 degrees the time required to move the door to a postion of 12 degrees from the latch is 5 seconds minimum. Doors and gates with spring hinges shall be adjusted and maintained per CBC 11B-404.2.8.2 so that from the open position of 70 degrees , the door shall move to the closed position in 1.5 seconds.
9. Provide sex-bolted or through bolt mounting for all door closers.

E. Flush Bolts & Dust Proof Strikes: Ives as scheduled.

1. Automatic Flush Bolts shall be of the low operating force design. Utilize the top bolt only model for interior doors where applicable and as permitted by testing procedures.
2. Manual flush bolts only permitted on storage or mechanical openings as scheduled.
3. Provide dust proof strikes at openings using bottom bolts.

F. Coordinators: Ives as scheduled.

1. Coordinator shall be a 1-5/8" wide by 5/8" high aluminum channel with the length variable to the door opening. It shall have a safety mechanism which will allow the active door to close first if under extreme pressure.

G. Door Stops: Ives as scheduled.

1. Unless otherwise noted in Hardware Sets, provide wall type with appropriate fasteners. Where wall type cannot be used, provide floor type. If neither can be used, provide overhead type.
2. Do not install floor stops more than four (4) inches from the face of the wall or partition 11B-307.2

3. Overhead stops shall be made of stainless steel and non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.

H. Protection Plates: Fabricate either kick, armor, or mop plates with four beveled edges. Provide kick plates 10" high and 2" LDW. Sizes of armor and mop plates shall be listed in the Hardware Schedule. Furnish with machine or wood screws of bronze or stainless to match other hardware.

I. Lock Protectors: Lock astragals shall be provided with internally threaded fasteners for flat head machine screws. No hex head or carriage bolt fasteners will be permitted. Must be through bolted to door.

J. Thresholds: As Scheduled and per details.

1. Thresholds shall not exceed 1/2" in height, with a beveled surface of 1:2 maximum slope.
2. Set thresholds in a full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements in Division 7 “Thermal and Moisture Protection”.
3. Use ¼” fasteners, red-head flat-head sleeve anchors (SS/FHSL).
4. Thresholds shall comply with CBC Section 11B-404.2.5

K. Seals: Sponge silicone gasketing to meet ASTM E 283-1984 test standards. Provide silicone gasket at all rated and exterior doors. All fire rated openings are to be in compliance with NFPA 252 and UL 10C.

L. Rain Drips: Provide rain drips at the heads of all exterior doors where there is not enough overhang to protect the opening.

M. Door Shoes & Door Top Caps: Provide door shoes at all exterior wood doors and top caps at all exterior out-swing doors.

N. Silencers: Furnish silencers for interior hollow metal frames, 3 for single doors, 2 for pairs of doors. Omit where sound or light seals occurs, or for fire-resistive-rated door assemblies.

2.03 KEYING

A. Furnish a Grand Master, Master, keyed alike or keyed different system as directed by the Owner or Architect. School District to verify Schlage Everest “D” Keyways.

B. Provide construction keying for doors requiring locking during construction; remove temporary inserts immediately prior to Owner occupancy. Furnish permanent keys directly to Owner.

C. Key Blanks: Standard "6" pin bow key blank; tag to identify.

D. Supply keys and blanks as follows:

1. Supply 2 cut change keys for each different change key code.
2. Supply 1 uncut key blank for each change key code.
3. Supply 6 cut master keys for each different master key set.
4. Supply 3 uncut key blanks for each master key set.

2.04 FINISHES

A. Generally to be satin chromium US26D (626) unless otherwise noted.

B. Furnish push plates, pull plates and kick or armor plates in satin stainless steel US32D (630) unless other wise noted.

C. Door closers shall be powder-coated to match other hardware, unless otherwise noted.

D. Aluminum items to be finished anodized aluminum US28 (628), except thresholds which can be furnished as standard mill finish.

2.05 FASTENERS

A. Screws for strikes, face plates and similar items shall be flat head, countersunk type, provide machine screws for metal and standard wood screws for wood.

B. Screws for butt hinges shall be flathead, countersunk, full-thread type.

C. Fastening of closer bases or closer shoes to doors shall be by means of sex bolts and spray painted to match closer finish.

D. Provide expansion anchors for attaching hardware items to concrete or masonry.

E. All exposed fasteners shall have a phillips head.

F. Finish of exposed screws to match surface finish of hardware or other adjacent work.

G. All Exit Devices and Lock Protectors shall be fastened to the door by the means of sex bolts or through bolts.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify that doors and frames are square and plumb and ready to receive work and dimensions are as instructed by the manufacturer.

B. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and requirements of DHI.

B. Use the templates provided by hardware item manufacturer.

C. Mounting heights for hardware shall be as recommended by the Door and Hardware Institute. Operating hardware will to be located between 30" and 44" AFF. Per CBC Section 11B-402.2.7

D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units that are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

F. Set thresholds for exterior doors in full bed of butyl-rubber sealant.

G. If hand of door is changed during construction, make necessary changes in hardware at no additional cost.

3.03 ADJUST AND CLEAN

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

B. Clean adjacent surface soiled by hardware installation.

C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

D. Instruct Owner's Personnel in proper adjustment and maintenance of hardware finishes, during the final adjustment of hardware.

E. Continued Maintenance Service: Approximately six months after the completion of the project, the Contractor accompanied by the Architectural Hardware Consultant, shall return to the project and re-adjust every item of hardware to restore proper functions of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

3.04 HARDWARE LOCATIONS

A. Conform to CCR, Title 24, Part 2, and ADAAG for positioning requirements for persons with disabilities. Operating hardware to be mounted between 30” and 44” above finished floor.

3.05 FIELD QUALITY CONTROL

A. Architectural Hardware Consultant (AHC) to inspect installation and certify that hardware and its installation have been furnished and installed in accordance with manufacturer's instructions and as specified herein.

3.06 SCHEDULE

A. The items listed in the following schedule shall conform to the requirements of the foregoing specifications.

B. The Door Schedule on the Drawings indicates which hardware set is used with each door.

General Specification
Manufacturers Abbreviations (Mfr.)

GLY	=	Glynn-Johnson Corporation	Overhead Stops
IVE	=	Ives	Hinges, Protection Plates, & Stops
LCN	=	LCN	Door Closers
NGP	=	National Guard Products	Thresholds, Gasketing & Weatherstrip
SCH	=	Schlage Lock Company	Locks, Latches & Cylinders
VON	=	Von Duprin	Exit Devices & Mullions

SPECWORKS # 54205-B62W427XV

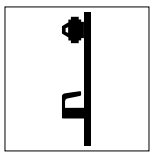
HW SET: 01 EXTERIOR PAIR / MULLION AND PANIC HARDWARE MAIN ENTRY

DOOR MARK: D1 D9

EACH TO HAVE:

2	EA	CONTINUOUS HINGE	112HD	628	IVE
1	EA	MULLION	KR4954	689	VON
1	EA	PANIC HARDWARE	CD99DT	626	VON
1	EA	PANIC HARDWARE	CD99NL	626	VON
1	EA	RIM CYLINDER	20-057T	626	SCH
1	EA	MORTISE CYLINDER	20-061T (FOR KR)	626	SCH
2	EA	MORTISE CYLINDER	20-061T X XQ11-948 (FOR CD)	626	SCH
4	EA	CORE ONLY	23-030 EVEREST "D"	626	SCH
2	EA	SURFACE CLOSER	4041 (PUSH SIDE MOUNT)	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
2	EA	FLOOR STOP & HOLDER	FS43	626	IVE
1	SET	WEATHER SEAL	SUPPLY WITH DOOR AND FRAME ASSEMBLY		
2	EA	DOOR SWEEP	200NA	AL	NGP
1	EA	THRESHOLD	896V	AL	NGP

NOTE: VERIFY THRESHOLD DETAIL WITH THRESHOLD SPECIFIED.



LNL Lever, night latch

KNL Knob, night latch

- Key retracts latchbolt
- Rim and 1 ¼" mortise cylinder
- Handed, reversible lever

HW SET: 02 INTERIOR / COMMUNICATING DOOR CONNECTING TO SHOP & STORAGE

DOOR NUMBER: D3

EACH TO HAVE:

3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	652	IVE
1	EA	STORE LOCK	ND66PD RHO	626	SCH
1	EA	DOME STOP	FS436	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	SURFACE CLOSER	4041 (PUSH SIDE MOUNT)	689	LCN

HW SET: 03 INTERIOR / OFFICE

DOOR NUMBER: D4,D6,D7,D8,D10,D12

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	OFFICE LOCK	ND50PD RHO	626	SCH
1	EA	DOME STOP	FS436	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	SURFACE CLOSER	4041 (PUSH SIDE MOUNT)	689	LCN

HW SET: 04 INTERIOR / OFFICE TOILET

DOOR NUMBER: D5

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY SET	ND40S RHO	626	SCH
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DOME STOP	FS436	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 05

DOOR NUMBER: D2

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE LATCH	ND10S RHO	626	SCH
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DOME STOP	FS436	626	IVE
				GRY	IVE

112HD



Full mortise - narrow frame and door leaf

- For 1 3/4" doors
- Spread bearing design
- Non-handed for custom cut lengths
- Flush mounted, no inset
- 48" Maximum door width
- Beveled or square edge doors
- For doors weighing up to 450 pounds without reinforcing, 600 pounds with reinforcing

Specifications

Standard length	83", 85", 95", 120"
Standard mounting hardware	12-24 x 3/4" Steel self drilling/self tapping Phillips-head screw
Certifications	▪ Exceeds Grade 1 ANSI/BHMA 156.26 for 150lbs and 300lbs ▪ UL10C listed (90 min)

Options

EPT	Electric power transfer

Optional mounting hardware

SECHM	Security screws - hollow metal door and frame
SECWDHM	Security screws - 1/2 wood, 1/2 hollow metal
SECWDWD	Security screws - wood door and frame
TEKSWD	1/2 Self drill, self tap 1/2 wood
TF	Thread forming screws
WD	Wood door and frame

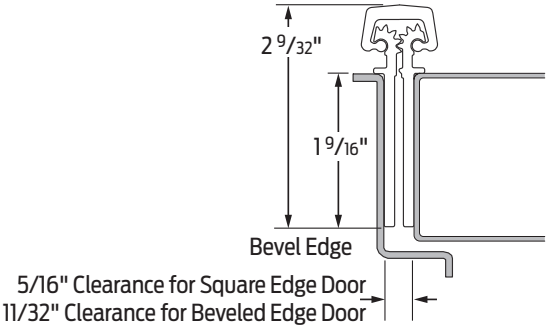
Finishes

BHMA	Description	Substrate	Finish
628	Clear Aluminum Anodized	Aluminum	US28
710	Dark Bronze Anodized	Aluminum	313AN
711	Black Anodized	Aluminum	315AN

Custom anodizing and painting are available, consult factory

For single door applications:

For pairs of doors see chart and general information.



ALLEGION™



VON DUPRIN®

98/99 Series

Exit devices



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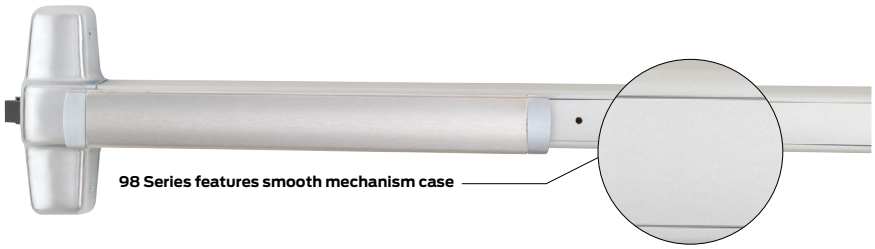
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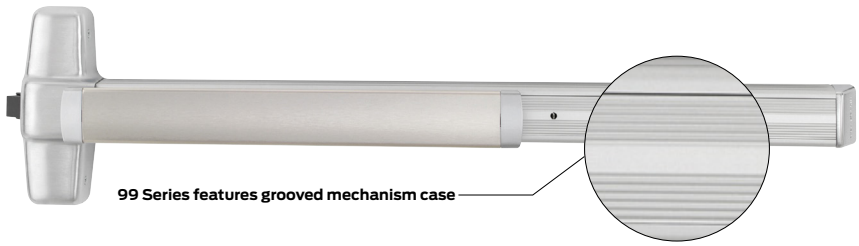


Engineered for value and performance

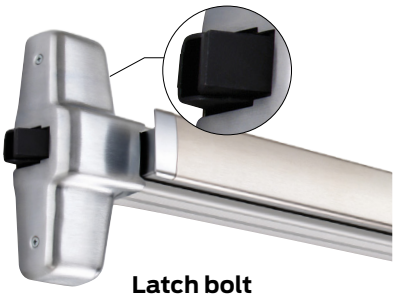
Von Duprin® empowers its customers to embrace change by providing flexible solutions that can be modified over time, protecting your investment well into the future. Von Duprin 98/99 Series push pad devices have a universal center case design that is unique to the industry and provides superior flexibility—from adding trim, switching handing or adding new retrofit options, you can configure numerous variations in the field without replacing your device.

Von Duprin's exit devices offer durable solutions that are proven in the field to perform under heavy use and abuse and backed by a team of experts experienced in door hardware application and code compliance. Allegion stands behind every Von Duprin product we make with unparalleled customer support thanks to our team of experts based in the U.S. that average more than 15 years of experience, so you are assured to receive expert advice.

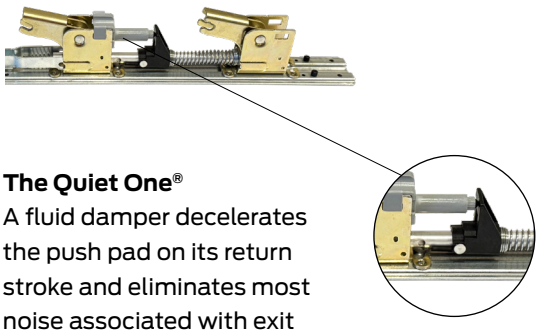




Von Duprin exit devices are available in two external surface styles, designated 98 and 99 Series.



Latch bolt
Deadlocking latch bolt provides security and improved performance at standard device cost.



The Quiet One®
A fluid damper decelerates the push pad on its return stroke and eliminates most noise associated with exit device operations. Furnished on all 98/99 Series exit devices.

Nomenclature – how to order

Prefix	Device series/type		Trim/ rating		Suffix/ finish		Door width	Handing	Less bottom rod/cable	Trim options/ finish	Optional strike/finish	Accessories	Other information
1	2	3	4	5	6	7	8	9	10	11	12	13	14
QEL	- 98	- 27	- L	- F	- —	- 626	- 3'	- RHR	- LBR	- 996-06/626	- 499F	- SNB	- HM

Detail

1 Prefixes

None	Standard
AX	Accessible device
CD	Cylinder dogging - panic only
CDSI	Cylinder dogging with security indicator
CI	Cylinder dogging indicator
CD-CX	Chexit cylinder dogging
CX	Chexit
DI	Dogging indicator
E	Electric locking mortise/lever
ESL	Emergency secure lockdown
FER	Fortified exit rim
HDSI	Hex dogging with security indicator
HH	Wind and impact
HW	Hurricane, wind only
LD	Less dogging
L-KC	Lever- key capture
LX	Latch bolt monitoring
LX-LC	Latch bolt monitoring, low current
LX-RX	Latch bolt monitoring, request to exit
LX-RX-LC	Latch bolt monitoring, request to exit low current
OUT	Outdoor defense
PL	Pullman latch
PN	Pneumatic latch retraction
QEL	Quiet electric latch retraction
QM	Quiet mechanical
RX	Request to exit
RX2	Double request to exit
RX-AUX	Request to exit, auxiliary
RX-LC	Request to exit, low current
SD	Special dogging -panic only
SS	Signal switch
WP-RX	Waterproof request to exit
WS-T	Windstorm (FEMA rated)
XP	Heavy protection - rim

2 Device series

98	Series 98-smooth
99	Series 99-grooved

3 Device type

None	Rim device
27	Surface mounted vertical rod device
47	Concealed vertical rod device
47WDC	Concealed vertical rod wood door device
48	Concealed vertical rod device
49	Concealed vertical cable device
50WDC	Concealed vertical cable wood door device
52	Rim device with remote trim input (pool exit hardware)
57	Three-point latch device
75	Mortise lock device

4 Trim functions

EO	For AD or CO locks, order the panic as Exit Only (EO)
DT	Dummy trim
EO	Exit only
HL	Hospital pull trim
K	Knob
K-BE	Knob - blank escutcheon
K-DT	Knob, rigid - dummy trim
K-NL	Knob, rigid - night latch
L	Lever (classroom)
L-BE	Lever - blank escutcheon
L-DT	Lever, rigid - dummy trim
L-KC	Lever - key capture
L-NL	Lever, rigid - night latch
NL	Night latch
NL-OP	Night latch cylinder assembly, optional pull
TL	Turn lever
TL-BE	Turn lever - blank escutcheon
TL-KC	Turn Lever - key capture
TP	Thumbpiece
TP-BE	Thumbpiece - blank escutcheon

5 Rating

F	Fire exit hardware
Blank	Panic exit hardware

6 Suffix

-2	Double cylinder (rim and mortise only)
-2SI	Double cylinder with security indicator (rim only)
CON	Connectors
WH	Weep holes

7 Finish

605	Bright brass
606	Satin brass
612	Satin bronze
619	Satin nickel
622/711	Matte black/Matte black, anodized
625	Bright chrome
626	Satin chrome
626AM	Satin chrome, antimicrobial
628	Aluminum, anodized
630	Satin stainless
630AM	Satin stainless, antimicrobial
643e	Aged bronze
693	Black paint
710	Dark brown, anodized

8 Door width

		Door thickness	
3'	Standard default	1 3/4"	Standard
4'		2 1/4"	Optional
2'	Vertical only		

9 Handing

LHR	Left hand reverse
RHR	Right hand reverse

10 Less bottom rod/cable

LBR	Less bottom rod
LBL	Less bottom latch
LBR-AFL	LBR with fire pin
LBL-AFL	LBL with fire pin

11 Trim options/finish

06	Standard default (optional levers available)

12 Optional strike/finish

See optional strikes/finish for each device type

13 Accessories

CYL	Cylinder
GBK	Glass bead kit
SEC	Security screws
SLM	SLM blocking
SNB	Sex bolts

14 Other information

Touchbar options

BRAILLE	Vision impaired touchpad, raised letter, and braille
PUSH	Touchbar trim embossed 'PUSH'
RSS	Red silk-screened lettered touchbar trim
KN	Knurled touchbar
SG	Safety glow

Miscellaneous

CE	CE labeled
LCP	Less cover plate
IOWDA	#IOWDA cover plate

Door material

AL	Aluminum door
HM	Hollow metal
WD	Wood door
CP	Composite door
INS2	Insulclad - 1/2"
INS4	Insulclad - 1/4"

Door application

D	Double egress
P	Pair of doors
S	Single door

Note: Not all options are listed. See the specific device type pages for complete options available.

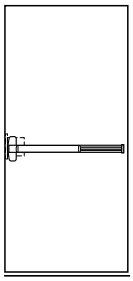
As the pioneer in the industry, Von Duprin continues to advance the industry through customer-centric innovation, which delivers solutions to the most challenging applications.

Backed by high quality standards, Von Duprin exit devices were among the first in the industry certified to ANSI/BHMA A156.3 Grade 1. Our exit devices are tested to the highest standards and proven in the field to perform under heavy use and abuse, giving you peace of mind both now and in the future.

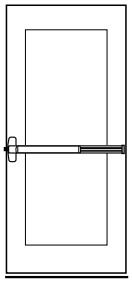
The versatile design can be easily upgraded to connect to a larger electronic ecosystem, empowering you to adapt with flexible solutions. You can configure numerous variations in the field without replacing your device and protecting your investment. This makes upgrades easy and cost-effective.

Popular applications

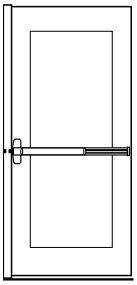
Single door applications



Single mortise lock device

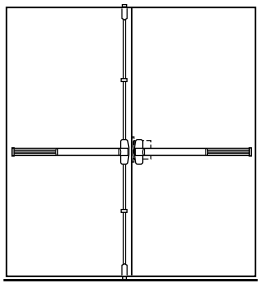


Single rim device

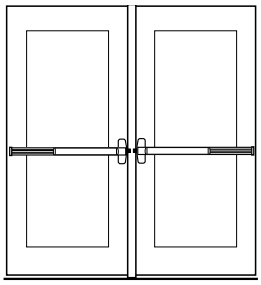


Single three-point latch device

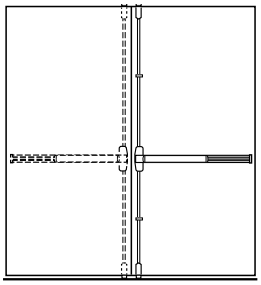
Double door applications



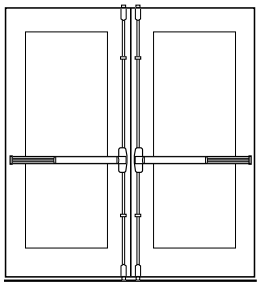
Mortise lock and surface mounted or concealed vertical cable/rod device combination—same direction



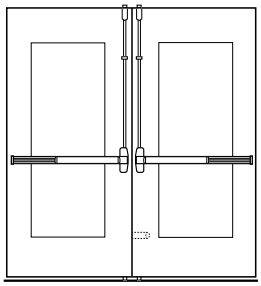
Two rim devices with mullion—same direction



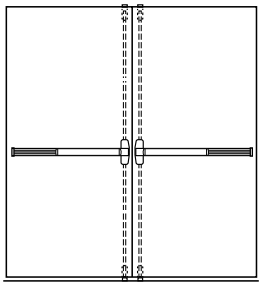
Two vertical rods—double egress
Two surface/concealed rods or cables



Two surface mounted vertical rod devices—same direction*



Two fire exit hardware vertical cables/rods with auxiliary fire latch-LBR option*



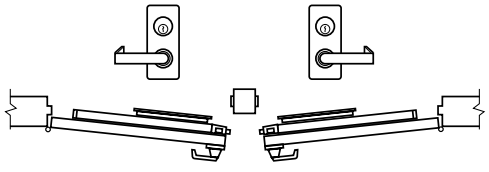
Two concealed vertical cables/rods*

* Do not use with overlapping astragals

Door handing

Left hand-reverse orientation

Right hand-reverse orientation



(Left hand-reverse)

Outside

(Right hand-reverse)

98/99 Rim exit device



98 and 99 rim exit devices for all types of single and double doors with mullion, UL listed for panic exit hardware. Devices are certified to ANSI/BHMA A156.3 Grade 1. The 98 device has a smooth mechanism case and the 99 device has a grooved case. The rim device is non-handed except when the following device options are used: SD (special dogging), -2 (double cylinder) or SS (signal switch). Covers stock hollow metal doors with 86 or 161 -2SI (double cylinder with security indicator) cutouts on single doors (may cover cutouts on pairs – consult template).

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device
Device lengths	3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 13/16" (1011mm) 39 11/16" (1008mm) with mullion
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Latch bolt	Deadlocking, 3/4" (19mm) throw
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) and 2 1/4" (57mm) thick metal or wood doors (Optional 425 SNB available, see page 66 for quantities)

Accessories



299 Strike
Ships standard,
optional strikes available.



Hex key dogging
Comes standard on
98/99 rim exit devices.

Features and options

Electrified options

LX	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit (option available to order with Outdoor Defense)
CON	Allegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
AX	Accessible device
FER	Fortified exit rim
GBK	Glass bead kit
OUT	Outdoor defense
PN	Pneumatic latch retraction
QM	Quiet mechanical
SNB	Sex bolts
SEC	Security screws
WH	Weep holes (option available to order with Outdoor Defense)

Dogging feature
Hex key dogging standard

Dogging options

CD	Cylinder dogging
CD-CX	Chexit cylinder dogging
CDSI	Cylinder dogging with security indicator
HDSI	Hex dogging with security indicator
SD	Special center case dogging
LD	Less dogging
DI	Dogging indicator
CI	Cylinder dogging indicator

Strikes
299 – Dull black

98-F/99-F Rim exit device



98-F and 99-F Rim fire exit devices are certified to ANSI/BHMA A156.3 Grade 1 and UL listed for fire exit hardware. See page 69 for detailed information on UL fire exit hardware label and door opening size information. The 98-F device has a smooth mechanism case and the 99-F device has a grooved case. The rim device is non-handed except when the following device options are used: -2 (double cylinder), -2SI (Double cylinder with security indicator) or SS (signal switch).

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device
Device lengths	3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 13/16" (1011mm) 39 11/16" (1008mm) with mullion
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Latch bolt	Deadlocking, 3/4" (19mm) throw
Finishes	605, 606, 612, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) and 2 1/4" (57mm) thick metal or wood doors; Optional 425 SNB available for metal doors; 425 and 825 SNB required on wood doors without SLM blocking (See page 66 for quantities)

Accessories



299F Strike
Ships standard, optional strikes available



499F Strike
With 9854/9954 mullion

Features and options

Electrified options

LX	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit (option available to order with Outdoor Defense)
CON	Allegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
AX	Accessible device
GBK	Glass bead kit
OUT	Outdoor defense
PN	Pneumatic latch retraction
QM	Quiet mechanical
SNB	Sex bolts
SEC	Security screws
SLM	Special laminate material blocking
WH	Weep holes (option available to order with Outdoor Defense)

Dogging option
No mechanical dogging;
QEL options available

Strikes
299F – Dull black, 499F with mullions

XP98/99 Rim exit device



XP98/99 Rim exit devices are designed for single and double doors with mullion that require increased security. The “smart” latch changes shape when subjected to external forces. This design enables the exit door to withstand an external attack and remain secure. Additionally, the patented latch bolt design provides greater, longer-lasting latch bolt to strike contact which is not easily affected by the twisting motion of a weakened frame, resulting in an opening that will remain strong. Devices are certified to ANSI/BHMA A156.3 Grade 1 and UL listed for panic exit hardware. The rim device is non-handed except when the following device options are used: SD (special dogging) or -2 (double cylinder). Covers stock hollow metal doors with 86 or 161 cutouts on single doors (may cover cutouts on pairs – consult template).

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device
Device lengths	3' 2'4" to 3' (711mm to 914mm) door size 4' 2'10" to 4' (864mm to 1219mm) door size
Device centerline from finished floor	39 13/16" (1011mm) 39 11/16" (1008mm) with mullion
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Latch bolt	Deadlocking, 3/4" (19mm) throw
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) and 2 1/4" (57mm) thick metal or wood doors (Optional 425 SNB available, see page 66 for quantities)

Features and options

Electrified options

LX-LC	Latch bolt monitor switch, low current
RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

-2	Double cylinder
AX	Accessible device
GBK	Glass bead kit
SNB	Sex bolts
SEC	Security screws
WH	Weep holes

Dogging feature

Hex key dogging standard

Dogging options

CD	Cylinder dogging
CD-CX	Chexit cylinder dogging
CDSI	Cylinder dogging with security indicator
HDSI	Hex dogging with security indicator
SD	Special center case dogging
LD	Less dogging
DI	Dogging indicator
CI	Cylinder dogging indicator

Strikes

909 – Dull black

Accessories



909 Strike
Ships standard for single or double doors.



XP latch
Provides increased security with its two piece design.



Hex key dogging
Comes standard on 98/99 rim exit devices.

XP98-F/99-F Rim exit device



XP98/99 Rim fire exit devices are certified to ANSI/BHMA A156.3 Grade 1 and UL listed for fire exit hardware. See page 69 for detailed information on UL fire exit hardware label and door opening size information. These are designed for single and double doors with 9954-XP mullion that require increased security. The “smart” latch changes shape when subjected to external forces. This design enables the exit door to withstand an external attack and remain secure. Additionally, the patented latch bolt design provides greater, longer-lasting latch bolt to strike contact which is not easily affected by the twisting motion of a weakened frame, resulting in an opening that will remain strong. The rim device is non-handed except when the following device option is used: -2 (double cylinder). Covers stock hollow metal doors with 86 or 161 cutouts on single doors (may cover cutouts on pairs – consult template).

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device
Device lengths	3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 13/16" (1011mm) 39 11/16" (1008mm) with mullion
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97 mm) Pushbar depressed – 3 1/16" (78 mm)
Latch bolt	Deadlocking, 3/4" (19mm) throw
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) and 2 1/4" (57mm) thick metal or wood doors. Optional 425 SNB available for metal doors. 425 and 825 SNB required on wood doors without SLM blocking (See page 66 for quantities)

Features and options

Electrified options

LX-LC	Latch bolt monitor switch, low current
RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

-2	Double cylinder
AX	Accessible device
GBK	Glass bead kit
SNB	Sex bolts
SEC	Security screws
SLM	Special laminate material blocking
WH	Weep holes

Dogging option

No mechanical dogging;
QEL options available

Strikes

909 – Dull black, fire rated single doors
954 – Dull black, fire rated double doors

Accessories



909 Strike
Ships standard for single doors.



XP latch
Provides increased security with its two piece design.



954 Strike
For fire rated double doors and 9954XP mullion.

9875/9975 Mortise lock device



9875/9975 Mortise lock device for all types of single or double doors, UL listed for panic exit hardware. Devices are certified to ANSI/BHMA A156.3 Grade 1. Fits stock hollow metal doors with 86 cutout and door stiles as narrow as 4 3/4" (121mm). The 9875 device has a smooth mechanism case and the 9975 device has a grooved case. The mortise lock device is non-handed except when the following device options are used: -2 (double cylinder), -2SI (double cylinder with security indicator) or SS (signal switch).

The 7500 Mortise lock is equipped with a 3/4" (19mm) anti-friction latch bolt which is field reversible without removing the lock from the door. It has a non-handed auxiliary bolt for deadlocking and a faceplate with an adjustable bevel.

Specifications

Device functions	Device ships setup for EO/DT/NL functions. Instructions show how to set up the device in the field for use with TP, K, and L classroom function trims.
Device lengths	3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 5/8" (1006mm)
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) and 2 1/4" (57mm) thick metal or wood doors. (Optional 425 SNB available, see page 66 for quantities)

Features and options

Electrified options

RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
GBK	Glass bead kit
PN	Pneumatic latch retraction
SNB	Sex bolts
SEC	Security screws
WH	Weep holes

Dogging feature

Hex key dogging standard

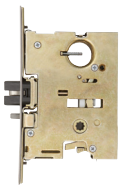
Dogging options

CD	Cylinder dogging
CD-CX	Chexit cylinder dogging
CDSI	Cylinder dogging with security indicator
HDSI	Hex dogging with security indicator
SD	Special center case dogging
LD	Less dogging
DI	Dogging indicator
CI	Cylinder dogging indicator

Strikes

575 – Dull black

Accessories



7500 Mortise lock



575 Strike



Hex key dogging
Comes standard on 9875/9975 mortise lock exit devices.

9875-F/9975-F Mortise lock fire exit device



9875-F/9975-F Fire exit mortise lock devices are certified to ANSI/BHMA A156.3 Grade 1 and UL listed for fire exit hardware. See page 69 for detailed information on UL listed fire exit hardware label and door opening size information. Fits door stiles as narrow as 4 3/4" (121mm). The 9875-F device has a smooth mechanism case and the 9975-F device has a grooved case. The mortise lock device is non-handed except when the following device options are used: -2 (double cylinder), -2SI (double cylinder with security indicator) or SS (signal switch) devices.

The 7500 Mortise lock is equipped with 3/4" (19mm) anti-friction latch bolt which is field reversible without removing the lock from the door. It has a non-handed auxiliary bolt for deadlocking and a faceplate with an adjustable bevel.

Specifications

Device functions	Device ships setup for EO/DT/NL functions. Instructions show how to set up the device in the field for use with TP, K, and L classroom function trims.
Device lengths	3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 5/8" (1006mm)
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) and 2 1/4" (57mm) thick metal or wood doors. Optional 425 SNB available for metal doors. 425 and 825 SNB required on wood doors without SLM blocking. (See page 66 for quantities)

Features and options

Electrified options

RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
GBK	Glass bead kit
PN	Pneumatic latch retraction
SNB	Sex bolts
SEC	Security screws
SLM	Special laminate material blocking
WH	Weep holes

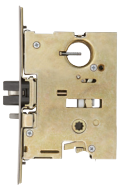
Dogging option

No mechanical dogging;
QEL options available

Strikes

575 – Dull black

Accessories

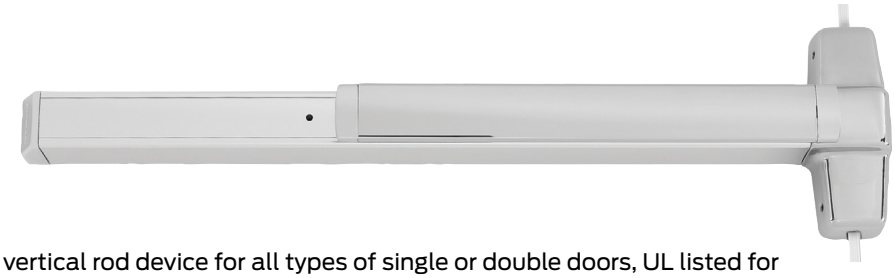


7500 Mortise lock



575 Strike

9827/9927 Surface mounted vertical rod device



9827/9927 Surface mounted vertical rod device for all types of single or double doors, UL listed for panic exit hardware. Devices are certified to ANSI/BHMA A156.3 Grade 1. Covers stock hollow metal doors with 86 or 161 cutouts. The 9827 device has a smooth mechanism case and the 9927 device has a grooved case. The surface vertical rod device is non-handed except when the following device options are used: -2 (double cylinder), -2SI (double cylinder with security indicator), SD (special dogging), SS (signal switch) or WS (tornado/hurricane). Vertical rod and latch guards are available to protect the bottom rod of the exit device from damage by impacts of carts or gurneys passing through doors.

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device
Device lengths	2' 2' (610 mm) Door size 3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 5/8" (1006 mm)
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Latch bolt	Deadlocking anti-friction top and bottom bolt, 5/8" (16mm) throw
Door undercut	1/4" (7mm) recommended
Top and bottom latch case	4 1/2" x 2 1/8" x 1 1/2" (114mm x 54mm x 38mm)
Vertical rods	1/2" square tubing, standard rods accommodate 7' (2134mm) doors. Top rod length: 34 15/16" (887mm); Bottom rod length: 31 1/2" (794mm). Extension rods available in 3' (914mm) for doors over 7'; One piece top rod is available for 8' (2438mm) and 10' (3048mm) doors
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) to 2 1/4" (57mm) thick metal or wood doors, and 325 SNB for top and bottom latch. (Optional 425 SNB available)

Features and options

Electrified options

LX	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit (option available to order with Outdoor Defense)
CON	Allegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
AX	Accessible device
GBK	Glass bead kit
LBR	Less bottom rod
OUT	Outdoor defense
PL	Pullman latch
PN	Pneumatic latch retraction
QM	Quiet mechanical
SNB	Sex bolts
SEC	Security screws
WH	Weep holes (option available to order with Outdoor Defense)
WS	Tornado and hurricane tested

Dogging feature

Hex key dogging standard

Dogging options

CD	Cylinder dogging
CDSI	Cylinder dogging with security indicator
HDSI	Hex dogging with security indicator
SD	Special center case dogging
LD	Less dogging
DI	Dogging indicator
CI	Cylinder dogging indicator

Strikes

Top – 299 – Dull black
Bottom – 248L4 and 304L – Unfinished

Accessories



299
Top strike



Top latch



304L
Bottom strike



248L4
Bottom strike
For use with flat threshold



Bottom latch



Hex key dogging
Comes standard on 9827/9927 devices.

9827-F/9927-F Surface mounted vertical rod fire device



9827-F/9927-F Fire exit surface mounted vertical rod device are certified to ANSI/BHMA A156.3 Grade 1 and UL listed for fire exit hardware. See page 69 for detailed information on UL fire exit hardware label and door opening size information. The 9827-F device has a smooth mechanism case and the 9927-F device has a grooved case. The surface vertical rod device is non-handed except when the following device options are used: -2 (double cylinder), -2SI (double cylinder with security indicator), SS (signal switch), and WS (tornado/hurricane). Vertical rod and latch guards are available to protect the bottom rod of the exit device from damage by impacts of carts or gurneys passing through doors. Rod and latch guards can be used on hollow metal or tin clad composite fire doors.

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device
Device lengths	2' 2' (610 mm) Door size 3' 2'4" to 3' (711mm to 914 mm) Door size 4' 2'10" to 4' (864 mm to 1219 mm) Door size
Device centerline from finished floor	39 5/8" (1006 mm)
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97 mm) Pushbar depressed – 3 1/16" (78 mm)
Latch bolt	Deadlocking anti-friction top and bottom bolt, 5/8" (16mm) throw
Door undercut	1/4" (7mm) recommended
Top and bottom latch case	4 1/2" x 2 1/8" x 1 1/2" (114mm x 54mm x 38mm)
Vertical rods	1/2" square tubing, standard rods accommodate 7' (2134mm) doors. Top rod length: 34 15/16" (887mm); Bottom rod length: 31 1/2" (794mm). Extension rods available in 3' (914mm) for doors over 7' One piece top rod is available for 8' (2438mm) and 10' (3048mm) doors
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) to 2 1/4" (57mm) thick metal or wood doors, and 325 SNB for top and bottom latch (Optional 425 SNB available)

Accessories



299F
Top strike



499F
Top strike
LBR



Top latch



Bottom latch



304L
Bottom strike

Features and options

Electrified options

LX	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit (option available to order with Outdoor Defense)
CON	Allegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
AX	Accessible device (LBR only)
GBK	Glass bead kit
LBR	Less bottom rod
OUT	Outdoor defense
PL	Pullman latch
PN	Pneumatic latch retraction
QM	Quiet mechanical
SNB	Sex bolts
SEC	Security screws
SLM	Special laminate material blocking
WH	Weep holes (option available to order with Outdoor Defense)
WS	Tornado and hurricane tested

Dogging option

No mechanical dogging;
QEL options available

Strikes

Top – 299F –(499F LBR) Dull black
Bottom – 304L – Unfinished

9857/9957 Three-point latching device



9857/9957 Three-point latching device for all types of single or double doors, UL listed for panic exit hardware. Devices are ANSI A156.3 Grade 1. Covers stock hollow metal doors with 86 or 161 cutouts. The 9857 device has a smooth mechanism case and the 9957 device has a grooved case. The three-point latching device is non-handed except when the following device options are used: -2 (double cylinder), -2SI (double cylinder with security indicator), SD (special dogging), SS (signal switch), or WS (windstorm). Vertical rod and latch guards are available to protect the bottom rod of the exit device from damage by impacts of carts or gurneys passing through doors.

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device.
Device lengths	3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 13/16" (1011mm)
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Latch bolt	Deadlocking anti-friction top and bottom bolt, 5/8" (16mm) throw; Deadlocking rim bolt, 3/4" (19mm) throw
Door undercut	1/4" (7mm) recommended
Top and bottom latch case	4 1/2" x 2 1/8" x 1 1/2" (114mm x 54mm x 38mm)
Vertical rods	1/2" square tubing, standard rods accommodate 7' (2134mm) doors. Top rod length: 34 15/16" (887mm); Bottom rod length: 31 1/2" (794mm). Extension rods available in 3' (914mm) for doors over 7'. One piece top rod is available for 8' (2438mm) and 10' (3048mm) doors.
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) to 2 1/4" (57mm) thick metal or wood doors, and 325 SNB for top and bottom latch (Optional 425 SNB available)

Features and options

Electrified options

LX	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
GBK	Glass bead kit
PL	Pullman latch
PN	Pneumatic latch retraction
SNB	Sex bolts
SEC	Security screws
WH	Weep holes
WS	Tornado and hurricane tested

Dogging feature

Hex key dogging standard

Dogging options

CD	Cylinder dogging
CD-CX	Chexit cylinder dogging
CDSI	Cylinder dogging with security indicator
HDSI	Hex dogging with security indicator
SD	Special center case dogging
LD	Less dogging
DI	Dogging indicator
CI	Cylinder dogging indicator

Strikes

Top and middle – 299 – Dull black
Bottom – 248L4 and 304L – Unfinished

Accessories



299
Top and middle strike



Top latch



304L
Bottom strike



248L4
Bottom strike
For use with flat threshold



Bottom latch



Hex key dogging
Comes standard on 9857/9957 three point latching devices.

9857-F/9957-F Three-point latching fire exit device



9857-F/9957-F Fire exit three-point latching device are UL listed for fire exit hardware. See page 69 for detailed information on UL listed fire exit hardware label and door opening size information. Devices are ANSI A156.3 Grade 1. The 9857-F device has a smooth mechanism case and the 9957-F device has a grooved case. The three-point latch device is non-handed except when the following device option is used: -2 (double cylinder), -2SI (double cylinder with security indicator), SS (signal switch) or WS (windstorm). Vertical rod and latch guards are available to protect the bottom rod of the exit device from damage by impacts of carts or gurneys passing through doors.

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device
Device lengths	3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864 mm to 1219mm) Door size
Device centerline from finished floor	39 13/16" (1011mm)
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Latch bolt	Deadlocking anti-friction top and bottom bolt, 5/8" (16mm) throw; Deadlocking rim bolt, 3/4" (19mm) throw
Door undercut	1/4" (7mm) recommended
Top and bottom Latch case	4 1/2" x 2 1/8" x 1 1/2" (114mm x 54mm x 38mm)
Vertical rods	1/2" square tubing, standard rods accommodate 7' (2134mm) doors. Top rod length: 34 15/16" (887mm); Bottom rod length: 31 1/2" (794mm). Extension rods available 3' (914mm) for doors over 7'. One piece top rod is available for 8' (2438mm) and 10' (3048mm) doors.
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) and 2 1/4" (57mm) thick metal or wood doors, and 325 SNB for top and bottom latch. (Optional 425 SNB available for metal doors; 825 SNB required on wood doors without SLM blocking)

Features and options

Electrified options

LX	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
GBK	Glass bead kit
PN	Pneumatic latch retraction
SNB	Sex bolts
SEC	Security screws
SLM	Special laminate material blocking
WH	Weep holes
WS	Tornado and hurricane tested

Dogging option

No mechanical dogging;
QEL options available

Strikes

Top and middle – 299F – Dull black
Bottom – 304L – Unfinished

Accessories



299F
Top and middle strike



Top latch



304L
Bottom strike



499F
Rim strike
For mullion applications



Bottom latch

9847/9947 Concealed vertical rod device



9847/9947 Concealed vertical rod device for use on single or double metal doors, UL listed for panic exit hardware. These are certified to ANSI/BHMA A156.3 Grade 1. The 9847 device has a smooth mechanism case and the 9947 device has a grooved case. The concealed vertical rod device is non-handed except when the following device options are used: -2 (double cylinder), -2SI (double cylinder with security indicator), SD (special dogging), or SS (signal switch).

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device.
Device lengths	2' 2' (610mm) Door size 3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 5/8" (1006 mm) Standard Adjustable from 35 5/8" (905mm) to 49 5/8" (1260mm)
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Latch bolt	Deadlocking top and bottom bolt, 5/8" (16mm) throw
Door undercut	1/4" (7mm) recommended
Top and bottom latch case	4 1/2" x 2 1/8" x 1 1/2" (114mm x 54mm x 38mm)
Vertical rods	Round 2-piece adjustable rods – Top rod adjustable from 6'8" (2027mm) to 8'4"(2533mm). Bottom rod adjustable 35 5/8" (905mm) to 49 5/8" (1260mm). Extension rod kits available for doors over 8'4" (2533mm).
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) to 2 1/4" (57mm) thick metal doors (Optional 425 SNB available)

Features and options

Electrified options

LX	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
GBK	Glass bead kit
LBR	Less bottom rod
PL	Pullman latch
PN	Pneumatic latch retraction
SNB	Sex bolts
SEC	Security screws
WH	Weep holes

Dogging feature

Hex key dogging standard

Dogging options

CD	Cylinder dogging
CD-CX	Chexit cylinder dogging
CDSI	Cylinder dogging with security indicator
HDSI	Hex dogging with security indicator
SD	Special center case dogging
LD	Less dogging
DI	Dogging indicator
CI	Cylinder dogging indicator

Strikes

Top – 338 – Unfinished
Bottom – 385A – Unfinished

Accessories



338
Top strike



Top latch



Bottom latch

Accessories



385A
Bottom strike



Hex key dogging
Comes standard on 9847/9947 concealed vertical rod devices

9847-F/9947-F Concealed vertical rod fire exit device



9847-F/9947-F Fire exit concealed vertical rod device are certified to ANSI/BHMA A156.3 Grade 1 and UL listed for fire exit hardware. See page 69 for detailed information on UL fire exit hardware label and door opening size information. The 9847-F device has a smooth mechanism case and the 9947-F device has a grooved case. The concealed vertical rod device is non-handed except when the following device option is used: -2 (double cylinder), -2SI (double cylinder with security indicator), SS (signal switch) devices.

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device
Device lengths	2' 2' (610 mm) Door size 3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 5/8" (1006 mm) Standard Adjustable from 35 5/8" (905mm) to 49 5/8" (1260mm)
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Latch bolt	Deadlocking top and bottom bolt, 5/8" (16mm) throw
Door undercut	1/4" (7mm) recommended
Top and bottom latch case	3 3/4" x 1 1/2" x 1" (95mm x 38mm x 25mm)
Vertical rods	Round 2-piece adjustable rods – Top rod adjustable from 6'8" (2027mm) to 8'4"(2533mm). Bottom rod adjustable 35 5/8" (905mm) to 49 5/8" (1260mm) Extension rod kits available for doors over 8'4" (2533mm)
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) to 2 1/4" (57mm) thick metal doors (Optional 425 SNB available)

Features and options

Electrified options

LX	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
GBK	Glass bead kit
LBR	Less bottom rod
PN	Pneumatic latch retraction
SNB	Sex bolts
SEC	Security screws
SLM	Special laminate material blocking
WH	Weep holes

Dogging option

No mechanical dogging;
QEL options available

Strikes

Top – 338 – Unfinished
Bottom – 385A – Unfinished

Accessories



338
Top strike



Top latch



Bottom latch



385A
Bottom strike

9848/9948 Concealed vertical rod device



9848/9948 Concealed vertical rod device for use on single or double metal doors, UL listed for panic exit hardware. These are certified to ANSI/BHMA A156.3 Grade 1. Covers stock hollow metal doors with 86 or 161 cutouts. The 9848 device has a smooth mechanism case and the 9948 device has a grooved case. The concealed vertical rod device is non-handed except when the following device options are used: -2 (double cylinder), -2SI (double cylinder with security indicator), SD (special dogging), or SS (signal switch).

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device
Device lengths	2' 2' (610 mm) Door size 3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 5/8" (1006 mm) Standard Adjustable from 35 5/8" (905mm) to 49 5/8" (1260mm)
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97 mm) Pushbar depressed – 3 1/16" (78mm)
Latch bolt	Deadlocking top bolt, 5/8" (16mm) throw Deadlocking bottom bolt, 1 1/2" (38mm) throw
Door undercut	3/4" (19mm) maximum, more than 1/4" minimum
Top and bottom latch case	4 1/4" x 1 1/2" x 1 1/8" (107mm x 38mm x 28mm)
Vertical rods	Round 2-piece adjustable rods – Top rod adjustable from 6'8" (2027mm) to 8'4"(2533mm). Bottom rod adjustable 35 5/8" (905 mm) to 49 5/8" (1260 mm). Extension rod kits available for doors over 8'4" (2533mm).
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) to 2 1/4" (57mm) thick metal doors (Optional 425 SNB available)

Features and options

Electrified options

LX	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
GBK	Glass bead kit
PN	Pneumatic latch retraction
SNB	Sex bolts
SEC	Security screws
WH	Weep holes

Dogging feature

Hex key dogging standard

Dogging options

CD	Cylinder dogging
CD-CX	Chexit cylinder dogging
CDSI	Cylinder dogging with security indicator
HDSI	Hex dogging with security indicator
SD	Special center case dogging
LD	Less dogging
DI	Dogging indicator
CI	Cylinder dogging indicator

Strikes

Top – 338 – Unfinished
Bottom – 385A – Unfinished

Accessories



338
Top strike



Top latch



Bottom latch



385A
Bottom strike



Hex key dogging
Comes standard on 9847/9947 concealed vertical rod devices

9848-F/9948-F Concealed vertical rod fire exit device



9848-F/9948-F Concealed vertical rod device are certified to ANSI/BHMA A156.3 Grade 1 and UL listed for fire exit hardware. See page 69 for detailed information on UL listed fire exit hardware label and door opening size information. The 9848-F device has a smooth mechanism case and the 9948-F device has a grooved case. The concealed vertical rod device is non-handed except when the following device option is used: -2 (double cylinder), -2SI (double cylinder with security indicator), SS (signal switch).

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device
Device lengths	2' 2' (610mm) Door size 3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 5/8" (1006mm) Standard Adjustable from 35 5/8" (905mm) to 49 5/8" (1260mm)
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Latch bolt	Deadlocking top bolt, 5/8" (16mm) throw Deadlocking bottom bolt, 1 1/2" (38mm) throw
Door undercut	3/4" (19mm) maximum, more than 1/4" minimum
Top and bottom Latch case	4 1/4" x 1 1/2" x 1 1/8" (107mm x 38mm x 28mm)
Vertical rods	Round 2-piece adjustable rods – Top rod adjustable from 6'8" (2027mm) to 8'4"(2533mm). Bottom rod adjustable 35 5/8" (905mm) to 49 5/8" (1260 mm). Extension rod kits available for doors over 8'4" (2533mm).
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) to 2 1/4" (57mm) thick metal doors. (Optional 425 SNB available)

Features and options

Electrified options

LX	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
GBK	Glass bead kit
PN	Pneumatic latch retraction
SNB	Sex bolts
SEC	Security screws
SLM	Special laminate material blocking
WH	Weep holes

Dogging option

No mechanical dogging;
QEL options available

Strikes

Top – 338 – Unfinished
Bottom – 385A – Unfinished

Accessories



338
Top strike



Top latch



Bottom latch



385A
Bottom strike

9849/9949 Concealed vertical cable device



9849/9949 Concealed vertical cable device for use on single or double metal doors, UL listed for panic exit hardware. These are certified to ANSI/BHMA A156.3 Grade 1. The 9849 device has a smooth mechanism case and the 9949 device has a grooved case. The concealed vertical cable device is non-handed except when the following device options are used: -2 (double cylinder), -2SI (double cylinder with security indicator), SD (special dogging), or SS (signal switch).

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device.
Device lengths	2' 2' (610 mm) Door size 3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 5/8" (1006 mm)
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Latch bolt	Deadlocking top and bottom bolt, 1/2" (13mm) throw
Door undercut	3/4" (19mm) maximum (24231516 spacer block kit needed for 3/4" undercut)
Top and bottom latch case	5 13/16" x 1 1/4" x 1 7/16" (147mm x 32mm x 37mm)
Vertical cable	7/32" (6mm) Diameter stainless steel cables
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) to 2 1/4" (57mm) thick metal doors (Optional 425 SNB available)

Features and options

Electrified options

LX*	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
AX	Accessible device
GBK	Glass bead kit
LBL	Less bottom latch
PN	Pneumatic latch retraction
SG	Safety glow
SNB	Sex bolts
SEC	Security screws
WH	Weep holes

Dogging option

No mechanical dogging;
QEL options available

Dogging options

CD	Cylinder dogging
CD-CX	Chexit cylinder dogging
CDSI	Cylinder dogging with security indicator
HDSI	Hex dogging with security indicator
SD	Special center case dogging
LD	Less dogging
DI	Dogging indicator
CI	Cylinder dogging indicator

Strikes

Top – 249 – Unfinished
Bottom – 349 – Unfinished

*For 98/9949 devices, LX switch monitors trim input or electric dogging of EL/QEL devices. LX switch does not monitor latch bolt condition.

9849/9949 Concealed vertical cable device

Accessories

249 Top strike



349 Bottom strike



338 Filler plate
(retrofit bracket)



Top latch



Center slide





Bottom latch



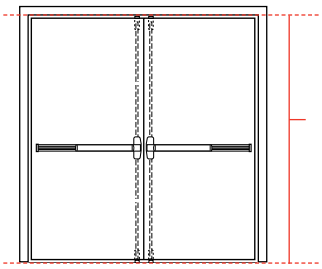
Cable detail



Hex key dogging
Comes standard on 9849/9949 concealed vertical cable devices

Nominal door opening height		Top cable part number	Bottom cable part number
72" - 82"	6'0" - 6'10"	47250398	47250403
***82" - 96"**	***6'10" - 8'**	**47250175**	**47250178**
>96" - 110"	>8'0" - 9' 2"	47250176	47250179
>110" - 120"	>9'2" - 10'	47250177	47250180

*Default door opening height. Specify door opening height if other than the default. For door heights less than 6'0" and greater than 10', contact our Customer Care department to discuss your specific application needs.



Door opening height
is distance from bottom of frame header to finished floor.

See table on left for standard offering.

9849-F/9949-F Concealed vertical cable fire exit device



98/9949-F Concealed vertical cable devices are certified to ANSI/BHMA A156.3 Grade 1 and UL listed for fire exit hardware. See page 69 for detailed information on UL listed fire exit hardware label and door opening size information. The 9849 device has a smooth mechanism case and the 9949 device has a grooved case. The concealed vertical cable device is non-handed except when the following device options are used: -2 (double cylinder), -2SI (double cylinder with security indicator), SD (special dogging), or SS (signal switch).

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device
Device lengths	2' 2' (610 mm) Door size 3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 5/8" (1006 mm) Standard
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Latch bolt	Deadlocking anti-friction top and bottom bolt, 5/8" (16mm) throw
Door undercut	3/4" (19mm) maximum (24231516 spacer block kit needed for 3/4" undercut)
Top and bottom Latch case	5 13/16" x 1 1/4" x 1 7/16" (147mm x 32mm x 37mm)
Vertical cable	7/32" (6mm) Diameter stainless steel cables
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) to 2 1/4" (57mm) thick metal doors (Optional 425 SNB available)

Features and options

Electrified options

LX*	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
AX	Accessible device
GBK	Glass bead kit
LBL	Less bottom latch
PN	Pneumatic latch retraction
SG	Safety glow
SNB	Sex bolts
SEC	Security screws
WH	Weep holes

Dogging feature

Hex key dogging standard

Dogging options

CD	Cylinder dogging
CD-CX	Chexit cylinder dogging
CDSI	Cylinder dogging with security indicator
HDSI	Hex dogging with security indicator
SD	Special center case dogging
LD	Less dogging
DI	Dogging indicator
CI	Cylinder dogging indicator

Strikes

Top – 249 – Unfinished
Bottom – 349 – Unfinished

*For 98/9949 devices, LX switch monitors trim input or electrified dogging of EL/QEL devices. LX switch does not monitor latch bolt condition.

9849-F/9949-F Concealed vertical cable fire exit device

Accessories

249 Top strike



349 Bottom strike



338 Filler plate
(retrofit bracket)



Top latch



Center slide





Bottom latch



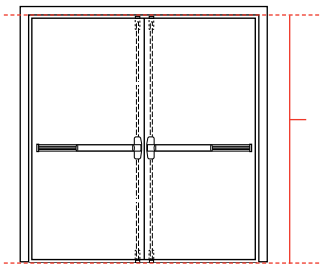
Cable detail



Hex key dogging
Comes standard on 9849/9949 concealed vertical cable devices

Nominal door opening height		Top cable part number	Bottom cable part number
72" - 82"	6'0" - 6'10"	47250398	47250403
***82" - 96"**	***6'10" - 8'**	**47250175**	**47250178**
>96" - 110"	>8'0" - 9' 2"	47250176	47250179
>110" - 120"	>9'2" - 10'	47250177	47250180

*Default door opening height. Specify door opening height if other than the default. For door heights less than 6'0" and greater than 10', contact our Customer Care department to discuss your specific application needs.



Door opening height
is distance from bottom of frame header to finished floor.

See table on left for standard offering.

9847WDC/9947WDC Wood door concealed vertical rod device



9847WDC/9947WDC Concealed vertical rod device for use on single or double wood doors, UL listed for panic exit hardware. Devices are certified to ANSI/BHMA A156.3 Grade 1. The 9847WDC device has a smooth mechanism case and the 9947WDC device has a grooved case. The concealed vertical rod device is non-handed except when the following device options are used: -2 (double cylinder), -2SI (double cylinder with security indicator), SD (special dogging), or SS (signal switch).

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device
Device lengths	2' 2' (610 mm) Door size 3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 5/8" (1006mm) Standard Adjustable from 35 5/8" (905mm) to 49 5/8" (1260mm)
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Latch bolt	Deadlocking top bolt, 5/8" (16mm) throw
Door undercut	1/4" (7mm) maximum
Top and bottom Latch case	3 3/4" x 1 1/2" x 1" (95mm x 38mm x 25mm)
Vertical rods	Round 2-piece adjustable rods – Top rod adjustable from 6'8" (2027mm) to 8'4"(2533mm). Bottom rod adjustable 35 5/8" (905mm) to 49 5/8" (1260 mm). Extension rod kits available for doors over 8'4" (2533mm).
Scalp plate[1]	Device is furnished standard with an 8" (203mm) long scalp plate for easy access to rods
Finishes	605, 606, 612, 625, 626, 628 and 710 (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) to 2 1/4" (57mm) thick wood doors. (425 SNB required on wood doors without SLM blocking)

1. Do not use on pair of doors with 9875/9975.

Accessories

338 Top strike





Top latch



Bottom latch

385A Bottom strike



283 Top strike
For use with wood frames





Hex key dogging
Comes standard on 9847/9947 wood door concealed vertical rod devices

Features and options

Electrified options

LX	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
GBK	Glass bead kit
LBR	Less bottom rod
PL	Pullman latch
PN	Pneumatic latch retraction
SNB	Sex bolts
SEC	Security screws
WH	Weep holes

Dogging feature

Hex key dogging standard

Dogging options

CD	Cylinder dogging
CDSI	Cylinder dogging with security indicator
HDSI	Hex dogging with security indicator
LD	Less dogging
DI	Dogging indicator
CI	Cylinder dogging indicator

Strikes

Top – 338 – Unfinished
Bottom – 358A – Unfinished

9847WDC-F/9947WDC-F Wood door concealed vertical rod fire device



9847WDC-F/9947WDC-F Fire exit concealed vertical rod devices are certified to ANSI/BHMA A156.3 Grade 1 and UL listed for fire exit hardware. See page 69 for detailed information on UL listed fire exit hardware label and door opening size information. The 9847WDC-F device has a smooth mechanism case and the 9947WDC-F device has a grooved case. The concealed vertical rod device is non-handed except when the following device options are used: -2 (double cylinder), -2SI (double cylinder with security indicator), SS (signal switch).

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device
Device lengths	2' 2' (610 mm) Door size 3' 2'4" to 3' (711mm to 914 mm) Door size 4' 2'10" to 4' (864 mm to 1219 mm) Door size
Device centerline from finished floor	39 5/8" (1006 mm) Standard
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97 mm) Pushbar depressed – 3 1/16" (78 mm)
Latch bolt	Deadlocking top and bottom bolt, 5/8" (16mm) throw
Door undercut	1/4" (7mm) maximum
Top and bottom Latch case	3 3/4" x 1 1/2" x 1" (95mm x 38mm x 25mm)
Vertical rods	Round 2-piece adjustable rods – Top rod adjustable from 6'8" (2027mm) to 8'4"(2533mm). Bottom rod adjustable 35 5/8" (905 mm) to 49 5/8" (1260 mm). Extension rod kits available for doors over 8'4" (2533mm).
Scalp plate[1]	Device is furnished standard with an 8" (203mm) long scalp plate for easy access to rods
Finishes	605, 606, 612, 625, 626, 628, 710 (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) to 2 1/4" (57mm) thick wood doors. (425 SNB required on wood doors without SLM blocking)

1. Do not use on pair of doors with 9875-F/9975-F.

Features and options

Electrified options

LX	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
GBK	Glass bead kit
LBR	Less bottom rod
PL	Pullman latch
PN	Pneumatic latch retraction
SNB	Sex bolts
SEC	Security screws
WH	Weep holes

Dogging option

No mechanical dogging;
QEL options available

Strikes

Top – 338 – Unfinished
Bottom – 385A – Unfinished

Accessories



338
Top strike



Top latch

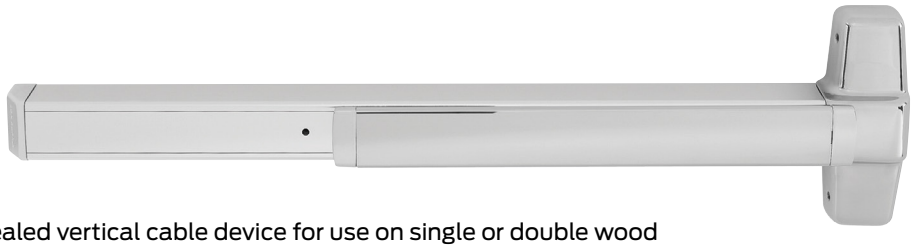


Bottom latch



385A
Bottom strike

9850WDC/9950WDC Wood door concealed vertical cable device



9850WDC/9950WDC Concealed vertical cable device for use on single or double wood doors, UL listed for panic exit hardware. Devices are certified to ANSI/BHMA A156.3 Grade 1. The 9850WDC device has a smooth mechanism case and the 9950WDC device has a grooved case. The concealed vertical cable device is non-handed except when the following device options are used: SD (special dogging), or SS (signal switch).

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device
Device lengths	2' 2' (610mm) Door size 3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864mm to1219 mm) Door size
Device centerline from finished floor	39 5/8" (1006mm) Standard
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Latch bolt	Deadlocking top and bottom bolt. 1 1/2" (38mm) throw
Door undercut	3/4" (19mm) maximum
Top and bottom Latch case	5 13/16" x 1 1/4" x 1 7/16" (147mm x 32mm x 37mm)
Vertical cables	7/32" (6mm) Diameter stainless steel cables
Scalp plate[1]	Device is furnished standard with a 15" (381mm) long scalp plate for easy access to cables
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) to 2 1/4" (57mm) thick wood doors.

1. Do not use on pair of doors with 9975 devices.

Features and options

Electrified options

LX*	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
RX996L	Trim monitor switch
RX-LC	Request to exit low current
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

AX	Accessible device
GBK	Glass bead kit
LBL	Less bottom latch
PN	Pneumatic latch retraction
SG	Safety glow
SNB	Sex bolts
SEC	Security screws
WH	Weep holes

Dogging feature

Hex key dogging standard

Dogging options

CD	Cylinder dogging
CDSI	Cylinder dogging with security indicator
HDSI	Hex dogging with security indicator
SD	Special center case dogging
LD	Less dogging
DI	Dogging indicator
CI	Cylinder dogging indicator

Strikes

Top – 150 – Unfinished
Bottom – 450 – Unfinished

*For 98/9950WDC devices, LX switch monitors trim input or electrified dogging of EL/QEL devices. LX switch does not monitor latch bolt condition.

9850WDC/9950WDC Wood door concealed vertical cable device

Accessories

150 Top strike



Top latch





Hex key dogging
Comes standard on 9850/9950 concealed vertical cable devices

450 Bottom strike



Center slide

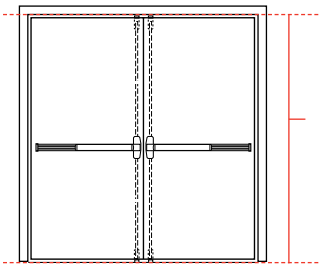


338 Filler plate
(retrofit bracket)





Bottom latch



Door opening height
is measured from finished floor to frame rabbet on door side.

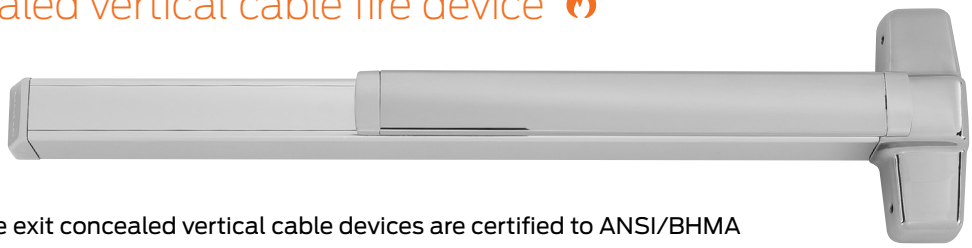
See table for standard offering.

Standard door opening height	
Feet	Cable tolerance
6'8" - 7'	72" - 84"
7'1" - 8'	85" - 96"
8'1" - 9'	97" - 108"
9'1" - 10'	109" - 120"

Note: Non-standard sizes available with extended lead time.
Consult Customer Care for more information 1-877-671-7011.

9850WDC-F/9950WDC-F

Wood door concealed vertical cable fire device



9850WDC-F/9950WDC-F Fire exit concealed vertical cable devices are certified to ANSI/BHMA A156.3 Grade 1 and UL listed for fire exit hardware. See page 69 for detailed information on UL listed fire exit hardware label and door opening size information. The 9850WDC-F device has a smooth mechanism case and the 9950WDC-F device has a grooved case. The concealed vertical cable device is non-handed except when the following device options are used: SS (signal switch).

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device.
Device lengths	2' 2' (610mm) Door size 3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 5/8" (1006mm) Standard
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Latch bolt	Deadlocking top and bottom bolt, 1 1/2" (38mm) throw
Door undercut	3/4" (19mm) maximum
Top and bottom Latch case	5 13/16" x 1 1/4" x 1 7/16" (147mm x 32mm x 37mm)
Vertical cables	7/32" (6mm) Diameter stainless steel cables
Scalp plate[1]	Device is furnished standard with a 15" (381mm) long scalp plate for easy access to cables
Finishes	US3, US3A, US4, US4A, US10, US26, US26D, US26D-AM, US28, 313, 315 and 643e (US15 and US32D available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) to 2 1/4" (57mm) thick wood doors

1. Do not use on pair of doors with 9975 devices.

Features and options

Electrified options

LX*	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
RX996L	Trim monitor switch
RX-LC	Request to exit low current
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

AX	Accessible device
GBK	Glass bead kit
LBL	Less bottom latch
PN	Pneumatic latch retraction
SG	Safety glow
SNB	Sex bolts
SEC	Security screws
SLM	Special laminate material blocking
WH	Weep holes

Dogging option

No mechanical dogging;
QEL options available

Strikes

Top – 150 – Unfinished
Bottom – 450 – Unfinished

*For 98/9950 devices, LX switch monitors trim input or electric dogging of EL/QEL devices. LX switch does not monitor latch bolt condition.

Accessories

150 Top strike



450 Bottom strike



Top latch





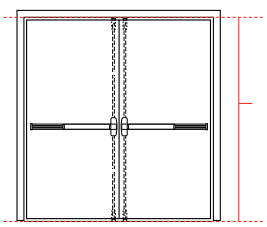
Center slide

Bottom latch





338 Filler plate
(retrofit bracket)



Door opening height
is measured from finished floor to frame rabbet on door side.

See table for standard offering.

Standard door opening height	
Feet	Cable tolerance
6'8" - 7'	72" - 84"
7'1" - 8'	85" - 96"
8'1" - 9'	97" - 108"
9'1" - 10'	109" - 120"

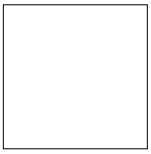
Note: Non-standard sizes available with extended lead time.
Consult Customer Care for more information 1-877-671-7011.

Trim functions

Von Duprin protects your investment by empowering you to adapt with flexible solutions and modular options. The 98/99 Series features numerous trim options to serve your different needs. Designed with flexibility in mind, our solutions offer ease of adding new options as they are developed.

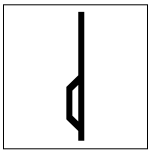
With Von Duprin, you can be confident that as the needs of your facility change, our products can be upgraded easily to meet your needs, especially as the mechanical and electronic technology converge. Von Duprin's versatile design enables you to add functionality to existing devices in a cost-effective way, protecting your investment well into the future.

A variety of device trim lock type functions such as key lock and unlock, latch bolt retraction with key and no cylinder designs for an "always operable" function are available in levers, knobs, latches, thumbpiece and thumbturn designs.



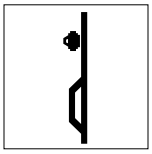
EO No outside trim

- Exit only



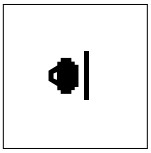
DT Dummy trim

- Pull when dogged (not recommended for fire device)



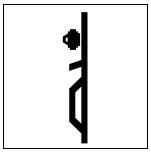
NL Night latch

- Key retracts latchbolt
- Rim and 1 ¼" mortise cylinder



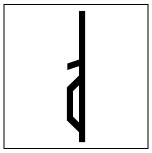
NLOP Night latch

- Key retracts latchbolt, pull required



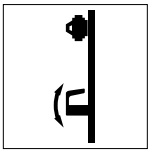
TP Thumbpiece

- Key locks and unlocks
- Rim and 1 ¼" mortise cylinder



TPBE Thumbpiece, blank escutcheon

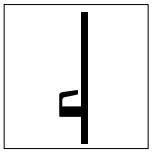
- Blank escutcheon always operable (no cylinder, use with DT trim)



L Lever

K Knob

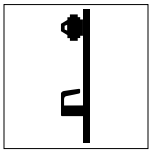
- Key locks and unlocks
- Rim and 1 ¼" mortise cylinder
- Handed, reversible lever
- Electrified lever operation available



LDT Lever, dummy trim

KDT Knob, dummy trim

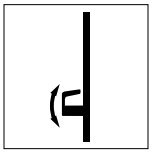
- Pull when dogged



LNL Lever, night latch

KNL Knob, night latch

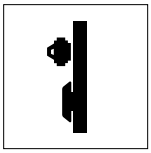
- Key retracts latchbolt
- Rim and 1 ¼" mortise cylinder
- Handed, reversible lever



LBE[1] Lever, blank escutcheon

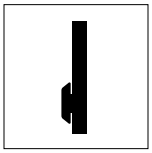
KBE Knob, blank escutcheon

- Always operable (no cylinder)



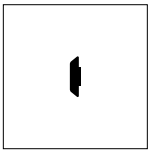
TL Turn lever

- Key locks and unlocks (use with DT trim)
- 1 ¼" mortise cylinder

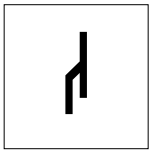


TLBE Turn lever, blank escutcheon

- Blank escutcheon always operable (no cylinder, use with DT trim)



TLOP Turn lever, optional pull



HL Hospital latch

- Key locks and unlocks
- 1 ¼" mortise cylinder

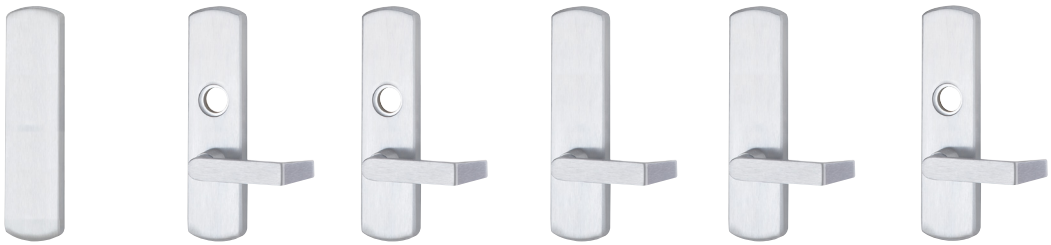
No trim



Trim description		
Nomenclature	EO	110NL-MD 110NL-WD
Trim function	No outside trim	Night latch optional pull
Function description	Exit only	Key retracts latch bolt, optional pull required
ANSI function	01	03
Device compatibility		
98/99/ XP98/XP99 Rim	■	■
98/99/ XP98/XP99 Rim-F	■	■
98/9927/27-F	■	■
98/9947/47-F	■	■
98/9947WDC/WDC-F	■	■
98/9948/48-F	■	■
98/9949/49-F	■	■
98/9950WDC/50WDC-F	■	■
98/9952†	■	
98/9957/57-F	■	■
98/9975/75-F	■	
Dimensions		
Escutcheon plate size	—	—
Pull center to center	—	—
Projection	—	—
Handing		
	—	—
Cylinder type		
Rim or vertical device	—	Rim
Mortise lock device	—	—

† Default trim is 252L /L-BE. Must be ordered as EO when paired with other trims (ordered separately).

996 trim



Trim description						
Nomenclature	996EO	996L*	996L-NL*	996L-BE*	996L-DT	996L-KC
Trim function	Exit only plate	Lever	Lever-night latch	Lever-blank escutcheon	Lever-dummy trim	Lever - Key capture
Function description	Exit only plate	Key locks and unlocks	Key retracts latch bolt	Always operable, no cylinder	Pull when dogged	Key unlocks, lever retracts latch bolt
ANSI function	01	08	03	14	02	09
Device compatibility						
98/99 Rim/Rim-F	■	■	■	■	■	■
XP98/XP99 Rim/Rim-F	■	■	■	■	■	■
98/9927/27-F	■	■	■	■	■	■
98/9947/47-F	■	■	■	■	■	■
98/9947WDC/WDC-F	■	■	■	■	■	■
98/9948/48-F	■	■	■	■	■	■
98/9949/49-F	■	■	■	■	■	■
98/9950WDC/50WDC-F	■	■	■	■	■	■
98/9952†	†	†	†	†	†	
98/9957/57-F	■	■	■	■	■	■
98/9975/75-F	■	■	■	■	■	
Dimensions						
Escutcheon plate size	2 3/4" x 10 3/4" x 27/32" (70 x 273 x 21mm)					
Pull center to center	—	—	—	—	—	
Projection	—	2 7/8" (73mm)	2 7/8" (73mm)	2 7/8" (73mm)	2 7/8" (73mm)	
Handing						
	—	Handed/ reversible	Handed/ reversible	Handed/reversible	Handed/reversible	
Cylinder type						
Rim or vertical device	—	Rim	Rim	—	—	
Mortise lock device	—	1 1/4" mortise	1 1/4" mortise	—	—	

* Specify R/V if used for rim and vertical devices, M for mortise device. Example, 996L-R/V or 996L-M.

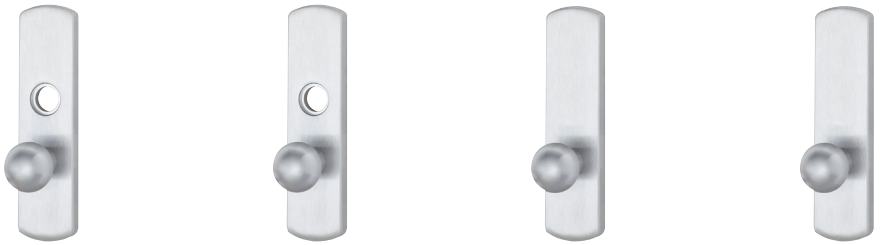
† Default trim is 252L /L-BE. Must be ordered as EO when paired with other trims (ordered separately).

Note: Projection may vary depending on the lever design selected

See lever designs on page 72 to determine if the lever is field reversible

Specify M996 for electronic locking and unlocking. See electrified options Page 59 for more information.

996 trim



Trim description				
Nomenclature	996K*	996K-NL*	996K-BE*	996K-DT
Trim function	Knob	Knob-night latch	Knob- blank escutcheon	Knob - dummy trim
Function description	Key locks and unlocks	Key retracts latch bolt	Always operable, no cylinder	Pull when dogged
ANSI function	08	03	14	02
Device compatibility				
98/99/ XP98/XP99 Rim	■	■	■	■
98/99/ XP98/XP99 Rim-F	■	■	■	■
98/9927/27-F	■	■	■	■
98/9947/47-F	■	■	■	■
98/9947WDC/WDC-F	■	■	■	■
98/9948/48-F	■	■	■	■
98/9949/49-F	■	■	■	■
98/9950WDC/50WDC-F	■	■	■	■
98/9952†				
98/9957/57-F	■	■	■	■
98/9975/75-F	■	■	■	■
Dimensions				
Escutcheon plate size	2 3/4" x 10 3/4" x 27/32" (70 x 273 x 21mm)			
Pull center to center	—	—	—	—
Projection	3 1/4" (83mm)	3 1/4" (83mm)	3 1/4" (83mm)	3 1/4" (83mm)
Handing				
	—	—	—	—
Cylinder type				
Rim or vertical device	Rim	Rim	—	—
Mortise lock device	1 1/4" mortise	1 1/4" mortise	—	—

* Specify R/V if used for rim and vertical devices, M for mortise device. Example, 996K-R/V or 996K-M.

† Default trim is 252L /L-BE. Must be ordered as EO when paired with other trims (ordered separately).

990 trim



Trim description					
Nomenclature	990EO	990DT	990NL*	990TP*	990TP-BE*
Trim function	Exit only plate	Dummy trim	Night latch	Thumbpiece	Thumbpiece blank escutcheon
Function description	Exit only plate	Pull when dogged	Key retracts latch bolt	Key locks and unlocks	Always operable, no cylinder
ANSI function	01	02	03	05	15
Device compatibility					
98/99 Rim/Rim-F	■	■	■	■	■
XP98/XP99 Rim/Rim-F	■	■	■	■	■
98/9927/27-F	■	■	■	■	■
98/9947/47-F	■	■	■	■	■
98/9947WDC/WDC-F	■	■	■	■	■
98/9948/48-F	■	■	■	■	■
98/9949/49-F	■	■	■	■	■
98/9950WDC/50WDC-F	■	■	■	■	■
98/9952†					
98/9957/57-F	■	■	■	■	■
98/9975/75-F	■	■	■	■	■
Dimensions					
Escutcheon plate size	3" x 14 3/16" x 3/32" (76 x 360 x 2mm)				
Pull center to center	—	5 1/2" (140mm)	5 1/2" (140mm)	5 1/2" (140mm)	5 1/2" (140mm)
Projection	—	2" (51mm)	2" (51mm)	2" (51mm)	2" (51mm)
Handing					
	—	—	—	—	—
Cylinder type					
Rim or vertical device	—	—	Rim	Rim	—
Mortise lock device	—	—	1 1/4" mortise	1 1/4" mortise	—

* Specify R/V if used for rim and vertical devices, M for mortise device. Example, 990NL-R/V or 990NL-M.

† Default trim is 252L /L-BE. Must be ordered as EO when paired with other trims (ordered separately).

696 trim






Trim description				
Nomenclature	696DT	696NL*	696TP*	696TP-BE*
Trim function	Dummy trim	Night latch	Thumbpiece	Thumbpiece blank escutcheon
Function description	Pull when dogged	Key retracts latch bolt	Key locks and unlocks	Always operable, no cylinder
ANSI function	02	03	05	15
Device compatibility				
98/99/ XP98/XP99 Rim	■	■	■	■
98/99/ XP98/XP99 Rim-F	■	■	■	■
98/9927/27-F	■	■	■	■
98/9947/47-F	■	■	■	■
98/9947WDC/WDC-F	■	■	■	■
98/9948/48-F	■	■	■	■
98/9949/49-F	■	■	■	■
98/9950WDC/50WDC-F	■	■	■	■
98/9952†				
98/9957/57-F	■	■	■	■
98/9975/75-F	■	■	■	■
Dimensions				
Escutcheon plate size	1 5/8" x 13 1/2" x 3/16" (41 x 343 x 5mm)			
Pull center to center	5 1/2" (140mm)	5 1/2" (140mm)	5 1/2" (140mm)	5 1/2" (140mm)
Projection	2 1/6" (52mm)	2 1/6" (52mm)	2 1/6" (52mm)	2 1/6" (52mm)
Handing				
	—	—	—	—
Cylinder type				
Rim or vertical device	—	Rim	Rim	—
Mortise lock device	—	1 1/4" mortise	1 1/4" mortise	—

* Specify R/V if used for rim and vertical devices, M for mortise device. Example, 696NL-R/V or 696NL-M.

† Default trim is 252L /L-BE. Must be ordered as EO when paired with other trims (ordered separately).

697 trim






Trim description				
Nomenclature	697DT	697NL*	697TP*	697TP-BE*
Trim function	Dummy trim	Night latch	Thumbpiece	Thumbpiece blank escutcheon
Function description	Pull when dogged	Key retracts latch bolt	Key locks and unlocks	Always operable, no cylinder
ANSI function	02	03	05	15
Device compatibility				
98/99 Rim/Rim-F	■	■	■	■
XP98/XP99 Rim/Rim-F	■	■	■	■
98/9927/27-F	■	■	■	■
98/9947/47-F	■	■	■	■
98/9947WDC/WDC-F	■	■	■	■
98/9948/48-F	■	■	■	■
98/9949/49-F	■	■	■	■
98/9950WDC/50WDC-F	■	■	■	■
98/9952†				
98/9957/57-F	■	■	■	■
98/9975/75-F	■	■	■	■
Dimensions				
Escutcheon plate size	1 5/8" x 13 1/2" x 3/16" (41 x 343 x 5mm)			
Pull center to center	5 1/2" (140mm)	5 1/2" (140mm)	5 1/2" (140mm)	5 1/2" (140mm)
Projection	3" (76mm)	3" (76mm)	3" (76mm)	3" (76mm)
Handing				
	—	—	—	—
Cylinder type				
Rim or vertical device	—	Rim	Rim	—
Mortise lock device	—	1 1/4" mortise	1 1/4" mortise	—

* Specify R/V if used for rim and vertical devices, M for mortise device. Example, 697NL-R/V or 697NL-M.

† Default trim is 252L /L-BE. Must be ordered as EO when paired with other trims (ordered separately).

374 Control x DT and 376 Control x DT trim



Trim description	374 Control x DT			376 Control x DT		
Nomenclature	374T x 990DT	374T-BE x 990DT	374T-NL x 990DT	376T x 990DT	376T-BE x 990DT	376T-NL x 990DT
Trim function	Thumbturn	Thumbturn - blank escucheon	Thumbturn - night latch	Thumbturn	Thumbturn - blank escucheon	Thumbturn - night latch
Function description	Key locks and unlocks, use with DT trim	Always operable, no cylinder, use with DT trim	Insert key to unlock, remove key to lock	Key locks and unlocks, use with DT trim	Always operable, no cylinder, use with DT trim	Insert key to unlock, remove key to lock
ANSI function	11	16	12	11	16	12
Device compatibility						
98/99/ XP98/XP99 Rim						
98/99/ XP98/XP99 Rim-F						
98/9927/27-F	■	■	■			
98/9947/47-F				■	■	■
98/9947WDC/WDC-F						
98/9948/48-F				■	■	■
98/9949/49-F						
98/9950WDC/50WDC-F						
98/9952†						
98/9957/57-F	■	■	■			
98/9975/75-F						
Dimensions						
Escutcheon plate size	TL: 1 11/16" x 7 1/2" x 7/8" (43 x 191 x 22mm)					
	DT: 3" x 14 3/16" x 3/32" (76 x 360 x 2mm)					
Pull center to center	—	—	—	—	—	—
Projection	2" (51mm)	2" (51mm)	2" (51mm)	2" (51mm)	2" (51mm)	2" (51mm)
Handing						
	—	—	—	—	—	—
Cylinder type						
Rim or vertical device	1 1/4" mortise	—	1 1/4" mortise	1 1/4" mortise	—	1 1/4" mortise
Mortise lock device	—	—	—	—	—	—

† Default trim is 252L /L-BE. Must be ordered as EO when paired with other trims (ordered separately).

376 T-WDC Control x DT and 252 trim



Trim description	376 T-WDC Control x DT			252 Trim	
Nomenclature	376T-WDC x 990DT	376TWDC-BE x 990DT	376TWDC-NL x 990DT	252L	252L-BE
Trim function	Thumbturn	Thumbturn - blank escucheon	Thumbturn - night latch	Lever	Lever - blank escutcheon
Function description	Key locks and unlocks, use with DT trim	Always operable, no cylinder, use with DT trim	Insert key to unlock, remove key to lock	Key locks and unlocks	Always operable, no cylinder
ANSI function	11 or 12	16	04	08	14
Device compatibility					
98/99 Rim/Rim-F					
XP98/XP99 Rim/Rim-F					
98/9927/27-F					
98/9947/47-F					
98/9947WDC/WDC-F	■	■	■		
98/9948/48-F					
98/9949/49-F					
98/9950WDC/50WDC-F					
98/9952†				■	■
98/9957/57-F					
98/9975/75-F					
Dimensions					
Escutcheon plate size	TL: 1 11/16" x 7 1/2" x 7/8" (43 x 191 x 22mm)			3" x 6 3/8" x 15/16" (76 x 162 x 24mm)	
	DT: 3" x 14 3/16" x 3/32" (76 x 360 x 2mm)				
Pull center to center	—	—	—	Handed/reversible	
Projection	—	2" (51mm)	2" (51mm)	2 5/8" (67mm)	2 5/8" (67mm)
Handing					
	—	—	—	—	—
Cylinder type					
Rim or vertical device	1 1/4" mortise	—	1 1/4" mortise	1 1/4" mortise	—
Mortise lock device	—	—	—	—	—

† Default trim is 252L /L-BE. Must be ordered as EO when paired with other trims (ordered separately).

Optional trim

Schlage® HL6 quiet hospital push/pull latch



Von Duprin and Schlage® have collaborated on an exit device trim that provides both accessibility and performance. In combination, the 98/9975 mortise lock device along with the newly designed Schlage HL6 quiet hospital push/pull latch delivers an exit device with mortise lock durability that utilizes an easy to use, ADA compliant push/pull trim. The HL6 is now 50% quieter through dampened paddle action, reducing the noise associated with lock operation providing healthcare organizations a reliable solution for noise reduction initiatives. The 98/9975HL device is available in most standard architectural finishes, including antimicrobial options. Consult the HL Series catalog or data sheet for complete product information.

392-7 Offset pull



The 392-7 Offset pull is 3/4" round stainless steel, with a 7" center to center which matches the 98/99 center case. Often used with a night latch operation. 3 1/2" (89mm) offset with 1 1/2" (38mm) clearance.

Order Exit device as Exit Only (EO) or Night Latch - Omit Pull (NLOP) and order pull as a separate line item.

Vandal resistant trim: Ives VR910 and VR914 Series



VR910 black grip for softer touch and resilience to temperature extremes. VR914 grip in all stainless steel. Grip designed for comfortable operation.

Features

- Stainless steel construction, 11 gauge (0.120" thick); 630 finish only
- Thru-bolts and rugged mounting screws for maximum fastening strength
- Built-in lock protector prevents vandalism to mortise latch bolt (available on certain models)
- Extra-tough stainless steel cylinder collar prevents pipe wrench or similar tool from damaging cylinder; tapered design prevents side impacts from transferring directly to cylinder; collar spins freely.
- Furnished with mounting screws for door thicknesses of 1 3/4" to 2 1/4"
- 1 1/2" (38mm) clearance from grip to door, total projection 1 7/8" (48mm)
- Consult the Ives catalog for more information

Order the exit device Exit Only (EO) and the VR trim separatly from Ives.

Model	For use with	Size
VR910DT and VR914DT	98/99 Rim or vertical rod device	5 1/2" x 11" (133mm x 279mm)
VR910NL and VR914NL	98/99 Rim or vertical rod device	5 1/2" x 11" (133mm x 279mm)
VR910M-DT and VR914M-DT	9875/9975 Mortise device	7 1/4" x 11" (184mm x 279mm)
VR910M-NL and VR914M-NL (handing required)	9875/9975 Mortise device	7 1/4" x 11" (184mm x 279mm)

Electronic locks from Schlage

AD Series



The AD Series was designed to be the right choice for today, and is ready to adapt to whatever the future holds.

There are a variety of options that allow you to select the AD Series electronic lock that's right for you, and a wide selection of features that can be configured in the field to further customize each opening. When your needs change in the future, the innovative modular design of the AD Series allows you to easily upgrade the credential reader or networking option, and adapt to emerging technologies using your existing chassis – all without taking the lock off the door. This means that you can be confident that your choice of the AD Series is right for today, and that your investment will be protected into the future.

Credential reader options

AD Series electronic locks are compatible with many different credential types.



- Multi-technology (reads 125 kHz prox and 13.56 MHz smart)
- Smart - iClass compatible

+ KEYPAD



- Magnetic stripe (swipe)

+ KEYPAD



- Keypad

Communication options

Networked

In facilities where increased monitoring and control are needed, a networked solution is essential. The AD Series networked options feature:

- Open architecture platform
- Reliable 900 MHz communicationon wireless locks
- Real-time monitoring

The AD Series networked lock is available in either a wireless or hardwired configuration to fit your application needs.

- **AD-300** Networked hardwired locks
- **AD-302** Networked hardwired FIPS 201-2 integration-ready locks
- **AD-400** Networked wireless locks
- **AD-402** Networked wireless FIPS 201-2 integration-ready locks

Standalone

Standalone locks are a cost-effective solution for doors that do not require real-time monitoring. The AD Series standalone solution provides:

- Option for future upgrade to networked wireless
- Improved credential management
- Audit trail reports

Schlage offers one AD Series standalone solution to fit your environment:

- **AD-200** Access rights are stored on the lock

Chassis

- Cylindrical
- Mortise
- Mortise deadbolt
- Exit trim[1]

Locking functions[2]

- Classroom/storeroom
- Office
- Privacy
- Apartment

Certifications

- ANSI/BMHA A156.25
- ANSI/BHMA Grade 1
- UL 294 listed
- UL 10C
- ADA
- FCC part 15
- RoHS

Complete your system

Complete your AD Series system with readers, credentials, system components, and other wireless accessories.

1. See AD Series exit trim compatibility data sheet for complete list of compatability by manufacturer.
2. Lock function capability varies depending on Physical Access Control Software (PACS) OEM integration design.

CO Series



In the world of standalone electronic locks, CO Series offers simple solutions for access control. These easy-to-use, versatile locks can be applied anywhere there is a need to control access without distributing keys. The popular CO-100 is a simple lock that momentarily unlocks with a valid PIN code entry. It can be used indoors or out and allows administrators a variety of command options. The Series also includes CO-200. These computer programmable locks can provide audit trails and feature dual credential options (card+PIN) that provide an even greater level of security.

Compatibility

The CO Series offers a wide range of applications and can be used alongside other Schlage electronic locks. They feature expanded cylinder, exit device, and credential compatibility.

Electronic locks from Schlage

Exit device compatibility[1]

	Rim	SVR[2]	CVR/CVC	Mortise
Von Duprin 98/99 and 98/99 XP	✔	✔	✔	✔
Von Duprin 22/22F	✔	✔		
Falcon 25	✔			

1. See CO Series exit trim compatibility datasheet for complete list of compatability by manufacturer.
2. CO-220 is not compatible with surface vertical rod (SVR) devices.

Note: Exit device must be ordered as Exit Only (EO).

Credential compatibility

CO-100

- Manually programmable
- Keypad only
- User rights stored on the lock
- Remote release, outdoor use and occupancy indication options

CO-200

- Computer or manually programmable
- Keypad, magnetic stripe (+PIN), proximity (+PIN)
- User rights stored on the lock
- Ability to provide schedules and audits

Chassis

- Cylindrical
- Mortise
- Mortise deadbolt
- Exit trim

Functions

- Classroom/storeroom
- Office
- Privacy

Power

- 4 standard (AA) batteries

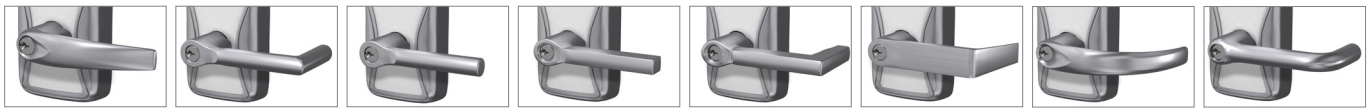
Reliability

When it comes to securing your facility, you can't afford to take chances. CO Series locks are tested to the highest quality and reliability standards in the industry, including:

- ANSI/BHMA A156.25 and ANSI/BHMA Grade 1
- UL 294
- UL 10C
- ADA

Lever styles and finishes for AD and CO Series

Lever options



Athens | Boardwalk | Broadway | Latitude | Longitude | Rhodes | Sparta | Tubular

Finish options							
Color	Bright brass	Satin brass	Satin bronze	Satin nickel	Bright chrome	Satin chrome	Aged bronze
ANSI/BHMA number	605	606	612	619	625	626/626AM	643e

XE360™ Series



The XE360 Series is the next generation of wireless locks from Schlage. The sleek design offers customers a solution that looks as good as it performs – at an affordable price point.

Features and Benefits

- Next level design inside and out
- Credential support includes Schlage MIFARE®, Bluetooth® and NFC mobile[1]
- Available with LED indicator, interior push button, or deadbolt with thumbturn
- Advanced encryption keeps data and communications safe
- Wireless configuration using connected smartphones or tablets
- No-Tour or offline system capability
- Ready for the future with the innovative FleX Module™ that allows for communication type, memory and encryption upgrades
- Utilizes a heavy-duty Grade 1 mortise chassis for exceptional quality and reliability
- Open architecture – interoperable and simple for software alliances to integrate
- Works seamlessly with other Schlage wireless locks, including Schlage Control[2]
- Uniquely concealed key override standard on all locks

1. Dependent on access control software provider support of specific mobile credentials.
2. Check with your Proptech or PACS provider for specific support.

Chassis

- Mortise
- Mortise deadbolt
- Tubular
- Exit trim

Locking functions functionality

- With indicator (I)
  - Storeroom
- With button
  - Office
  - Privacy
  - Apartment

Note: Door Position Sensor is recommended for privacy and apartment functions.

Certifications

- ANSI/BHMA A156.13-2022
- ANSI/BHMA A156.25-2023 locked outdoor type
- ANSI/BHMA A156.5-2020
- UL 294
- ULC 60839
- UL 10C 3-hour
- CAN/ULC S104 3-hour
- FCC Part 15
- Industry Canada (IC)
- Industry Canada (IC)-RSS210
- ADA Compliant[3]
- RoHS
- REACH
- TAA
- FL12400
- FL4613
- FL1592
- FL14482
- FL10356
- FL3905[4]

Compatibility

The XE360 exit trim is currently compatible with rim and surface vertical rod styles of the following exit devices:

- Falcon 25
- Von Duprin 98/99; XP98/99 rim
- Von Duprin 22

Exit device compatibility[1]

	Rim	SVR[2]	CVR/CVC	Mortise
Von Duprin 98/99 and 98/99 XP	✔	✔	✔	✔
Von Duprin 22/22F	✔	✔		
Falcon 25	✔			

Dogging options

Cylinder dogging (CD)



Cylinder dogging is available on all 98/99 Panic exit devices to replace the standard hex key dogging. Unit requires a standard 1 1/4" (32mm) mortise cylinder with an inverted straight cam. When ordering, reference Schlage cylinder 20-001, 1 1/4", XQ11-949. This provides the L583-477 cam inverted at the factory.

To order, specify: Use prefix, CD, example CD99L

Less dogging (LD)

Less dogging is available in all 98/99 Panic exit devices to remove the dogging option.

To order, specify: Use prefix LD, example LD99L

Special center case dogging (SD)

Special cylinder dogging in the center case is available for Chexit, QEL, ALK panic devices to allow for mechanical push/pull operation. With this option, the latch bolt is held retracted and pushbar is still operable. Specify handing—RHR or LHR.

SD requires 1 1/4" (32mm) mortise cylinder with an inverted straight cam. When ordering, reference Schlage cylinder 20-001, 1 1/4", XQ11-949. This provides the L583-477 cam inverted at the factory.

Note: Available on rim and vertical panic exit devices only.

To order, specify:

1. Prefix SD, example SD99L and Handing.
2. Not for 98/9975 Devices.

Cylinder dogging kit* (CDK)

For field conversion, from hex key dogging, conversion kit is available.

To order, specify: 99CDK or 98CDK, specify finish.

*Cannot be added to fire exit hardware.

Hex key dogging kit* (HDK)



For field conversion, from cylinder dogging, conversion kit is available.

To order, specify: 99HDK or 98HDK, specify finish.

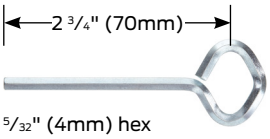
*Cannot be added to fire exit hardware.

Dog keys

Dog key (old style)



Dog key (standard)



Dogging indicator (CI/DI)

- Red indicator light blinks every 5 seconds when not dogged, visible from over 75 feet away
- Available in a hex or cylinder dogging format
- Designed for battery life over one year
- Available as a factory option or field retrofit kit
- Designed for device with mechanical dogging built after 1997

To order, specify:

As device option:

1. DI99EO 3' 630 (hex dogging)
2. CI98EO 4' 628 (cylinder dogging)

As retrofit kit:

1. DI Retrofit Kit 3' 662 (hex dogging)
2. CI Retrofit Kit 4' 613 (cylinder dogging)

Classroom security/security indicators

Designed for high use and abuse institution environments, such as schools and hospitals, these Von Duprin products are recommended for the following applications.

Visual verification
Reduce the time it takes to tour your facility and ensure each door is secure by installing the Von Duprin security indicator to provide at-a-glance visual verification.

Lockdown
Lock down high occupancy areas such as auditoriums, cafeterias and gymnasiums, from inside the room with the Von Duprin security indicator that provides positive visual confirmation.

Features and benefits
- Lockdown solution that meets fire and life safety codes for free egress
- Modular conversion kits allow you to quickly and easily upgrade your existing devices

-2SI security indicator with double cylinder
- Lock/unlock directional indicators provide a clear direction of rotation to secure opening
- Available for 98/99 Series devices

CDSI/HDSI dogging indicator
- Hex or cylinder dogging options
- Visual indication of whether the exit device is dogged or undogged
- Available for 98/99 & 33A/35A Series panic devices

Dogging security indicators (CDSI/HDSI)

The CDSI/HDSI dogging indicator provides an at-a-glance verification of the status of the door from inside of the room. Visible “LOCKED” and “UNLOCKED” indicators show whether the device is undogged or dogged. This feature can be used with hex key (HDSI) or cylinder dogging (CDSI) options on various device types–rim, mortise and vertical systems. (See minimum door charts for CDSI and HDSI to the right).


CDSI


HDSI

To order, specify:
1. Cylinder dogging security indicator: Prefix CDSI.
2. Hex dogging security indicator: Prefix HDSI.
3. Above options cannot be used with fire-rated devices and are recommended for use in combination with the following trim functions: DT, K-DT, L-DT, EO, NL, K-NL, L-KC, L-NL, NL-OP.

Double cylinder with security indicator (-2SI)

The -2SI has an interior key cylinder which locks or unlocks the lever trim from interior side of the door. The accompanying directional indication aids in operation. In addition, the status indicator provides at-a-glance verification of the LOCKED/UNLOCKED status of the door from inside of the room. This option can be ordered as a new product or as a retrofit conversion kit to an existing 98/99 device.

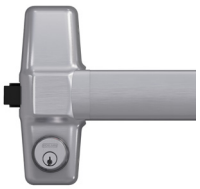


To order, specify:
1. Suffix: -2SI double cylinder with security indicator.
2. Specify device type, available with L and L-BE functions.
3. Specify handing and finish.

Cylinders are sold separately. Schlage rim cylinders 20-021 (keyed), XB11-979 and XB13-379 (thumbturns) are recommended.

Double cylinder

Double cylinder features an inside key cylinder which locks or unlocks the outside trim from inside a room. Clear lock/unlock icons provide directional indication to secure opening. This option can be ordered as a new product or as a retrofit conversion kit to an existing 98/99 device.



To order, specify:
1. Suffix -2 double cylinder.
2. Specify device type, available with L and L-BE functions.
3. Specify handing and finish.

Note: Cylinders are sold separately. Schlage rim cylinders 20-021 (keyed), XB11-979 and XB13-379 (thumbturns) are recommended.

WARNING: Double cylinder options (2/2SI) are ideal for fire exit hardware and panic hardware that is not equipped with the dogging feature. **Combining a double cylinder option with the dogging feature is not recommended,** as the hardware could be in the dogged (unlatched) position when the indicator states a locked position.

CDSI

Device	3'	4'
98/99	32	38
9875	N/A	N/A
9827	32	38
9857	32	38
9847	32	38
9848	32	38
9849	32	38
33	32	38
3327	32	38
3347	32	38
3348	32	38
3349	32	38

HDSI

Device	3'	4'
98/99	32	38
9875	N/A	N/A
9827	32	38
9857	32	38
9847	32	38
9848	32	38
9849	32	38
33	32	38
3327	32	38
3347	32	38
3348	32	38
3349	32	38

Environmental options

Quiet Mechanical (QM)

The QM option controls motion to reduce operational noise. It is available for the 996 trim, as well as 98/99 and 33A/35A rim and surface vertical rod devices. The QM trim solution provides a damper-controlled lever return. Likewise, the QM device option provides damper-controlled re-latching.

Features and benefits

- Controlled motion to reduce operational noise
- 996 damper-controlled lever return
- 98/99 and 33/35A damper controlled re-latching
- Available pre-installed from factory or as a retrofit kit
- Compatible with QEL, AX, RX, CD and HD
- To order, specify QM prefix of device and/or QM prefix of trim. example QM99L x QM996L to receive both

Pneumatic (PN) controlled exit devices



The PN feature provides remote latch bolt retraction in hazardous areas where electrically operated devices would not be permitted. The pneumatic solenoid will retract the latch bolt for momentary or prolonged periods. PN exit devices are particularly suited for use with automatic door operators. The PN feature is available on both Panic and fire exit hardware devices.

The PN feature includes a special actuating linkage that gives building owners the option of mechanically or pneumatically dogging the exit device. If manual hex-key dogging is required, specify HD-PN (Dogging the device, whether mechanically or pneumatically, makes the device function as a push/pull unit and reduces the wear on its moving parts.) If cylinder dogging is required, the standard cylinder dogging is not available, but special center case dogging is available, specify SD-PN. SD-PN is not available on the 9875 or 9975 devices.

When activated pneumatically, the latch bolt(s) of the exit device retract in ½ to 1 ½ seconds. This pneumatic operation uses air pressure ranging from 50 to 100 pounds per square inch.

This product will function only when it is part of a pneumatic system (air compressor, air lines, pneumatic system, etc.) Contact LCN for correct control boxes.

To order, specify:

- Standard — Use prefix PN, example PN99NL
- Hex key dogging — Use prefix HD-PN, example HD-PN99NL
- Special center case dogging (handing is required, specify RHR or LHR) — Use prefix SD-PN, example SD-PN99NL

Pneumatic transfer (PNT)

Pneumatic controls

PNT-1 is available for pneumatic latch retraction exit devices. Appearance and dimensions are identical to EPT models.

Fortified exit rim devices (FER)

The Von Duprin® 33A/35A and 98/99 series offers Fortified exit rim (FER) devices for use in applications desiring additional security and in systems undergoing ASTM F3561-22 testing. The FER device has design enhancements to add extra reinforcement, including a cast steel center case (33A/35A) and formed steel (98/99) chassis. Armored trim plates will also be used with the EO (Exit Only) devices.

Von Duprin® launched the FER 33/35A devices on November 4, 2024, with the FER 98/99 to follow in early 2025.

FER (Fortfied Exit Rim) Devices		
Series	33A/35A narrow stile	98/99 wide stile
Device type	Rim	Rim
Functions	EO (with 388-FER trim plate) NLOP (388 trim)	EO (with 996-FER trim plate) L-NL (996-L-NL trim)

FER Options		
Prefix	FER - Fortified exit ALK - Alarm kit CD - Cylinder dogging CDSI - Cylinder dogging security indicator RX - Request to exit RX-LC - Request to exit low current RX2 - Double request to exit	ESL - Emergency secure lockdown HD - Hex dogging HDSI - Hex dogging security indicator LD - Less dogging QEL - Quiet electric latch retraction HD-QEL - Quiet electric latch retration with hex dogging
Suffix	CON - Connectors WH - Weep holes	
Finishes	605 - Bright brass 606 - Satin brass 612 - Satin bronze 619 - Satin nickel 622/711 - Matte black/matte black, anodized 625 - Bright chrome 626 - Satin chrome	626AM - Satin chrome, antimicrobial 628 - Aluminum, anodized 630 - Satin stainless (98/99 only) 630AM - Satic stainless, antimicrobial (98/99 only) 643e - Aged bronze 693 - Black paint 710 - Dark brown, anodized
Door width	3'- 3 foot device 4'- 4 foot device	
Handing	LHR - Left hand reverse RHR - Right hand reverse	
Touchbar options	PUSH - Touchbar trim embossed 'PUSH' RSS - Red silk-screened lettered touchbar trim SG - Safety glow	

For double door applications:

- For ASTM F3561-22 requirements, must use 48/4954 mullion and TruLite Doors
- For other security and safety applications, 98/9954 mullion can be used.

Outdoor defense (OUT) exit devices

Outdoor defense (OUT) option for Von Duprin exit devices are designed to safeguard against moisture, temperature variations, and corrosion in exterior applications. Testing conditions simulated driving rain, high (151 F) and low (-31 F) temperatures, dust, and debris (for list of testing and outdoor defense conditions see Outdoor Defense data sheet). Available for the popular 98/99 Series rim and surface vertical rod exit devices, this option is engineered to protect internal components and assemblies that are critical to exit device function and long life from moisture, temperature, and the elements as well as protect electronic features such as switches, latch retraction, delayed/controlled egress, and alarm kits.



To order, specify

1. Prefix: OUT, Outdoor Defense
2. Specify Device type and functions requested
3. Specify finish

98/9952 Rim with remote trim input (pool exit hardware)

Openings beyond the interior often have additional functional requirements that go beyond the limits of standard door hardware. Von Duprin offers the safety of panic hardware for pool enclosures, tested to withstand corrosive cleaners typically used in outdoor pool environments. Both the device and trim are built with components engineered to protect against high pressure bleach concentration used in some pool applications. Understanding that hardware solutions need to be flexible and configurable, the Von Duprin 98/9952 with 252L trim is designed to meet the very specific needs of these applications.

Engineered to be installed easily, the 98/9952 device can be mounted within the required range by the model codes and accessibility standards, while the 252L trim is mounted at least 54" from finished floor or concrete. Gate poles must have at least 3" stile width by 2" depth for ideal installation.

Compliance

- Listed with UL for panic exit hardware (UL 305)
- Certified to ANSI/BHMA A156.3 Grade 1
- Meets International Building Code for pool enclosures
- Compliant with the 2010 ADA Standards for Accessible Design

Features and benefits

- Patent-pending design built to meet code requirements for pool enclosures
- Ideal for pool gate applications where high pressure bleach concentration is used
- Easy installation and maintenance
- Simple to operate
- UL listed for panic exit hardware (UL305)

Specifications

Device functions	EO, L, L-BE
Dogging	LD – Less dogging
Device lengths	3' , 4'
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Latch bolt	Deadlocking 3/4" (19mm) throw
Trims	252-L, 252-LBE
Strike	699 roller strike
Finishes	626, 710
Options	WH – Weep holes





Accessories

699 Roller strike



Storm options
WS-T-9827/9927 and WS-T-9857/9957
Multi-point exit devices: certified to ICC-500 (2020)

Overview

The Von Duprin® 98/99 Series exit device is designed to withstand the toughest of environments. In accordance with ICC 500 (2020) standard for wind and storm shelters required by the 2021 International Building Code (IBC 2021), Von Duprin offers a Windstorm Tornado (WS-T) option on multi-point exit devices for single doors or door pairs. The two-point WS-T 98/9927 exit device for door pairs and three-point WS-T 98/9957 exit devices for single doors incorporate reinforced components to help ensure the building and its occupants are kept safe from wind and projectile debris. These devices are third party tested to comply with ICC-500 (2020) standards and FEMA P-361 (2021) guidelines when installed on Steelcraft listed and labeled Tornado Resistant Assemblies.

The ICC500 (2020) standard requires outside levers to be locked and rigid during storm events and unlocked outside levers to have inside lock status indicators. While active L-trim is not available with the WS-T option, mixed-use shelters or safe rooms, such as classrooms, auditoriums, and cafeterias, can utilize Von Duprin security indication options to allow occupants to remain on the secure side of the door while maintaining free egress. Windstorm exit devices can be ordered with double cylinder with security indicator (-2SI), Emergency Secure Lockdown (ESL), and Cylinder Dogging Security Indicator (CDSI) to facilitate ease of the outside lever lockdown from the inside.

Since pioneering the first exit device in 1908, Von Duprin life safety products have provided unparalleled quality, performance and flexibility for schools, hospitals, stadiums and public buildings. These products come with the support and customer care only offered by Von Duprin, providing the confidence and peace of mind at critical moments of life safety.

Features and benefits

- Designed to endure tornado force winds and flying debris
- Uniquely designed center case
- Reinforced top and bottom latch housing with strengthening strap
- Stamped end cap mounting bracket
- Top soffit latch with reinforced ratchet release bracket
- Cast latch covers
- Stronger latch mounting screws
- Thru-bolted attachment points
- Lockdown security indicator options provide peace of mind and timely lockdown of the outside lever during a storm

WS-T-9827/9927 Windstorm ratings

- Flush door pair applications:

  Minimum 6'0" x 6'8" and maximum 8'0" x 8'0" flush Steelcraft Tornado Resistant Pair Assemblies (swinging same direction)
- ICC500 (2020), FEMA P-361 (2021) and International Building Code (IBC 2021) Compliant:
  - Listed and labeled for ICC500 (2020) Standard for the Design and Construction of Storm Shelters.
    - Design pressure +/- 243 PSF
    - 15 pound 2 x 4 at 100 mph
  - Listed for Panic and Fire-Rated Exit Hardware
    - Fire exit hardware listed for 90-minute UL10C for door pairs (swinging same direction)
    - Panic Hardware UL305 listed
  - ANSI/BHMA A156.3 Grade 1
- WS-T-9827/9927 is suitable for use in Enhanced Hurricane Protection Areas. See Allegion-Schlage Lock Company, LLC. Florida product approval FL41734.
- Flush single door applications:

  Minimum 3'0" x 6'8" and maximum 4'0" x 8'0" flush Steelcraft Tornado Resistant Single Door Assemblies

  Flush single door applications:

  Minimum 3'0" x 6'8" and maximum 4'0" x 8'0" Flush Steelcraft Tornado Resistant Single Door Assemblies
- ICC500 (2020), FEMA P-361 (2021) and International Building Code (IBC 2021) Compliant:
  - Listed and labeled for ICC500 (2020) Standard for the Design and Construction of Storm Shelters.
    - Design pressure +/- 252 PSF
    - 15 pound 2 x 4 at 100 mph
  - Listed for panic and fire-rated exit hardware
    - Fire exit hardware listed for 3 hour UL10C (single doors)
    - Panic Hardware UL305 listed
  - ANSI/BHMA A156.3 Grade 1WS-T-9857/9957
- WS-T-9857/9957 is suitable for use in Enhanced Hurricane Protection Areas. See Allegion-Schlage Lock Company, LLC. Florida product approval FL41734.

Note: The Von Duprin WS-T exit device options must be installed on Steelcraft Tornado Resistant Assemblies that are tested to ICC500 and FEMA standards. Tornado assembly components are approved and certified as an assembly and cannot be mixed and matched. These components include the frame, door, hinges, anchors, and latching hardware. Proper installation of tornado doors is critical. It is recommended to have a pre-installation meeting with the contractor, specifier, door supplier, and installer to discuss the installation. Steelcraft Tornado Resistant Assemblies that include glass lights and continuous hinges tested for ICC500 (2020) with WS-T 98/9927 pairs are currently not available. View the Steelcraft Tech Data Manual for the most up-to-date testing and assembly information.

WS-T-9857/9957 Windstorm specifications

Specifications	
Device functions	Device ships EO (Exit only) DT, L-DT, L-BE-2, L-KC
Device lengths	3': 2' 4" to 3' (71mm to 914mm) door size 4': 2' 10" to 4' (864mm to 1219mm) door size
Strikes	Bottom – 304L unfinished
Mechanical options	-2SI - Double cylinder with security indicator CD - Cylinder dogging* CDSI - Cylinder dogging, security indicator LD - Less dogging *WS-T devices with CD/CDSI option must utilize a thumbturn cylinder. A dogging key is not permitted.
Electrical options	LX - Latchbolt monitor switch RX - Push pad monitor switch RX-2 - Double push pad monitor switch SS - Signal switch QEL/ESL - Quiet electric latch/emergency secure lockdown
Fasteners and sex bolts (SNB)	Includes 1-3/4" (44mm) metal doors SNB furnished for top & bottom latches and device (required)
Device centerline from finished floor	39-1/2" (1003mm)
Door undercut	1/4" (7mm)
Center case dimensions	8" x 2-3/4" x 2-3/8"
Mechanism case dimensions	2-1/4" x 2-1/4" (57mm x 57mm)
Top and bottom latch case	4-1/2" x 2-1/2" x 1-7/8" (114mm x 64mm x 48mm)
Vertical rods	1/2" (13mm) round tubing, standard rods accommodate 7' (2134mm) doors Top rod length is 36-1/4" (921mm) Bottom rod length is 31-3/4" (806mm)
Projection	Pushbar neutral – 3-13/16" (97mm) Pushbar depressed – 3-1/16" (78mm)
Finishes	605, 606, 612, 625, 626, 628, 710, 711, 629

Mechanical options

Trim guide



Trim function	Exit only (EO)	Dummy trim (DT)	Dummy trim, less control (DT)	Lever - Key capture (L-KC)	Lever - Blank escutcheon (L-BE)-2/-2SI option	Lever - Dummy trim (L-DT)	Lever - Dummy trim (L-DT) less control
Product description	WS-T-9927-EO WS-T-9827-EO WS-T-9957-EO WS-T-9857-EO	WS-T-9927-DT WS-T-9827-DT WS-T-9957-DT WS-T-9857-DT	WS-T-9927-DT-less control WS-T-9827-DT-less control WS-T-9957-DT-less control WS-T-9857-DT-less control	WS-T-9927-L-KC WS-T-9827-L-KC WS-T-9957-L-KC WS-T-9857-L-KC	WS-T-9927-L-BE-2SI WS-T-9827-L-BE-2SI WS-T-9957-L-BE-2SI WS-T-9957-L-BE-2SI	WS-T-9927-L-DT WS-T-9827-L-DT WS-T-9957-L-DT WS-T-9857-L-DT	WS-T-9927-L-DT-less control WS-T-9827-L-DT-less control WS-T-9957-L-DT-less control WS-T-9857-L-DT-less control
Supplied trim	None	377T-KC x 990DT	990DT	996L-KC	377T-KC x 996-2	377T-KC x 996L-DT	996L-DT
Projection		2" (51 mm)	2" (51 mm)	2 7/8" (73mm)	2 7/8" (73mm)	2 7/8" (73mm)	2 7/8" (73mm)
ANSI function	1	12	2	9	12, 14	12	2
Cylinder type		1 1/4" (32mm) mortise		Rim			
Notes					12/14 changes ansi function based on the -2SI setting. "12" if "locked" state and "14" if unlocked state	NL-DT will not have a key cylinder hole in this application	L-DT will not have a key cylinder hole in this application

Compliant WS-T trim choices

ICC 500 - 2020 requires the exterior lever to be locked or rigid during a storm. The 996L-Trim option is not available with the WS-T option due to this requirement.

The following three Von Duprin trim options allow for day-to-day unlocked outside trim and enable a lockdown functionality with indication, providing ICC 500 - 2020 compliance.

Option 1: You require an exterior lever that remains unlocked/active until lockdown and always latches

Option	Inside cylinder	Trim	Function
Double Cylinder with Security Indicator (-2SI)	Keyed or thumbturn	996	L-BE
		and	
		377	T-KC

In a storm event, a user can see the lock's status via the indicator to quickly determine if the door needs to be locked, which is done via thumbturn or key. A key can be used to enter from the outside during lockdown. The door returns to a locked state as soon as the key is removed.

Option 2: You require access control to retract the latch when a credential is presented until lockdown

Option	Inside cylinder	Trim	Function
Quiet electronic latch retraction (QEL) with emergency secure lockdown (ESL)	Keyed or thumbturn	996	L-KC
		or	
		377	T-KC

In a storm event, the user engages the thumbturn which prompts ESL to interrupt power to QEL motor, disabling card access and electronic dogging. A key can be used to enter from the outside during lockdown. The door returns to a locked state as soon as the key is removed.

Option 3: You require an exterior lever that is always locked but want the ability to mechanically undog the door until lockdown. (Opening must be non-fire rated.)

Option	Inside cylinder	Trim	Function
Cylinder dogging security indication (CDSI)	Thumbturn only	996	L-KC

In a storm event, the user can quickly see the latch's status via the indicator to see if the push pad is undogged or dogged. If undogged, the user twists the thumbturn to dog the door. A key can be used to enter from the outside during lockdown. The door returns to a locked state as soon as the key is removed.

Note: 377T-KC is not ADA compliant

The following Von Duprin trim options allow for fixed outside trim, providing ICC 500 - 2020 compliance:

Option 4: You require an exterior that is exit only

Option	Inside cylinder	Trim	Function
Exit only	NA	NA	EO

There is no exterior lever, so no action is needed during storm event.

Option 5: You require trim that is always locked and requires key for entry

Option	Inside cylinder	Trim	Function
Always locked	NA	996	L-KC

Exterior is always locked and can only be operated with use of mechanical key. No action is needed during storm event.

To support ADA compliance, extended latch guards for rods are recommended (WS-LGO-3 and WS-LGO-4) but they are not required for ICC 500 compliance.

Storm options

Hurricane rated exit devices and mullions

Hurricane resistant openings are designed to withstand storm conditions for long periods of time while maintaining the structural and functional integrity of the opening. The primary purpose is to not only prevent debris and wind from penetrating the assembly but also to maintain functionality after the storm.

Hurricane codes and applications

Florida was the first state to develop hurricane codes. As a result, the requirements set by the Florida Building Code (FBC) may be adopted by jurisdictions in other states where hurricane protection is a necessity. The appropriate hurricane solution depends on the specific requirements for the application. Contact your local Allegion representative for the specific requirements in your state.

Hurricane rated devices

Wind and Impact

FBC TAS 201, 202, 203
[Wind and Impact zone (HVHZ) ASTM E1886, ASTM E1996, ASTM E330]
Exterior door assemblies certified for installation within the Florida High Velocity Hurricane Zone (coastal region of the state) are subject to specific tests for both wind speed and flying debris called out in the TAS protocols of the Florida Building Code. Impact, structural, and cyclic tests must be conducted on full assemblies (e.g., exit device and door) as part of the standard.

Wind-Only

ANSI-ASTM E330 [Wind-Only (non-impact zone)]
Exterior door assemblies certified for installation in non-impact regions (typically inland regions) are tested for structural integrity in accordance with ASTM E330 for wind-only applications. These doors are subject to a structural test load equal to 1.5 times their actual design pressure rating, and they must remain operable with no breakage of glazing panels.

To order, specify:

1. Use prefix “HH” for wind and impact or “HW” for wind-only. If application is unknown, specify HH device, which will satisfy both applications.
2. Model number and description
3. Door mode: SGL (single) or PR (pair)

   Example: CD HH99NL 3’ 626 PR

Note: Many hurricane rated devices use standard device components. Devices will be furnished with the proper strikes and components if HH or HW is specified. All HH devices will include through bolts. Pricing will be adjusted accordingly. See Von Duprin price book for details.

Hurricane rated mullions

Wind and Impact

- Designed for use with these HH (Wind and Impact) rated devices:
  - HH98/99 (specify devices with 499F strikes)
  - HH98/9957 (specify devices with 499F strikes)
  - HH-XP98/99 (specify devices with 909 or 954 strikes)
- Steel mullion
- Furnished for 8’ doors; cut in field as needed
- No KR or electrified options available
- Furnished blank (no strike prep)
- Mullion tube and fittings are unique from are not interchangeable with 9954

Panic and fire-rated applications

- HH9954

To order, specify:

1. HH9954 x Finish (689 or 695)

Wind-Only

- Designed for use with HW (Wind-Only) rated devices
- Identical to standard mullions, except for hurricane rated bottom fitting mounting hardware

Panic applications

- Steel - 1654, 4954, 4954-XP
- Aluminum - 5654, 5654-XP, 5754

Fire-rated applications

- 9954, 9954-XP

To order, specify:

1. Use KR if keyed removable option is desired (steel mullions)
2. HW
3. Model number
4. Height of opening
5. Finish
6. Strikes, when required, should be ordered with device

   Example: KR-HW9954 7’ 689

Disclaimer: Hurricane rated exit devices for use when paired with Allegion approved doors.

Application	Model	Single door	Double door	
		Standard strike	Mullion	Standard strike
HH (Wind and Impact Rated) All impact rated devices require mounting with through bolts	98/99	299F	HH9954	499F
	98-F/99-F	299F	HH9954	499F
	XP98/99	909	HH9954	909
	XP98-F/99-F	909	HH9954	954
	9827/9927	Top: 299F Bottom: 304L	-	Top: 299F Bottom: 304L
	9827-F/9927-F	-	-	Top: 299F Bottom: 304L
	HH9847/9947*	Top: 338 Bottom: 304L	-	Top: 338 Bottom: 304L
	9847-F/9947-F	-	-	Top: 338 Bottom: 304L
	9849/9949	Top: 249 Bottom: 349	-	Top: 249 Bottom: 349
	9849-F/9949-F	-	-	Top: 249 Bottom: 349
	9857/9957	Top: 299F Middle: 299F Bottom: 304L	HH9954	Top: 299F Middle: 499F Bottom: 304L
	9857-F/9957-F	Top: 299F Middle: 299F Bottom: 304L	HH9954	Top: 299F Middle: 499F Bottom: 304L
	9875/9975	575	-	-
			-	-
	9875-F/9975-F	575	-	-
HW (Wind-Only)	98/99	299	4954 or KR4954	299
			1654 or KR1654	1606
			5654	299
			5754	1408
	98-F/99-F	299F	9954 or KR9954	499F
	XP98/99	909	4954XP or KR4954XP	909
			5654XP	909
	XP98-F/99-F	909	9954XP or KR9954XP	954
	9827/9927	Top: 299 Bottom: 304L	-	Top: 299 Bottom: 304L
	9827-F/9927-F	-	-	Top: 299F Bottom: 304L
	9847/9947	Top: 338 Bottom: 304L	-	Top: 338 Bottom: 304L
	9847-F/9947-F	-	-	Top: 338 Bottom: 304L
	9849/9949	Top: 249 Bottom: 349	-	Top: 249 Bottom: 349
	9849-F/9949-F	-	-	Top: 249 Bottom: 349
	9857/9957	Top: 299 Middle: 299 Bottom: 304L	4954 or KR4954	Top: 299 Middle: 299 Bottom: 304L
			1654 or KR1654	Top: 299 Middle: 1606 Bottom: 304L
			5654	Top: 299 Middle: 299 Bottom: 304L
			5754	Top: 299 Middle: 1408 Bottom: 304L
	9857-F/9957-F	Top: 299F Middle: 299F Bottom: 304L	9954 or KR9954	Top: 299F Middle: 499F Bottom: 304L
	9875/9975	575	-	-
	9875-F/9975-F	575	-	-

* HH98/9947 is furnished with double latch brackets and requires template #10319.

Accessibility options

Accessible device (AX)

The AX device is a UL certified exit device designed to meet the progressive requirements of the California Building Code for accessible openings. This device meets the 5 lbs of operating force requirement called for in chapter 11B-309.4. The AX device also exceeds ANSI/BHMA requirements. Available devices include: AX98/99, AX98/99-F, AX98/9927LBR, AX98/9927-F LBR, AX98/9949LBL, AX98/9949-FLBL, AX98/9949-F LBLAFL, AX98/9950LBL, AX98/9950-FLBL. Additionally, all AX devices will be shipped with a new UL label clearly stating “Meets California building Code (2013) Sec. 11B-309.4” and an “AX” identifier label on device center case. See images for reference.



AX option is not available on 2' exit devices. (SVR/CVR/CVC only, R & M not available in 2' sizes.)

Latches

Less bottom rod, panic and fire rated (LBR)

LBR option is available on panic-rated devices by eliminating the bottom rod, latch, and strike.

LBR option is available on fire rated devices using a spring-loaded auxiliary latch bolt installed in the lower door edge. When exposed to heat the auxiliary latch bolt releases, keeping the doors in alignment and closed during a fire. UL listed 3 hours on hollow metal doors double egress, 90 minute swinging same direction, and 20 minutes wood doors (consult wood door manufacturer). Fits door stiles as narrow as $3^{5}/_{8}$".

Fire rated LBR devices must be ordered in pairs or must be used in conjunction with an approved automatic or constant latching flush bolt.

Pullman latch (PL)

When PL is specified the standard latches are replaced with pullman style latches. Pullman latches are always extended and are most commonly used in conjunction with electric strikes and LBR-less bottom rod application. Not available with Fire rated devices.

Not recommended where security is of the utmost importance since latches do not deadlock.

Push pads

Dummy push pad

The 330 dummy push pad is designed as a companion unit for all 99 devices. The 350 dummy push pad is a companion unit for all 98 devices. The push pad is rigid or nonfunctioning. A push/pull operation can be accomplished by using 990DT, 996DT trim or any Ives Pull.

The 330/350 can be equipped with a functional push pad and will accommodate an RX or WP-RX switch. Specify RX-330.

May also be equipped with the RX2, double RX switch.

To order, specify:
1. 330 or 350.
2. Size 3' or 4' (914mm or 1219mm)
3. Finish – 605, 606, 612, 625, 626, 628, 710 and 622/711. (630 – 350 only)
4. Specifiy RX, WP-RX or RX-2 if desired.

Safety glow (SG)



Self-illuminating touchpad defines the location of the exit door in dark or smoke-filled area. The safety glow coating is a special powder coat finish that glows brightly during low or no light conditions. This coating was developed to meet MEA standards where luminescent exit door markings are required in commercial facilities. There are no batteries or electronics, the coating is charged when exposed to light.

To order, specify: Suffix SG, EL 9927L-SG

Red silk screen (RSS)



Red silkscreen lettering on touchpad trim - "Emergency Exit Only, Push To Open And Sound Alarm". This comes standard on SS devices.

To order, specify: Suffix RSS, 9927L-SS RHR

Braille, embossed and knurled touchpads



* Image shown is a special order.

Braille touchpad embossed with the standard message “CAUTION STAIRWELL” in braille and raised letters provides assistance to persons with impaired vision. Letters are 1/2" (13mm) high and braille is #2, raised height is 3/32" (2mm). Other messages are available, limited to 20 characters per line.* **Order** through specials process.

Embossed touchpad is embossed with the word “PUSH”. **To order, specify:** Suffix EMB, EL9927L-EMB.

Knurled touchpad is to provide warning to persons with impaired vision. **To order, specify:** Suffix PBKN, EL9927L-PBKN.

*Consult factory for availability.

Latch retraction

Quiet electric latch retraction (QEL)

Quiet electric latch retraction (QEL) provides electronic control of an exit device for environments where limited operational noise is desired. These devices always provide mechanical egress. The electrified latch retraction can also be activated by an access system or building automation system to unlatch the exit device momentarily. Often the QEL is used with a credential reader and access control system to unlock the door momentarily for authorized users.

The QEL can also be configured to electronically retract the latch for an extended period of time to allow free entry. This is a convenient alternative to mechanical dogging. If manual dogging is required, the hex dogging option is available, to order specify HD-QEL. Special center case dogging is also available for 98/99 rim and vertical systems, specify SD-QEL.

The standard default QEL feature will retract the latch bolt and pushpad. If an active pushpad is required utilize the QEL-L option. This option will retract the latch bolt and maintain an active pushpad.

In some applications an audible indication of pushpad retraction is desired. The QEL-B (B-buzzer) option is a feature that can be added as a retrofit to a QEL device in the field that will send an audible notification of initial latchbolt retraction.

The QEL option is available on panic devices and fire rated devices. UL approved for Class II circuit applications.

The QEL option does not include the power transfer from door to frame, the power supply, or the control operator. Refer to EPT-2 power transfer and the PS902 or 914 power supply.

The PS902/914 with the 2RS, 4RL or 4R board is the minimum required. Other option boards available for other functions, see PS902/914 power supply for additional information.

The QEL has a low inrush current, so it can be used with standard Schlage power supplies. Calculate the peak current draw of all devices in the system to determine the required amperage of the supply.

The -2RS option board is designed to control two electric latch retraction devices and provide time delay between the firing of outputs is required. The power transfer is also sold separately.

To order, specify:

1. Standard — use prefix QEL, example QEL99L.
2. Special center case dogging — use prefix SD-QEL, example SD-QEL99L

Note: Baseplate and modular QEL Conversion kits are available for field retrofit. Please see parts/service manual for part numbers.

Schlage PS902	Schlage PS904	Schlage PS906
Up to 2 amps	Up to 4 amps	Up to 6 amps

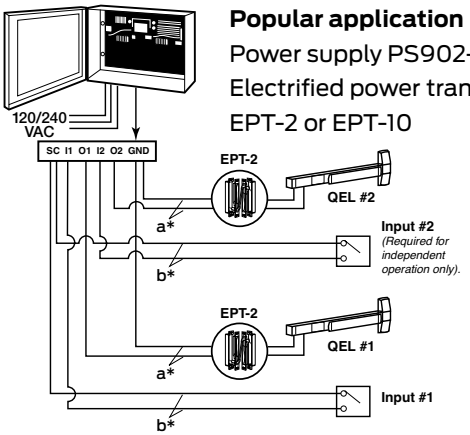
QEL electrical load

Voltage	24VDC
Current	1.0 A Inrush (0.5 sec.) / 0.14 A Holding

Minimum door opening widths*

Application	Surface vertical	Concealed vertical	Mortise	Rim
Min. door opening	28 1/4"	28 1/4"	28 3/4"	29 1/4"

* For 3' devices. For 4' devices, add 6".



Popular application
Power supply PS902-2RS
Electrified power transfer
EPT-2 or EPT-10

a*

Distance (one-way)	Wire gauge
200 '	18 AWG
320 '	16 AWG
500 '	14 AWG
800 '	12 AWG

b*

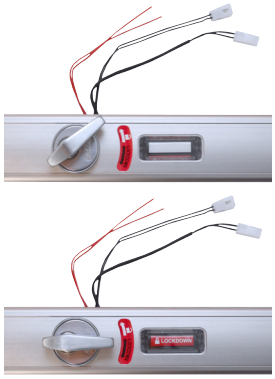
Wire selection	Switch wire size
1200 ft. Max.	18 gauge standard

Latch retraction

Emergency secure lockdown (ESL)

The emergency secure lockdown (ESL) option is ideal for high-occupancy spaces, such as auditorium-style classrooms with access control

Occupants can turn the thumb turn (or cylinder key) of the ESL option installed, interrupting the power to the QEL motor, and electronically undogging to secure pull side of the door as well as sends a signal to the access control system. The visual indication assures the occupant the exit device has been put into secure lockdown mode.



To order, specify:

1. Suffix: ESL Emergency secure lockdown.
2. Specify device type and length with the ESL option.

Specify handing and finish

Note: ESL requires PS902-4R for single door (add -FA if fire rated), or PS904-4R-4R for double door (add FA to both -4R boards if fire rated).

QEL minimum door widths

	SVR	CVR/CVC	MOR	RIM
98/99 3'	28-1/4"	28-1/4"	28-3/4"	29-1/4"
98/99 4'	34-1/4"	34-1/4"	34-3/4"	35-1/4"
33A/35A 3'	28-1/4"	25-1/4"	x	29-1/4"
33A/35A 4'	34-1/4"	34-1/4"	x	35-1/4"

QEL and ESL minimum door widths

	SVR	CVR/CVC	MOR	RIM
98/99 3'	36"	36"	36"	36"
98/99 4'	42"	42"	42-1/2"	43"
33A/35A 3'	36"	36"	x	36"
33A/35A 4'	42"	42"	x	43"

Delayed/controlled egress

The Chexit® (CX) (with motor driven blocking actuator)*



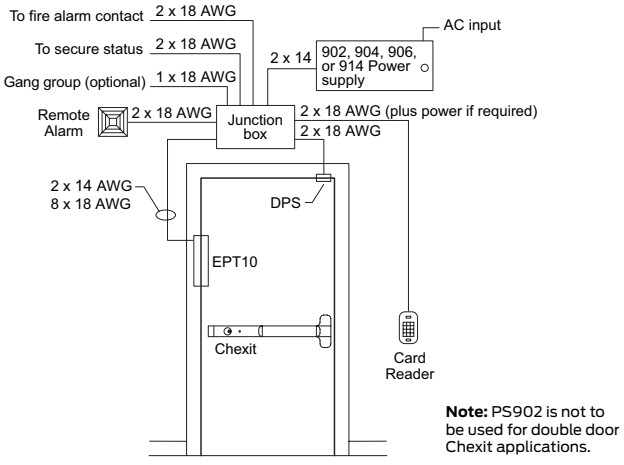
The Von Duprin Chexit device is designed for controlled egress applications. It meets both life safety and security needs, as well as the requirements of NFPA 101 for "Special Locking Arrangement" and IBC "Special Egress-Control Devices". All control inputs, auxiliary locking, local alarm and remote signaling outputs are self-contained in the Chexit assembly. Numerous configurable options allow the device to be customized for the specific code or application requirements. The standard Chexit device sounds an alarm and keeps the door secured for 15 seconds following an exit attempt with immediate release upon fire.

The Chexit device includes a 6" x 20" decal for application on door. "PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 SECONDS"

Chexit typical applications

Chexit single door with options – The Chexit is used as an access control device. The card reader allows access. Also shown in this application is an external horn and door position switch. The auxiliary horn is used for increased volume in remote locations. Using a door position switch gives added security to the opening in case the door is not reclosed.

With the Chexit disarmed, the opening functions as a normal exit device. If card readers are required on both sides of the door, the normally closed contacts of the readers should be wired in series.



Note: PS902 is not to be used for double door Chexit applications.

Figure 1. Riser diagram, single door

Minimum door opening sizes for CX devices

(Consult factory for other size requirements)

Device	3' (914mm) Length	4' (1219mm) Length
CX98/98-F/99/99-F	2'10 3/4" (883mm)	3'4 3/4" (1035mm)
CX-XP98/XP98-F/XP99/XP99-F	2'10 3/4" (883mm)	3'4 3/4" (1035mm)
CX9827/9827-F/9927/9927-F	2'10 1/4" (870mm)	3'4 1/4" (1022mm)
CX9847/9847-F/9947/9947-F	2'10 1/4" (870mm)	3'4 1/4" (1022mm)
CX9848/9848-F/9948/9948-F	2'10 1/4" (870mm)	3'4 1/4" (1022mm)
CX9849/9849-F/9949/9949-F	2'10 1/4" (870mm)	3'4 1/4" (1022mm)
CX9850/9850WDC-F/ 9950/9950WDC-F	2'10 1/4" (870mm)	3'4 1/4" (1022mm)
CX9857/9857-F/9957/9957-F	2'10 1/4" (870mm)	3'4 1/4" (1022mm)
CX9875/9875-F/9975/9975-F	2'10 1/4" (870mm)	3'4 1/4" (1022mm)

Specifications / Power supply requirements[1]

Input voltage – 24VDC
Input current inrush – 1.25A
Input current holding – 390mA
Alarm relay and secure relay contact ratings – 24VDC, 1A
Fire alarm, Inhibit and door position switch inputs require normally closed dry contacts.

Power supply information for CX devices with motor driven blocking actuator[1]

Power supply	Maximum number of devices
PS902 (up to 2 amps)	1 Chexit device
PS904 (up to 4 amps)	3 Chexit devices
PS906 (up to 6 amps)	4 Chexit devices
PS914 (up to 4 amps)	4 Chexit devices

Note: When powering multiple components, verify that the amperage requirements of all components combined does not exceed the power supply output rating, see table above for output ratings. Consult Installation Instructions for proper wire gauge and wire run requirements. Exceeding the recommended devices and/or not following Installation Instructions may void your warranty. Call Customer Care at 877-671-7011 or visit the Allegion website for more information - www.us.allegion.com.

To order, specify:

1. Prefix product description number "CX". Example: CX99L
2. Specify option (see options on page 53). Example: CX-RCM or CD-CX
3. Door size other than 3' (914mm).
4. Door thickness other than 1 3/4" (45mm).
5. Finish.
6. Handing, LHR or RHR. Required with "CD" option.

1. Chexit devices built after August 24, 2015 are built using motor driven blocking actuators that have decreased power supply and operating requirements. The information listed in this catalog references the power supply and operating requirements that are needed for the new products with motor driven blocking actuators. For information on devices built previous to August 24, 2015, please contact Customer Care at 877-671-7011.

Delayed/controlled egress

Chexit, RCM and DE5300 features

The Chexit, remote chexit module (RCM) or DE5300 devices have several features and options available to fit your applications. See below for more information.

Inputs and outputs

Fire alarm input
This input releases the door immediately upon a fire alarm allowing immediate egress. The internal alarm can be silenced during a fire input via an onboard switch setting.

Inhibit input (access control)
This optional input is provided to allow authorized egress or entry when the device is armed using an external card reader, key switch, etc. It also allows remote reset of the Chexit, RCM or DE5300 in an alarmed condition. The ability to reset alarms with the inhibit input can be disabled via an onboard switch setting.

Door position switch input
An optional door position switch (DPS) can provide door position status to Chexit, RCM or DE5300 for additional security, ensuring that the door is closed, and can cause alarm when the door is left or forced open.

Gang bus
The gang bus allows a Chexit, RCM or DE5300 device to signal other Chexit, RCM or DE5300 devices when it enters the release delay, allowing multiple doors to release at the same time in an emergency. Up to 8 devices may be connected to the gang bus.

Alarm relay contacts
The alarm relay contacts are provided as a means to control a remote alarm, such as a horn or lamp, or signal an external monitor. The contacts can be configured with a jumper as normally open or normally closed, and become active upon entering an alarmed condition.

Secure relay contacts
The secure relay contacts are provided as a means to signal an external monitor. The contacts can be configured as normally open or normally closed with a jumper, and become active when the dps indicates the door is closed and the push pad is locked.

Delays

Release delay
When the push pad is pushed and the nuisance delay expires, the Chexit, RCM or DE5300 enters the release delay with alarm. During the release delay, the internal alarm sounds, the alarm relay activates, and the Chexit/RCM keeps the push pad or DE5300 magnetic lock, locked for 15 seconds (less any time already elapsed during the nuisance delay). Once started, the release delay sequence will not stop and the devices will unlock.

Nuisance delay
When a Chexit, RCM or DE5300 is located in a public area, it can be desirable to limit false releases when the push pad is accidently pushed. The nuisance delay is the brief time a push pad can be accidently pushed before the release delay sequence starts. If the nuisance time is set to 0 seconds the Chexit, RCM or DE5300 will enter release delay as soon as the push pad is pushed (when armed). Setting the nuisance time to 1, 2, or 3 seconds allows the push pad to be pressed for 1 to 3 seconds before the Chexit, RCM or DE5300 goes into release delay. If the nuisance audio and nuisance delay are both on, the internal alarm will pulse during the nuisance delay. The alarm relay does not activate during the nuisance delay. If the push pad is released before the nuisance delay expires, the Chexit, RCM or DE5300 will remain armed.

Rearm delay
The rearm delay is the amount of time after the key switch or inhibit input is deactivated to when the device rearms. It is designed to give someone time to pass through the door before rearming occurs. The rearm time can be changed via the onboard switch settings from 0 and 28 seconds in 2 second increments. If the rearm time is set to 30 seconds and a DPS is used, if the door is opened and the rearm time expires, there will be no alarm. The Chexit, RCM or DE5300 will rearm after the door is closed. If the door never opens, the Chexit, RCM or DE5300 will rearm after 30 seconds. If not using a DPS, the Chexit, RCM or DE5300 will always rearm in 30 seconds.

DPS delay
If the DPS detects that the door closed during the rearm delay, the Chexit, RCM or DE5300 ends the rearm delay and allows 2 seconds for the latch to clear the strike before rearming.

Delayed/controlled egress

Interface

Key switch

The Key Switch provides the means to Arm or Disarm/Reset the Chexit, RCM or DE5300. Turning the Key Switch clockwise initiates the Rearm Delay, and turning the Key Switch counter-clockwise Disarms/Resets the Chexit, RCM or DE5300. The Key Switch allows the key to be removed in either the Arm or the Disarm/Reset position.

Status indicator

The red Status Indicator displays the status of the Chexit, RCM or DE5300. The Status Indicator flashes slow if the Chexit, RCM or DE5300 is armed, flashes fast in an alarmed mode, is off when inhibited and on solid during Rearm Delay.

Internal alarm

The Internal Alarm sounds the status of the Chexit, RCM or DE5300. The Internal Alarm sounds continuously during and after a fire alarm or a Release Delay, pulses fast during the Nuisance Delay or a tamper and pulses slow during Disarmed Powerup mode.

Settings

Armed powerup

When set to OFF, a power disruption and power return will put the Chexit, RCM or DE5300 in a disarmed, unlocked alarm mode.

Trim fail safe / fail secure (FS/FSE)

The trim input power can be set to FS (Fail Safe; locked when energized, unlocked when deenergized or during power failure) or FSE (Fail Secure; unlocked when energized, locked when deenergized or during power failure).

The trim must be bought or modified to physically function as FS or FSE. This on board setting only selects the trim input power.

Trim operation overview

Rim and vertical application: Trim will not function when Chexit is armed.
Mortise application: Trim will function when Chexit is armed.

Chexit requiring pull side operation

	Mechanical trim	Electric Trim
Rim and vertical	Access control disarms Chexit. Rotate lever to enter.	Access control disarms Chexit and unlocks electric trim. Rotate lever to enter.[1]
Mortise	a) Use key to unlock lever. Rotate lever to enter.[2] b) Use RX996L-M to disarm Chexit. Rotate lever to enter.[3]	Access control disarms Chexit and unlocks electric trim or electric mortise lock. Rotate lever to enter.

1. Fail Secure Trim recommended. For Fail Safe applications, contact technical support to review application.
2. Do not use Door Position Switch with Chexit in this application.
3. Allows free ingress at all times.

Delayed/controlled egress

Remote Chexit Module (RCM)

Designed to provide the concept of the Chexit delayed exit system for door sizes smaller than the standard Chexit device can accommodate. The Chexit module is installed in a control box and mounted in a remote location. Features and functions of the standard Chexit exit device are available on the Remote Chexit Module.



RCM Module

Minimum door opening sizes for RCM devices

(Consult factory for other size requirements)

Device	3' (914mm) Length	4' (1219mm) Length
CX-RCM 98/98-F/99/99-F	2'6" (762 mm)	2' 11-15/16" (912 mm)
CX-RCM XP98/XP98-F/XP99/XP99-F	2'6" (762 mm)	2' 11-15/16" (912 mm)
CX-RCM 9827/9827-F/9927/9927-F	2'5-7/16" (747 mm)	2' 11-3/8" (898 mm)
CX-RCM 9847/9847-F/9947/9947-F	2'5-7/16" (747 mm)	2' 11-3/8" (898 mm)
CX-RCM 9848/9848-F/9948/9948-F	2'6" (762 mm)	2' 11-15/16" (912 mm)
CX-RCM 9849/9849-F/9949/9949-F	2'5-7/16" (747 mm)	2' 11-3/8" (898 mm)
CX-RCM 9850/9850WDC-F/9950/9950WDC-F	2'6" (762 mm)	2' 11-15/16" (912 mm)
CX-RCM 9857/9857-F/9957/9957-F	2' 5-7/8" (758 mm)	2' 11-7/8" (911 mm)
CX-RCM 9875/9875-F/9975/9975-F	2'6" (762 mm)	2' 11-15/16" (912 mm)

Specifications / Power supply requirements*
Size – 3.75" x 5.57" x 2.50"
Input voltage – 24VDC
Input current inrush – 1.25A
Input current holding – 390mA
Alarm relay and Secure relay contact ratings – 24VDC, 1A
Fire alarm, Inhibit and Door position switch inputs require normally closed dry contacts.

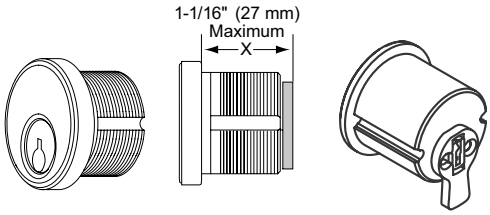
*RCM modules built after August 24, 2015 are built using motor driven blocking actuators that have decreased power supply and operating requirements.

Note: The information listed in this catalog references the power supply and operating requirements that are needed for the new products with motor driven blocking actuators. For information on devices built previous to August 24, 2015, please contact Customer Care at 877-671-7011.

Cylinder dogging (CD)

Special center case cylinder dogging option is available to allow push/pull operation of the Chexit, when disarmed and used in a heavy traffic area. Prefix device with “CD” and specify handing.





Cylinders

Cylinders are not furnished with the Chexit device and must be specified when ordering. Use 1 1/4" mortise cylinder with compression ring 36-083 with straight cam and orient cam as shown. Schlage cylinder 20-001-114 recommended for the device and the CD cylinder dogging option. See Schlage Price book for additional information.

To order, specify*:

See Chexit "How to order" on page 52.

Delayed/controlled egress

DE5300 system

Designed for controlled egress applications when used in conjunction with a magnetic lock. It meets both life safety and security needs, as well as the requirements of NFPA for "Special Locking Arrangement" and IBC "Special Egress-Control Devices". All control units, auxiliary locking, local alarm and remote signaling outputs are self-contained in the DE5300 assembly.



DE5300 Module

The DE5300 is commonly used on narrow stile doors where a standard or narrow stile Chexit is not practical. DE5300 Delayed Exit System uses a Chexit logic board and a Von Duprin RX-LC (low current request to exit) panic device to control a Schlage Electronics Direct Hold Magnetic Lock.

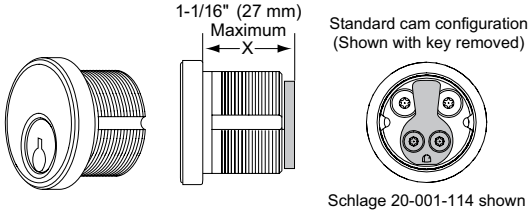
The Chexit module for the DE5300 is installed in a control box and mounted in the wall adjacent to the door. Features and functions of the standard Chexit exit device are available on the DE5300.

The DE5300 device includes a 6" x 20" decal for application on door.

“PUSH UNTIL ALARM SOUNDS.
DOOR CAN BE OPENED IN 15 SECONDS”

Cylinders

Cylinders are not furnished with the DE5300 and must be specified when ordering. Use 1 1/4" mortise cylinder with compression ring 36-083 with straight cam and orient cam as shown. Schlage cylinder 20-001-114 recommended for the device and the CD cylinder dogging option. See Schlage Price book for additional information.



Schlage 20-001-114 shown

Specifications / Power supply requirements
Size - 3.75" x 5.57" x 2.50"
Input voltage – 24VDC
Input current – 1A
Alarm relay and Secure relay contact ratings – 24VDC, 1A
Fire alarm, Inhibit and Door position switch inputs require normally closed dry contacts.

To order, specify:

1. DE5300
2. M420/P, M450/P, or M490/P magnetic lock (order direct from Schlage Electronics).
3. RX-LC 22/33A/35A/98/99 device.
4. PS900 Series
5. EPT-2/10

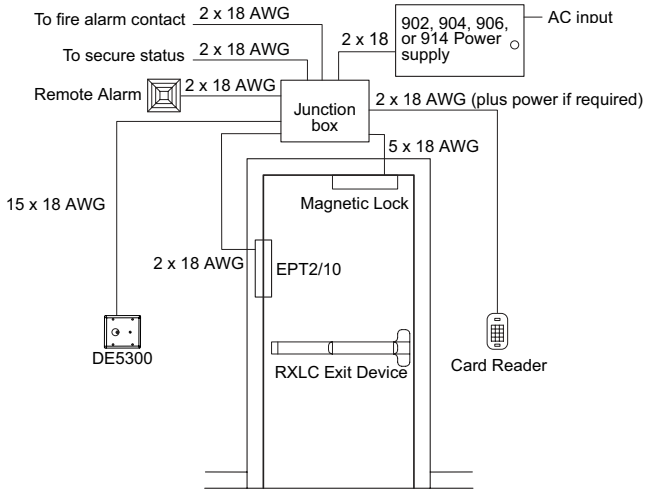


Figure 1. Riser diagram, single door

Switches

Request to exit (RX)

The RX feature is used to signal the use of an opening. This device is equipped with one internal SPDT switch which monitors the push pad. The device can be connected to a security console, or may be used as a single door alarm when used with a horn and power supply. The RX switch option should not be used to control a load, but as a signalling switch (2 amps resisitive maximum). The RX switch is available in a low current (LC) 50ma max. Most commonly used to signal low-current access control inputs.

To order, specify:

- Standard – use prefix RX, example RX99EO
- Low Current – use prefix RX-LC, example RX-LC98EO

Double request to exit (RX2)

The RX2 feature uses two RX switches.

To order, specify:

- Standard – Use prefix RX2, example RX299EO

Waterproof request to exit (WP-RX)

- Switch rated to IP67 – protected from contact with harmful dust and from immersion in water with a depth of up to 1 meter (3.3 feet) for up to 30 minutes

Note: All in-field electrical connections should be in compliance with IP67 to ensure trouble free operation.

Latch bolt monitoring (LX)

The LX feature is used to signal the use of an opening. This device is equipped with one internal SPDT switch which monitors the latch bolt.

The device can be connected to a security console, or may be used as a single door alarm when used with a horn and power supply.

The LX switch option should not be used to control a load, but as a signalling switch (2 amps resistive maximum).

The LX switch is available in a low current (LC) switch. Most commonly used in computer operated monitoring systems.

To order, specify:

- Standard – Use prefix LX, example LX99EO
- Low Current – Use prefix LX-LC, example LX-LC98EO

Electrical rating for all switches

- Standard – 2 amp maximum @ 24VDC
- Low Current (LC) - below 50 Milliamps @ 24VDC

Note: All switches can be either factory or field installed

Signal switch (SS)



Monitors push pad and latch bolt. The SS feature is used to signal the unauthorized use of an opening. This device is equipped with two internal SPDT switches. One switch monitors both the push pad and the latch bolt assembly, making the latch bolt tamper resistant, for positive security. An additional SPDT switch is connected to the 1 1/4" (32mm) mortise cylinder with straight cam for alarm "bypass." (Schlage cam reference L583-477). The device can be connected to a security console, or may be used as a single door alarm when used with a horn and power supply.

Push pad reads: "Emergency Exit ONLY – Push To Open And Sound Alarm." Push pad is only available in US32D finish with red silk-screened lettering.

The SS mortise lock device is furnished with both the signal switch device and the SS7500 mortise lock. The SS7500 mortise lock has the versatility and advantages of the 7500 lock with the addition of signalling functions to monitor latch bolt operation and the trim locking function.

To order, specify:

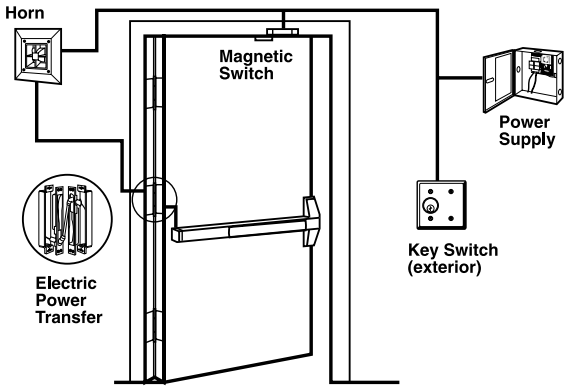
- Prefix SS, example SS99L.
- Handing required, LHR or RHR.

Electrical ratings

- Up to 2.0 amps @ 24VDC

Popular SS application

Unauthorized use of this opening will activate the local horn. The key switch permits inhibiting this system for authorized entry.



Remote monitoring and remote undogging



Remote monitoring

Remote monitoring, RM, provides visibility to request to exit (RX), latch bolt monitor (LX) and door position switch (DPS). RM is available as a modular kit that can be added to any existing Von Duprin 98/99 or 33A/35A series device. RM provides power source flexibility and can be battery powered or has the ability to be hard-wired.

For customers desiring real time monitoring, RM is designed to connect to Allegion's Software Alliance Members via IP. The RM can also be used with RSI connection to the ENGAGE™ gateway for daily schedule reporting. For more information about RM system capabilities and compatibilities, contact your local electronic sales engineer.



Remote undogging

Remote undogging, RU, option is a battery powered wireless solution that enables remote undogging and door status monitoring. The door status monitoring provides visibility to request to exit (RX), latch bolt monitor (LX) and door position switch (DPS). It enhances perimeter security by providing electronic override of mechanical dogging for emergency facility lockdown. RU provides power source flexibility and can be battery powered or has the ability to be hard-wired.

RU is available as a modular kit that can be added to any existing Von Duprin 98/99 or 33A/35A Series device. For customers desiring real time lockdown and monitoring, RU is designed to connect to Allegion's Software Alliance Members via IP. The RU can also be used with RSI connection to the ENGAGE™ gateway for daily schedule reporting. For more information about RU system capabilities and compatibilities, contact your local electronic sales engineer.

Alarm kit



Alarm kit (ALK) is a simple yet effective way to deter unauthorized use of an opening. While the exit device is still a means of egress, the ALK kit contains an internal horn. When the touch bar is depressed, the horn sounds to provide an audible means of signaling that the opening has been violated. The alarm kit can be armed or disarmed by key thus allowing the exit device to be set in an armed or disarmed mode. The horn is rated at 85 decibels.

The assembly includes both a 24VDC Input and External Inhibit standard. The External Inhibit provides remote arming and dis-arming.

The key switch uses a standard 1 1/4" (32mm) mortise cylinder with a straight cam (Schlage 20-001, L583-477 cam). The unit operates on one standard 9-volt alkaline battery. When the battery is weak, the horn will emit an intermittent low battery alert signal.

Auto reset (AR) is a standard feature for this option. This kit allows the device to resume the alarm option after a preset time. Preset times can be field selected at 1.5, 3, or 4.5 minutes.

Alarm kits are available with a choice of two switch kits, RX or LX. RX monitors the touchpad and is furnished standard. LX optional latch bolt monitoring is recommended for use with surface vertical rod exit devices or when alarm needs to sound from both the exit device and trim side of the door. Specify ALK-LX.

The ALK is available in two styles, 99ALK, grooved cover and 98ALK, smooth cover.

The ALK includes a 6" x 20" decal for application on door "EMERGENCY EXIT ONLY. ALARM WILL SOUND." RSS push bar trim can be used instead of the door decal, specify RSS push bar trim when ordering the device.

When the ALK is used, standard dogging is removed. If cylinder dogging is required, there are two choices. Special center case dogging (SD) is available. Or, as an engineered special, the ALK can be moved to the hinge side of the device, and standard cylinder dogging (CD) can be added. Note size restrictions on the following page.

To order, specify:

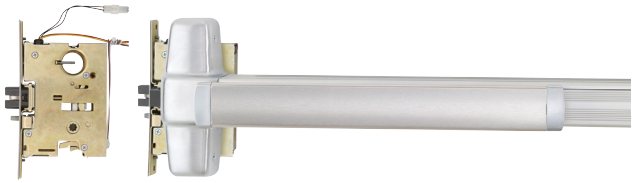
1. Standard, 98 ALK
2. Special center case dogging, SD98 ALK
3. Cylinder dogging, CD98 ALK

Note: For latch bolt monitoring on a 98/9975 with ALK, specify a SS7500 lock. LX switch not available for 98/9975 devices.

Minimum door opening sizes on ALK applications

Device	3' (914mm) Length	4' (1219mm) Length
98/98-F/99/99-F	2'10" (864mm)	3'4" (1016mm)
9875/9875-F/9975/9975-F	2'10" (864mm)	3'4" (1016mm)
9827/9827-F/9927/9927-F	2'10" (864mm)	3'4" (1016mm)
9857/9857-F/9957/9957-F	2'10" (864mm)	3'4" (1016mm)
9847/9847-F/9947/9947-F	2'9" (838mm)	3'3" (991mm)
9848/9848-F/9948/9948-F	2'9" (838mm)	3'3" (991mm)

Electrified mortise and electrified trim



The electric mortise lock device has all the versatility and advantages of the standard mortise lock device, plus the advantage of being electrically controlled by a remote switching device, an access control system or an automatic fire alarm system. The device features the E7500 mortise lock. The E7500 controls the locking of the outside trim. When unlocked, the door remains latched, preserving the fire rating of the door and making it particularly useful where codes permit locking but require unlocking during a fire emergency. The outside trim cylinder retracts the latch bolt for mechanical override, night latch function. Only available with TP, K or L functions.

The E7500 lock contains a SPDT signal to monitor the outside trim condition (locked or unlocked) and a second SPDT signal switch to monitor the latch bolt.

Standard features

- Field reversible handing
- 24 VDC continuous duty solenoid

Optional features

- Fail safe (locked when energized, unlocked when de-energized or during power failure). Specify with suffix "FS."
- Fail secure (unlocked when energized, locked when de-energized or during power failure). Specify with suffix "FSE"
- 24 VAC (with SO option)*
- 12 VDC
- 12 VAC (with SO option)*

Note: Some Fire codes will require "Fail Safe" (FS) operation for stairwell doors. Be sure to specify the correct operation for your application.

* SO (silence operation) not recommended for continuously-powered devices.

Electrical specifications

- Solenoid — .60 amps @ 12VDC
  .30 amps @ 24VDC
- Each switch — Up to 2.0 amps @ 24VDC Maximum

The E option does not include the power transfer from door to frame, the power supply or the control operator (Refer to EPT-10 and PS902 or PS914 power supply).

To order, specify:

1. Use prefix "E," example E9975
2. FS or FSE (Product is not able to be changed in the field)
3. Voltage

Electric mortise lock device

Adaptable for openings where continuous latching is required while the trim may be electrically locked or unlocked from a remote location—stairwells, exterior doors, etc.

Minimum system requirements

- PS902
- EPT-10 or electric hinge

M996L/L-BE Motor driven electrified trim

M996L/L-BE motor driven electrified breakaway lever trim provides remote locking and unlocking capabilities while incorporating the patented vandal-resistant trim design. The motor can be energized from a distant controller, thus allowing access control of the opening. The control of stairwells in high-rise buildings is a common application for this trim. M996 is furnished fail safe (FS) and convertible to fail secure (FSE) via dip switch. The M996 key bypass options are M996L (key functions as night latch mechanical override) or M996L-BE (no key override, blank escutcheon).



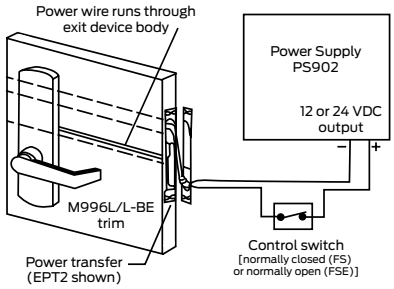
Specification

Dual voltage – up to 1.12 amps @ 12 VDC,
Up to .59 amps @ 24 VDC.

M996L/L-BE Motor driven electrified trim

To order, specify:

1. Use “M” prefix, example M996L.
2. Device type, R/V (rim/surface or concealed vertical
3. rod/cable) or M (mortise)
4. FS or FSE
5. Lever style (06 lever is furnished standard) Other levers, no extra charge.
6. Handing and finish
7. Allegion Connect specify CON



Power supplies

PS900 Series power supplies



The PS900 Series is a consolidated line of power supplies and accessories that offer enhanced flexibility and functionality specific to the changing needs of the access control market. The PS900 Series can be used in a variety of applications to convert high voltage AC power into the regulated low voltage DC outputs required by most access control devices. The PS900 Series protects devices downstream by providing Class 2[1], filtered and regulated power. The full line is UL294 certified.

Features

- Constant output rating at both 12VDC or 24VDC provides superior performance; includes field selectable jumper
- Flat mounting of option boards provides easier access to terminal blocks for connection of electrified devices
- High voltage protective cover
- Battery back-up board auto-selects voltage
- Fire alarm relay can be configured to provide either switched or un-switched outputs from a power supply
- PS914 designed with high inrush current for powering electrified panic devices
- Universal 120-240 VAC input
- Low voltage DC, regulated and filtered
- Electronic power limiting foldback circuit for AC current overload protection
- Fused primary input
- AC status monitor- isolated SPDT contacts
- AC input and DC output LED status indicators
- Cover mounted AC input indication
- Hinged cover with lock down screws
- Optional keylock

Certifications

- UL 294 certified—the standard for access control
- Class 2 rated[2]

PS900 Series power supplies

The PS900 Series offers a variety of distribution options, including basic fuse protection, simple relay, and advanced logic providing complex sequencing and timing functions.

Connectors on the power supply

Product	Schlage PS902	Schlage PS904	Schlage PS906	Von Duprin PS914
Amperage	2 amps	4 amps	6 amps	4 amps with 16 amp inrush
Distribution boards	1	2	3	2
Battery back-up board	1	1	1	1

Applications

The PS900 Series of power supplies works with many electrified devices including Schlage electromagnetic locks, Schlage AD Series hardwired locks, Schlage electrified mechanical locks, Von Duprin electrified strikes, Von Duprin exit devices and many other brands.

Accessories

The PS900 Series features seven option boards for use in a variety of applications. All PS900 Series power supplies option boards are UL 294 certified.

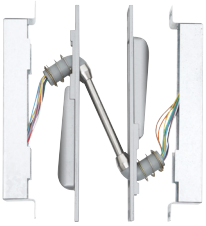
Option boards

- **900-4R:** 4 relay controlled output board to power multiple devices
- **900-4RL:** 4 relay distribution board with logic is field configurable for time delay function, auto operator, security interlock
- **900-8F:** Provides 8 individually fuse-protected outputs, giving the flexibility to power multiple devices and provide another layer of protection
- **900-8P:** Provides 8 individually fuse-protected outputs, giving the flexibility to power multiple devices and provide another layer of protection
- **900-FA:** Emergency interface relay integrates with fire alarm and is used to cut power in case of emergency[2]
- **900-BB:** Battery backup
- **900-2RS:** 2 relay control board for electric latch panic devices (EL or QEL), electric strikes or electrified trim
- **900-BBK:** Battery backup kit includes two 7A/hr batteries and provides up to four hours of backup power when cycled every 5 minutes at full load

1. PS906 can provide Class 2 rated outputs when used with 900-8P distribution board.
2. Except PS906, output rating exceeds Class 2 power limits.
3. PS906, output rating exceeds Class 2 power limits, but can provide Class 2 rated outputs when used with 900-8P distribution board.

Electrical and pneumatic power transfers

Electrical power transfer (EPT) Pneumatic transfer (PNT)



Electrical Power Transfer provides a means of transferring electrical power from a door frame to the edge of a swinging door. The units are completely concealed when the door is in the closed position, and are ideal for installations involving abuse or heavy traffic.

Two models are available; EPT-2, two 18 gauge wires and EPT-10, ten 24 gauge wires. The EPT-2 and EPT-10 are U/L listed as “miscellaneous door accessory”. UL Listed for use on fire doors.

Door applications

Degree of opening	Hinge type	Door thickness
0-180	Up to 5" butt hinges	1 3/4"
0-180	Up to 3/4" offest pivots	1 3/4"
0-130	5 1/2" butt hinges	1 3/4"
0-110	6" butt hinges	1 3/4"
0-90	Swing clear hinges	1 3/4"

Finishes

- 622 - Powder coated matte black
- 689 - Powder coated aluminum
- 695 - Powder coated bronze

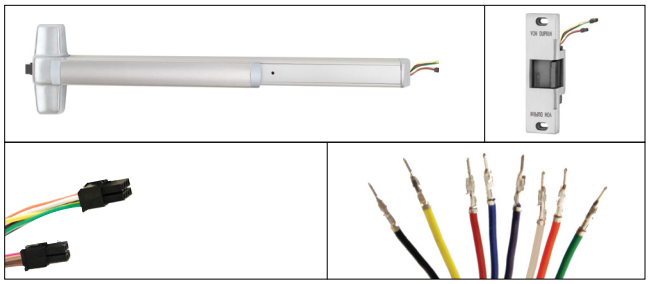
Dimensions

Housing	9" x 1 1/4" x 1 5/8" (229mm x 32mm x 38mm)
EPT-2	Two 18 gauge wires, up to 2 amps @ 24VDC, with a 16 amps maximum surge
EPT-10	Ten 24 gauge wires, up to 1 amps @ 24VDC, with a 16 amps maximum surge
PNT-1	5/32" Tubing

To order, specify:

1. EPT-2 ,EPT-10 or PNT-1
2. Finish, 622, 689, 695

Allegion Connect



Allegion Connect features common interconnect components for many cross-category electrified options. Allegion Connect is a quick and easy way to connect power sources. There is no wire cutting; reducing installation and maintenance time ultimately cutting cost. After installation, Allegion Connect continues to provide benefits throughout the lifetime of the opening by offering a service kit for repairs or modifications in the future.

Features and benefits

- Quick: common connections reducing installation time
- Perfect Connections: these factory installed connectors ensure the right wires match up every time
- Protective: the connectors protect the connection points throughout the installation process and lifetime of the opening
- Interchangeable: all Allegion Connect products utilize the same connectors
- Maintenance: you no longer need to cut away wire to disconnect Allegion products, also available is a service kit specifically for Allegion Connect products.

Harness length	Connectors on both ends	Connectors on one end, crimped pins on the other end
6 Inches	CON-6	CON-6P
12 Inches	CON-12	CON-12P
26 Inches	CON-26	CON-26P
32 Inches	CON-32	CON-32P
38 Inches	CON-38	CON-38P
44 Inches	CON-44	CON-44P
50 Inches	CON-50	CON-50P
192 Inches	CON-192	CON-192P
Power supply wire harness = connectors on one end, stripped leads on the other end.		
6 Inches	CON-6W - frame side of power transfer	

Consult door manufacturer for harness length requirements.

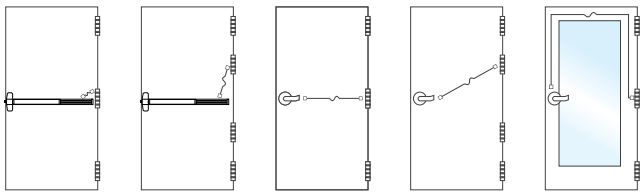
Note: You will need to purchase a separate wiring harness to go from exit device to hinge/EPT and an additional harness to go from hinge/EPT to power supply or access control system. Harness part numbers with ordering information can be located in the Schlage, Von Duprin and Falcon price books. A service kit is available for order in the Schlage, Von Duprin and Falcon price books. Included in this kit are male end plugs, female end plugs and pins to customize harnesses to your application.

Note: Must be ordered with exit devices and locks

To order, specify:

1. Specify CON for Connect electronic options
   Example: QEL-99-EO-CON
   (99 Series quiet electric latch retraction exit only with Connect connectors)
2. Specify harness length; Consult door manufacturer for harness length
3. Specify Von Duprin EPT10-CON or Ives electrical thru-wire hinge

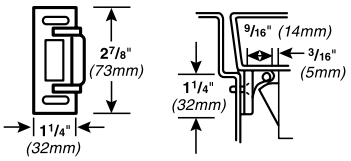
Wire run options



Strikes

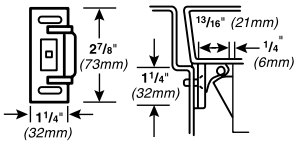
Strikes for rim devices

264



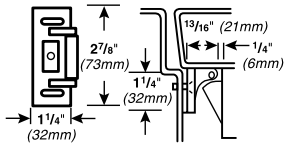
Projection 9/16" (14mm)

299



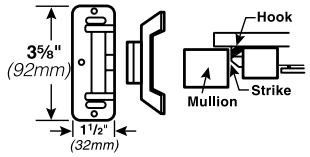
Projection 13/16" (21mm)

299F



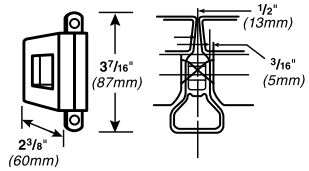
Projection 13/16" (21mm)

499F



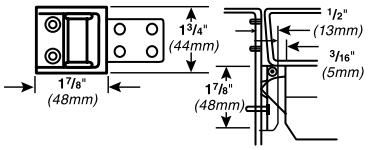
Projection 15/16" (24mm)

1408



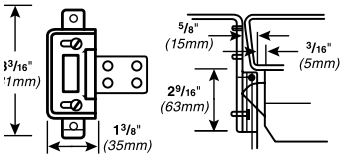
One per pair of doors

1439–Blade stop



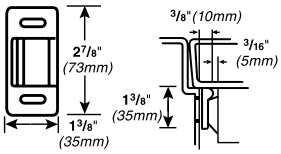
Projection 1/2" (13mm)

1410–Integral stop



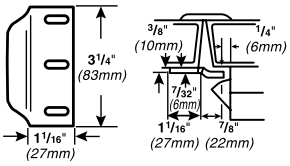
Projection 1/2" (13mm)

1606



Projection 3/8" (10mm)
(Panic devices only)

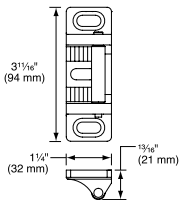
1609



- Requires coordinator
- For panic exit application only, not fire rated

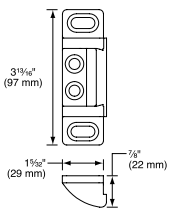
XP Strikes for rim devices

909



Projection 13/16" (21mm)

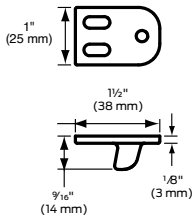
954



Projection 7/8" (22mm)
(For fire rated double door applications)

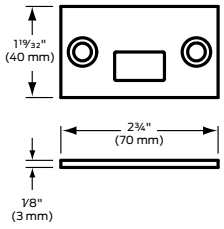
Strikes for vertical cable devices

249 - Top strike



Projection 9/16" (14mm)

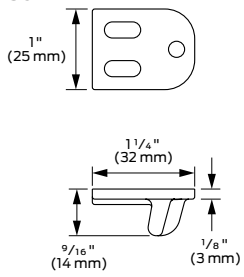
349 - Bottom strike



Projection 1/8" (3mm)

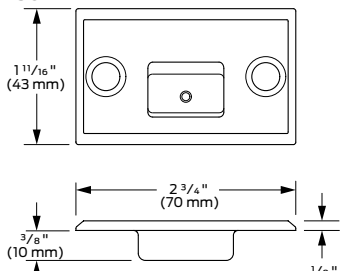
Strikes for 98/9950WDC devices

150



Projection 9/16" (14mm)

450

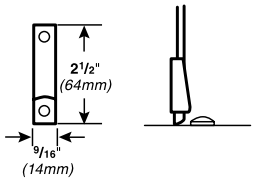


Projection 1/8" (3mm)

Strikes

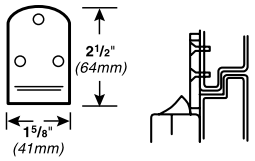
Strikes for vertical rod devices

248L-4



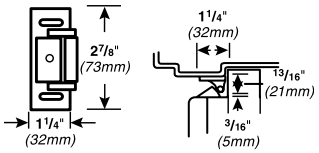
Projection 3/8" (10mm)

260U-Flush transom panic only
260U-F-Flush transom fire only



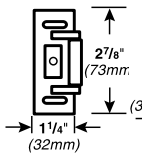
Projection 3/8" (10mm)

299



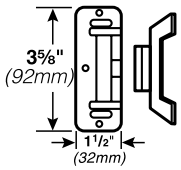
Projection 13/16" (21mm)

299F



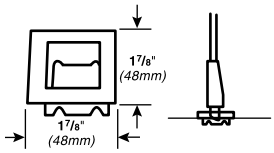
Projection 13/16" (21mm)

499F



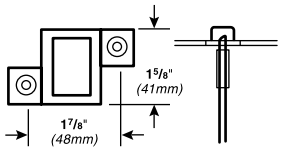
Projection 15/16" (24mm)

304L



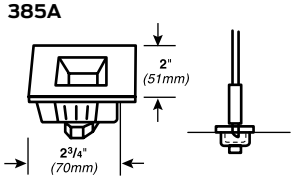
Projection 13/16" (21mm)

338



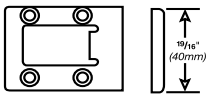
Mortise 5/8" (16mm)

385A



Mortise 2 1/2" (64mm)

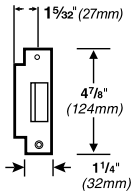
283



For use with WDC devices when used with wood frames

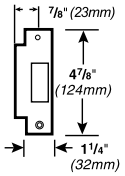
Strikes for mortise lock devices

575



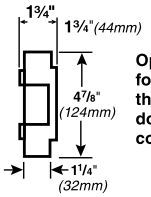
For use on 1 3/4" *(44mm)* or 2 1/4" *(57mm)* Single door and 2 1/4" *(57mm)* double door with coordinator.

575-2



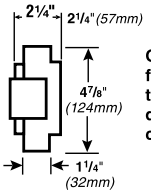
For use on 1 3/4" *(44mm)* thick double door with coordinator and astragal.

576A



Open back strike for 1 3/4" *(44mm)* thick double doors without coordinator.

576B



Open back strike for 2 1/4" *(57mm)* thick double doors without coordinator.

- Not for use with astragals
- For use on wood doors, contact door manufacturer

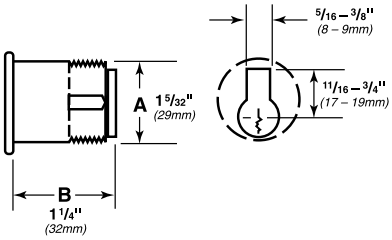
- Acceptable for 90 minute pair of hollow metal doors

Cylinders

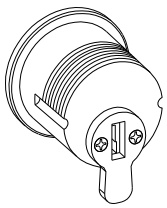
Cylinders are not furnished with device or trim and must be specified when ordering. Refer to trim pages for cylinder type.



Mortise — 3215
(Schlage 20-001, L583-477 cam)

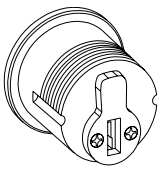


Dogged (inverted) cam



For CD, CDSI, CI and SD

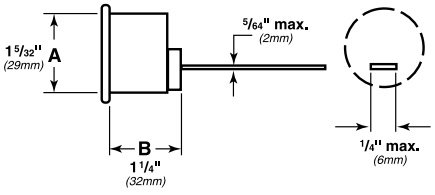
Undogged cam (standard operations)



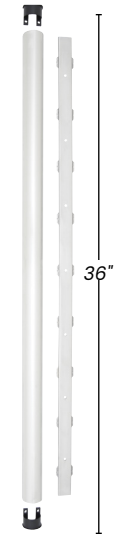
For ALK, CX, DE5300, RCM, SS and all 98/99 Series mortise cylinder trims and controls



Rim — 3216
(Schlage 20-022)



Door kits



Rod guard

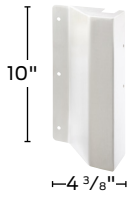
Vertical rod and latch guard (RG-27)

Series RG-27 Vertical rod and latch guards protect the bottom rods of exit devices from the damaging impacts of carts or gurneys passing through doors. (If bottom rods become damaged, the exit device will not function as intended and can jeopardize the ability to exit safely during an emergency.)

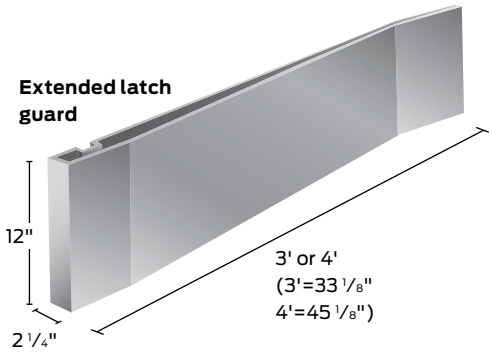
In addition to protecting the vertical rod, the guard provides a smooth, unobstructed surface so the door can be pushed open easily with the bumpers of a wheelchair. The latch guard portion is 10" high. The standard latch guard features a 45º ramp. The extended latch guard offers a continuous ramp for 3' or 4' doors.

All stainless steel construction in 630 finish. Latch guards can cover latches as large as 1 1/4"W x 10"H x 1 7/8" projection.

Latch guard



Extended latch guard



Models

RGO	Rod guard only (projection 1 3/16")
RG-27	Rod and latch guard
RG-27-3	3' (914mm) Rod guard and extended latch guard
RG-27-4	4' (1219mm) Rod guard and extended latch guard
LGO	Latch guard only
LGO-3	3' (914mm) Extended latch guard only
LGO-4	4' (1219mm) Extended latch guard only
WS-LGO-3	3' (914mm) Extended latch guard only for windstorm (WS) devices
WS-LGO-4	4' (1219 mm) Extended latch guard only for windstorm (WS) devices

When using on wood fire doors, high density block is required.

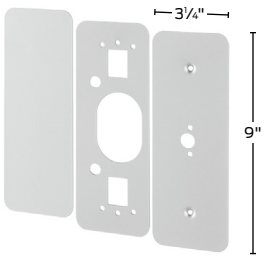
To order, specify:

1. Model number*
2. Handing (except on RGO).
3. Door material if other than hollow metal.
4. Optional sex bolt mounting available.

* RGO/RG-27 includes one rod guard only, which accommodates bottom or top rod up to 7' door. For longer top rods, specify rod guard quantity required. Also available are the WS-LGO-3; and WS-LGO-4' extended latch guards for use with WS98/9927/57 devices.

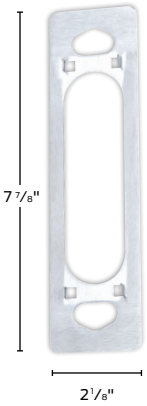
997 Cover plate kit

For 98/99 rim device, kit contains inside and outside plates for hinge stile cutouts, an inside plate for the lock stile, and necessary screws. Plates are designed to cover cutouts required by most existing exit device installations. Specify finish.



Wood door applications cover plate kit (WDA)

For wood door applications, used to cover up door preparations for control, also prevents the control from boring into the wood door. Finished to match control.



#10WDA Cover plate kit for 370 series controls

Glass bead kit (GBK)

Glass bead conversion kits are available for all 98/99 Series devices for use on doors with raised glass beads. Each kit consists of 1/4" (6mm) shim sets. GBK for surface vertical rod ships with 1/8" shims for rod guides.

To order, specify:

1. Device model.
2. GBK.
3. Device type (rim, mortise, surface rod, concealed rod, concealed cable).
4. Wood door (when used with concealed rod or concealed cable device).
5. Specify if using with 499F or 954 strike.
6. Finish.

Example: XP98 GBK Rim 954 SP28

Note: For 330/350 dummy pushbar, order hinge stile shim #971010, quantity 2.

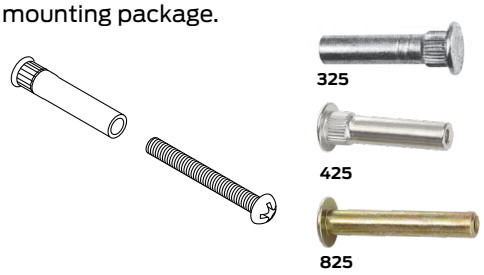
Sex bolts

Sex bolts provide secure mounting by mating with machine screws furnished with devices. Sex bolts are either optional or required, as shown in quantity chart below. Sex bolts ordered separately are not furnished with screws. If screws are required, order device mounting packages.

To order sex bolts

1. If ordering devices with sex bolts, specify SNB (sex nuts and bolts) in device description.
2. If ordering sex bolts separately, specify:
   - Sex bolt model number
   - Package quantity (sold as package of 2)
   - Finish

An alternative to sex bolt mounting is the use of UL or WH approved high density blocking material for wood fire-rated doors. Specify device with SLM (special laminate material) mounting package.



Device type	Function	Sex bolts						
		425			325 for 499F hook		325 for latches	825
		Required Included in device price	Required Added to device price	Optional Added to device price	Required Added to device price	Optional Added to device price	Required Included in device price	Required Added to device price
98/99/XP98/XP99 Rim	EO, NL-OP			6				
	DT, K, L, NL, TP, VR, 392, 696/697			2				
98/99/XP98/XP99 Rim-F, single door, metal door	EO, NL-OP			6				
	DT, K, L, NL, TP, VR, 392, 696/697			2				
98/99/XP98/XP99 Rim-F, double door, metal door	EO, NL-OP			6		2		
	DT, K, L, NL, TP, VR, 392, 696/697			2		2		
98/99/XP98/XP99 Rim-F, single door, wood door	EO, NL-OP, 392, 696/697*		6					
	DT, K, L, NL, TP, VR		2					2
98/99/XP98/XP99 RIM-F, double door, wood door	EO, NL-OP, 392, 696/697*		6		2			
	DT, K, L, NL, TP, VR		2		2			2
(HH)98/99/XP98/XP99 Rim panic and fire, single or double metal door	EO, NL-OP, 392, 696/697*		6			2		
	DT, K, L, NL, TP, VR		2			2		
98/9927/57/-F	EO, NL-OP, TL-OP			6			4	
	DT, K, L, NL, TP, TL, VR, 392, 696/697			2			4	2†
98/9927LBR/57LBR	EO, NL-OP, TL-OP			6			2	
	DT, K, L, NL, TP, TL, VR, 392, 696/697			2			2	
98/9927LBR-F, metal door	EO, NL-OP, TL-OP			6		2	2	
	DT, K, L, NL, TP, TL, VR, 392, 696/697			2		2	2	
98/9927LBR-F, wood door	EO, NL-OP, TL-OP			6	2		2	
	DT, K, L, NL, TP, TL, VR, 392, 696/697			2	2		2	
HH98/9927/57/-F	EO, NL-OP, TL-OP, 392, 696/697*		6		2		4	
	DT, K, L, NL, TP, TL, VR		2		2		4	
WS98/9927/57/-F	EO, 392	6					12	
	DT, L, VR	2					12	
98/9947/47WDC /48/49/50/-F, standard or LBR/LBL	EO, NL-OP, TL-OP			6				
	DT, K, L, NL, TP, TL, VR, 392, 696/697			2				
HH98/9947/49/-F	EO, NL-OP, TL-OP, 392, 696/697*		6					
	DT, K, L, NL, TP, TL, VR		2					
98/9952	EO			6				
	L, L-BE			2				
98/9975/-F	EO, NL-OP			6				
	DT, HL, K, L, NL, TP, 392, 696/697			2				
HH98/9975/-F	EO, NL-OP, 392, 696/697*		6					
	DT, HL, K, L, NL, TP		2					
98/99/XP98/XP99 Rim-F, single or double door, SLM blocking	No sex bolts, all applications; special laminate material (SLM) blocking mounting package added to price							
98/9927/57-F, SLM blocking								
98/9947WDC/50-F, standard or LBR/LBL, SLM blocking								
98/9975-F, SLM blocking								

* 696/697 must be milled on the back to sit flush against required 425 sex bolts

† These 825 sex bolts are only required for 98/9957-F on fire-rated wood doors with outside trim.

Mullions

Removable steel mullions provide single door performance in double door openings with rim devices. Mullions are easily removed by loosening bottom set screw and removing top fitting cover. The top mullion fitting is attached to the frame and is concealed by the fitting cover.

- Steel mullions are 2" (51mm) wide and 3" (76mm) deep, with a wall thickness of 1/8" (3mm) (except the HH9954 which has thicker walls).
- Mullions are shipped with mounting screws and prepared for strikes. (Strikes are not included except where indicated.)
- Steel mullions are available in SP28 and SP313 finishes. (Consult factory for other powder coat finish options.)

Keyed removable steel mullions (KR)

KR mullions make removal faster and easier by a single operation of the mortise cylinder. Once mullion is removed, large equipment or furniture can freely pass through the opening. The unit will self lock when re-installed, without the use of the cylinder key. Uses a 1 1/4" mortise cylinder with a straight cam (Schlage cam reference L583-477). Cylinders are sold separately. Prefix mullion model with "KR". (KR is not available on HH9954 or aluminum mullions.)

Removable aluminum mullions are 1 1/16" (27mm) wide on face closest to the door and 2 3/8" (60mm) at the widest point. The depth is 3 1/8" (79mm) with a wall thickness of 1/8" (3mm).

Aluminum mullions are available in 606, 612, 628, 710 and 622/711 finishes. Consult factory for other powder coat finish options. Aluminum mullions are not available keyed removable.

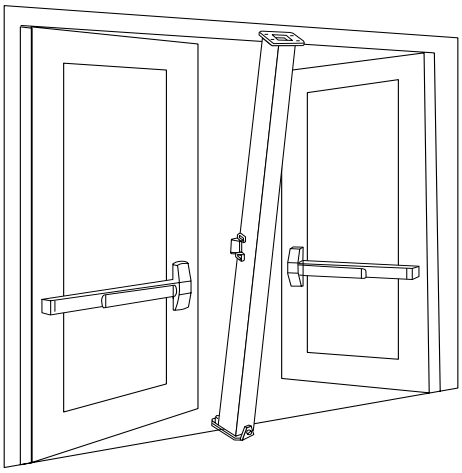
Stock hollow metal applications for devices mounted to cover ANSI 161 cutouts are higher than the standard mullion strike location. Consult the factory for special strike preparation or order a blank mullion. See below.

Blank mullions

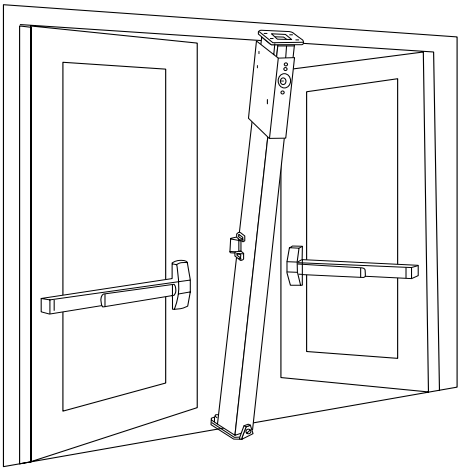
Blank mullions are furnished without strike preparation. They are used to mount devices at a strike height different from the standard mullion preparation.

To order, specify:

1. For keyed removable option on steel mullions, prefix model number with "KR"
2. Model number
3. Height of opening
4. Finish
5. Handing if required
6. Centerline deviation (refer to device template for standard centerline)
7. Strikes, when required, should be ordered with device



Removable mullions



Keyed removable steel mullions

Steel and aluminum mullions

Steel mullions

1654 Prepared for two 1606 strikes. If 1606 strikes are not specified on the order, two per mullion will be added. Additional charges apply.

4954 Prepared for 264 or 299 strikes. For use with all Von Duprin Panic rim devices.

4954-XP Prepared for two 909 strikes, for XP device.

9954 Prepared for and must be used with two 268 strikes (88-F device), or two 499F (22-F, 98-F, 99-F devices). UL fire labeled mullion for up to 3 hour opening using Von Duprin fire exit rim devices. This mullion is not easily removed due to special fittings. 98-F and 99-F devices are rated up to 10'0" (3048 mm).

Note: If 268 or 499F strikes are not specified on the order, two per mullion will be added. Additional charges apply.

9954-XP Prepared for two 954 strikes, for XP device.

HH9954 Heavy-duty mullion for use in impact-rated hurricane assembly. See UL Listing for Fire Exit Hardware on page 73 and Hurricane rated applications on pages 50-51.

4754 Prepared for two 4263 monitor strikes.

4854 Prepared for one 299 and one 6111 electric strike. Indicate handing for electric strike.

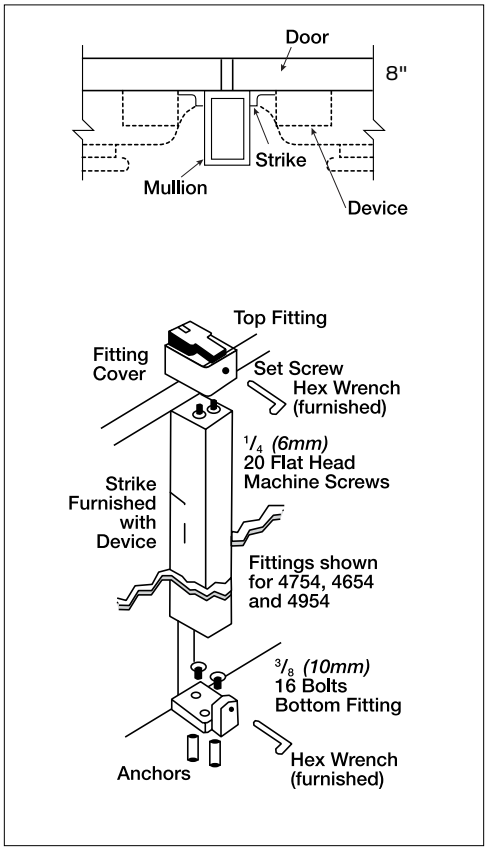
9854 Prepared for one 268 or 499F strike and one 6111 electric strike. Indicate handing for electric strike. UL fire labeled mullion for up to 90 minutes openings up to 8' x 8' (2438mm x 2438mm) using Von Duprin fire exit rim devices.

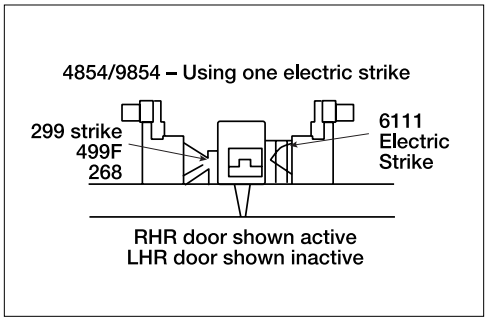
Aluminum mullions

5654 Prepared for two 299 strikes.

5654-XP Prepared for two 909 strikes, for XP device.

5754 Prepared for 1408 double strike.





UL Listing for fire exit hardware

UL Listed fire exit hardware label and opening size

Check with door manufacturers to confirm listing compatibility.

Exit device	Door material	Single door	Double door						
			With 9954 mullion	With 9854 mullion[4]	With KR9954 mullion	With KR9854 mullion[4]	V x V same direction[1]	V x Mortise same direction[3]	V x V double egress
98-F 99-F	Metal, composite (wood or plastic covered)	3 Hour 4' x 10'	3 Hour 8' x 10'	90 Min 8' x 8'	3 Hour 8' x 8'	90 Min 8' x 8'	—	—	—
98-F/99-F with 1439 Strike	Metal, composite (wood or plastic covered)	3 Hour 4' x 8'	—	—	—	—	—	—	—
XP98-F XP99-F	Metal, composite (wood or plastic covered)	3 Hour 4' x 10'	3 Hour 8' x 10'	90 Min 8' x 8'	3 Hour 8' x 8'	90 Min 8' x 8'	—	—	—
9827-F 9927-F	Metal, composite (wood or plastic covered)	—	—	—	—	—	3 Hour 8' x 10'	3 Hour 8' x 10'	3 Hour 8' x 10'
9827LBR-F 9927LBR-F	Metal, composite (wood or plastic covered)	—	—	—	—	—	3 Hour 8' x 8'	3 Hour 8' x 8'	3 Hour 8' x 8'
9827LBR-F[2] 9927LBR-F[2]	Wood core	—	—	—	—	—	20 Min no hose 8' x 8'	20 Min no hose 8' x 8'	20 Min no hose 8' x 8'
9847-F 9947-F	Metal, composite (wood or plastic covered)	—	—	—	—	—	3 Hour 8' x 10'	3 Hour 8' x 10'	3 Hour 8' x 10'
9847LBR-F 9947LBR-F	Metal, composite (wood or plastic covered)	—	—	—	—	—	3 Hour 8' x 9'	3 Hour 8' x 9'	3 Hour 8' x 9'
9847WDC-F 9947WDC-F	Composite (wood or plastic covered)	—	—	—	—	—	90 Min 8' x 9'3"	—	90 Min 8' x 9'3"
9847WDC-LBR-F 9947WDC-LBR-F	Composite (wood or plastic covered)	—	—	—	—	—	90 Min 8' x 9'3"	—	90 Min 8' x 9'3"
9847WDC-LBR-F[2] 9947WDC-LBR-F[2]	Wood core	—	—	—	—	—	20 Min no hose 8' x 9'3"	—	20 Min no hose 8' x 9'3"
9848-F 9948-F	Metal, composite (wood or plastic covered)	—	—	—	—	—	3 Hour 8' x 10'	3 Hour 8' x 10'	3 Hour 8' x 10'
9849-F 9949-F	Metal, composite (wood or plastic covered)	—	—	—	—	—	3 Hour 8' x 10'	3 Hour 8' x 10'	3 Hour 8' x 10'
9849LBL-F 9949LBL-F	Metal, composite (wood or plastic covered)	—	—	—	—	—	3 Hour 8' x 10'	3 Hour 8' x 10'	3 Hour 8' x 10'
9850-F 9950-F	Metal	—	—	—	—	—	90 Min 8' x 8'	—	90 Min 8' x 8'
9850WDC-F 9950WDC-F	Composite (wood or plastic covered)	—	—	—	—	—	90 Min w/ edge wrap 1 Hour w/o edge wrap 8' x 8'	—	—
9850WDC-LBL-F[2] 9950WDC-LBL-F[2]	Composite (wood or plastic covered)	—	—	—	—	—	20 Min w/ or w/o edge wrap, no hose 8' x 8'	—	—
9857-F 9957-F	Metal	3 Hour 4' x 10'	3 Hour 8' x 10'	3 Hour 8' x 10'	3 Hour 8' x 8'	3 Hour 8' x 8'	—	—	—
9857-F/9957-F with 1439 Strike	Metal	3 Hour 4' x 8'							
9875-F 9975-F	Metal, composite (wood or plastic covered)	3 Hour 4' x 10'	—	—	—	—	—	3 Hour See vertical row	—
WS9827-F WS9927-F	Metal, composite (wood or plastic covered)	—	—	—	—	—	3 Hour 8' x 8'	3 Hour 8' x 8'	3 Hour 8' x 8'
WS9857-F WS9957-F	Metal, composite (wood or plastic covered)	3 Hour 4' x 8'	—	—	—	—	—	—	—

1 Fire-rated flush bolts may be substituted on one leaf of a pair in these columns. Substitute two-point flush bolt for vertical devices; or substitute top flush bolt with auxiliary fire bolt for vertical rod LBR/LBL-AFL devices. The opening will carry the fire listing (# hours and opening size) of the least rated component.
2 Not listed for Canada.
3 For Vertical x Mortise opening sizes, see applicable vertical rod/cable device rows.
4 Hourly limitation due to 6111 electric strike listing.

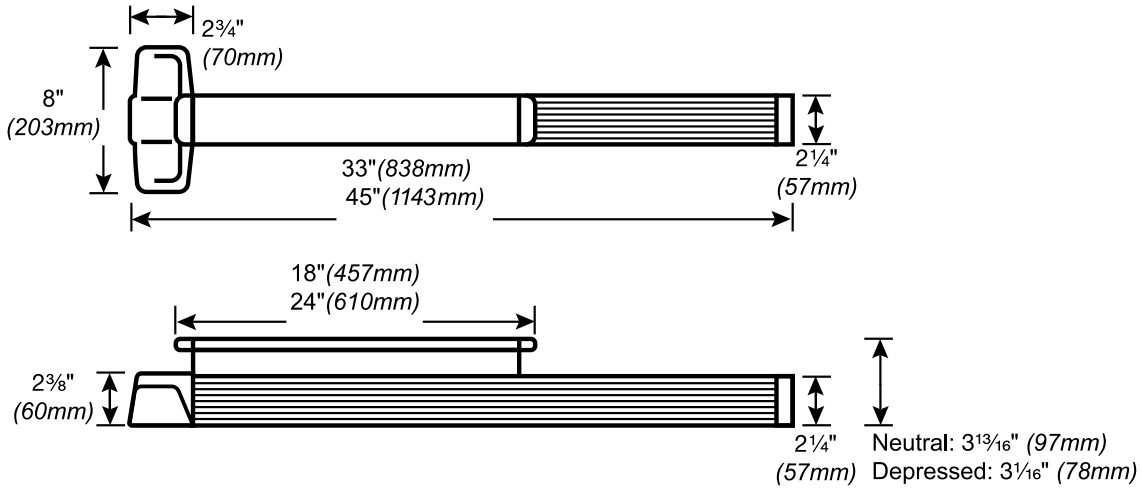
Notes:
Check with door manufacturers to confirm listing compatibility.
Overlapping astragal may not be used on pairs swinging same direction with vertical rods or cables on both leaves.

Function, grade and type options

ANSI Function, grade and type

Function	Grade 1, type 1	Grade 1, type 2	Grade 1, type 3	Grade 1, type 7	Grade 1, type 7	Grade 1, type 8	Grade 1, type 8	Grade 1, type 8	Grade 1, type 9
1	98EO/-F 99EO/-F	9827EO/-F 9927EO/-F	9875EO/-F 9975EO/-F	9847WDCEO/-F 9947WDCEO/-F	9850WDCEO/-F 9950WDCEO/-F	9847EO/-F 9947EO/-F	9848EO/-F 9948EO/-F	9849EO/-F 9949EO/-F	9857EO/-F 9957EO/-F
2	98DT 99DT	9827DT 9927DT	9875DT 9975DT	9847WDCDT 9947WDCDT	9850WDCDT 9950WDCDT	9847DT 9947DT	9848DT 9948DT	9849DT 9949DT	9857DT 9957DT
3	98NL/-F 99NL/-F	9827NL/-F 9927NL/-F	9875NL/-F 9975NL/-F	9847WDCNL/-F 9947WDCNL/-F	9850WDCNL/-F 9950WDCNL/-F	9847NL/-F 9947NL/-F	9848NL/-F 9948NL/-F	9849NL/-F 9949NL/-F	9857NL/-F 9957NL/-F
3	98K-NL/-F 99K-NL/-F	9827K-NL/-F 9927K-NL/-F	9875K-NL/-F 9975K-NL/-F	9847WDCK-NL/-F 9947WDCK-NL/-F	9850WDCK-NL/-F 9950WDCK-NL/-F	9847K-NL/-F 9947K-NL/-F	9848K-NL/-F 9948K-NL/-F	9849K-NL/-F 9949K-NL/-F	9857K-NL/-F 9957K-NL/-F
3	98L-NL/-F 99L-NL/-F	9827L-NL/-F 9927L-NL/-F	9875L-NL/-F 9975L-NL/-F	9847WDCL-NL/-F 9947WDCL-NL/-F	9850WDCL-NL/-F 9950WDCL-NL/-F	9847L-NL/-F 9947L-NL/-F	9848L-NL/-F 9948L-NL/-F	9849L-NL/-F 9949L-NL/-F	9857L-NL/-F 9957L-NL/-F
5	98TP/-F 99TP/-F	9827TP/-F 9927TP/-F	9875TP/-F 9975TP/-F	9847WDCTP/-F 9947WDCTP/-F	9850WDCTP/-F 9950WDCTP/-F	9847TP/-F 9947TP/-F	9848TP/-F 9948TP/-F	9849TP/-F 9949TP/-F	9857TP/-F 9957TP/-F
7	98TP-2/-F 99TP-2/-F		9875TP-2/-F 9975TP-2/-F						
8	98K/-F 99K/-F	9827K/-F 9927K/-F	9875K/-F 9975K/-F	9847WDCK/-F 9947WDCK/-F	9850WDCK/-F 9950WDCK/-F	9847K/-F 9947K/-F	9848K/-F 9948K/-F	9849K/-F 9949K/-F	9857K/-F 9957K/-F
8	98L/-F 99L/-F	9827L/-F 9927L/-F	9875L/-F 9975L/-F	9847WDCL/-F 9947WDCL/-F	9850WDCL/-F 9950WDCL/-F	9847L/-F 9947L/-F	9848L/-F 9948L/-F	9849L/-F 9949L/-F	9857L & F 9957L/-F
10	98K-2 /-F 99K-2/-F		9875K-2/-F 9975K-2/-F						
10	98L-2/-F 99L-2/-F		9875L-2/-F 9975L-2/-F						
11/12		9827TL/-F 9927TL/-F		9847WDC/-F 9947WDC/-F	9850WDC/-F 9950WDC/-F	9847TL/-F 9947TL/-F	9848/-F 9948/-F	9849/-F 9949/-F	9857TL/-F 9957TL/-F
14	98K-BE/-F 99K-BE/-F	9827K-BE/-F 9927K-BE/-F	9875K-BE/-F 9975K-BE/-F	9847WDCK-BE/-F 9947WDCK-BE/-F	9850WDCK-BE/-F 9950WDCK-BE/-F	9847K-BE/-F 9947K-BE/-F	9848K-BE/-F 9948K-BE/-F	9849K-BE/-F 9949K-BE/-F	9857K-BE/-F 9957K-BE/-F
14	98L-BE/-F 99L-BE/-F	9827L-BE/-F 9927L-BE/-F	9875L-BE/-F 9975L-BE/-F	9847WDCL-BE/-F 9947WDCL-BE/-F	9850WDCL-BE/-F 9950WDCL-BE/-F	9847L-BE/-F 9947L-BE/-F	9848L-BE/-F 9948L-BE/-F	9849L-BE/-F 9949L-BE/-F	9857L-BE/-F 9957L-BE/-F
16		9827TL-BE/-F 9927TL-BE/-F		9847WDC/-F 9947WDC/-F	9850WDC/-F 9950WDC/-F	9847TL-BE/-F 9947TL-BE/-F	9848/-F 9948/-F	9849/-F 9949/-F	9857TL-BE/-F 9957TL-BE/-F

Dimensions



Stile information

Device type	Standard single door			Standard double door			Optional single door			Optional double door		
	Strike	Trim/stile		Strike w/mullion*	Trim/Stile		Strike	Trim/stile		Strike w/mullion*	Trim/Stile	
		990/996	696/697		990/996	696/697		990/996	696/697		990/996	696/697
98/99	299	4 1/2" (114mm)	4 3/8" (111mm)	299 x 4954	4 7/8" (124mm)	4 3/4" (121mm)	1439 or 1410	3 13/16" (97mm)	3 13/16" (97mm)	299 x 5654	4 7/16" (113mm)	4 1/4" (108mm)
										1408 x 5754	3 13/16" (97mm)	3 13/16" (97mm)
							1606	4 1/16" (103mm)	3 15/16" (100mm)	1606 x 1654	4 3/8" (112mm)	4 1/4" (108mm)
XP 98/99	909			909 x 4954-XP			—	—	—	—	—	—
98-F/99-F	299F	4 1/2" (114mm)	4 3/8" (111mm)	499F x 9954	4 7/8" (124mm)	4 3/4" (121mm)	—	—	—	499F x 9854 KR9954	—	—
XP98-F/ XP99-F	909			954 x 9954-XP			—	—	—	—	—	—
9875 9975	575	4 3/4" (121mm)	4 3/4" (121mm)	575-2	—	—	—	—	—	576A-576B	4 3/4" (121mm)	4 3/4" (121mm)
9875-F 9975-F	575			575-2	—	—	—	—	—	576A-576B	4 3/4" (121mm)	4 3/4" (121mm)
9857 9957	299 (Top) 299 (Middle) 304L/248L-4 (Bottom)	4 1/2" (114mm)	4 3/8" (111mm)	299 x 4954	4 7/8" (124mm)	4 3/4" (121mm)	1439 or 1410	3 13/16" (97mm)	3 13/16" (97mm)	299 x 5654	4 7/16" (113mm)	4 1/4" (108mm)
										1408 x 5754	3 13/16" (97mm)	3 13/16" (97mm)
							1606	4 1/16" (103mm)	3 15/16" (100mm)	1606 x 1654	4 3/8" (112mm)	4 1/4" (108mm)
9857-F 9957-F	299F* (Top) 299F (Middle) 304L (Bottom)	4 1/2" (114mm)	4 3/8" (111mm)	299F 499F x 9954 304L	4 7/8" (124mm)	4 3/4" (121mm)	—	—	—	—	—	—

	Strike	Optional strike	Application	Trim/stile	
				990/996	696/697
9827 9927 Latch retraction	299 (Top) 304L/248L-4 (Bottom)	260U (Top) 385A (Bottom)	Single door	3 11/16" (94mm)	3 5/8" (92mm)
PL9827/PL9927 Pullman latch	299 (Top) 304L/248L-4 (Bottom)		Two vertical rod devices	3 11/16" (94mm)	3 5/8" (92mm)
9827-F 9927-F	299F* (Top) 304L (Bottom)	260U (Stainless) 385A (Bottom)			
9847 9947 9848 9948	338 (Top) 385A (Bottom)	304L (Bottom)	Vertical rod with Mortise lock device	4 3/4" (121mm)	4 3/4" (121mm)
9847-F 9947-F 9848-F 9948-F	338 (Top) 385A (Bottom)	304L (Bottom)	Two vertical rods	4 1/4" (108mm)	4 1/8" (105mm)
			Vertical rod with Mortise lock device	4 3/4" (121mm)	4 3/4" (121mm)
9847WDC 9947WDC	338 (Top) 385A (Bottom)	304L (Bottom)	Single door	4 1/4" (108mm)	4 1/4" (108mm)
			Two vertical rod devices	4 1/4" (108mm)	4 1/4" (108mm)
9847WDC-F 9947WDC-F	338 (Top) 385A (Bottom)	304L (Bottom)	Two vertical rod devices	4 1/4" (108mm)	4 1/4" (108mm)
9849 9949 9849 9949	249 (Top) 349 (Bottom)	—	Vertical cable with Mortise lock device	4 3/4" (121mm)	4 3/4" (121mm)
9849-F 9949-F 9849-F 9949-F	249 (Top) 349 (Bottom)	—	Two vertical cable	4 1/4" (108mm)	4 1/8" (105mm)
			Vertical cable with Mortise lock device	4 3/4" (121mm)	4 3/4" (121mm)
9850WDC 9950WDC	150 (Top) 450 (Bottom)	—	Single door	4 3/4" (121mm)	4 3/4" (121mm)
			Two vertical Cable devices	4 3/4" (121mm)	4 3/4" (121mm)
9850WDC-F 9950WDC-F	150 (Top) 450 (Bottom)	—	Two Vertical Cable Devices	4 3/4" (121mm)	4 3/4" (121mm)

*499F strike is the top strike for LBR applications.

Lever styles and finishes

Decorative levers



M51 [2]



M52 [2]



M53



M54



M55



M56



M57 [1]



M61 [3]



M62 [1,3]



M63 [3]



M81 [2]



M82



M83



M84



M85 [3]



ME1 [2,3,4]



ME2 [2,3,4]



ME3 [2,3]

1. Available in stainless steel substrate ONLY.
2. Knurling available, specify KN when ordering.
3. Handed.
4. Designed with Gensler as product design consultant.

Standard levers



01



02 [2]



03 [1,2]



05



06 [1,2] (Default lever)



07 [2]



12 [3]



16 - Omega



17 [1,2]



18



ACC - Accent [3]



AST - Asti [3]



MER - Merano [3]



LAT [1] - Latitude



LON [1] - Longitude

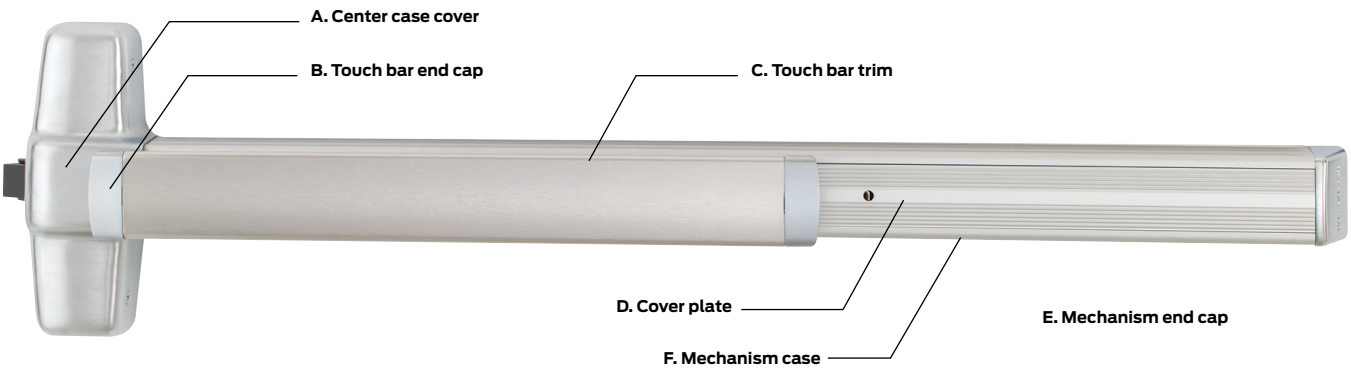
1. Available in Stainless Steel - specify SS when ordering.
2. Knurling available, specify KN when ordering.
3. Handed.

Finish options*						
Color	Bright brass	Satin brass	Satin bronze	Satin nickel	Matte black/ anodized	Bright chrome
ANSI/BHMA number	605	606	612	619	622/711	625

Finish options*						
Color	Satin chrome	Aluminum, anodized	Satin stainless	Aged bronze	Black paint	Dark brown, anodized
ANSI/BHMA number	626/626AM†	628	630/630AM†	643e	693	710

* Durable powder coated finishes available at special request. Please contact factory.
† AM = Antimicrobial

Device finish options



Finishes

Color	BHMA number	A, B, E	C	D and F
Bright brass	605	Bright brass	Bright brass, 605	Buffed anodized
Satin brass	606	Satin brass	Satin brass, 606	Anodized
Satin bronze	612	Plated	Satin bronze, 612	Anodized
Satin bronze, oil-rubbed	613	Oil rubbed bronze	Oil rubbed bronze, 613	Powder coat
Bright chrome	625	Plated	Bright stainless steel, 629	Buffed anodized
Satin chrome	626	Plated	Satin stainless steel, 630	Anodized
Satin stainless steel*	630	Stainless steel	Satin stainless steel, 630	Anodized
Aluminum, anodized	628	Powder coat	Satin stainless steel, 630	Anodized
Duranodic dark bronze	710	Powder coat	Powder coat	Powder coat
Black	622	Powder coat	Powder coat	Powder coat
Aged bronze	643e	Relieved aged bronze	Relieved aged bronze	Aged bronze, no relief

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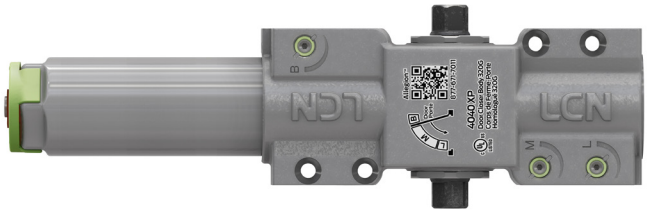
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4040XP Series





The 4040XP Series is LCN's most popular door closer—and for good reason. This durable, non-handed, surface-mounted, heavy-duty closer is designed for the most demanding high-use-and-abuse applications as well as for easy installation and maintenance.

Features

Certifications	Grade 1 - ANSI A156.4, UL 10C, ADA, 100 hour salt spray, meets BAA - Buy American Act
Body construction	▪ Patented positive stop ▪ Patented regulation valve indicators ▪ Independent speed adjustments ▪ QR code for instructions and support ▪ Cast iron body ▪ Full complement bearing ▪ 1 ½" diameter piston ▪ Double heat treated pinion journal
Fluid	All-weather Liquid X hydraulic fluid
Handing	Non-handed
Templating	Peel-n-Stick templates - 2 ¼" x 5" mounting hole pattern
Size	Adjustable spring size 1-6, includes LCN Green Dial
Warranty	30 years

Cover	▪ Snap-fit plastic cover (PC) with retention fit, standard ▪ Metal cover (MC), optional
Fasteners	Self reaming and tapping screws (SRT)
Mounting	Hinge (pull side), top jamb (push side), parallel arm (push side)
Arms	Regular arm
Finishes/colors/ powder coat	▪ 622 Matte black ▪ 689 Aluminum ▪ 690 Statuary bronze ▪ 691 Light bronze ▪ 693 Black ▪ 695 Dark bronze ▪ 696 Brass ▪ Custom colors optional ▪ Optional SRI primer - powder coat only ▪ Optional plated finishes

Product Configurations

Mounting						Finish		Cover			Cylinder			Arm function*						
Hinge (pull) side	Top jamb (pull)	Top jamb (push)	Parallel arm	Stop face	Powder coat	Plated	Plastic	Metal	Non-handed	Non-sized	Accessibility	Delay Action***	CYLAVB**	Regular (double)	Standard (single)	Hold Open	Fusible Link	EDA/HEDA	CUSH/HCUSH	SCUSH/SHCUSH	Double Egress
■	■	■	■	■	■	■	■	■	■	■	♿	■	■	120°	■	120°	■	180°	110°	110°	■

■ Available
■ Not available

♿ Closer available with less than 5.0 lbs. opening force on 36" door.
* Maximum opening/hold open point with standard template.
** Advanced Variable Back Check.
*** Delay feature incorporates standard 4040 cylinder (not XP).

Note: Special Templates - Customized installation templates or products may be available to solve non-standard applications. Contact LCN Product Support for assistance.

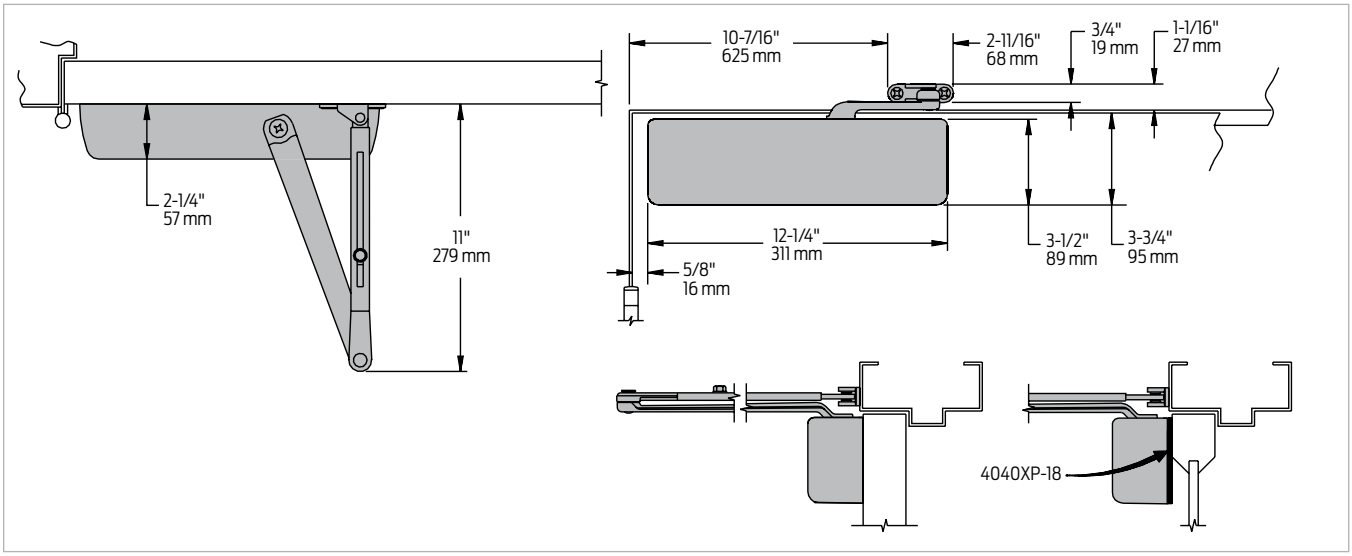
Adjustments

There are several design features that make installation or adjustment of the 4040XP easier and more intuitive.

- **LCN Green Dial** provides a visual reference of the spring power setting, taking the guesswork out of spring power adjustments.
- **Additional adjustments** can be made to the back check, main, and latch regulation valves which are labeled for easy identification.
  - Labels correspond to a diagram with door swing zones located on the closer body.
- **Patented positive stop feature** on all regulation valves. The improved staking feature prevents the screw from being backed out and causing accidental damage to the product.
  - The patented regulation valve indicators provide visual color indicators of how far a screw is backed out—the more visible the component, the faster the speed.
  - This makes adjustments simpler and more intuitive.
- **QR code** that provides on-the-spot access to interactive installation and maintenance instructions and tech support.

Mounting details

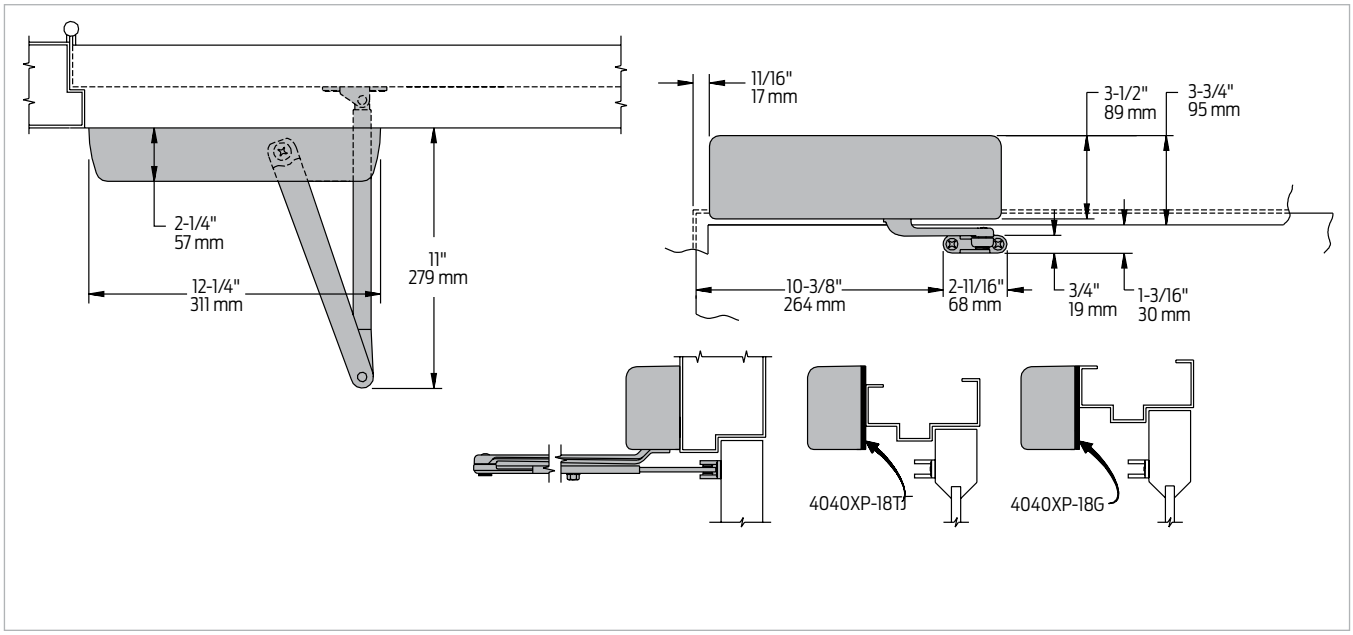
Hinge (pull) side mounting



Butt hinges	Should not exceed 5" (127 mm) in width
Auxiliary stop	Recommended at hold open point or where a door cannot swing beyond 120°
Reveal	Should not exceed 3/4" (19 mm) for Regular or Hold Open Arm
Top rail	Less than 3 3/4" (95 mm) requires plate, 4040XP-18; plate requires 2" (51 mm) minimum
Clearance	2 3/8" (60 mm) behind door required for 90° installation
Delay action	▪ Incorporates standard 4041 cylinder ▪ Delays closing from 120° to 70° ▪ Delay time adjustable up to approximately 1 minute
Maximum opening	▪ Templating allows up to 120° ▪ Hold open points 90° up to 120° with Hold Open Arm

Mounting details

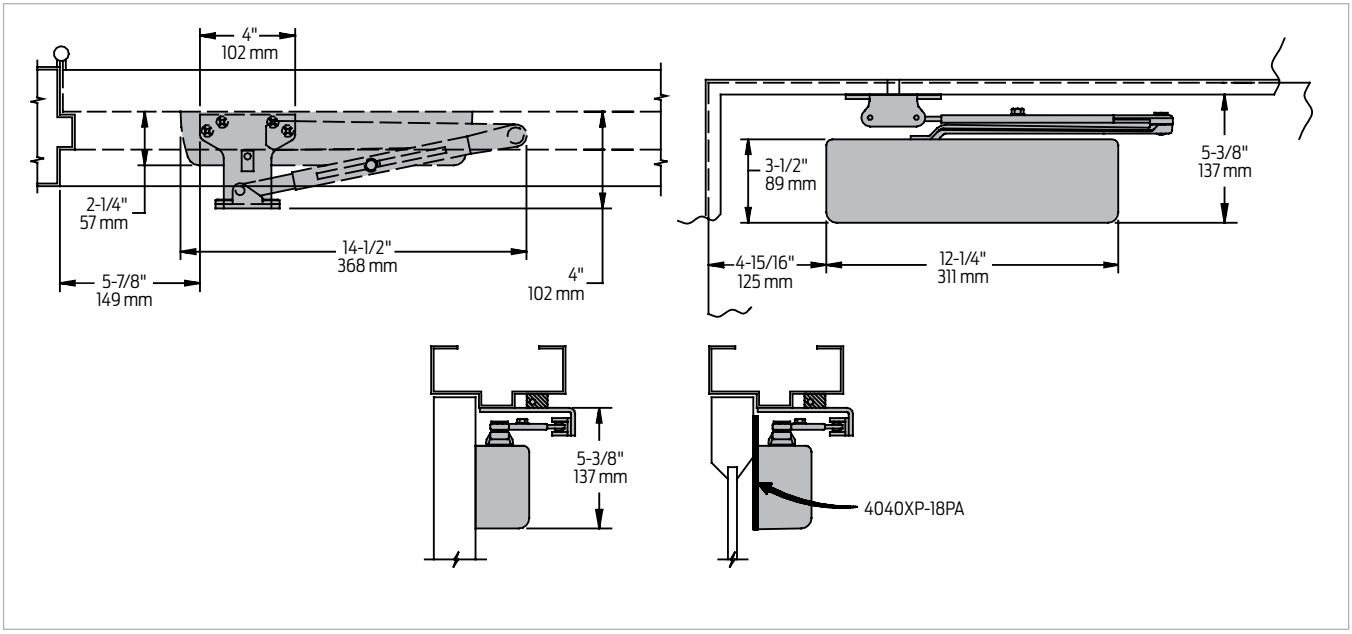
Top jamb (push) side mounting



Butt hinges	Should not exceed 5" (127 mm) in width		
Auxiliary stop	Recommended at hold open point or where a door cannot swing beyond 120°		
Reveal	Arm type	Reveal	Max opening
	Regular Arm	2 9/16"	Up to 120°
	Long Arm	4 13/16"	Up to 120°
	X Long Arm	4 13/16" up to 8"	Up to 120°
	Hold Open Arm	2 9/16"	Up to 120°
	Hold Open Long Arm	4 13/16"	Up to 120°
Top rail	▪ Requires 1 1/4" (32 mm) minimum ▪ 2 1/4" (57 mm) minimum with closer on plate, 4040XP-18TJ ▪ 3" (76 mm) minimum with closer on plate, 4040XP-18G		
Head frame	▪ Less than 3 1/2" (89 mm) requires plate, 4040XP-18TJ ▪ With flush ceiling, use plate, 4040XP-18G. Either plate requires 1 3/4" (44 mm) minimum		
Maximum opening	▪ Templating allows up to 120° ▪ Hold open points 85° up to 120° with Hold Open Arm		
Delay action	▪ Incorporates standard 4041 cylinder ▪ Delays closing from 120° to 70° ▪ Delay time adjustable up to approximately 1 minute		

Mounting details

Parallel arm (push) side mounting



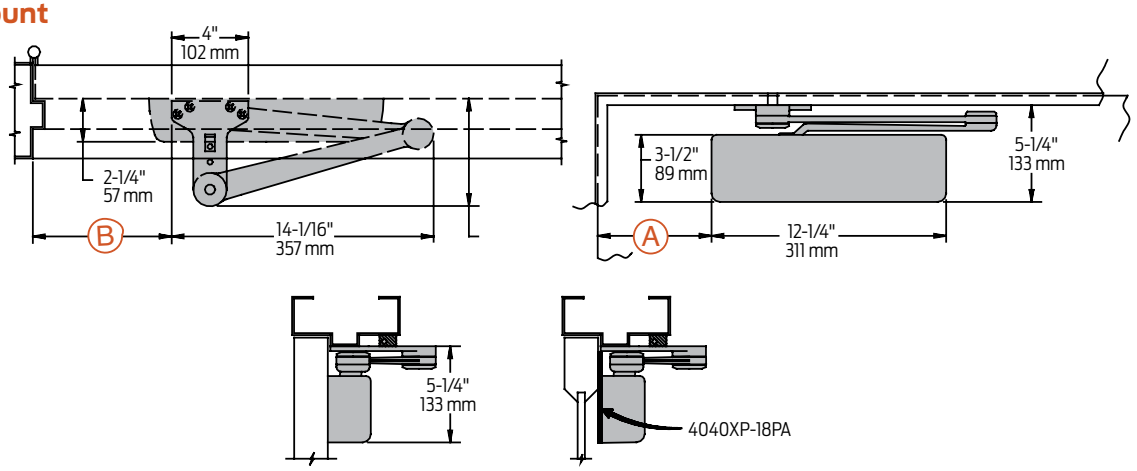
Butt hinges	Should not exceed 5" (127 mm) in width
Auxiliary stop	Recommended at hold open point, where the door cannot swing 180°, or where Cush-n-Stop Arm is not used
Reveal	Should not exceed 7/32" (6 mm)
Top rail	Less than 5 3/8" (137 mm) measured from the stop requires plate, 4040XP-18PA; plate requires 2" (51 mm) minimum from the stop
Head frame	Flush or rabetted requires PA shoe adapter, 4040XP-419
Stop width	Minimum 1" (25 mm); CUSH arm requires minimum 1 1/2" (38 mm)
Blade stop	Clearance requires 1/2" (13mm) blade stop spacer, 4040XP-61
Clearance	▪ 4040XP-62PA shoe is 4" (102 mm) from door face ▪ EDA shoe projects 5 1/2" (140 mm) from door face ▪ CUSH shoe projects 6" (152 mm) from door face
Delay action	▪ Incorporates standard 4041 cylinder, without XP cylinder ▪ Delays closing from 120° to 70° ▪ Delay time adjustable up to approximately 1 minute
Maximum opening	▪ 180° opening/hold open points with all except CUSH arms ▪ 110° opening/hold open with CUSH arms

Notes:
- Optional mounting requires PA shoe, 4040XP-62PA for regular or Hold Open Arms
- Add prefix "P" to closer description (eg. P4040XP)
- P4040XP closer includes 4040XP-201 fifth hole spacer to support PA shoe

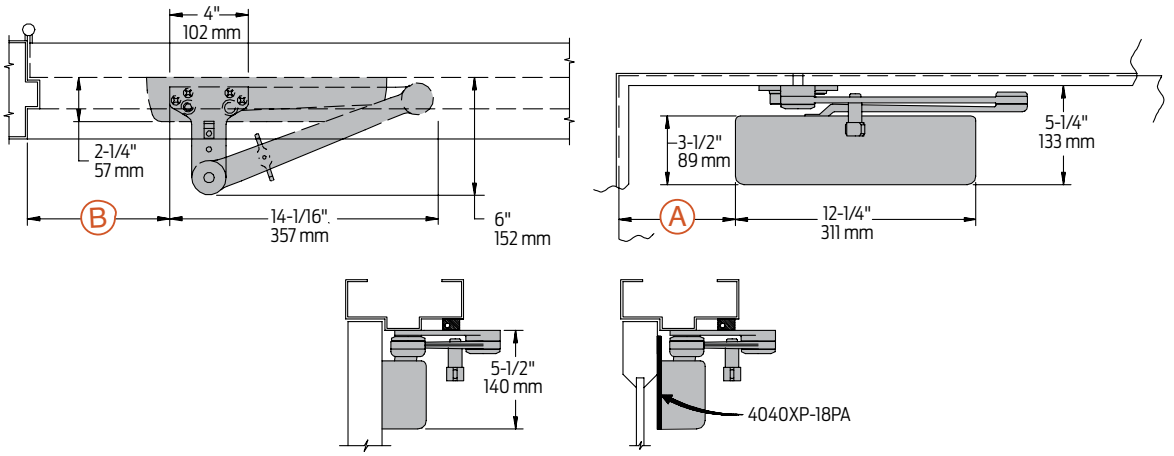
Mounting details

EDA and CUSH mounting

EDA mount



CUSH mount



Clearance	4040XP-62EDA is 5 1/2" (140 mm) from door face; 6" (152 mm) for CUSH	
Head frame	Flush or rabetted requires CUSH flush panel adapter, 4040XP-419	
CUSH Arm	Requires shoe support, 4040XP-30 for fifth screw anchorage where reveal is less than 3 1/16" (78 mm)	
Delay action	▪ Incorporates standard 4041 cylinder, without XP cylinder ▪ Delays closing from maximum opening to; 115° with 180° template, 95° with 110° template, 85° with 100° template, 75° with 90° template (delay time adjustable up to approximately 1 minute)	
Maximum opening	EDA arm can be templated for points at:	CUSH arms can be templated for opening/hold open point at:
	110°: A = 6 3/8" (162 mm) B = 7 3/4" (197 mm)	85°: A = 7 15/16" (202 mm) B = 9 1/8" (232 mm)
	or 180°: A = 2 7/8" (73 mm) B = 4 1/4" (108 mm)	90°: A = 7 3/16" (183 mm) B = 8 1/2" (216 mm)
	Hold open points up to maximum opening with HEDA arm	100°: A = 6 1/16" (154 mm) B = 7 1/4" (184 mm)
		or 110°: A = 5 1/16" (129 mm) B = 6 3/8" (162 mm)

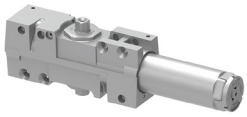
Notes:
- 4040XP Series closers ordered with EDA or CUSH arms include 4040XP-201 fifth hole spacer to support the shoe
- SCUSH stop points are approximately 5° more than templated stop point
- Hold open at templated stop points

Accessories

Cylinders

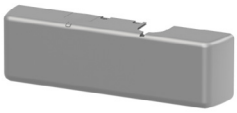


4040XP-3071
Cast iron cylinder assembly (CYL)
- Non-handed
- Heavy duty

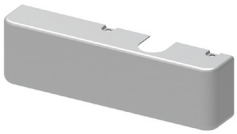


4041-3071 DEL
Delay Action Cylinder (CYLDEL)
- Used for delayed action closing
- Non-handed
- Heavy duty

Covers



4040XP-72
plastic cover (PC)
- Non-handed
- Includes 4040XP-54 snap-on cover clip
- Patented snap-fit cover with improved retention fit



4040XP-72MC
metal cover (MC)
- Handed
- Required for plated finishes and custom powder coat finishes
- Optional

Arms



4040XP-3077
Regular Arm (REGARM)
- Non-handed
- Mounts pull side or top jamb with shallow reveal P4041 closer includes PA shoe, 4040XP-62PA required for parallel arm mounting



4040XP-3077L
Long Arm (LONG)
- Non-handed
- Includes long rod and shoe, 4040XP-79LR for top jamb mount
- Optional



4040XP-3077ELR
Extra Long Arm (XLONG)
- Non-handed
- Includes extra long rod and shoe, 4040XP-79ELR for top jamb mount with deep reveal
- Optional



4040XP-3049
Hold Open Arm (H)
- Non-handed
- Mounts pull side or top jamb with shallow reveal, hold open adjustable shoe
- 4040XP-62PA shoe required for parallel arm mounting
- Optional



4040XP-3049L
Hold Open Long Arm (HLONG)
- Non-handed
- Includes long head and tube, 4040XP-3048L for top jamb mount
- Optional



4040XP-3077EDA
Extra Duty Arm (EDA)
- Non-handed
- Features forged, solid steel main and forearm for potentially abusive installations
- Optional



4040XP-3049EDA
Hold Open Extra Duty Arm (HEDA)
- Handed
- Parallel arm features forged, solid steel main and forearm for potentially abusive installations
- Hold open function is adjusted at the shoe
- Optional



4040XP-3077EDA/62G
Extra Duty Arm with 62G Thick Hub Shoe (EDAW62G)
- Non-handed
- Features forged, solid steel main and forearm for potentially abusive installations
- 62G shoe provides additional blade stop clearance
- Optional



4040XP-3049EDA/62G
Hold Open Extra Duty arm with 62G Thick Hub Shoe (HEDA62G)
- Handed
- Features forged, solid steel main and forearm for potentially abusive installations
- 62G shoe provides additional blade stop clearance; hold open function is adjusted at the shoe
- Optional



4040XP-3077CNS
Cush-n-Stop Arm (CUSH)
- Non-handed
- Features solid forged steel main arm and forearm with stop in soffit shoe.
- Optional



4040XP-3049CNS
Hold Open Cush-n-Stop Arm (HCUSH)
- Non-handed
- Hold open function with templated stop/hold open points
- Handle controls hold open function
- Optional

Accessories

Arms (cont.)



4040XP-3077SCNS
Spring Cush-n-Stop Arm (SCUSH)
- Non-handed
- For potentially abusive applications features solid forged steel main arm and forearm with spring loaded stop in the soffit shoe
- Optional



4040XP-3049SCNS
Spring Hold Open Cush-n-Stop Arm (SHCUSH)
- Non-handed
- For potentially abusive applications features solid forged steel main arm and forearm with spring loaded stop in the soffit shoe
- Handle controls hold open function
- Optional

Installation accessories



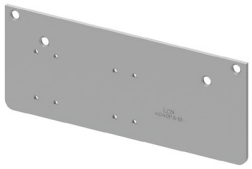
4040XP-18
Plate
- Required for hinge side mount where top rail is less than 3 3/4" (95 mm)
- Requires minimum 2" (51 mm) minimum top rail



4040XP-18G
Plate
- Locates top jamb mounted closer flush with top of head frame face in flush ceiling condition
- Requires 1 3/4" (44 mm) minimum head frame



4040XP-18TJ
Plate
- Centers top jamb mounted closer vertically on head frame where face is less than 3 1/2" (89 mm). Plate requires 1 3/4" (44 mm) minimum head frame



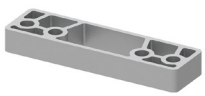
4040XP-18PA
Plate
- Required for parallel arm mounting where top rail is less than 5 1/2" (140 mm), measured from the stop
- Requires 2" (51 mm) minimum top rail



4040XP-62PA
PA shoe
- Required for parallel arm mounting



4040XP-30
CUSH shoe support
- Provides anchorage for fifth screw used with CUSH arms, where reveal is less than 3 1/16" (78 mm)
- Optional



4040XP-61
Blade stop spacer
- Required to lower parallel arm shoe to clear 1/2" (13 mm) blade stop
- Optional



4040XP-419
PA flush panel adapter
- Provides horizontal mounting surface for parallel arm shoe on single rabbeted or flush frame
- Optional



4040XP-62A
Auxiliary shoe
- Requires a top rail of 7" (178 mm)
- Shoe replaces -62PA for parallel arm mounting of regular arm with overhead holder/stop
- Optional

Ordering information

How-to-order 4040XP Series closers

1. Select finish

☐ Standard powder coat _____
Matte Black (622), Aluminum (689), Dark Bronze (695), Statuary Bronze (690), Light Bronze (691), Black (693), or Brass (696)

Closer will be shipped with:
- Standard cylinder
- Standard cover
- Regular arm
- Self reaming and tapping screws
(unless options listed below are selected)

Closer options

Cylinder
☐ Delay action cylinder (CYLDEL)

Cover
☐ Metal (specify right or left hand)(MC)

Finish
☐ Custom powder coat (RAL) _____
(handed metal cover required)
☐ Plated finish, US _____
(handed metal cover required)
☐ SRI primer
(use with powder coat finishes only)

Arm
☐ Regular Arm (REGARM)
☐ Regular Arm with Parallel Arm Bracket (RWPA)
☐ Regular Arm with 62A Auxiliary Shoe (RW62A)
☐ Long Arm (LONG)
☐ Extra Long Arm (XLONG)
☐ Hold Open Arm (H)
☐ Hold Open with Parallel Arm Bracket (HWPA)
☐ Hold Open Long Arm (HLONG)
☐ Extra Duty Arm (EDA)
☐ Extra Duty Arm with 62G Thick Hub Shoe (EDAW62G)
☐ Hold Open Extra Duty Arm (HEDA)
☐ Cush-n-Stop Arm (CUSH)
☐ Hold Open Cush-n-Stop Arm (HCUSH)
☐ Spring Cush-n-Stop Arm (SCUSH)
☐ Spring Hold Open Cush-n-Stop Arm (SHCUSH)

Optional screw packs
☐ Through bolt[1] self reaming and tapping screws (TBSRT)
☐ Wood and machine screws (WMS)
☐ Through bolt[1] wood and machine screws (TBWMS)
☐ Torx machine screws (TORX)
☐ Through bolt[1] and torx machine screws (TBTRX)

Installation accessories
☐ Plate, 4040XP-18
☐ Plate, 4040XP-18TJ
☐ Plate, 4040XP-18G
☐ Plate, 4030-18PA
☐ CUSH shoe support, 4040XP-30
☐ Blade stop spacer, 4040XP-61
☐ Auxiliary shoe, 4040XP-62A
☐ PA flush panel adapter, 4040XP-419

Special template
☐ ST- _____

1. Specify door thickness if other than 1 3/4".

Table of sizes

- 4040XP cylinders are adjustable from size 1 through size 6 and is shipped set to size 3
- Closing power of 4040XP Series closers may be adjusted 50%

Exterior (and vestibule) door width

24" 610mm	30" 762mm	36" 914mm	42" 1067mm	48" 1219mm
*4040XP	size 3	size 4	size 5	size 6

Minimum door width

Interior door width

24" 610mm	30" 762mm	38" 965mm	48" 1219mm	54" 1372mm	60" 1524mm
*4040XP	size 2	size 3	size 4	size 5	size 6

Minimum door width

→ Indicates recommended range of door width for closer size.
* Adjustable Size 1 thru 5.

Reduced opening force 4040XP Series closers

CAUTION! Any manual door closer, including those certified by BHMA to conform to ANSI Standard A156.4, that is selected, installed and adjusted based on ADA or other reduced opening force requirements may not provide sufficient power to reliably close and latch a door.

Refer to Automatic Operators catalog for information on systems that meet reduced opening force requirements without effecting closing power.

Door width	36"	42"	48"
8.5* lbs.	4040XP	4040XP	4040XP
5.0* lbs.	4040XP	4040XP	4040XP

* Maximum opening force.

4040XPT Series



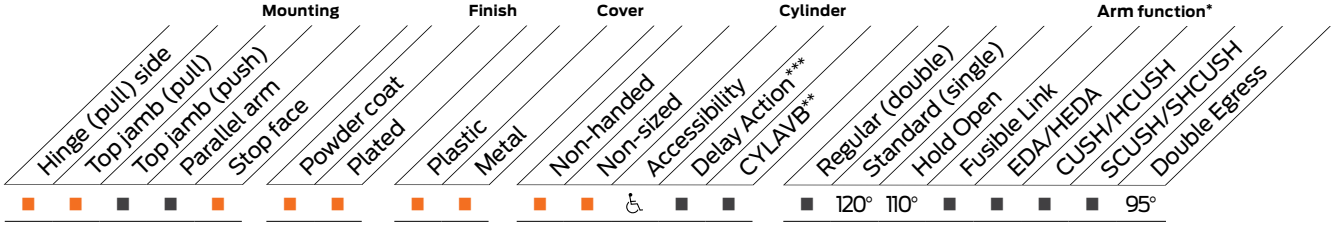
The 4040XPT is a Grade 1 device featuring a cast iron body and Liquid X Fluid ideal for pull or push side placement in high traffic applications. Its high-quality construction provides for reliable performance.

Features

Certifications	Grade 1 - ANSI A156.4, UL 10C, ADA, 100 hour salt spray, meets BAA - Buy American Act
Body construction	▪ Cast iron body ▪ Full complement bearing ▪ 1 ½" diameter piston ▪ Double heat treated pinion journal
Fluid	All-weather Liquid X hydraulic fluid
Handing	Non-handed
Size	Adjustable spring size 1-4
Warranty	30 years

Cover	▪ Snap-fit plastic cover (PC) with retention fit, standard ▪ Metal cover (MC), optional
Fasteners	Self reaming and tapping screws (SRT)
Mounting	Pull side on door, pull side top jamb, push side on door
Arms	Standard arm and track with roller
Finishes/colors/ powder coat	▪ 622 Matte black ▪ 689 Aluminum ▪ 690 Statuary bronze ▪ 691 Light bronze ▪ 693 Black ▪ 695 Dark bronze ▪ 696 Brass ▪ Custom colors optional ▪ Optional SRI primer - powder coat only ▪ Optional plated finishes

Special templates | Customized installation templates or products may be available to solve non-standard applications. Contact LCN Product Support for assistance.

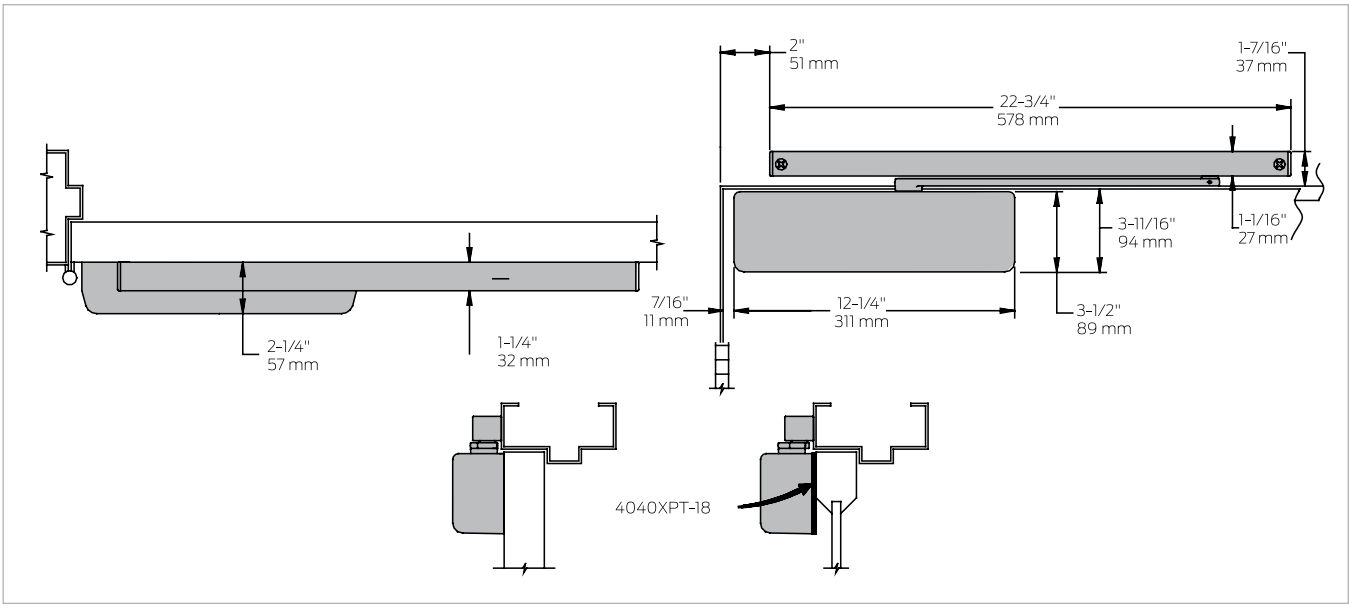


■ Available
■ Not available

♿ Closer available with less than 5.0 lbs. opening force on 36" door.
* Maximum opening/hold open point with standard template.
** Advanced Variable Back Check.
*** Delay feature incorporates standard 4040 cylinder (not XP).

Mounting details

Hinge (pull) side mounting

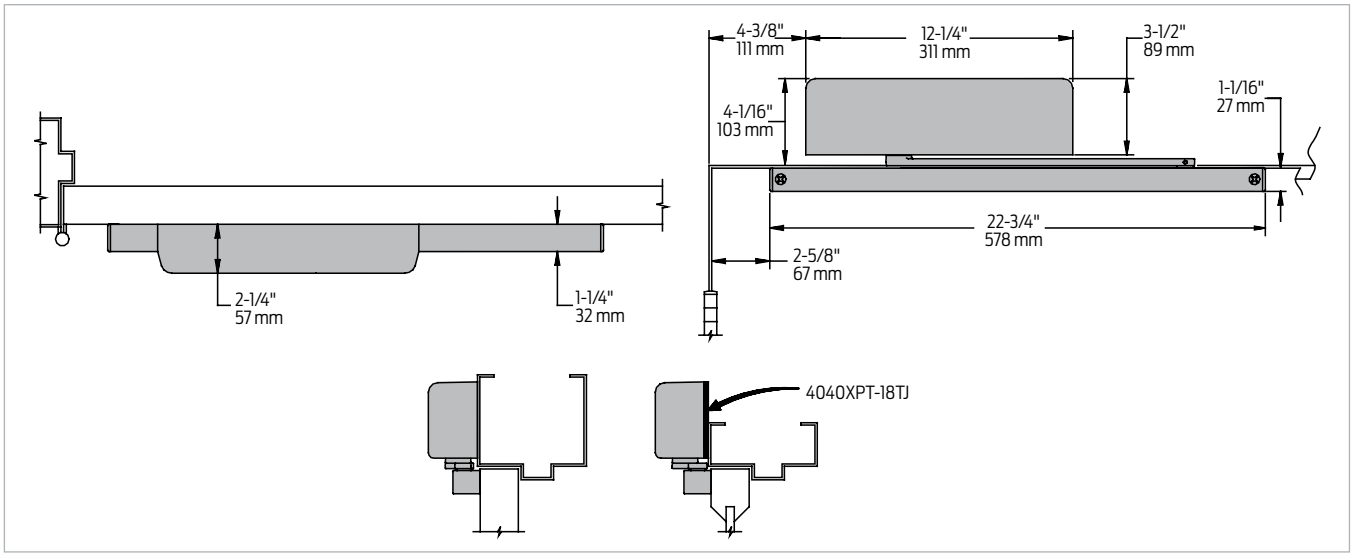


Butt hinges	Should not exceed 5" (127 mm) in width
Auxiliary stop	▪ Recommended at hold open point or where a door cannot swing 120° ▪ Optional track bumper assembly assists back check in cushioning the opening swing of the door ▪ Track bumper is not intended to replace an auxiliary stop
Reveal	Should not exceed 1/8" (3 mm) for standard arm
Top rail	Less than 3 3/4" (95 mm) requires plate, 4040XPT-18. Plate requires 1 13/16" (44 mm) minimum.
Head frame	Requires 1 1/4" (32 mm) minimum
Clearance	2 1/4" (57 mm) behind door required for 90° installation
Maximum opening	▪ Templating allows 120° with standard arm, limited to 110° when optional bumper is installed ▪ Variable hold open angles with infinite options

Note: Consult factory for applications where door must swing 180°.

Mounting details

Top jamb (pull) side mounting

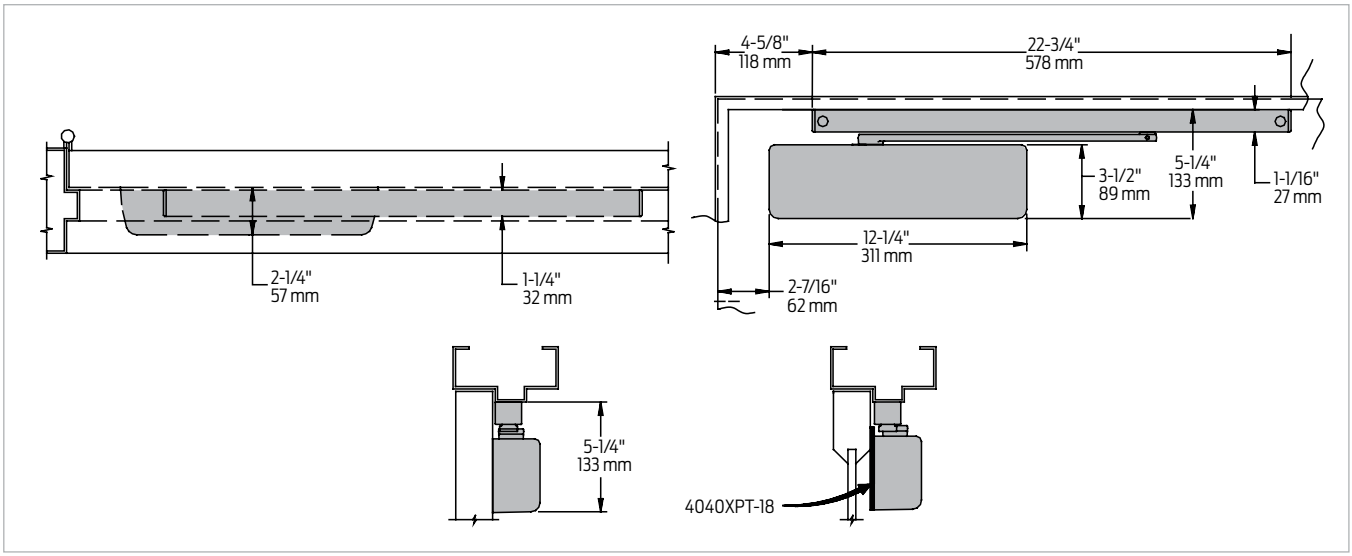


Butt hinges	Should not exceed 5" (127 mm) in width
Auxiliary stop	▪ Recommended at hold open point or where a door cannot swing 180° ▪ Optional track bumper assembly assists back check in cushioning the opening swing of the door ▪ It is not intended to replace an auxiliary stop
Reveal	Should not exceed 1/8" (3 mm)
Head frame	Less than 3 7/8" (98 mm), requires plate, 4040XPT-18TJ. Plate requires 1 3/4" (44 mm) minimum.
Clearance	1 1/4" (32 mm) behind door required for 180° installation
Maximum opening	▪ Templating allows 180° with standard track arm, limited to 110° with optional bumper installed ▪ Consult factory if door will be held open at 180° ▪ Variable hold open angles with infinite options

Note: Consult factory for applications where an exterior or large/heavy door must swing 180°

Mounting details

Stop face (push) side mounting



Butt hinges	Should not exceed 5" (127 mm) in width
Auxiliary stop	▪ Recommended at hold open point or where a door cannot swing 120° ▪ Optional track bumper assembly assists back check in cushioning the opening swing of the door ▪ It is not intended to replace an auxiliary stop
Clearance	Projects 2 1/4" (57 mm) from face of door
Top rail	▪ Less than 5 1/4" (133 mm) measured from the stop, requires plate, 4040XPT-18 ▪ Plate requires 3 1/2" (89 mm) minimum
Stop width	Minimum 1 1/4" (32 mm)
Maximum opening	▪ Templating allows 120° with standard track arm, limited to 110° with optional bumper tracks ▪ Variable hold open angles with infinite options

Note: Consult factory for applications where door must swing 180°.

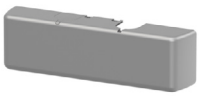
Accessories

Cylinders

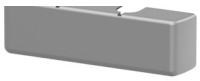


4040XPT-3071
Cast iron cylinder assembly (CYL)
- Non-handed
- Standard

Covers



4040XPT-72
Plastic Cover (PC)
- Non-handed
- Snap-on
- Standard



4040XPT-72MC
Metal Cover (MC)
- Handed
- Required for plated finishes and custom powder coat finishes
- Optional

Arms



4040XPT-3077T
Standard Arm (STDTRKARM)
- Non-handed
- Arm does not include track roller



4040XPT-3077DE
Double Egress Arm (DE)
- Handed
- For double egress doors and frames
- Does not include track roller
- Maximum reveal is 2 11/16" (68mm)
- Optional

Tracks



4040XPT-3038
Standard Track (STDTRK)
- Non-handed
- Non hold open
- Will accept hold open clip and/or bumper assembly
- Standard



4040XPT-3038B
Track with Bumper (BUMP)
- Non-handed
- Non hold open
- Will accept hold open clip
- Optional



4040XPT-3038H
Hold Open Track (H)
- Non-handed
- With hold open clip installed
- Will accept bumper assembly
- Optional



4040XPT-3038HB
Hold Open Track with Bumper (HBMP)
- Non-handed
- With hold open clip and bumper assembly installed
- Optional

Installation accessories



4040XPT-18
Plate
- Required for pull side (door mount) installations where top rail is less than 3 3/4" (95 mm)
  - Requires minimum 1 3/4" (44 mm) top rail
- Required for push side (door mount) installations where top rail is less than 5 1/4" (133 mm) measured from the stop
  - Requires minimum 3 1/2" (89 mm) top rail



4040XPT-18TJ
Plate
- Required for pull side top jamb installations where head frame is less than 3 7/8" (98 mm)
- Requires minimum 1 3/4" (44 mm) head frame



4040XPT-169
Track bumper
- Mounts in track to assist back check, does not replace auxiliary stop
- Limits maximum opening. Consists of bumper, bumper post, and mounting screw



4040XPT-3054
Hold open clip
- Mounts in track to provide hold-open function
- Hold open point controlled by clip location
- Consists of clip and mounting screws
- Requires 4040XPT-3034H hold open track roller



4040XPT-3034
Track roller
- Quiet, low friction roller assembly
- Shoulder dimension "X" = 1/8" (3mm)



4040XPT-3034H
Hold open track roller
- Quiet, low friction roller assembly
- Shoulder dimension "X" = 1/8" (3mm)

Ordering information

How-to-order 4040XPT Series closers

1. Select finish

☐ Standard powder coat _____
Matte Black (622), Aluminum (689), Dark Bronze (695), Statuary Bronze (690), Light Bronze (691), Black (693), or Brass (696)

Closer will be shipped with:
- Standard cylinder
- Standard cover
- Standard arm
- Track roller
- Standard track
- Self reaming and tapping screws
  (unless options listed below are selected)

Closer options

Cover
☐ Metal cover (MC)

Finish
☐ Custom powder coat (RAL) _____
(handed metal cover required)
☐ Plated finish, US _____
(handed metal cover required)
☐ SRI primer (use with powder coat finishes only)

Track
☐ Track with Bumper (BUMP)
☐ Hold Open Track (H)
☐ Hold Open Track with Bumper (HBMP)

Screw pack
☐ Through bolt[1] self reaming and tapping screws (TBSRT)
☐ Wood and machine screws (WMS)
☐ Through bolt[1] wood and machine screws (TBWMS)
☐ Torx machine screws (TORX)
☐ Through bolt[1] and torx machine screws (TBTRX)

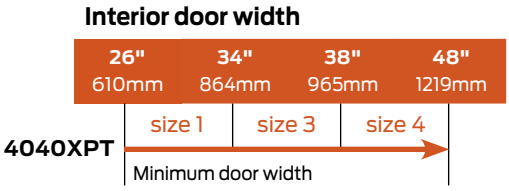
Installation accessories
☐ Plate, 4040XPT-18
☐ Plate, 4040XPT-18TJ

Special template
☐ ST- _____

1. Specify door thickness if other than 1 3/4".

Table of sizes

- Non-sized 4040XPT Series cylinder is adjustable from sizes 1 through 4 and is shipped set to size 3



→ Indicates recommended range of door width for closer size.

Reduced opening force 4040XPT Series closers

CAUTION! Any manual door closer, including those certified by BHMA to conform to ANSI Standard A156.4, that is selected, installed and adjusted based on ADA or other reduced opening force requirements may not provide sufficient power to reliably close and latch a door.

Refer to Automatic Operators catalog for information on systems that meet reduced opening force requirements without effecting closing power.

Door width	36"	42"	48"
8.5* lbs.	N/A	N/A	N/A
5.0* lbs.	4040XPT	4040XPT	4040XPT

* Maximum opening force.

200N, 201N

Neoprene Sweep

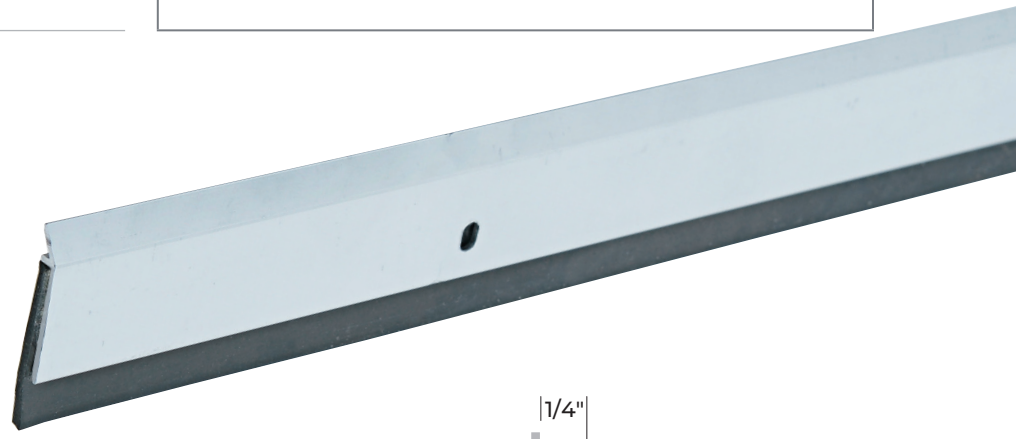
PRODUCT CUT SHEET

PROJECT:	
SUBMITTED BY:	
DATE:	
NOTES:	

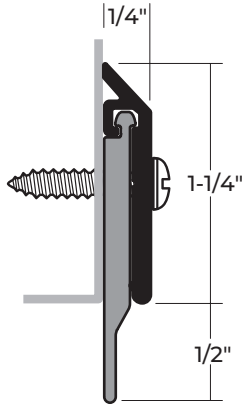
Material

Aluminum Alloy 6063, T5 Temper
Synthetic EPDM Rubber in Polypropylene Thermoplastic Matrix
Neoprene is Black

- Very Good Abrasion Resistance, Tensile Strength and Memory
- Flame-Resistant
- Moisture-Resistant
- Temperature Range -81°F to 275°F
- Good Resistance to Ozone, Sunlight and Aging
- BHMA Certified to ANSI/BHMA A156.22 Performance Tests for Heat and Cold
- #6 x ¾" Stainless Steel SMS Furnished
- Screw Holes Slotted for Adjustment



PRODUCT#	FINISH
200NA	Anodized Al
200NDKB	Dark Bronze
201NA	Anodized Al
201NDKB	Dark Bronze



BHMA CERTIFIED

NATIONAL GUARD PRODUCTS, INC.

MEMPHIS
4985 East Raines Road
Memphis, TN 38118

CARSON CITY
3689 Arrowhead Drive
Carson City, NV 89706

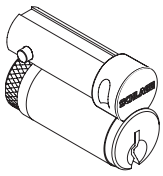
Fax: (800) 255-7874
Email: info@ngp.com

Quotes: quotes@ngp.com
Orders: orders@ngp.com

ngp.com
1-800-NGP-RUSH

FSIC, core only, cylinders

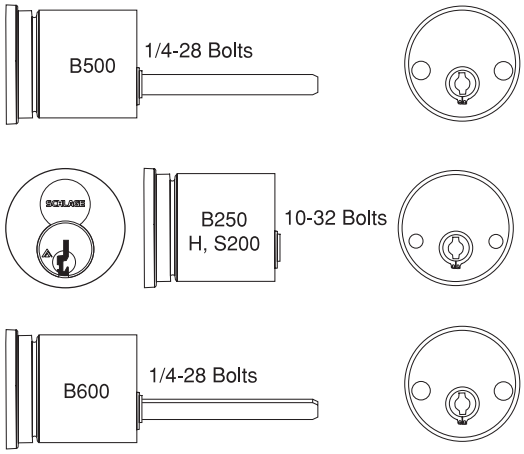
Number	Pins	Cylinder mechanism
23-030	6	Standard pin and tumbler
23-031	6	Standard pin and tumbler, less logo
91-161	7	SL cylinder (restricted Everest 29 R and Everest B only)
91-162	7	SL cylinder, less logo (restricted Everest 29 R and Everest B only)
20-740	6	Primus
20-741	6	Primus, less logo
20-740-XP	6	Primus XP
20-741-XP	6	Primus XP, less logo
91-861-XP	7	SL cylinder (restricted Everest 29 R and Everest B only)
91-862-XP	7	SL cylinder, less logo (restricted Everest 29 R and Everest B only)
30-120	6	Faculty restroom standard pin and tumbler (specify hand)
30-121	6	Faculty restroom standard pin and tumbler, less logo (specify hand)



Full size (FSIC)

FSIC housings for bored deadlocks, less core

Lockset series	Description	Number	Specify finish
B500 Series	Outside	B610-203 (single) B610-205 (double)	605, 606, 609, 612, 613, 619, 625, 626, and 643e
	Inside	B610-028[1]	See note below
B250	Outside	22-061	605, 606, 609, 613, 625, 626
	Inside of B252	22-062	
H, S200 Series	Outside	5306-135	605, 606, 609, 612, 613, 625, 626
B600 / 700 Series	Outside	B610-203 (single) B610-205 (double)	605, 606, 609, 612, 613, 619, 625, 626, 643e
	Inside	B610-028	See note below

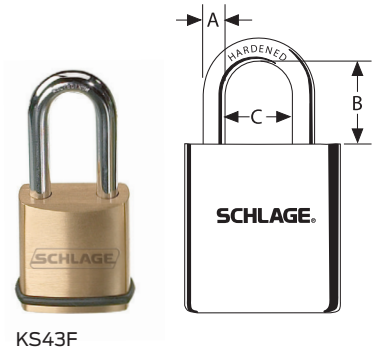


Specify finish of B610-031 inside snap-on faceplate ordered separately for B662/762, and B562.

1 Inside housing does not include snap-on faceplate.

FSIC padlocks

Brass lock body number	Shackle dimensions		
	A	B	C
Less - full size interchangeable core			
KS43D3200	3/8"	1 1/2"	3/4"
KS43F3200	3/8"	2"	3/4"



KS43F

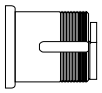
Full size interchangeable cores

FSIC mortise cylinders for L Series





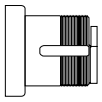
L & N escutcheons (cylinders with compression ring)



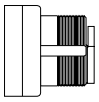
Cylinder only



Sectional trim (cylinder with compression ring, spring and 3/8" blocking ring)



Compression ring and spring



With blocking ring

FSIC cylinders for Schlage L Series mortise locks

Design	Function	Core mechanism				
		Standard pin and tumbler	**SL cylinder[1]**	**Primus Primus XP**	**Primus XP SL cylinder[1]**	**Housing less core**
L and N escutcheons (cylinders with compression ring)	All except below	30-008	91-163	20-798 20-798-XP	91-863-XP	30-007
	L9060 outside	30-030	91-165	20-782 20-782-XP	91-865-XP	30-032 + 36-083
	L9485, L9486 faculty restroom	30-010[2]	N/A	N/A	N/A	N/A
Sectional trim (cylinder with compression ring, spring and 3/8" blocking ring). 9060 requires 1/2" blocking ring.	All except below	30-138	91-169	20-776 20-776-XP	91-869-XP	30-137
	L9060 outside	30-030 + 36-082-050	91-165 + 36-082-050	20-783 20-783-XP	91-865-XP + 36-082-050	30-032 + 36-083 + 36-082-050
	L9485, L9486 faculty restroom	30-140[2]	N/A	N/A	N/A	N/A

1 For restricted Everest 29 R and Everest B only.

2 Faculty restroom function cores are handed. Specify hand of door.



L583-255
Cam for all functions except L9060 outside



K510-680
Cam for L9060 outside

FSIC cylinders with straight cam for exit devices

Number	Core mechanism	Collar
26-091	Standard pin and tumbler	Compression ring and spring
20-061	Standard pin and tumbler	3/8" blocking rings + compression ring and spring
91-173	SL	3/8" blocking rings + compression ring and spring
20-763	Primus	Compression ring and spring
20-763-XP	Primus XP	Compression ring and spring
20-771	Primus	3/8" blocking rings + compression ring and spring
20-771-XP	Primus XP	3/8" blocking rings + compression ring and spring
91-873-XP	SL Primus XP	3/8" blocking rings + compression ring and spring
20-059	Housing less core	None
26-064	Housing less core	Compression ring and spring

Note: All cylinders are 1 1/2" long.



K510-730
Straight cam, other applications

SECTION 088000
GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Windows.
2. Doors.
3. Storefront and curtain wall framing.

B. Related Sections include the following:

1. Division 08 - "Mirrors" Section for unframed mirrors.

1.3 DEFINITIONS

A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

D. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

E. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.4 PERFORMANCE REQUIREMENTS

A. California Building Code, Title 24, Part 6 of the California Code of Regulations.

1. NFRC 100: Procedure for Determining Fenestration Product U-factors." November 2002
2. NFRC 200 Procedure for Determining Fenestration Product Solar Heat Gain Coefficients at Normal Incidence." November 2002
3. NFRC 400: Procedure for Determining Fenestration Product Air Leakage." January 2002

B. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

C. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:

a. Specified Design Wind Loads: In accordance with the California Building Code.
b. Maximum Lateral Deflection: For the following types of glass supported on all 4 edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch, whichever is less.

1) For monolithic-glass lites heat treated to resist wind loads.
2) For insulating glass.

D. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.5 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Samples: For each glass product, including insulated units, in the form of 12-inch square samples for glass and of 12-inch long Samples for sealants. Install sealant Samples between two strips of material representative in color the adjoining framing system.

C. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

D. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

E. Product Test Reports: For each of the following types of glazing products:

1. Tinted Spandrel glass.
2. Tinted Insulating glass.
3. Clear tempered glass.
4. Glazing sealants.
5. Glazing gaskets.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance.

B. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.

C. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201.

1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.

D. Glazing Publications: Comply with published recommendations of glass products manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. IGMA Publication for Insulating Glass: SIGMA TM-3000, “Glazing Guidelines for Sealed Insulating Glass Units.”

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg F.

1.9 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form, made out to Owner and signed by coated-glass manufacturer agreeing to replace coated-glass

units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form, made out to Owner and signed by insulating-glass manufacturer agreeing to replace insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where products are named, the following requirements apply to product selection:

1. Basis-of-Design Product: The design for each glazing product is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the following manufacturers.

a. Guardian Industries.
b. Pilkington Building Products North America.
c. PPG Industries, Inc.
d. Viracon.

2.2 GLASS PRODUCTS

A. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
3. For uncoated glass, comply with requirements for Condition A.
4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
5. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated.

B. Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.

1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.

2. Provide Kind FT (fully tempered) glass lites where safety glass is indicated.
3. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
4. Sealing System: Dual seal, with primary and secondary sealants as follows:

    a. Manufacturer's standard sealants.

5. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:

    a. Spacer Material: Aluminum with anodic finish to match aluminum window framing system.
    b. Desiccant: Molecular sieve or silica gel, or blend of both.
    c. Corner Construction: Manufacturer's standard corner construction.

2.3 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:

1. EPDM, ASTM C 864.
2. Silicone, ASTM C 1115.
3. Thermoplastic polyolefin rubber, ASTM C 1115.
4. Any material indicated above.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:

1. EPDM.
2. Silicone.
3. Any material indicated above.

2.4 GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:

1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Elastomeric Glazing Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Single-Component Neutral-Curing Silicone Glazing Sealants:

    a. Available Products:

        1) Dow Corning Corporation; 790.
        2) GE Silicones; SilPruf LM SCS2700.

    b. Type and Grade: S (single component) and NS (nonsag).
    c. Class: 100/50.
    d. Use Related to Exposure: NT (nontraffic).
    e. Uses Related to Glazing Substrates: M, G, A, and, as applicable to glazing substrates indicated, O.

C. Glazing Sealants for Fire-Resistive Glazing Products: Identical to products used in test assemblies to obtain fire-protection rating.

2.5 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:

1. Type 1, for glazing applications in which tape acts as the primary sealant.
2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.6 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

2.7 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

2.8 MONOLITHIC FLOAT-GLASS UNITS

A. Uncoated Clear Float-Glass Units, **G-1**: Class 1 (clear) annealed or Kind HS (heat-strengthened) float glass where heat strengthening is required to resist thermal stresses induced by differential shading of individual glass lites and to comply with system performance requirements.

1. Thickness: ¼ inch, (6.0 mm).

B. Uncoated Clear Float-Glass Units, **TG-1**: Class 1 (clear) Kind FT (fully tempered) float glass.

1. Thickness: ¼ inch, (6.0 mm).

2.9 MONOLITHIC WIRED-GLASS UNITS

A. Polished Wired-Glass Units **WG-1**: Form 1 (wired glass, polished both sides), Quality-Q6, Mesh 2 (M2) (Square), 6.0 mm thick.

1. Manufacturers:

a. Asahi/AMA Glass Corp.; affiliated with AFG Industries, Inc.
b. Central Glass Co., Ltd.; distributed by Northwestern Industries, Inc.
c. Pilkington Sales (North America) Ltd.
d. Or approved equal.

2.10 INSULATING-GLASS UNITS

A. Insulating-Glass Units **IG-1**:

1. Overall Unit Thickness and Thickness of Each Lite: 1-inch (25mm) and ¼ inch (6.0 mm).
2. Interspace Content: Clean-Dry-Air.
3. Outdoor Lite: Class 1 (clear) float glass.
4. Indoor Lite: Class 1 (clear) float glass.

B. Solar-Control Tinted Insulating-Glass Units **TIG-1**:

1. Basis-of-Design Product: Viracon Inc. Solar screen low-e insulating glass VE 5-2M.
2. Overall Unit Thickness and Thickness of Each Lite: 1-inch (25mm) and ¼ inch (6.0 mm).
3. Interspace Content: Clean-Dry-Air.
4. Outdoor Lite: Class 2 (tinted) float glass.

a. Kind FT (fully tempered).
b. Tint Color: “Blue” by Viracon, Inc.

5. Indoor Lite: Class 1 (clear) float glass.

a. Kind FT (fully tempered).

6. Performance

a. Solar Heat Gain Coefficient (SHGC): 0.28
b. Visible transmittance (VT): 45 Percent
c. U-Factor (K-Value): 0.26 Summer, 0.29 Winter BTU/Hr./Ft^2/F

2.11 SPANDREL GLASS

A. Basis-of-Design Product: Spandrel Glass **SG-1**

1. Viracon Inc. Match VE 5-2m “Blue”
2. Overall Unit Thickness: 1-inch, (25 mm).
3. Interspace Content: insulated closed cell foam.
4. Outdoor Lite: Class 2 float glass.

a. Kind FT (fully tempered).

5. Indoor Lite: Class 1 (clear) float glass.

a. Kind FT (fully tempered).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing for glazing, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep system.
3. Minimum required face or edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, window framing, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Glazing channel dimensions: Provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lights.

G. Provide spacers for glass lights where length plus width is larger than 50 inches as follows:

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

K. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

L. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

M. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

N. Do not remove release paper from tape until just before each glazing unit is installed.

O. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.4 GASKET GLAZING (DRY)

A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Center glass lights in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weather tight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.5 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lights and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.6 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000

SECTION 092900
GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Interior gypsum board.
2. Tile backing panels.

B. Related Sections include the following:

1. Division 05 - "Cold-Formed Metal Framing" for steel framing that supports gypsum board.
2. Division 06 - "Sheathing" for exterior gypsum sheathing.
3. Division 07 - "Building Insulation" for insulation installed in assemblies that incorporate gypsum board.
4. Division 09 - “Painting” for primers applied to gypsum board surfaces.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For the following products:
1. Textured Finishes: Three samples of 48 inch sq. size for each textured finish indicated and on same backing indicated for Work.

1.4 QUALITY ASSURANCE

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

1.5 STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install interior products until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PANELS, GENERAL

A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. G-P Gypsum.
b. Lafarge North America Inc.
c. National Gypsum Company.
d. PABCO Gypsum.
e. USG Corporation.

B. Regular Type:

1. Thickness: 5/8 inch and 3/4 inch
2. Long Edges: Tapered.

C. Type X:

1. Thickness: 5/8 inch and 3/4 inch.
2. Long Edges: Tapered.

D. Flexible Type: Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.

1. Thickness: 1/4 inch.
2. Long Edges: Tapered.

E. High Impact Type: Manufactured to produce greater resistance to surface indentation, through-penetration (impact resistance), and abrasion than standard, regular-type and Type X gypsum board.

1. Core: 5/8 inch, Type X.
2. Long Edges: Tapered.
3. Surface Indentation per ASTM D5420: 0.11”
4. Soft Body Single Impact Resistance per ASTM E695: 480 ft. lbs.
5. Abrasion per ASTM D4977: 0.284”
6. Basis of Design: USG Fiberock Panel VHI Abuse Resistant

F. High Impact, Moisture, and Mold-Resistant Type: Manufactured to produce greater resistance to surface indentation, through-penetration (impact resistance), and abrasion with moisture and mold-resistant core than standard, regular-type and Type X gypsum board

1. Core: 5/8 inch, Type X.
2. Long Edges: Tapered.
3. Surface Indentation per ASTM D4977: 0.097”
4. Soft Body Single Impact Resistance per ASTM E695: 180 ft. lbs.
5. Water Absorption per ASTM C473: 5%
6. Mold Resistance per ASTM D3273: 10
7. Basis of Design: USG Fiberock Interior Panels Aqua-Tough

G. Moisture and Mold Resistant Type: With moisture and mold resistant core and surfaces.

1. Core: 5/8 inch, Type X.
2. Long Edges: Tapered.

2.3 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

a. Custom Building Products; Wonderboard.
b. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
c. USG Corporation; DUROCK Cement Board.

2. Thickness: 5/8 inch.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shapes:

a. Cornerbead.
b. LC-Bead: J-shaped; exposed long flange receives joint compound.
c. L-Bead: L-shaped; exposed long flange receives joint compound.
d. U-Bead: J-shaped; exposed short flange does not receive joint compound.

e. Expansion (control) joint.
f. Curved-Edge Cornerbead: With notched or flexible flanges.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Wallboard: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.

D. Joint Compound for Tile Backing Panels:

1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Acoustical Sealant: As specified in Division 07 Section "Joint Sealants."

E. Thermal Insulation: As specified in Division 07 Section "Building Insulation."

F. Prime Coat: Primer recommended by gypsum board manufacturer.

2.7 TEXTURE FINISHES

A. Primer: As recommended by textured finish manufacturer.

B. Aggregate Finish: Water-based, job-mixed, aggregated, drying-type texture finish for spray application.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

2. Texture: Refer to drawings for texture schedule.

a. Light orange peel.
b. Medium orange peel.
c. Light splatter knock down.
d. Medium splatter knock down.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
2. Fit gypsum panels around ducts, pipes, and conduits.

3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board as indicated on finish schedule on drawings:

1. GB-1: Regular Type on vertical surfaces.
2. GB-2: High-Impact Type to 8’-0” above finish floor, Regular Type from 8’-0” to underside of structure above on vertical surface.
3. GB-3: High Impact and Moisture- and Mold-Resistant Type on vertical surface.
4. GB-4: Moisture- and Mold-Resistant Type above tile wainscot on vertical surface.
5. GB-5: Moisture- and Mold-Resistant Type on vertical surface.
6. GB-6: Regular Type on ceiling surfaces.
7. GB-7: High Impact and Moisture- and Mold-Resistant Type on ceiling surface.
8. GB-8: Moisture- and Mold-Resistant Type on ceiling surface.
9. All fire rated assemblies shall use gypsum board with a type X classification.
10. Flexible Type: Apply in double layer at curved assemblies.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-furring or Hat-channel furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring or Hat-channel furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers with screws; fasten face layers with adhesive and supplementary fasteners.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

3.4 APPLYING TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.

3.5 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.
2. LC-Bead: Use at exposed panel edges.
3. L-Bead: Use where edge trim can only be installed after gypsum panels are installed.
4. U-Bead: Use where indicated.
5. Curved-Edge Cornerbead: Use at curved openings.

3.6 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for mirrors and vinyl covered tack panels.
3. Level 3: Not used.
4. Level 4: At wall and ceiling surfaces that will be exposed to view.

    a. Prime coat (primer) shall be applied prior to applying texture finishes.

5. Level 5: Not used.

E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 APPLYING TEXTURE FINISHES

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved sample and free of starved spots or other evidence of thin application or of application patterns.

C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

3.8 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 095113
ACOUSTICAL PANEL CEILINGS AND DRYWALL FURRING SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes acoustical panels and exposed suspension systems for ceilings.

B. This Section includes suspended ceiling system for Drywall Furring.

C. This Section includes acoustical panels and exposed suspension systems for ceilings

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: For each type of panel and suspension grid indicated.

C. Maintenance Data: For finishes to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations:

1. Suspension Grid: Obtain each type through one source from a single manufacturer.
2. Ceiling Panels: Obtain each type through one source from a single manufacturer.

B. UL-Rated Assemblies: Where acoustical ceilings are components of floor, roof or beam assemblies indicated for fire-resistance rating, including those required for compliance with governing regulations, provide acoustical materials and application or suspension bearing UL Classification Marking for applicable UL design number listed in UL "Fire Resistance Index." Where required by applicable UL design, provide protection materials for fixtures and ducts.

C. Installation of ceiling system shall be in conformance with ASTM C636, latest edition.

D. California Division of State Architects Office Standard IR 25-2 for Metal Suspension Systems for Lay-in Panel Ceilings, requiring seismic restraint and control.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where the

will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.6

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.7 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 ACOUSTIC PANELS

A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

B. Mineral Fiber Acoustical Panels: Provide units not less than of density 20 lbs. Per cu. ft. or greater, medium-coarse non-directional texture, NRC 0.50 to 0.60, STC 35 to 39, light reflectance over 75%.

C. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

D. Basis-of-Design Products: Provide products indicated as manufactured by:

1. Armstrong World Industries, Inc.

a. Subject to compliance with requirements, provide the product indicated or a comparable product by one of the following:

1) BPB USA.
2) Ecophon CertainTeed, Inc.
3) USG Interiors, Inc.

E. Acoustical Panels:

1. Acoustical Panel ACP-1: Vinyl faced fiberglass acoustical panel, Armstrong World Industries, Optima No. 3150 **NOT USED**

   a. Size: 24 x 24 x 3/4 inch
   b. Edge: Square.
   c. Pattern: Light texture.
   d. LR: Not less than 0.90
   e. NRC: Not less than 0.90.

2. Acoustical Panel ACP-2: Vinyl faced washable panel, USDA approved for food service applications, Armstrong World Industries, Clean Room VL Non-perforated No.870.

   a. Size: 24 x 48 x 5/8 inch **OK MATCH EXISTING**
   b. Edge: Square.
   c. Pattern: Smooth, light texture.
   d. LR: Not less than 0.80.
   e. NRC: Not less than 0.10.

3. Acoustical Panel ACP-3: Armstrong World Industries, Cortega No. 769. **NOT USED**

   a. Size: 24 x 48 x 5/8 inch
   b. Edge: Square.
   c. Pattern: Fine fissured
   d. LR: Not less than 0.82.
   e. NRC: Not less than 0.55.

4. Acoustical Panel ACP-4: Hard surface, Armstrong World Industries, Clean Room VL Non-perforated No.868. **NOT USED**

   a. Size: 24 x 24 x 5/8 inch
   b. Edge: Square.
   c. Pattern: Smooth, light texture.
   d. LR: Not less than
   e. NRC: Not less than 0.80.

5. Acoustical Panel ACP-5: Armstrong World Industries, Cortega No. 824. **NOT USED**

   a. Size: 24 x 24 x 5/8 inch
   b. Edge: Square.
   c. Pattern: Fine fissured
   d. LR: Not less than 0.82.
   e. NRC: Not less than 0.55.

2.2 METAL SUSPENSION SYSTEMS

A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635, C636, C645, DSA IR 25-2, and IR 25-3.

B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

D. Wire Hangers, Braces, and Ties: Provide Zinc-Coated, Carbon-Steel Wire complying with ASTM A 641/A 641M, Class 1 zinc coating, soft temper. Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 12 gage wire. Refer to drawings for additional requirements.

E. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 coating designation, with prefinished 15/16-inch wide metal caps on flanges. For Drywall Furring Systems not less than G40 coating designation for general use and G90 coating designation for use at toilets, showers and locker rooms.

1. Structural Classification: Heavy duty.
2. End Condition of Cross Runners: Stepped.
3. Finish: White.
4. Products: Subject to compliance with requirements, provide one of the following:

    a. Celotex/Chicago Metallic Corp., DSA Product Acceptance Report No. PA-026.
    b. Armstrong World Industries, DSA Product Acceptance Report No. PA-041.
    c. USG / Donn, DSA Product Acceptance Report No. PA-030.
    d. Armstrong World Industries, DSA Product Acceptance Report No. PA-105 for Drywall Furring Systems.

2.3 EDGE MOLDING AND TRIM

A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated.

B. Hold-Down Clips: Where required for wind uplift resistance in vestibule or to achieve fire-resistance rating, provide standard spring steel clips, except provide accessible type at locations indicated on drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans wherever possible.

1.2 Suspension System Installation

Installation of the suspension system shall comply with ASTM C636 and ASTM E580 Section 5.2.

3.3 INSTALLATION

A. General: Install acoustical panel ceilings to comply with ASTM C 636, AND ASTM E580 SECTION 5.2 seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Install suspension systems to comply with ASTM C 636, with hangers supported only from building structural members. Locate hangers not less than 6" from each end and spaced 4 feet along each carrying channel of direct-hung runner, unless otherwise indicated, leveling to tolerance of 1/8 inch in 12feet.

C. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperatures.

D. Install edge moldings of type indicated at perimeter of acoustical ceiling area and at locations where necessary to conceal edges of acoustical units.

E. Screw-attach moldings to substrate at intervals not over 16 inches o.c. and not more than 3inches from ends, leveling with ceiling suspension system to tolerance of 1/8" in 12'-0". Miter corners accurately and connect securely.

F. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.

1. Install hold-down clips in areas indicated, and in areas where required by governing regulations or for fire-resistance ratings; space as recommended by panel manufacturer, unless otherwise indicated or required.

3.4 CLEANING

A. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members, comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113-6

SECTION 096513
RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Resilient base.
2. Resilient stair accessories.
3. Resilient molding accessories.

B. Related Sections:

1. Division 09 Section "Composition Tile Flooring" for composition floor tiles.
2. Division 09 Section "Carpeting."

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of product indicated.

C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.6 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

1.7 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE (TS)

A. Resilient Base:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Armstrong World Industries, Inc.
b. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
c. Roppe Corporation, USA.

B. Resilient Base Standard: ASTM F 1861.

1. Material Requirement: Type TS (rubber, vulcanized thermoset).
2. Manufacturing Method: Group I (solid, homogeneous**)**.
3. Style: Cove (base with toe).

C. Minimum Thickness: 0.125 inch.

D. Height: As indicated on Drawings.

E. Lengths: manufacturer's standard length.

F. Outside Corners: Preformed.

G. Inside Corners: Job formed or preformed.

H. Finish: As selected by Architect from manufacturer's full range.

I. Colors and Patterns: As selected by Architect from full range of industry colors.

2.2 RESILIENT STAIR ACCESSORIES

A. Resilient Stair Treads:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Armstrong World Industries, Inc.
    b. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
    c. Roppe Corporation, USA.

B. Resilient Stair Treads Standard: ASTM F 2169.

1. Material Requirement: Type TS (rubber, vulcanized thermoset).
2. Surface Design:

    a. Class 2, Pattern: Raised-disc design.

3. Manufacturing Method: Group 2, tread with contrasting color for the visually impaired.

C. Nosing Style: Round.

D. Nosing Height: 2 inches.

E. Thickness: 1/4 inch.

F. Size: Lengths and depths to fit each stair tread in one piece or, for treads exceeding maximum lengths manufactured, in equal-length units.

G. Risers: Smooth, flat, coved-toe, height and length to cover risers; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.

1. Thickness: 0.125 inch.

H. Stringers: Of same thickness as risers, height and length after cutting to fit risers and treads and to cover stair stringers; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.

I. Colors and Patterns: As selected by Architect from full range of industry colors.

2.3 RESILIENT MOLDING ACCESSORY

A. Resilient Molding Accessory:

1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
b. Johnsonite.
c. Roppe Corporation, USA.

B. Description: Carpet edge for glue-down applications, Nosing for carpet, Nosing for resilient floor covering, Reducer strip for resilient floor covering, Joiner for tile and carpet, and Transition strips.

C. Material: Rubber.

D. Profile and Dimensions: As indicated in drawings.

E. Colors and Patterns: As selected by Architect from full range of industry colors.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

C. Stair-Tread-Nose Filler: Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates that do not conform to tread contours.

D. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.

E. Floor Polish: Provide protective liquid floor polish products as recommended by resilient stair tread manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
4. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

    a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install resilient products until they are same temperature as the space where they are to be installed.

1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Preformed Corners: Install preformed corners before installing straight pieces.

H. Job-Formed Corners:

1. Inside Corners: Use straight pieces of maximum lengths possible.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Stair Accessories:

1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
2. Tightly adhere to substrates throughout length of each piece.
3. For treads installed as separate, equal-length units, install to produce a flush joint between units.

C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

B. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products until Substantial Completion.

END OF SECTION 096513

SECTION 097700
FIBERGLASS REINFORCED PLASTIC PANELING

PART 1-GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:

1. Fiberglass reinforced plastic wall paneling installed over gyspsum board.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and installation instructions for paneling.

B. Samples: Submit, for verification purposes, samples of each type, color, and pattern of paneling, including accessories required, indicating full range of color and pattern variation. Provide 4" x 4" samples of paneling and 4" long sections of paneling accessories.

1.4 QUALITY ASSURANCE

A. Manufacturer: Provide each type of paneling as produced by a single manufacturer, including recommended primers, adhesives and accessories.

1. Fire Hazard Classification: Provide materials bearing UL label and marking, indicating fire hazard classification of paneling, as determined by ASTM E 84.
2. Provide materials with the following fire hazard classifications: Class 1.

a. Flame spread not more than: 25
b. Smoke developed not more than: 200

1.5 DELIVERY, STORAGE AND HANDLING

A. Comply with the manufacturer's instructions and recommendations and as herein specified.

B. Deliver materials in original packages or containers clearly labeled to identify manufacturer, brand name, quality or grade, and fire hazard classification.

C. Store materials in original undamaged packages or containers. do not store panels in an upright position. Maintain temperature in Storage area above 40 degrees F., and not less that 65 degrees F. for at least 24 hours before installation of the panels.

1.6 PROJECT CONDITIONS

A. Maintain constant temperature and humidity conditions closely approximating final occupied conditions at areas of installation for at least 48 hours before, during, and after the application of materials.

PART 2-PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide one of the following:

1. Marlite, Pebbled Surface.
2. Kemlite, Pebbled Surface.
3. Structoglas – Sequentia, Embossed

2.2 MATERIALS

A. 3/32 inch Pre-finished panels 4' x height required x nominal, solid fiberglass reinforced polyester construction; color to be selected by Architect from manufacturers full range of available colors.

B. Adhesive: Per manufacturer's recommendations, meeting requirements of ASTM C557-65T, Non-Toxic and Non-Flammable.

2.3 ACCESSORIES

A. Provide manufacturer's standard prefinished moldings and trim, in lengths to match panels, at all joints, corners and edges, color as selected by Architect.

PART 3-EXECUTION

3.1 EXAMINATION

A. Installer must examine the areas and conditions under which panels are to be installed. Notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.2 INSTALLATION

A. Install panels to comply with manufacturer's written installation procedures.

1. Install one-piece panels for full height at walls. Horizontal joints are not permitted unless otherwise indicated.

B. Apply sealant to all moldings according to manufacturer's recommendations.

C. Start installation from a corner and work progressively around the room. Allow at least 1/16" in the molding joint for expansion. Do not force panels tightly together. Provide means of leveling panels so they are installed vertical. Extend panels continuously behind cabinets and other surface-mounted items, unless otherwise indicated.

D. All surfaces to which panels are applied shall be clean and dry. Remove loose dirt, paint or other flaking material.

E. Apply seal coat to surface of gypsum board to receive paneling.

F. Apply adhesive with comb spreader to entire back of panel. Apply adhesive in accordance with manufacturer's instructions. Leave no adhesive between ridges.

G. Adhesive and room temperature shall be between 60 degrees F. and 100 degrees F. during application.

H. Press panels immediately into position. With uniform hand pressure, press panels firmly into contact with adhesive bead.

I. Continue bonding next panel as outlined above. After a fifteen to twenty minute interval, reapply pressure to all areas to be bonded to provide a final set.

3.3 ADJUST AND CLEAN

A. Remove excess adhesive along finished seams as directed by the manufacturer.

B. Replace removed plates and fixtures; verify cut edges of panels are completely concealed.

C. Remove surplus materials, rubbish, and debris resulting from installation upon completion of work, and leave areas of installation in neat, clean condition.

END OF SECTION 097700

SECTION 099100
PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes surface preparation and field painting, staining or refinishing of the following:

1. Exposed exterior items and surfaces.
2. Exposed interior items and surfaces.
3. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
4. Traffic striping.
5. Painting of shop-primed metal surfaces.

B. Paint/stain exposed surfaces, except where the paint/stain schedules indicate that a surface or material is not to be painted/stained or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.

1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.

C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1. Prefinished items include the following factory-finished components:

a. Acoustical wall panels.
b. Toilet enclosures.
c. Stainless steel items.
d. Finished mechanical and electrical equipment.
e. Light fixtures.
f. Distribution cabinets.

2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:

a. Furred areas.

b. Ceiling plenums.
c. Utility tunnels.
d. Pipe spaces.
e. Duct shafts.

3. Finished metal surfaces include the following:

    a. Anodized aluminum.
    b. Stainless steel.
    c. Chromium plate.
    d. Copper.
    e. Bronze and brass.

4. Operating parts include moving parts of operating equipment and the following:

    a. Valve and damper operators.
    b. Linkages.
    c. Sensing devices.
    d. Motor and fan shafts.

5. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

D. Related Sections include the following:

1. Division 5 Section "Metal Fabrications" for shop priming ferrous metal.
2. Division 6 Section "Finish Carpentry".
3. Division 8 Section "Steel Doors and Frames" for shop priming steel doors and frames.
4. Division 9 Section "Gypsum Board Assemblies" for surface preparation for gypsum board.
5. Divisions 22, 23 and 26: Painting of mechanical and electrical work is specified in Divisions 22, 23 and 26, respectively.

1.3 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
4. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
5. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

1.4 SUBMITTALS

A. Product Data: For each paint system specified. Include block fillers and primers.

1. Material List: Provide an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
2. Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.
3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

B. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for each type of finish-coat material indicated.

1. After color selection, the Architect will furnish color chips for surfaces to be coated.

C. Samples for Verification: Of each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.

1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
2. Provide a list of materials and applications for each coat of each sample. Label each sample for location and application.
3. Submit Samples on the following substrates for the Architect's review of color and texture only:

    a. Concrete: Provide four 4-inch-square samples for each color and finish.
    b. Concrete Masonry: Provide four 4-by-8-inch samples of masonry, with mortar joint in the center, for each finish and color.
    c. Painted Wood: Provide two 12-inch- square samples of each color and material on hardboard.
    d. Stained or Natural Wood: Provide two 4-by-8-inch samples of natural- or stained-wood finish on actual wood surfaces.
    e. Ferrous Metal: Provide two 4-inch- square samples of flat metal and two 8-inch-long samples of solid metal for each color and finish.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.

B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. VOC content.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.

1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.7 PROJECT CONDITIONS

A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F .

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F.

C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

D. Protection:

1. Cover or otherwise protect finished work of other trades, work not to be painted concurrently, landscaping, and adjacent property from damage.
2. When not in use, store paints in designated areas. Keep containers closed. At end of day's work, remove empty containers, paint soaked rags, and debris. Vent fumes. Take precautions to prevent fire.

E. Sequencing, Scheduling:

1. Coordinate removal and replacement of hardware, electrical fixtures and trim, and related work of other Sections.
2. Stain, prime, back paint, and pre-finish items before installation as required.

F. Cleaning and Disposal:
   1. Do not use Project plumbing fixtures or piping systems for:

      a. Cleaning painting equipment and utensils.
      b. Disposal of waste from cleaning or disposal of paints.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products in the paint schedules.

B. Manufacturers: The products specified at the end of Part 3 are based on the products of ICI Sinclair. The following listed manufacturers products equivalent to scheduled products are acceptable for use.

   1. Dunn Edwards
   2. Fuller-O'Brien Paints.
   3. Sherwin Williams
   4. Tnemec

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

   1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

C. Colors: Provide color selections made by the Architect. Colors to be factory mixed and to match approved samples.

D. Mixing:

   1. Follow manufacturer's printed recommendations.
   2. Mix all paints thoroughly prior to application.
   3. Mix only in Inspector's presence in assigned spaces.

4. Except where thinning is specifically recommended by manufacturer, do not thin products.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.

1. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
2. Start of painting is the Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime.
2. Cementitious Materials: Prepare concrete, concrete masonry block, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.

a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. All testing shall be performed and certified by a representative of the paint manufacturer. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's written instructions.
c. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.
d. At concrete and concrete blcok surfaces, fill cracks and defects with cement grout; match surface texture.

3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.

a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
b. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, paneling, window sills and trim.
c. When transparent finish is required, backprime with spar varnish.
d. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on backside.
d. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.

5. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.
a. Blast steel surfaces clean as recommended by paint system manufacturer and according to requirements of SSPC-SP 10.
b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.

6. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

D. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
3. Use only thinners approved by paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

F. Drywall: Fill any cracks or defects with drywall joint compound or speckle. Sand any rough spots smooth. Do not raise nap on paper covering.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the schedules.
2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
9. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
10. Sand lightly between each succeeding enamel or varnish coat.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
2. Omit primer on metal surfaces that have been shop primed and touchup painted.

3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items as identified in Divisions 15 and 16.

F. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

G. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.

H. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

I. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

1. Provide satin finish for final coats.

J. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.

K. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 SPECIAL REQUIREMENTS

A. All paint which is skinned over or dirty shall be strained immediately through fine cheese cloth to remove dirt, grit, skins, etc., before using.

B. When painting around glass on interior side of windows, paint shall extend out on glass approximately 1/16”. This shall be done in a neat and workmanlike manner. Painting work, if done beyond this point, shall be removed flush with putty or wood stops and be repainted.

C. All workers on the job site are to be dressed in painter’s whites with caps and OSHA approved footwear.

3.5 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.6 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

C. Correction of Defective Work:

1. Repair abraded, damaged or incomplete paint surfaces by methods acceptable to Architect. Spot repairs to be well-blended into adjacent work. For large repairs, re-coat entire plane or building element in which damaged area occurs.
2. Defaces surfaces of work not to be painted shall be cleaned and their original finish restored.

3.7 PAINT SYSTEMS SCHEDULE

A. Interior Paint Finishes

Surface		Finish Schedule Designation			Manufacturer's System Designation	
(1)	Gypsum Drywall	P12.A	Flat, Latex	First Coat Second Coat Third Coat	1000 1201 1201	Pigmented PVA Sealer HID WALL DULUX DULUX
		P12.B	Semi-Gloss Latex	First Coat Second Coat Third Coat	1000 1406 1406	Pigmented PVA Sealer HID WALL DULUX DULUX
		P12.C	Eggshell Enamel Latex	First Coat Second Coat Third Coat	1000 1403 1403	Pigmented PVA Sealer HID WALL DULUX DULUX
	(Textured)	P12.D	Flat	One Coat	1251	Speed Wall
(2)	Wood	P13.A	Semi-Gloss Latex	First Coat Second Coat Third Coat	2000 1406 1406	DULUX DULUX DULUX
		P13.B	Eggshell Enamel, Latex	First Coat Second Coat Third Coat	2000 1403 1403	DULUX DULUX DULUX
		P13.C	Lacquer Velvet	Stain First Coat Second Coat Third Coat	1700 37798 LC383 LC383	Wood Pride Sanding Sealer High Solids Velvet Lacquer High Solids Velvet Lacquer
		P13.D	Lacquer Semi-Gloss	Stain First Coat Second Coat Third Coat	1700 37798 LC381 LC381	Wood Pride Sanding sealer High Solids Semi-Gloss Lacquer High Solids Semi-Gloss Lacquer
		P13.E	Lacquer Gloss	Stain First Coat Second Coat Third Coat	1700 37798 LC382 LC382	Wood Pride Sanding Sealer High Solids Gloss Lacquer High Solids Gloss Lacquer
		P13.F	Varnish Velvet	Stain First Coat Second Coat Third Coat	1700 1806 1806 1806	WOODPRIDE WOODPRIDE WOODPRIDE WOODPRIDE
		P13.G	Varnish Semi-Gloss	Stain First Coat Second Coat Third Coat	1700 1806 1806 1806	WOODPRIDE WOODPRIDE WOODPRIDE WOODPRIDE
		P13I	Fire Retardant Intumescent Paint (Sheen as selected by Architect)	First Coat Second Coat Third Coat		Water base sealer as recommended by manufacturer Flame Coat or Bar Flame or approved equal
(3)	Ferrous Metal	P14.A	Flat Latex	First Coat Second Coat Third Coat Fourth Coat	4020 1201 1201 1201	DEVFLEX DULUX DULUX DULUX

		P14.B	Semi-Gloss Latex	First Coat Second Coat Third Coat Fourth Coat	4020 1406 1406 1406	DEVFLEX DULUX DULUX DULUX
(3) cont.	(Ferrous Metal)	P14.C	Eggshell Latex	First Coat Second Coat Third Coat Fourth Coat	4020 1403 1403 1403	DEVFLEX DULUX DULUX DULUX
(4)	Galvanized Metal/Alumi num	P15.A	Flat Latex	First Coat Second Coat Third Coat	4020 1201 1201	DEFLEX DULUX DULUX
		P15.B	Semi-Gloss Latex	First Coat Second Coat Third Coat	4020 1406 1406	DEFLEX DULUX DULUX
		P15.C	Eggshell Latex	First Coat Second Coat Third Coat	4020 1403 1403	DEFLEX DULUX DULUX
(5)	Plaster, Concrete, Brick, Stucco	P16.A	Flat Latex	First Coat Second Coat Third Coat	3210 1201 1201	GRIPPER DULUX DULUX
		P16.B	Semi-Gloss Latex	First Coat Second Coat Third Coat	3210 1406 1406	GRIPPER DULUX DULUX
		P16.C	Eggshell Latex	First Coat Second Coat Third Coat	3210 1403 1403	GRIPPER DULUX DULUX
(6)	Concrete Block	P17.A	Flat latex	First Coat Second Coat Third Coat	4000 1210 1210	Blox Fill DULUX DULUX
		P17.B	Semi-Gloss Latex	First Coat Second Coat Third Coat	4000 1201 1201	Block Fill DULUX DULUX
		P17.C	Eggshell Latex	First Coat Second Coat Third Coat	4000 1403 1403	Block Fill DULUX DULUX
(7)	Acoustical Ceiling Tile/ Plaster	P18.A	Latex	One Coat to Cover	1251	Speed Wall
(8)	Ceramic Tile like Finishes	P19.A		First Coat Second Coat Third Coat	4408 4408 4408	TRU-GLAZE TRU-GLAZE TRU-GLAZE
(9)	Ceiling and Wall w/misc. Pipes & Conduit, attached and Trusses	P20.A		One Coat	1280	DRYFALL White or Black

	& Beams w/Spray-on Fire Insulation					

B. Exterior Paint Finishes

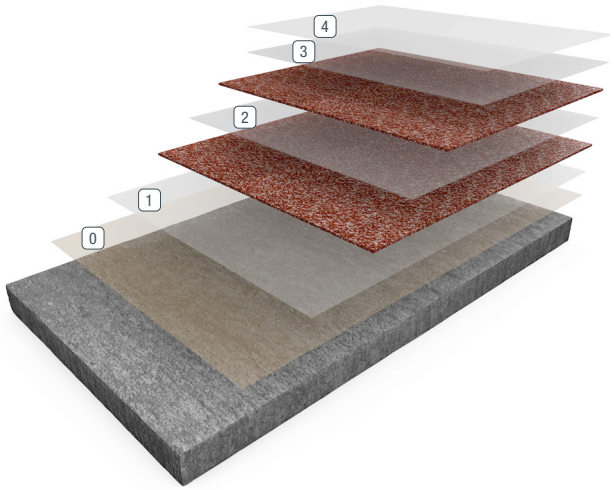
Surface		Finish Schedule Designation			Manufacturer's System Designation	
(1)	Plaster, Concrete	P50.A	Flat, Acrylic	First Coat Second Coat Third Coat	2000 2200 2200	DULUX DULUX DULUX
		P50.B	Low Sheen Enamel Acrylic	First Coat Second Coat Third Coat	2000 2403 2403	DULUX DULUX DULUX
		P50.C	Elastomeric (Smooth) 5 yr. labor warranty	First Coat Second Coat “Spray Application”	2000 2260	DECRA FLEX DECRA FLEX
		P50.D	Elastomeric (Medium Aggregate) 5 yr. labor warranty	First Coat Second Coat Third Coat	2000 2270 2270	DECRA FLEX DECRA FLEX DECRA FLEX
(2)	Concrete Block Masonry	P51.A	Flat, acrylic emulsion	First Coat Second Coat Third Coat	4000 2200 2200	DULUX DULUX DULUX
		P51.B	Elastomeric Smooth 5 Yr. labor warranty	First Coat Second Coat Third Coat	2000 2260 2260	DULUX DECRAFLEX DECRA FLEX
		P51.C	Elastomeric (Medium Aggregate) 5 yr labor warranty	First Coat Second Coat Third Coat	2000 2270 2270	DULUX DECRAFLEX DECRA FLEX
		P51.D	Elastomeric (Coarse Aggregate)	First Coat Second Coat Third Coat	2000 2290 2290	DULUX DECRAFLEX DECRA FLEX
		P51.E	Clear Water Repellent 10-yr Warranty	1 Coat		Rain Guard Micro-Seal
(3)	Wood	P53.A	Flat Acrylic Emulsion	First Coat Second Coat Third Coat	2000 2200 2200	DULUX DULUX DULUX
		P53.B	Semi-Gloss Acrylic	First Coat Second Coat Third Coat	2000 2406 2406	DULUX DULUX DULUX
		P53.C	Low Sheet Enamel Acrylic	First Coat Second Coat Third Coat	2000 2403 2403	DULUX DULUX DULUX
		P53.D	Flat, Stain Water Base Semi-Transparent	First Coat Second Coat	2610 2610	WOODPRIDE WOODPRIDE
		P53.E	Flat, Stain Opaque	First Coat Second Coat	2600 2600	WOODPRIDE WOODPRIDE
		P53.F	Varnish Clear Gloss	First Coat Second Coat	1808 1808	WOODPRIDE WOODPRIDE

				Third Coat	1808	WOODPRIDE
		P53.G	Stain and Varnish	First Coat Second Coat Third Coat	1700 1808 1808	WOODPRIDE WOODPRIDE WOODPRIDE
(4)	Ferrous Metal	P55.D	Gloss High Perform..	First Coat Second Coat Third Coat	235 379 379	DEVRAN DEVTHANE DEVTHANE
		P55.E	Semi-Gloss High Perform.	First Coat Second Coat Third Coat	235 378 378	DEVRAN DEVTHANE DEVTHANE
(5)	Galvanized Metal & Aluminum	P56.C	Gloss High Perform.	First Coat Second Coat Third Coat	4020 379 379	DEVFLEX DEVTHANE DEVTHANE
		P56.D	Semi-Gloss High Perform.	First Coat Second Coat Third Coat	4020 378 378	DEVFLEX DEVTHANE DEVTHANE
		P56.E	Gloss	First Coat Second Coat Third Coat	4020 3028 3028	DEVFLEX DULUX DULUX
(6)	Aluminum	P58.A	Flat, Acrylic	First Coat Second Coat Third Coat	4020 2200 2200	DEVFLEX DULUX DULUX
		P58.B	Semi-Gloss Enamel Acrylic	First Coat Second Coat Third Coat	4020 2406 2406	DEVFLEX DULUX DULUX

END OF SECTION 099100

RESUFLOR™ DECO QUARTZ DB23

Sherwin-Williams Resuflor Deco Quartz DB23 is a nominal 1/8" system that uses decorative colored quartz aggregates, high-solids epoxy resins, and chemical-resistant grout and topcoats to form a protective surface that is aesthetically pleasing, durable and slip, wear and stain resistant.



0 **Optional Primer**
1 **First Broadcast**
2 **Second Broadcast**
3 **Grout Coat**
4 **Topcoat**

BENEFITS

- Aesthetically pleasing appearance
- Limitless color options
- Durable, wear and slip resistant
- Chemical and stain resistant
- Fiberglass scrim option for maximum tensile strength and crack isolation
- Optional waterproofing and/or membrane
- Can be applied vertically (integrated cove base)
- Contributes to LEED v4.1 credits

USES

- Commercial kitchens (areas where temperature will not exceed 160°F in service)
- Animal care
- Clean rooms
- Pharmaceuticals
- Locker and restrooms
- Packaging and storage areas

TYPICAL PHYSICAL PROPERTIES

Color	Pre-blended standard colors Custom color blends available
Shore D Hardness ASTM D2240	80-85 @ 0 sec | 75-80 @ 15 sec
Compressive Strength ASTM D695	13,500 psi
Tensile Strength ASTM D2370	8,000 psi
Abrasion Resistance ASTM D 4060, CS-17 Wheel, 1,000 cycles	18 mg/loss Result based on independent lab testing of Resutile HTS™
Adhesion to Concrete ASTM D4541	450 psi (concrete failed)
Adhesion to Concrete ASTM D7234	732 psi (concrete failed)
Flammability ASTM D635	182 mm/min

INSTALLATION

Sherwin-Williams High Performance Flooring materials shall only be installed by approved contractors. The following information is to be used as a guideline for the installation of the Resuflor Deco Quartz DB23. Contact the Sherwin-Williams Technical Service Department for assistance prior to application.

SURFACE PREPARATION — GENERAL

Sherwin-Williams systems can be applied to a variety of substrates if the substrate is properly prepared. Preparation of surfaces other than concrete will depend on the type of substrate, such as wood, concrete block, quarry tile, etc. Should there be any questions regarding a specific substrate or condition, please contact the Sherwin-Williams Technical Service Department prior to starting the project. Refer to Surface Preparation Form G-1.

SURFACE PREPARATION — CONCRETE

Concrete surfaces may be abrasive blasted to remove all surface contaminants and laitance. The prepared concrete shall have a surface profile equal to CSP 4-6. Refer to Form G-1. After initial preparation has occurred, inspect the concrete for bug holes, voids, fins and other imperfections. Protrusions shall be ground smooth while voids shall be filled with a system compatible filler. For recommendations, consult the Sherwin-Williams Technical Service Department.

TEMPERATURE

Throughout the application process, substrate temperature should be 50-90°F. Substrate temperature must be at least 5°F above the dew point. Applications on concrete substrate should occur while temperature is falling to lessen off gassing. The material should not be applied in direct sunlight, if possible.

APPLICATION INFORMATION — SURFACE PREP PROFILE CSP 4-6

VOC MIXED	APPLICATION STEP	MATERIAL	MIXED RATIO	THEORETICAL COVERAGE PER COAT CONCRETE	PACKAGING
<50 g/L	Primer	MPE	2:1	133-160 sq. ft. / gal	3, 15, 165 or 750 gals
<50 g/L 0	1st Broadcast	MPE 5900F	2:1 To excess	133-160 sq. ft. / gal .4 lbs. / sq. ft.	3, 15, 165 or 750 gals 50 lbs.
<50 g/L 0	2nd Broadcast	MPE 5900F	2:1 To excess	65-70 sq. ft. / gal .4 lbs. / sq. ft.	3, 15, 165 or 750 gals 50 lbs.
<100 g/L	Grout Coat	UVE	2:1	107 sq. ft. / gal	3 or 15 gals
<100 g/L	Topcoat	HTS	2:1	535 sq. ft. / gal	Pre-measured kit

ALTERNATE SYSTEM #1

VOC MIXED	APPLICATION STEP	MATERIAL	MIXED RATIO	THEORETICAL COVERAGE PER COAT CONCRETE	PACKAGING
<50 g/L	Primer	MPE	2:1	133-160 sq. ft. / gal	3, 15, 165 or 750 gals
<50 g/L 0	1st Broadcast	MPE 5900F	2:1 To excess	133-160 sq. ft. / gal .4 lbs. / sq. ft.	3, 15, 165 or 750 gals 50 lbs.
<50 g/L 0	2nd Broadcast	MPE 5900F	2:1 To excess	65-70 sq. ft. / gal .4 lbs. / sq. ft.	3, 15, 165 or 750 gals 50 lbs.
<100 g/L	Grout Coat	3746	2:1	107 sq. ft. / gal	3 or 15 gals
<100 g/L	Topcoat	3746	2:1	200 sq. ft. / gal	3 or 15 gals

ALTERNATE SYSTEM #2

VOC MIXED	APPLICATION STEP	MATERIAL	MIXED RATIO	THEORETICAL COVERAGE PER COAT CONCRETE	PACKAGING
<50 g/L	Primer	MPE	2:1	133-160 sq. ft. / gal	3, 15, 165 or 750 gals
<50 g/L 0	1st Broadcast	MPE 5900F	2:1 To excess	133-160 sq. ft. / gal .4 lbs. / sq. ft.	3, 15, 165 or 750 gals 50 lbs.
<50 g/L 0	2nd Broadcast	MPE 5900F	2:1 To excess	65-70 sq. ft. / gal .4 lbs. / sq. ft.	3, 15, 165 or 750 gals 50 lbs.
<100 g/L	Grout Coat	4850	2:1	125-200 sq. ft. / gal	3 or 15 gals
<100 g/L	Topcoat	4850	2:1	200 sq. ft. / gal	3 or 15 gals

For additional topcoat options, consult the Sherwin-Williams Topcoat Selection Guide or contact your Sherwin Williams representative.

PRIMER

APPLICATION – PRIMER – RESUFLOR MPE COVERAGE

RATE: One gallon of Resuflor MPE will cover:

160 sq. ft. at 10 mils wet/dry film
145 sq. ft. at 11 mils wet/dry film
133 sq. ft. at 12 mils wet/dry film

PREMIX PART A using a Jiffy® mixer blade and slow speed drill. (This is required for both 3-gallon and full-filled 5-gallon units.) For full-filled 5 gallon pails, pour out 2 gallons into a measuring container. Then, pour the measured Part A into a mixing pail.

ADD RESUFLOR MPE PART B TO PART A (3 GALLONS TOTAL MIX). For full-filled 5-gallon pails, pour out 1 gallon Part B into a measuring container that is separate from the one used with the Part A. Then, add the measured Part B to the Part A already in the mixing pail. **POTLIFE:** Mix only enough material which can be applied within the work time (time between the addition of Part B to Part A and the completion of all application actions). Check the following chart for work times at various temperatures. For smaller quantities, use 2 parts PART A to 1 part PART B by volume.

APPROXIMATE WORK TIME

65°F	70°F	75°F	80°F	90°F
40 min	30 min	25 min	20 min	15 min

MIX FOR 3 MINUTES using a Jiffy® mixer blade and slow speed drill. (Failure to do so could result in lower/diminished coating properties.)

IMMEDIATELY POUR ALL OF THE MIXED MATERIAL onto the floor in a single bead.

PUSH THE SQUEEGEE at an even speed using downward pressure to apply the desired thickness. A notched squeegee can be used to increase the thickness applied. **NOTE:** The use of spiked shoes will allow freedom of movement on the wet floor. **CAUTION:** The surface will be slippery.

START THE SECOND AND REMAINING PASSES by pushing material parallel to the first stroke. Hold the bead of material near the center of the bar and push at an even speed with slight down pressure.

BACKROLL THE MATERIAL with a 3/8" nap roller for a smooth uniformed appearance. Backrolling is required to remove the puddles and squeegee lap marks in order to obtain uniform texture and a consistent mil thickness.

1ST BROADCAST COAT

APPLICATION – 1ST BROADCAST COAT – RESUFLOR MPE COVERAGE RATE: One gallon of RESUFLOR MPE will cover:

160 sq. ft. at 10 mils wet/dry film
145 sq. ft. at 11 mils wet/dry film
133 sq. ft. at 12 mils wet/dry film

PREMIX PART A using a Jiffy® mixer blade and slow speed drill. (This is required for both 3-gallon and full-filled 5-gallon units.) For full-filled 5 gallon pails, pour out 2 gallons into a measuring container. Then, pour the measured Part A into a mixing pail.

ADD RESUFLOR MPE PART B TO PART A (3 GALLONS TOTAL MIX). For full-filled 5-gallon pails, pour out 1 gallon Part B into a measuring container that is separate from the one used with the Part A. Then, add the measured Part B to the Part A already in the mixing pail. **POTLIFE:** Mix only enough material which can be applied within the work time (time between the addition of Part B to Part A and the completion of all application actions). Check the following chart for work times at various temperatures. For smaller quantities, use 2 parts PART A to 1 part PART B by volume.

APPROXIMATE WORK TIME

65°F	70°F	75°F	80°F	90°F
40 min	30 min	25 min	20 min	15 min

MIX FOR 3 MINUTES using a Jiffy® mixer blade and slow speed drill. (Failure to do so could result in lower/diminished coating properties.)

IMMEDIATELY POUR ALL OF THE MIXED MATERIAL onto the floor in a single bead.

PUSH THE SQUEEGEE at an even speed and down pressure to apply the desired thickness. A notched squeegee can be used to increase the thickness applied. **NOTE:** The use of spiked shoes will allow freedom of movement on the wet floor. **CAUTION:** The surface will be slippery.

START THE SECOND AND REMAINING PASSES by pushing material parallel to the first stroke. Hold the bead of material near the center of the bar and push at an even speed with slight down pressure.

BACKROLL THE MATERIAL with a 3/8" nap roller for a smooth uniformed appearance. Backrolling is required to remove the puddles and squeegee lap marks in order to obtain uniform texture and a consistent mil thickness.

APPLICATION - 1ST BROADCAST COAT - QUARTZ AGGREGATE IMMEDIATELY BROADCAST TO EXCESS WITH DECORATIVE QUARTZ into the uncured Resuflor MPE resin on the floor. Do not dump or pile the material. Gently scatter it onto the floor by hand tossing so as to cover the wet resin completely. **NOTE:** It is important that epoxy is not visible (no wet or shiny areas) after quartz settles because any visible epoxy will yellow. A coverage rate of 0.4 to 0.5 pounds per sq. ft. of quartz is recommended.

ALLOW SYSTEM TO CURE 8-10 hours at 75°F.

THOROUGHLY SWEEP AND VACUUM to remove loose colored quartz from surface. **NOTE: DO NOT** save and reuse swept and vacuumed colored quartz unless you have taken extra precautions.

2ND BROADCAST COAT

APPLICATION – 2ND BROADCAST COAT - RESUFLOR MPE

COVERAGE RATE: One gallon of Resuflor MPE will cover 65-70 sq. ft./gal at 22-24 mils wet/dry film.

REPEAT STEPS used for mixing and spreading of the first seed coat.

APPLICATION – DECORATIVE QUARTZ

REPEAT STEPS used for application of the broadcast quartz.

GROUT COAT

APPLICATION – GROUT COAT – RESUFLOR UVE

COVERAGE RATE: A gallon of Resuflor UVE will cover 107 sq. ft. at 15 mils wet/dry film 100 sq. ft. at 16 mils wet/dry film.

PREMIX PART A using a Jiffy® mixer blade and slow speed drill. Pour out 2 gallons into a measuring container. Then, pour the measured Part A into a mixing pail.

ADD RESUFLOR UVE PART B TO PART A (3 GALLONS TOTAL MIX). Pour out 1 gallon Part B into a measuring container that is separate from the one used with the Part A. Then, add the measured Part B to the Part A already in the mixing pail.

POTLIFE: Mix only enough material which can be applied within the work time (time between the addition of Part B to Part A and the completion of all application actions). Check the following chart for work times at various temperatures. For smaller quantities, use 2 parts PART A to 1 part PART B by volume.

APPROXIMATE WORK TIME

65°F	70°F	75°F	80°F	90°F
50 min	40 min	35 min	30 min	25 min

MIX FOR 2 MINUTES using a Jiffy® mixer blade and slow speed drill. (Failure to do so could result in lower/diminished coating properties.)

IMMEDIATELY POUR ALL OF THE MIXED MATERIAL onto the floor in a single bead.

PUSH THE FLAT SQUEEGEE at an even speed with sufficient down pressure to apply the thinnest coat. **NOTE:** The use of spiked shoes will allow freedom of movement on the wet floor.

START THE SECOND AND REMAINING PASSES by pushing material parallel to the first stroke. Hold the bead of material near the center of the bar.

BACKROLL THE MATERIAL with a 3/8" nap roller for a smooth uniformed appearance. Backrolling is required to remove the puddles and squeegee lap marks in order to obtain uniform texture and a consistent mil thickness. **NOTE:** Get off the Resuflor UVE as soon as possible.

Resuflor UVE must be topcoated with Resutile HTS 100 at floor temperatures of 65-90°F within 24 hours.

TOPCOAT

APPLICATION – TOPCOAT- RESUTILE HTS 100

NOTE: The topcoat of Resutile HTS 100 must be applied after the Resuflor UVE has set up enough to walk on and within 24 hours.

PREMIX PART A FOR 3 MINUTES USING A JIFFY® MIXER BLADE with slow speed drill. POTLIFE: Mix only enough material which can be used in a two-hour period. NOTE: Once opened, this material cannot be resealed for later use.

POUR PART C INTO PART A while mixing.

CONTINUE TO MIX AND ADD PART B.

MIX FOR 3 MINUTES using a Jiffy® mixer blade and slow speed drill. Pour into application tray.

APPLY RESUTILE HTS 100 at the rate of 535 sq.ft./gal with a 3/8" nap roller. For proper appearance and development of physical properties, it is crucial that material is not applied above or below this rate. Dip the roller in the coating and lightly roll out excess in the application tray. Apply two 8-10-ft.-long paths on the concrete, making one stroke left to right and one right to left. Rewet the roller and apply two more paths adjacent to the first pair. Rewet roller and apply a third pair adjacent to the second.

SPREAD THE MATERIAL evenly with V-shaped cross passes.

MAKE SURE THE FLOOR HAS JUST ENOUGH COATING TO COVER EVENLY. Excess material could cause the floor to blister, especially in high humidity. Insufficient material will cause the floor to look non-uniform.

LEVEL THE AREA with straight passes that cross the initial material paths. These final strokes will reduce roller marks. If the appearance is not satisfactory, reroll the area.

REMIX THE MATERIAL in the tray occasionally (with the roller) to prevent settling of the Part C (filler).

NOTE: When multiple applicators are used to apply material, inconsistencies between areas may result. To ensure a more uniform finish, an individual outfitted with spike shoes may finish by pushing or pulling a roller across all applicator areas.

ALLOW COATING TO DRY 24 HOURS at 75°F, 50% relative humidity before opening to light traffic. Allow more time at low temperatures, low humidity or for heavier traffic. Full coating properties take 14 days to develop.

CLEANUP

Clean up mixing and application equipment immediately after use. Use toluene or xylene. Observe all fire and health precautions when handling or storing solvents.

SAFETY PRECAUTIONS

Refer to the SDS before use. Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

MATERIAL STORAGE

Store materials in a temperature controlled environment (50-90°F) and out of direct sunlight. Keep resins, hardeners and solvents separated from each other and away from sources of ignition.

MAINTENANCE

Occasional inspection of the installed material and spot repair can prolong system life. For specific information, contact the Sherwin-Williams Technical Service Department.

DISCLAIMER

The information and recommendations set forth in this document are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication.

Consult www.sherwin-williams.com/resin-flooring to obtain the most recent Product Data information and application instructions.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams.

NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

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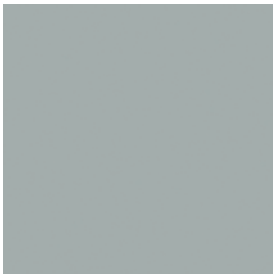
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SHERWIN WILLIAMS® | HIGH PERFORMANCE FLOORING

COLOR CARD

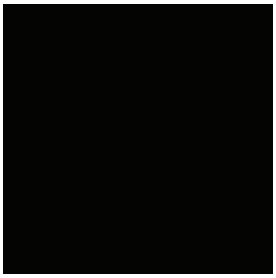
STANDARD COLORS

We offer a wide range of flooring systems for virtually any industrial, commercial or institutional application — from warehouses to transportation garages to food service operations. Our systems are designed to minimize your downtime while giving you the performance you demand. But specifying the right color can be as important as selecting the appropriate coating. Color can improve employee morale, enhance your image, increase productivity and contribute to the safety of your employees. Sherwin-Williams strives to provide the products you need in the color you require. In addition to the standard colors identified here, custom colors are also available.



Canada Gray
(51)

Light Gray
(52)



Black
(61)



Sandy Beige
(78)



Rich Green
(30)



Regal Blue
(70)



Rotunda Red
(65)

White
(59)

Bright Yellow
(68)



Steel Gray
(54)



Charcoal
(53)



Tile Red
(74)

Computerized custom color matching available upon request.

This reproduction approximates the actual color. Factors such as the type of product, degree of gloss, texture, size and shape of area, lighting, heat or method of application may cause color variance. Contact your Sherwin-Williams representative for details.

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SHERWIN WILLIAMS® | HIGH PERFORMANCE FLOORING

COLOR CARD

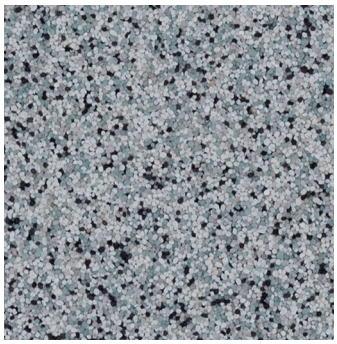
DECO QUARTZ

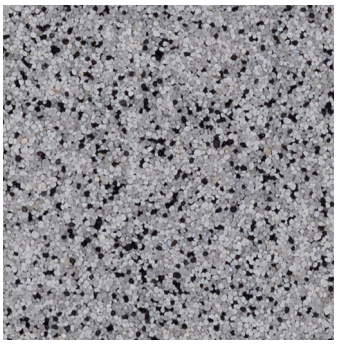
DECORATIVE RESINOUS FLOORING

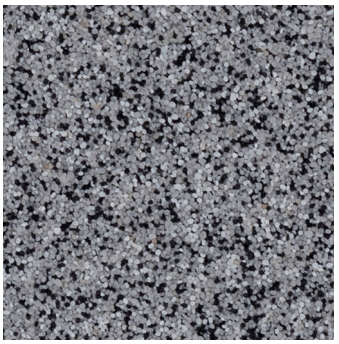
Decorative colored quartz aggregates combine with resins to create a unique design while providing a slip-resistant and hard-wearing protective floor solution. These system blends are completely customizable and ideal for healthcare, laboratory, food service, locker room areas and more.

COOL BLENDS


Grey Linen

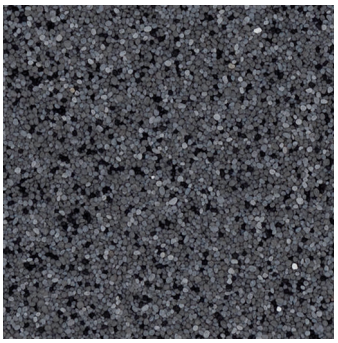

Peppered Granite

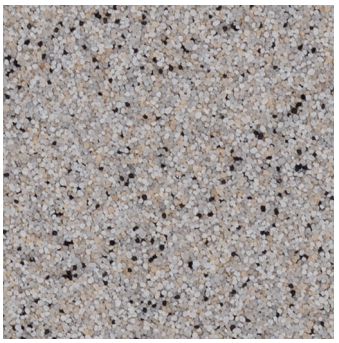

Meteor Shower


Starry Evening

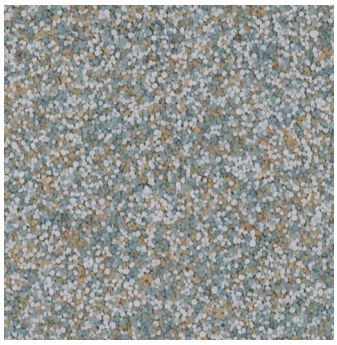

Birch Bark

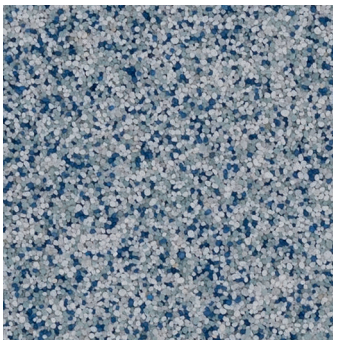

Midnight

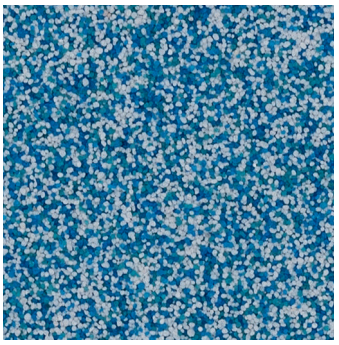

Stormy Evening


Foggy Morning


Fallen Fog


Maple Pepper


Winter Sky


Ocean Waves

This reproduction approximates the actual color. Factors such as the type of product, degree of gloss, texture, size and shape of area, lighting, heat, or method of application may cause color variance. Substituting other manufacturers' colors may not be representative of our blends. Contact your Sherwin-Williams representative for details.

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High Performance Flooring
PM-AD0120-CC 3/21

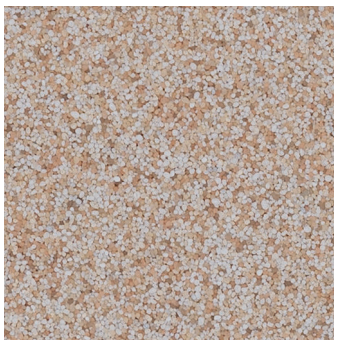
SHERWIN WILLIAMS® | HIGH PERFORMANCE FLOORING

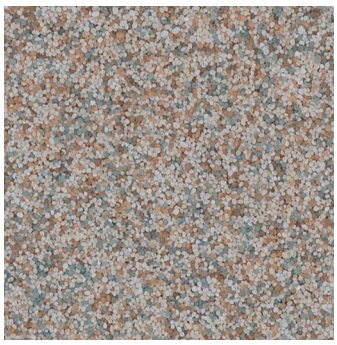
COLOR CARD

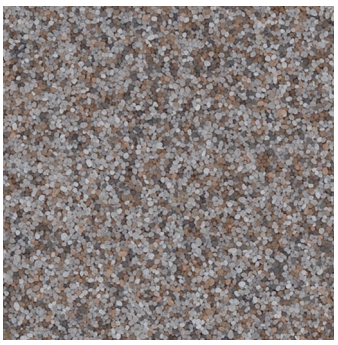
DECO QUARTZ

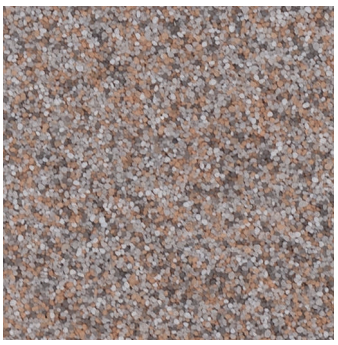
DECORATIVE RESINOUS FLOORING

WARM BLENDS

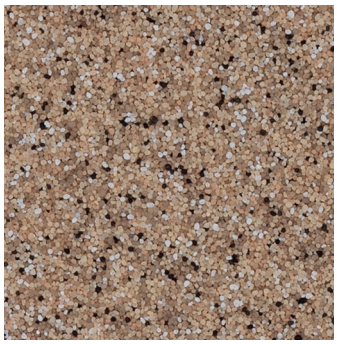

Coconut Sugar


Cashmere


Fuzzy Wool


Spiced Rice Cake

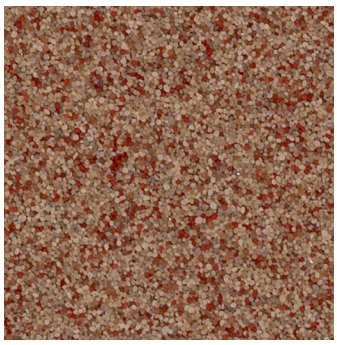

Sandstorm

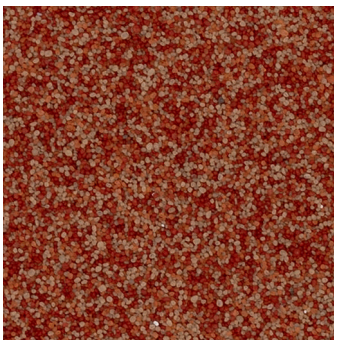

Coastal Plain

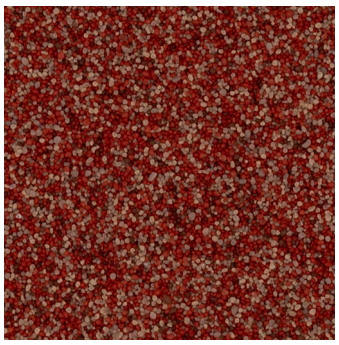

Warm Beach


Cinnamon Coffee


Caramel Brulee


Cardamom


Fall Foliage


Cayenne

This reproduction approximates the actual color. Factors such as the type of product, degree of gloss, texture, size and shape of area, lighting, heat, or method of application may cause color variance. Substituting other manufacturers' colors may not be representative of our blends. Contact your Sherwin-Williams representative for details.

United States & Canada
sherwin-williams.com/resin-flooring
swflooring@sherwin.com

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High Performance Flooring
PM-AD0120-CC 3/21

Smooth Design, Raised Design, & Dimensions Rubber Tile

TECHNICAL DATA

PRODUCT DESCRIPTION

Finish & Appearance	Smooth, Slate, Low Profiled Raised, Textured, Raised Square, Hammered, Raised Circular, Warning Tile, Lug Back, Crackle, Random, Stripe, Smooth Landing Mat, & Diamond Landing Mat, No Factory Finish
Nominal Dimensions [1]	12” (30.5 cm) x 12” (30.5 cm) x 1/8” (3.2 mm) 12” (30.5 cm) x 12” (30.5 cm) x 3/16” (4.8 mm) 19 11/16” (50 cm) x 19 11/16” (50 cm) x 1/8” (3.2 mm) 19 11/16” (50 cm) x 19 11/16” (50 cm) x 3/16” (4.8 mm) 19 11/16” (50 cm) x 19 11/16” (50 cm) x 13/64” (5.2 mm) 24” (61 cm) x 24” (61 cm) x 0.080” (2 mm) 24” (61 cm) x 24” (61 cm) x 1/8” (3.2 mm) 27” (68.6 cm) x 27” (68.6 cm) x 1/8” (3.2 mm) 27” (68.6 cm) x 27” (68.6 cm) x 3/16” (4.8 mm) 36” (91.4 cm) x 36” (94.1 cm) x 1/8” (3.2 mm)

PRODUCT PERFORMANCE PROPERTIES

ASTM F1344 – Rubber Floor Tile	Type I, A & B, Grade 1
ASTM E648 (NFPA 253) – Critical Radiant Flux	Class I, ≥ 0.45 W/cm^2
ASTM E662 (NFPA 258) – Smoke Density	Passes, ≤ 450
CAN/ULC-S102.2 – Surface Burning	115 Flame Spread Rating 275 Smoke Development Classification
ASTM D2047 – Static Coefficient of Friction [2]	≥ 0.50
ASTM F970 – Static Load Resistance [3]	Passes, < 0.005” Indentation @ 250 psi Passes, < 0.005” Indentation @ 1,100 psi Modified
ASTM F2753 – Rolling Load Limit [4]	≤ 500 lbs./in^2
ASTM F925 – Chemical Resistance [5]	Excellent, Additional Chemical List available via chart
ASTM G21 – Resistance to Fungi	Excellent
ASTM D3389 – Abrasion Resistance	Excellent, ≤ 1 g loss (after 1000 cycles)
ASTM F1514 – Heat Stability	ΔE ≤ 8
ISO 4918 – Castor Chair Test	Excellent, No Damage or Separation after 25,000 Cycles
ASTM D2240 – Durometer Hardness Indentation	≥ 85 Shore A

ACOUSTICAL PERFORMANCE PROPERTIES [6]

6 INCH CONCRETE SLAB	
ASTM E2179 – Sound Reduction	ΔIIC 9
6 INCH CONCRETE SLAB / CEILING ASSEMBLY	
ASTM E492 – Impact Insulation Class	IIC 51

ASTM E90 – Sound Transmission Class	STC 63

PRODUCT INSTALLATION & WARRANTY INFORMATION

Lot Controlled	Yes
Suitable for In Floor Radiant Heat	Yes
Heat Weldable / Required	Not Recommended
Indoor / Outdoor Suitability	Indoor Use Only
Service & Storage Temperature Range [7]	60° - 85° F
Recommended Adhesives [8]	Excelsior AW-510 Wet-Set Acrylic Adhesive Excelsior PS-525 Modified Pressure Sensitive Adhesive Excelsior U-705 Urethane Adhesive Excelsior EW-710 Urethane Enhanced Two-Part Epoxy Adhesive
Product Warranty [9]	10 Year Limited Commercial Warranty

ATTRIBUTES, CERTIFICATIONS, & REGULATORY INFORMATION

- Manufactured in Fostoria, Ohio
- Health Product Declaration (HPD) Available
- Environmental Product Declaration (EPD) Available
- Contributes to LEED v4/4.1 Requirements
- Achieved NSF/ANSI 332 Level 1 Certification
- Achieved FloorScore Certification
- Meets California Department of Public Health V1.2 (CA Section 01350) requirements
- Meets Collaborative for High Performance Schools (CHPS) requirements
- Does Not Contain Recycled Materials
- Red List Chemical Free
- Recyclable Through the Roppe Impact Program
- Qualifies for American Made Products Acts and/or Requirements

SUPPORT & ADDITIONAL DOCUMENTATION

Product Support Phone & Email	(800) 537 – 9527 / sales@roppe.com
Technical Support Phone & Email	(844) 393 – 4044 / solutions@rhctechnical.com
Product Technical Documentation	www.roppe.com
Associated or Related Documentation	Excelsior AW-510 Wet-Set Acrylic Adhesive Excelsior PS-525 Modified Pressure Sensitive Adhesive Excelsior U-705 Urethane Adhesive Excelsior EW-710 Urethane Enhanced Two-Part Epoxy Adhesive Referenced Standards within Technical Documents Technical Bulletin Rubber Flooring Installation Rubber Flooring Care & Maintenance Roppe Products Warranty

[1] Nominal Dimensions are the marketed dimensions of the product, tolerances are allowed in the manufacturing process and our tolerance range is what is allowed by the ASTM documentation overseeing the product construction.

[2] ADA Standards for Accessible Design state the floor surface shall be stable, firm and slip resistant. Our test results utilize the James Machine as described in ASTM D2047 and as described in UL410 for floor covering materials (FCM) utilizing a leather foot under dry conditions. Maintenance processes and commonly utilized site applied finishes, polishes, and other sealers to maintain resilient flooring products will change the walking surface and ultimately the Static Coefficient of Friction.

[3] ASTM F970 testing at loads above 250 psi is outside the scope of the test method and is considered modified. Modification to the testing process for us is the additional load utilizing the same foot as described in the test method by ASTM. Since testing is conducted on flooring product alone, our stated results do not take into consideration chosen adhesive, any utilized underlayments and/or substrates or subfloors. These results should not be construed as an indicator of installed flooring performance.

[4] ASTM F2753 testing at loads of 500 lbs. of force on each wheel after acclimation to laboratory conditions. The Hil-Rom Gurney wheel is utilized for 1,000 cycles and then examined for indentation, seam condition, tearing, or visible issues. Wheels shall not be metal or hard plastic, and the shape of the wheels must be flat with rounded edges and manufactured with a shore hardness when tested as Type A of ≤ 90.

[5] ASTM F925 testing is utilized to ensure flooring materials will stand up to certain household standard chemistries. Additional chemical resistance testing performed using this test method is for informational and guidance purposes only. Proper maintenance will influence chemical resistance, but the best defense against a negative effect is to clean the drop/spill from the flooring surface immediately.

[6] Acoustical testing information is provided for information and guidance when selecting flooring materials. Testing is conducted on flooring products with or without underlayments and over laboratory substrates. These results should not be construed as an indicator of installed flooring performance and results.

[7] See installation documents for full installation details regarding approved substrates, job site conditions and acclimation procedures.

[8] Recommended adhesives listed are recommended to be used to obtain the full listed system warranty that includes a bond performance warranty. Material installed with adhesives other than those listed here or an approved option in writing will only have a product manufacturing and wear warranty, no performance or bond warranty.

[9] See product warranty for full details regarding limitations and warranty coverage.

The contents contained within this Technical Data Sheet (TDS) may be utilized or copied into another projected related document, but this original document will remain in effect at the time of product installation, this TDS shall not be supplemented or replaced by the resulting project documentation. **Any alterations to the wording or requirements contained in or derived from this document shall void all related warranties.**

See installation information and documents for full installation details regarding substrates, job site conditions, & acclimation procedures. The intent of this document is to provide technical and performance properties of the mentioned adhesive as well as define the intended method of installation for the products in which the adhesive is approved for use. Any installation guidelines are to be considered as a starting point at a minimum for a successful installation. We rely on the expertise and professionals that are installing the products to adjust based on site conditions. Anything that appears to be a link, is and leads to additional information if necessary or provides a means of contact in the event there are any additional questions. Prior to acceptance of this document refer to the product website to confirm that you have the most current revision.

These products are intended for installation by professionals, prior to use the user must determine the suitability of our products for the intended use, and the user alone assumes all risks and liability.

Mohawk Group

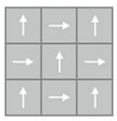
Made to Last

Overview

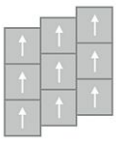
Feature	Description
Collection	Denim Culture
Style	Made to Last (GT350)
Product Type	Carpet Tile
Size	24 in x 24 in
Construction	Tufted
Surface Appearance	Textured Patterned Loop
Fiber	Duracolor® Tricor Premium Nylon
Dye Method	Solution Dyed
Stain Release Technology	Permanent, Built into the Fiber
Soil Release Technology	EcoSentry Soil Protection
Backing	Ecoflex One
Pile Weight	19 oz/yd2 (644 g/m2)
Gauge	1/12 (47.00 rows per 10 cm)
Stitches per Inch	12 (47.2 per 10cm)
Pile Thickness	0.078
Total Thickness	0.302 "
Installation	Glue Down, FlexLok
Installation Method	Quarter Turn, Vertical Ashlar, Brick Ashlar, Multi Directional
Recommended Adhesive	Enpress, M700 Plus, FlexLok+ Tabs, Total Bond



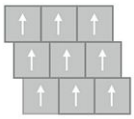
Recommended Installation Methods



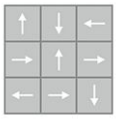
Quarter Turn



Vertical Ashlar



Brick Ashlar



Multi Directional

Mohawk Group

Colorways



Grey Wash

Color code: 969
Style number: GT350



Sage Wash

Color code: 656
Style number: GT350



Charcoal Wash

Color code: 989
Style number: GT350



Stone Wash

Color code: 727
Style number: GT350



Sand Wash

Color code: 838
Style number: GT350



Light Wash

Color code: 535
Style number: GT350

Colorways



Vintage Wash

Color code: 878
Style number: GT350



Acid Wash

Color code: 938
Style number: GT350



Indigo Wash

Color code: 565
Style number: GT350

Testing

Feature	Description
TARR Rating	Heavy
GSA Stain Release	Pass
Flammability	(ASTM E648) Class 1 - Glue Down
Static Propensity	(AATC 134) Under 3.5 KV
Smoke Density	(ASTM E662) Less than 450

Mohawk Group

Sustainability

Feature	Description
Embodied Carbon	5.26 kg CO2e/sq m2
Carbon Handprint	-5.52 kg CO2e/sq m2
Beyond Carbon Neutral	-0.26
Total Recycled Content	72.75%
Pre-Consumer Recycled Content	63.56%
Post-Consumer Recycled Content	9.19%
EPD	EcoFlex ONE EPD
HPD	HPD EcoFlex ONE
Material Health	Declare Red List Free
NSF 140	EcoFlex ONE - NSF 140 Platinum
LEED	Calculate LEED on Ecomedes
Indoor Air Quality	GLP 1171
The Waterways Project	Eligible
Mindful Materials	Participates in Mindful Materials Library
MindClick Rating	Achiever
Country Of Origin	USA

Packaging

Feature	Description
Square Yards Per Carton	8.00
Pieces per Carton	18
Cartons Per Pallet	22
Weight Per Carton (lbs)	44.8
Weight per Piece (lbs)	2.5

Warranties

Lifetime Limited Carpet Tile Warranty, Lifetime Limited Duracolor Stain Warranty, Lifetime Static

SECTION 101400
PANEL SIGNS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Interior and exterior panel signs attached to the building.
2. Photoluminescent signs.

B. Related Sections include the following:

1. Division 01 - “Temporary Facilities and Controls” for Project identification signage.
2. Division 10 - “Dimensional Sign Characters” for individual character signs.
3. Division 10 - “Cast Metal Plaques” for cast metal dedication plaques.
4. Division 22, 23, and 26 – “Plumbing, Mechanical, and Electrical” for tags and nameplates for plumbing, mechanical, and electrical equipment.
5. Division 32 - “Parking Bumpers and Signage” for parking lot and pedestrian signage.

1.3 DEFINITIONS

A. ADA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

1.4 SUBMITTALS

A. Product Data: Manufacturer’s product data including construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of sign.

B. Shop Drawings: Include plans, elevations, and full-scale template layout of characters and other components. Show mounting methods, grounds, mounting heights, layout, spacing, reinforcement, accessories, and installation details.

1. Provide message list for each sign, including large-scale details of wording, lettering, and Braille layout.

C. Schedule: Schedule indicating sign locations, type, other pertinent data, and referenced to rooms or doors. For bid purposes, the Contractor shall provide an allowance of twelve (12) characters per sign.

D. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for each type of sign and material indicated.

E. Samples for Verification: Provide 2 full size sample signs showing edge and corner condition, border, text characters of height specified, Braille text, and selected colors, of each type of sign indicated. Sample will be retained by Architect.

F. Maintenance Data: For signage cleaning and maintenance requirements to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each sign type through one source from a single manufacturer.

B. Regulatory Requirements: Comply with the California Building Code, Title 24, The Americans with Disabilities Act (ADA), and ANSI A117.1.

1. Letters and numerals on signs shall be sans serif uppercase characters raised 1/32-inch from the background and be accompanied by Grade 2 Braille.
2. Raised characters shall be between 5/8-inch and 2-inches high.
3. Braille dots shall be 1/10 inches on center in each cell with 2/10 inch space between cells measured from the second column of dots in the first cell to the first column of dots in the second cell. Braille dots shall be raised a minimum of 1/40 inch above the background.
4. Pictograms shall be accompanied by the equivalent written description located directly below the pictogram. The outside dimension of the pictogram field shall be a minimum of 6 inches in height.
5. Characters, symbols, and backgrounds shall be of a non-glare finish.
6. Characters and symbols shall contrast with their background.
7. Letters and numbers on signs shall have a width to height ratio between 3:5 and 1:1, and a stroke width to height ratio between 1:5 and 1:10.

1.6 PROJECT CONDITIONS

A. Field Measurements: Where sizes of signs are determined by dimensions of surfaces on which they are installed, verify dimensions by field measurement before fabrication and indicate measurements on Shop Drawings.

1.7 WARRANTY

A. Warranty: Manufacturer's standard form in which manufacturer agrees to replace signs that fail in materials or workmanship within specified warranty period.

1. Damage from deliberate destruction and vandalism is excluded.
2. Warranty Period for Interior Signs: Building lifetime.
3. Warranty Period for Exterior Signs: 20 years from date of Substantial Completion.
4. Warranty Period for Photoluminescent Signs: 15 years.

PART 2 - PRODUCTS

2.1 PANEL SIGNS

A. Manufacturers, Basis-of-Design Products: Products indicated below are based on products manufactured by:

1. Best Sign Systems Inc.

a. Subject to compliance with requirements, provide the product(s) indicated or comparable products by one of the following:

1) ASI-Modulex, Inc.
2) Gemini Incorporated.

B. General: Provide smooth panel sign surfaces constructed to remain flat under installed conditions within tolerance of plus or minus 1/16 inch measured diagonally from corner to corner complying with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.

C. Provide signs that comply with requirements and at locations indicated in the Drawings and the Sign Schedule at the end of this specification Section.

D. Braille Text: Braille text shall be Contracted Grade 2. Translation of sign copy into Braille to be the responsibility of the manufacturer.

E. Text Font: Sans Serif, unless otherwise indicated.

F. Text Height: As indicated on Drawings. Text height for each type of sign

G. Interior Panel Signs: Basis of Design: Best Sign Systems, Inc., HC 300 Series signs complying with the following requirements:

1. Material: Fiberglass Sheet, 0.25-inch thick.
2. Edge Condition: Beveled.
3. Corner Condition: Rounded to radius of 1/2 inch.
4. Border: 3/8-inch wide.
5. Mounting: Unframed, wall mounted.
6. Color: As selected by Architect from manufacturer's full range, text and border shall contrast with background.

H. Exterior Panel Signs: Basis of Design: Best Sign Systems, Inc., HC 300 Series signs complying with the following requirements:

1. Material: Fiberglass Sheet, 0.25-inch thick.
2. Edge Condition: Beveled.

3. Corner Condition: Rounded to radius of 1/2 inch.
4. Border: 3/8-inch wide.
5. Mounting: Unframed, wall mounted.
6. Color: As selected by Architect from manufacturer's full range, text and border shall contrast with background.

2.2 PHOTOLUMINESCENT SIGNS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Bright Path Lighting, Inc.
2. Evenlite Inc.
3. Holophane Corporation.
4. Isolite Corporation.
5. Johnsonite; Division of Duramax, Inc.

B. Photoluminescent Signs: Self-contained, single face, UL 924 photoluminescent “Exit” signs as follows:

1. Sign Substrate: Manufacturer’s standard photoluminescent self-extinguishing PVC.
2. Frame: Manufacturer’s standard clear anodized aluminum frame with transparent polycarbonate face with translucent lettering.
3. Letter Color: Red or Green as selected by Architect.
4. Mounting: Wall or ceiling mount as required for project conditions including manufacturer’s standard mounting hardware where required.
5. Service Life: 25 years.

2.3 ACCESSORIES

A. Mechanical Fasteners: Use tamper resistant fasteners fabricated from materials that are not corrosive to sign material and mounting surface.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Locate signs and accessories where indicated, using mounting methods of types described and in compliance with manufacturer's written instructions.

1. Install signs level, plumb, and at heights indicated, with sign surfaces free from distortion and other defects in appearance.
2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as pairs of doors, install signs on nearest adjacent wall. Locate to allow approach within 3 inches of sign without encountering protruding objects or standing within swing of door. Install wall signs centered 60-inches above the floor surface.

B. Wall-Mounted Panel Signs: Attach panel signs to wall surfaces using methods indicated below:

1. Vinyl-Tape Mounting: Use double-sided foam tape to mount signs to smooth, nonporous surfaces that cannot be drilled or screwed. Do not use this method for vinyl-covered or rough surfaces.
2. Silicone-Adhesive Mounting: Use liquid-silicone adhesive recommended in writing by sign manufacturer to attach signs to irregular, porous, or vinyl-covered surfaces. Use double-sided vinyl tape where recommended in writing by sign manufacturer to hold sign in place until adhesive has fully cured.
3. Mechanical Fasteners: Use non-removable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.
4. Where panel signs are mounted on glass, provide matching plate on opposite side of glass to conceal mounting materials.

3.3 CLEANING AND PROTECTION

A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

B. Clean per manufacturer’s recommendation prior to final inspection.

3.4 SIGN SCHEDULE

A. Interior Room Identification Signs: Provide interior room identification signage adjacent to doors as indicated and scheduled on the Drawings.

1. Text Content: Identify rooms by number and name unless otherwise indicated. Room names and numbering shall comply with Owner’s instructions (not Architect’s referencing or numbering as indicated on the Drawings).
2. Text Height: As indicated on Drawings and in compliance with CBC CHAPTER 11B-703
3. Sign Size: As indicated on drawings, and as required to contain all required text and characters.

B. Interior Tactile Exit Signs: Provide tactile exit signs to comply with regulatory requirements at the following locations:

1. At each grade level exterior exit door, text to read “Exit.”
2. At exit doors to corridors from rooms having illuminated exit signs, text to read “Exit Route.”

C. Toilet Room Identification Signs: Signage shall consist of door and wall mounted signs to comply with regulatory requirements and as indicated on the Drawings.

D. Exterior Identification Signs: Provide exterior identification signage at exterior public access doors to each usable or occupied space of the building.

1. Text Content: Identify building areas by functional use. Text content shall comply with Owner's instructions.
2. Text Height: As indicated on Drawings and in compliance WITH CBC CHAPER 11B-703
3. Sign Size: As indicated on drawings.

E. Exterior International Symbol of Accessibility (ISA) Signs: Provide ISA signage at exterior public access entrances to each building.

1. Signs shall include an international symbol of accessibility graphic 5-inches square in size, field size 6-inches square minimum.

F. Vertical Platform Lift Signs: Provide signs to comply with regulatory requirements located at lower landings of vertical platform lifts, sign information to include:

1. International Symbol of Accessibility.
2. Text stating:

    a. LIFT SHALLNOT BE USED TO TRANSPORT MATERIALS OR EQUIPMENT
    b. LIFT CAPACITY 750 LBS
    c. IN CASE OF EMERGENCY CALL ###-###-#### (Phone number to be confirmed prior to sign fabrication).

END OF SECTION 101400

SECTION 102800
TOILET ROOM ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Washroom accessories.
2. Shower accessories.
3. Custodial accessories.
4. Underlavatory guards.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

1. Construction details and dimensions.
2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.
5. Manufacturer's warranty.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated on Drawings.
2. Identify products using designations indicated on Drawings.

C. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same articles in Part 2, provide products of same manufacturer unless otherwise approved by Architect.

B. Regulatory Requirements: Toilet room accessories and mounting heights shall comply with accessibility requirements of the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and

Facilities (ADAAG)" and with the California Building Code, Chapter 11B, “Accessibility to Public Buildings, Public Accommodations, Commercial Buildings, and Publicly Funded Housing.”

1. The height from the floor to any operating mechanism or point of dispensing shall not exceed 40-inches.

1.5 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

C. Coordinate backing for mounting accessories with wall framing.

1.6 WARRANTY

A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 10 (ten) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304 with satin finish, unless otherwise indicated.

B. Brass: ASTM B 19 flat products; ASTM B 16, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel).

D. Galvanized Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.

E. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.2 WASHROOM, SHOWER AND CUSTODIAL ACCESSORIES

A. Basis-of-Design Products: Contractor furnished and installed accessories shall be as indicated in the schedule at the end of Part 3 of this specification section. The products indicated in the schedule are based on one manufacturer, subject to compliance with requirements, provide the named products or comparable products by one of the following:

1. American Specialties, Inc.
2. Bobrick Washroom Equipment, Inc. (Basis of Design Products).
3. Bradley Corporation.

2.3 UNDERLAVATORY GUARDS

A. Basis-of-Design Product: The design for accessories is based on products indicated. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

1. Plumberex Specialty Products, Inc.
2. Truebro, Inc. (Basis of Design)

B. Underlavatory Guard, Basis-of-Design Product: Truebro, Inc., Lavguard2 series underlavatory guard.

1. Description: Antimicrobial, white molded-plastic underlavatory guard assemblies. Underlavatory guard assemblies shall cover waste piping and hot and cold water supply piping, allow service access without removing coverings, and shall prevent contact with hot surfaces and/or sharp objects.
2. Locations: Provide underlavatory guard assemblies at all lavatories in all toilet rooms and at sinks that are indicated to be accessible to persons in a wheel chair including sinks in base cabinets with doors and removable bottoms or without bottoms.

2.4 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

C. Shower Accessories: Shower accessories shall have wall penetrations sealed with mildew resistant silicone sealant. Sealant shall not be visible in the finished installation. Sealant shall be as specified in Division 7 Section “Joint Sealants.”

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

3.3 ACCESORY LOCATIONS

A. General: Accessories shall be provided at locations indicated on drawings, for locations where accessories are not indicated, provide accessories as follows:

1. Paper Towel dispenser: Provide one surface mounted paper towel dispenser for each sink or lavatory; at multiple lavatory locations, provide one towel dispenser for every 2 lavatories.
2. Soap Dispenser: Provide one surface mounted soap dispenser for each sink or lavatory.
3. Toilet Tissue Dispenser: Provide one surface mounted toilet tissue dispenser for each toilet; provide semi-recessed toilet tissue dispensers at wheel chair accessible toilets.
4. Seat Cover Dispenser: Provide one surface mounted seat cover dispenser for each toilet.
5. Grab Bars: Provide one 36-inch grab bar at the back of the toilet and one 48-inch grab bar at the side of the toilet for all wheel chair accessible toilets.

3.4 SCHEDULE 1 – CONTRACTOR FURNISHED AND INSTALLED ACCESSORIES

A. General: Exposed surfaces of accessories shall be stainless steel with a satin finish unless otherwise indicated.

B. The following accessories shall be furnished and installed by the Contractor:

Reference	Description

Reference	Description
TA-GB1	Bobrick B-6106 Series Grab bar, 1-1/2 inch diameter, satin finish, concealed mounting with snap flange, wheel chair accessible toilets to have (1) 36 inch long rear grab bar and (1) 48 inch long side grab bar, other locations to have size and configuration as indicated on drawings.
TA-LG1	Lavatory Piping Guard, Trubro Lavatory piping guard for hot and cold water supply and waste piping.
TA-MR1	Bobrick B-165 Series (size as indicated on drawings) Mirror, channel frame, 1/2 x 1/2 x 1/2 type 430 stainless steel, bright finish, mitered corners, 1/4-inch mirror glass (10 year warranty), concealed mounting with theft resistant locking device. (Note: Mirrors require 1-inch clearance all around for securing to concealed mounting bracket).
TA-ND1	Sanitary napkin Disposal container, surface mounted, stainless steel container with molded polyethylene waste receptacle and keyed lock, 1.2 gallon capacity (projects 4-1/16 inches from wall).
TA-PT1	Bobrick B-262 (Classic Series) Paper towel dispenser, surface mounted (projects 4-inches from wall), tumbler lock at top of face of cabinet, 400 C-fold or 525 multi-fold towels, projects 4 inches from wall
TA-SC1	Bobrick B-221 (Classic Series) Seat cover dispenser, surface mounted, capacity of 250 single or half fold toilet seat covers, fills from bottom.
TA-SD2	Bobrick B-4112 (Contura Series) Liquid soap dispenser, surface wall mounted (horizontal orientation), 40 oz. capacity, concealed mounting, projects 3-1/2 inch wall to push button.
TA-TP1	Bobrick B-3888 (Classic Series) Toilet tissue dispenser, semi-recessed (3-3/16-inch wall recess with 2-3/4-inch projection), multi-roll, non-controlled delivery with theft resistant spindle, holds (2) 5.25 inch rolls, Flush tumbler lock. Use at wheel chair accessible toilet stalls.
TA-TP2	Bobrick B-2888 (Classic Series) Toilet tissue dispenser, surface mounted (6-inch projection from wall), multi-roll, non-controlled delivery with theft resistant spindle, holds (2) 5.25 inch rolls, Flush tumbler lock. Use at non- wheel chair accessible toilet stalls.
TA-PT2	Bobrick B-38084 Recessed towel dispenser and waste receptacle

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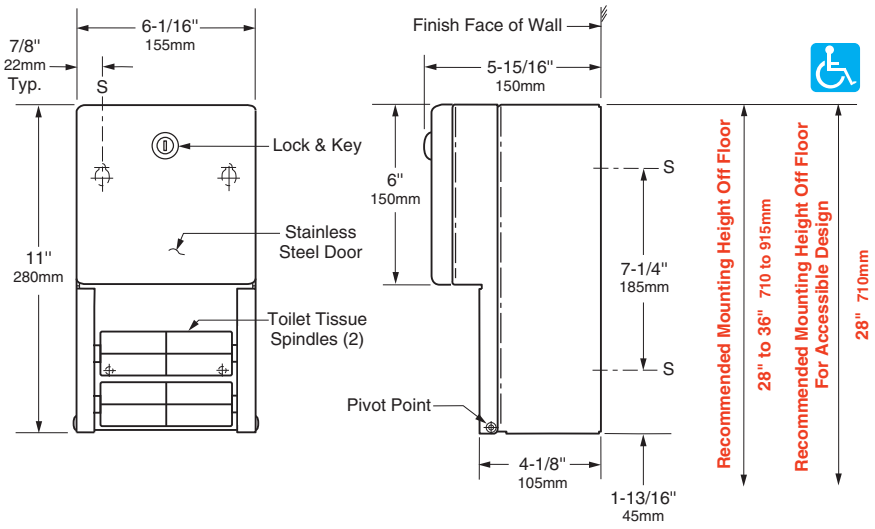
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Technical Data

SURFACE-MOUNTED MULTI-ROLL TOILET TISSUE DISPENSER

B-2888





MATERIALS:

Cabinet — 18-8, type-304, 22-gauge (0.8mm) stainless steel. All-welded construction. Exposed surfaces have satin finish.

Door — 18-8, type-304, 22-gauge (0.8mm) stainless steel with 18-gauge (1.2mm) stainless steel door frame. Exposed surfaces have satin finish. Front of door is drawn, one-piece, seamless construction. Secured to cabinet with two rivets. Equipped with a tumbler lock keyed like other Bobrick washroom accessories.

Dispensing Mechanism, Inner Housing and Cam — 18-8, type-304, 18-gauge (1.2mm) stainless steel.

Spindles (2) — Heavy-duty, one-piece, molded ABS. Theft-resistant. Retained in dispensing mechanism when door is locked.

OPERATION:

Unit holds two standard-core toilet tissue rolls up to 5-1/4" (133mm) diameter (1800 sheets). Tissue rolls are loaded and locked into dispensing mechanism. Extra roll automatically drops in place when bottom roll is depleted. Depleted rolls can only be removed after unlocking door.

INSTALLATION:

For partitions with particleboard or other solid core, secure with four #10 x 5/8" (4.8 x 16mm) sheet-metal screws (not furnished) at points indicated by an *S*, or provide through-bolts, nuts, and washers.

For hollow-core metal partitions, provide solid backing into which sheet-metal screws can be secured. If two units are installed back-to-back, then provide threaded sleeves and machine screws for the full thickness of partition.

For plaster or dry wall construction, provide concealed backing to comply with local building codes, then secure unit with sheet-metal screws.

For other wall surfaces, provide fiber plugs or expansion shields for use with sheet-metal screws or provide 3/16" (5mm) toggle bolts or expansion bolts.

SPECIFICATION:

Surface-mounted multi-roll toilet tissue dispenser shall be type-304 stainless steel with all-welded construction, including dispensing mechanism, inner housing and cam; exposed surfaces shall have satin finish. Front of toilet tissue dispenser door shall be drawn, one-piece, seamless construction. Door shall be secured to cabinet with two rivets and equipped with a tumbler lock keyed like other Bobrick washroom accessories. Unit shall dispense two standard-core toilet tissue rolls up to 5-1/4" (133mm) diameter (1800 sheets). Extra roll shall automatically drop in place when bottom roll is depleted. Unit shall be equipped with two theft-resistant, heavy-duty, one-piece, molded ABS spindles.

Surface-Mounted Multi-Roll Toilet Tissue Dispenser shall be Model B-2888 of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.

The illustrations and descriptions herein are applicable to production as of the date of this Technical Data Sheet.
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Revised 4/27/11 Printed in U.S.A.
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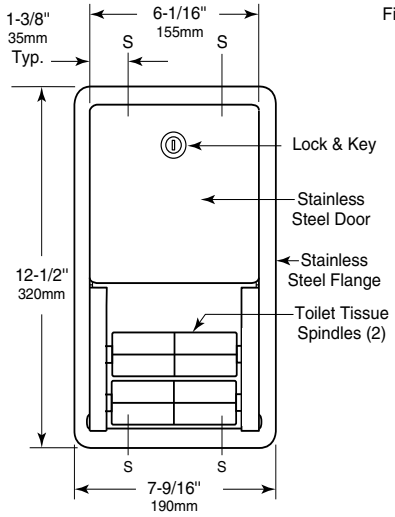
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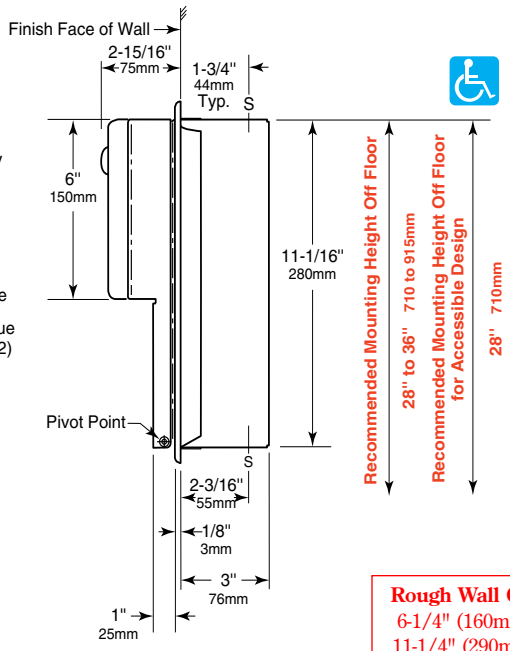
Technical Data

RECESSED MULTI-ROLL TOILET TISSUE DISPENSER

B-3888







Rough Wall Opening
6-1/4" (160mm) wide
11-1/4" (290mm) high
3-1/8" (80mm) minimum
recessed depth

MATERIALS:

Cabinet — 18-8, type-304, 22-gauge (0.8mm) stainless steel. Welded construction. Exposed surfaces have satin finish.

Flange — 18-8, type-304, 22-gauge (0.8mm) stainless steel with satin finish. Drawn, one-piece, seamless construction.

Door — 18-8, type-304, 22-gauge (0.8mm) stainless steel with 18-gauge (1.2mm) stainless steel door frame. Exposed surfaces have satin finish. Front of door is drawn, one-piece, seamless construction. Secured to cabinet with two rivets. Equipped with a tumbler lock keyed like other Bobrick washroom accessories.

Dispensing Mechanism, Inner Housing and Cam — 18-8, type-304, 18-gauge (1.2mm) stainless steel.

Spindles (2) — Heavy-duty, one-piece, molded ABS. Theft-resistant, spindles retained in dispensing mechanism when door is locked.

OPERATION:

Unit holds two standard-core toilet tissue rolls up to 5-1/4" (133mm) diameter (1800 sheets). Tissue rolls are loaded and locked into dispensing mechanism. Extra roll automatically drops in place when bottom roll is depleted. Depleted rolls can only be removed after unlocking door.

INSTALLATION:

Provide framed rough wall opening 6-1/4" wide x 11-1/4" high (160 x 290mm). Minimum recessed depth required to finish face of wall is 3-1/8" (80mm). Allow clearance for construction features that may protrude into opening from opposite wall. Coordinate with mechanical engineer to avoid pipes, vents, and conduits. Mount unit with shims between framing and cabinet at all points indicated by an *S*, then secure unit with sheet-metal screws (not furnished).

SPECIFICATION:

Recessed multi-roll toilet tissue dispenser shall be type-304 stainless steel with welded construction, including dispensing mechanism, inner housing and cam; exposed surfaces shall have satin finish. Front of toilet tissue dispenser door shall be drawn, one-piece, seamless construction. Door shall be secured to cabinet with two rivets and equipped with a tumbler lock keyed like other Bobrick washroom accessories. Flange shall be drawn, one-piece, seamless construction. Unit shall dispense two standard-core toilet tissue rolls up to 5-1/4" (133mm) diameter (1800 sheets). Extra roll shall automatically drop in place when bottom roll is depleted. Unit shall be equipped with two heavy-duty, one-piece, molded ABS spindles. Theft-resistant, spindles retained in dispensing mechanism when door is locked.

Recessed Multi-Roll Toilet Tissue Dispenser shall be Model B-3888 of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.

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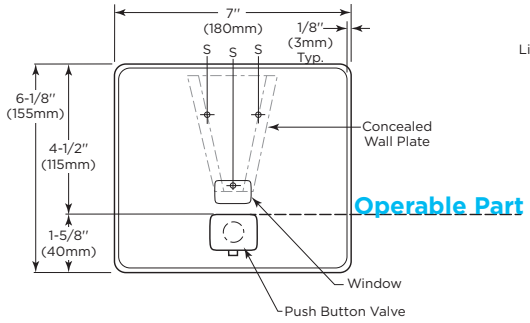
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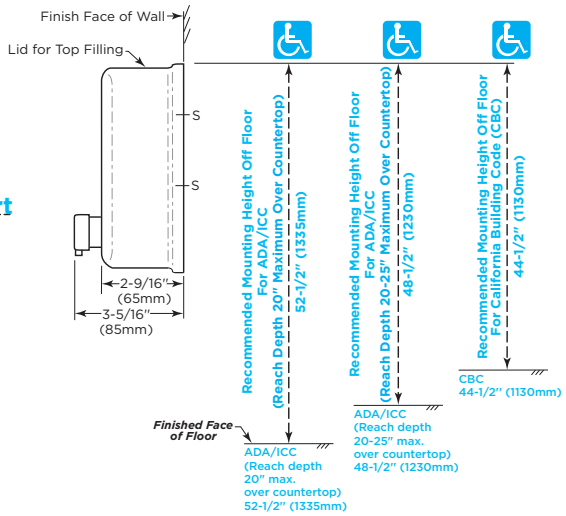
Technical Data

ConturaSeries® SURFACE-MOUNTED SOAP DISPENSER

B-4112







Installation Guidance

***Operable Part:** Top of pushbutton

Maximum mounting height of operable part:

ADA/ICC (Reach Depth 20" Maximum Over Countertop): 48" above finished floor (AFF)

ADA/ICC (Reach Depth, 20"-25" Maximum Over Countertop): 44" above finished floor (AFF)

CBC: 40" above finished floor (AFF)

*For more information regarding operable parts, please refer to Bobrick Planning Guide for Accessible Restrooms, page 9.

MATERIALS:

Container — Body is 18-8, Type-304, 20-gauge (1.0mm) stainless steel with satin-finish. Drawn, one-piece, seamless construction. Front has same degree of arc as other Bobrick ConturaSeries washroom accessories. Radius on corners and edges complement other ConturaSeries accessories. Back plate is 22-gauge (0.8mm) stainless steel with 20-gauge (1.0mm) stainless steel mounting bracket attached. Container body and back plate are epoxy-sealed to prevent warping and leakage. Concealed wall plate is 20-gauge (1.0mm) stainless steel. Equipped with a plastic soap refill-indicator window and a locked, hinged stainless steel lid for top filling. Capacity: 40-fl oz (1.2-L).

Valve — Black molded plastic push button. Soap head-holding mushroom valve. Stainless steel spring. U-packing seal and duckbill. Antibacterial-soap-resistant plastic cylinder.

continued . . .

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Revised 5/7/25

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OPERATION:

Corrosion-resistant valve dispenses commercially marketed all-purpose hand soaps. To prevent corrosion, use only chloride-free pH-netural liquid soaps, non-iodine based soaps and do not use alcohol based sanitizers. Valve operates with one hand, without tight grasping, pinching, or twisting of the wrist, and with less than 5 pounds of force (22.2 N) to comply with accessible design guidelines (including ADAAG in U.S.A.). Window indicates when refill is required. The locked, hinged lid opens for top filling with special key provided. Concealed, vandal-resistant mounting.

INSTALLATION:

Secure wall plate to the wall with screws furnished at points indicated by an *S*. Slide mounting bracket of container down onto wall plate and secure unit with furnished locking-screw. For plaster or dry wall construction, provide concealed backing to comply with local building codes, then secure unit with screws furnished. For other wall surfaces, provide fiber plugs or expansion shields for use with screws furnished, or provide 1/8″ (3mm) toggle bolts or expansion bolts.
Note: Surface-mount the dispenser plumb and true with valve 6″ (152mm) to right or left of lavatory center. Provide 4″ (102mm) minimum clearance from the lid to the underside of any horizontal projection. Push buttons should be located 44″ (1120mm) maximum above the finish floor. Where a high reach is over an obstruction (countertop), the high forward reach shall be 48″ (1220mm) maximum where the reach depth is 20″ (510mm) maximum. Where the reach depth exceeds 20″ (510mm) the high forward reach shall be 44″ (1120mm) maximum and the reach depth shall be 25″ (635mm) maximum.

SPECIFICATION:

Surface-mounted soap dispenser shall be Type-304 stainless steel with satin-finish. Corrosion-resistant valve shall dispense commercially marketed all-purpose hand soaps. To prevent corrosion, use only chloride-free pH-netural liquid soaps. Valve shall be operable with one hand and with less than 5 pounds of force (22.2 N) to comply with accessible design guidelines (including ADAAG in U.S.A.). Front of soap dispenser shall have same degree of arc and match other Bobrick ConturaSeries accessories in the washroom. Radius on corners and edges of soap dispenser shall complement other Bobrick ConturaSeries washroom accessories. Container body and back plate shall be epoxy-sealed to prevent warping and leakage. Soap dispenser shall have concealed, vandal-resistant mounting. Locked, hinged stainless steel lid for top filling shall require special key to open. Capacity shall be 40-fl oz (1.2-L).

Surface-Mounted Stainless Steel Soap Dispenser shall be Model B-4112 of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.

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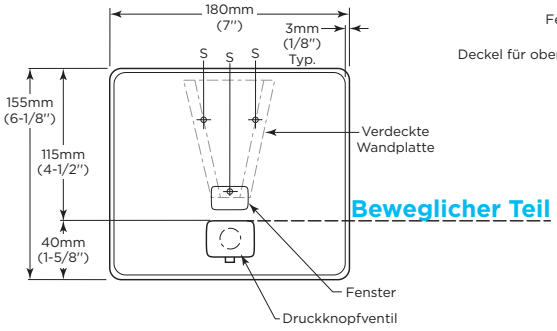
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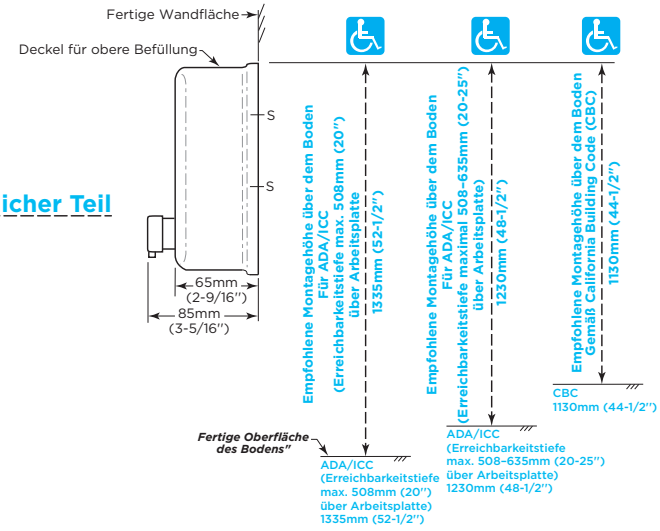
Technische Daten

ConturaSeries® AUFPUTZ-SEIFENSPENDER

B-4112







Installationsanleitung

***Beweglicher Teil:** Oberseite des Druckknopfes

Maximale Montagehöhe des beweglichen Teils:

ADA/ICC (Reichweite maximal 508mm (20″) über der Arbeitsplatte): 1220mm (48″) über dem fertigen Boden (OKFF)

ADA/ICC (Reichweite, 508-635mm (20–25″) maximal über der Arbeitsplatte): 1118mm (44″) über dem fertigen Boden (OKFF)

CBC: 1016mm (40″) über dem fertigen Boden (OKFF)

*Weitere Informationen zu beweglichen Teilen finden Sie im Bobrick-Planungshandbuch für barrierefreie Toiletten, Seite 9.

MATERIALIEN:

Gehäuse — Das Gehäuse besteht aus 18-8, Typ 304, 20 Maßstab (1,0 mm) rostfreiem Stahl mit Satin-Finish. Gezogene, einteilige, nahtlose Konstruktion. Die Vorderseite weist den gleichen Bogengrad auf wie andere Waschraumzubehörteile der Bobrick ConturaSerie. Radien an Ecken und Kanten ergänzen anderes Zubehör der ConturaSerie. Die Rückplatte besteht aus 0,8mm (22 Zoll) starkem Edelstahl mit einer daran befestigten Montagehalterung aus 1,0mm (20 Zoll) starkem Edelstahl. Behälterkörper und Rückplatte sind mit Epoxidharz versiegelt, um Verformungen und Undichtigkeiten zu verhindern. Die verdeckte Wandplatte besteht aus 1,0mm (20 Zoll) starkem Edelstahl. Ausgestattet mit einem Seifennachfüllanzeigefenster aus Kunststoff und einem verriegelbaren Edelstahldeckel mit Scharnier zum Befüllen von oben. Kapazität: 1,2 l (40 fl oz).

Ventil — Schwarzer Druckknopf aus geformtem Kunststoff. Pilzventil mit Seifenkopfhalterung. Feder aus Edelstahl. U-Dichtung und Ventil. Antibakteriell-seifenbeständiger Kunststoffzylinder.

Fortsetzung folgt . . .

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Der Hersteller behält sich das Recht vor, von Zeit zu Zeit Änderungen und Verbesserungen an Design und Abmessungen vorzunehmen und tut dies auch.

Überarbeitet am 7/5/25
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BETRIEB:

Korrosionsbeständiges Ventil zur Abgabe handelsüblicher Allzweck-Handseifen. Um Korrosion zu vermeiden, verwenden Sie nur chloridfreie, pH-neutrale Flüssigseifen sowie Seifen auf Jodbasis und keine Desinfektionsmittel auf Alkoholbasis. Das Ventil lässt sich mit einer Hand bedienen, ohne dass man das Handgelenk fest greifen, einklemmen oder verdrehen muss, und mit einem Kraftaufwand von weniger als 5 Pfund (22,2 N), um den Richtlinien für barrierefreies Design (einschließlich ADAAG in den USA) zu entsprechen. Ein Fenster zeigt an, wann eine Nachfüllung erforderlich ist. Der verschlossene Klappdeckel lässt sich zum Befüllen von oben mit dem mitgelieferten Spezialschlüssel öffnen. Verdeckte, vandalismusgeschützte Montage.

INSTALLATION:

Befestigen Sie die Wandplatte mit den mitgelieferten Schrauben an den durch ein Symbol gekennzeichneten Stellen an der Wand. *S* . Schieben Sie die Montagehalterung des Behälters nach unten auf die Wandplatte und befestigen Sie die Einheit mit der mitgelieferten Feststellschraube. Sorgen Sie bei Gips- oder Trockenbauwänden für eine verdeckte Rückwand, um den örtlichen Bauvorschriften zu entsprechen, und befestigen Sie die Einheit anschließend mit den mitgelieferten Schrauben. Für andere Wandoberflächen stellen Sie Faserdübel oder Spreizdübel zur Verwendung mit den mitgelieferten Schrauben bereit, oder stellen Sie Kippdübel oder Spreizdübel mit einem Durchmesser von 1/8″ (3mm) bereit.
Hinweis: Montieren Sie den Spender lotrecht und waagerecht auf der Oberfläche, mit dem Ventil 152mm (6″) rechts oder links von der Mitte des Waschraums. Sorgen Sie für einen Mindestabstand von 102mm (4″) zwischen Deckel und Unterseite aller horizontalen Vorsprünge. Druckknöpfe sollten sich maximal 1120mm (44″) über dem fertigen Boden befinden. Wenn über ein Hindernis (Arbeitsplatte) hinweg in großer Höhe gegriffen werden muss, darf die Reichweite nach vorne maximal 1220mm (48″) betragen, während die Reichweitentiefe maximal 510mm (20″) beträgt. Wenn die Reichweite 510mm (20″) überschreitet, darf die hohe Vorwärtsreichweite maximal 1120mm (44″) und die Reichweite maximal 635mm (25″) betragen.

SPEZIFIKATION:

Der Aufputz-Seifenpsender besteht aus Edelstahl Typ 204 mit eiiner matt gebürsteten Oberfläche. Das korrosionsbeständige Ventil dient zur Abgabe handelsüblicher Allzweck-Handseifen. Um Korrosion vorzubeugen, verwenden Sie nur chloridfreie, pH-neutrale Flüssigseifen. Das Ventil ist mit einer Hand und mit weniger als 5 Pfund Kraft (22,2 N) bedienbar und entspricht den Richtlinien für barrierfreies Design (einschließlich ADAAG in den USA). Die Vorderseite des Seifenspenders weist den gleichen Bogengrad auf und passt zu den anderen Zubehörteilen der Bobrick ConturaSerie im Waschraum. Der Radius an den Ecken und Kanten des Seifenspenders ist passend zu den anderen Waschraumzubehör der Bobrick Contura Serie. Behälterkörper und Rückplatte sind mit Epoxidharz versiegelt um Verformungen und Undichtigkeiten zu verhindern. Der Seifenspender wird verdeckt und vandalismusgeschützt montiert. Der verriegelbare, klappbare Edelstahldeckel zum Befüllen von oben erfordert zum Öffnen einen Spezialschlüssel. Das Fassungsvermögen beträgt 1,2 l (40 fl oz).

Der Aufputz-Seifenspender aus Edelstahl ist das Modell B-4112 von Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, Kalifornien; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australien; und Bobrick Washroom Equipment Limited, Vereinigtes Königreich sein.

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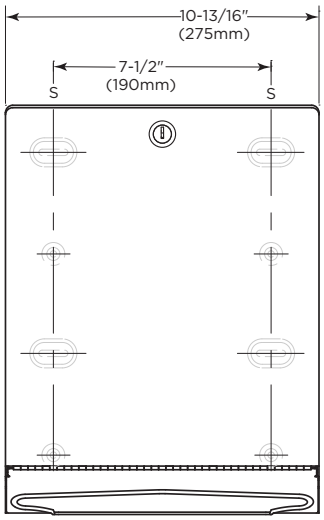
BOBRICK

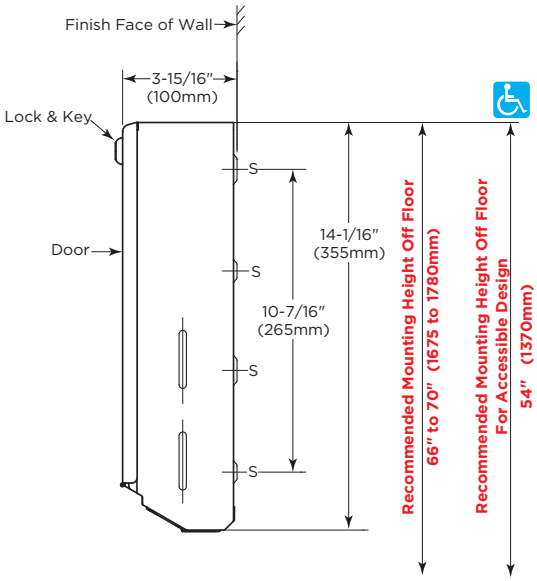
Technical Data

ClassicSeries® SURFACE-MOUNTED PAPER TOWEL DISPENSER

B-262







MATERIALS:

Cabinet — 18-8, type-304, 22-gauge (0.8mm) stainless steel. All-welded construction. Exposed surfaces have satin finish. Towel tray has hemmed opening to dispense paper towels without tearing.

Door — 18-8, type-304, 22-gauge (0.8mm) stainless steel with satin finish. Secured to cabinet with a full-length stainless steel piano-hinge. Equipped with a tumbler lock keyed like other Bobrick washroom accessories.

Optional: Order Bobrick Part No. 262-130 TowelMate® available as an optional accessory. TowelMate accessory allows for paper towels to dispense one at a time without bulging, sagging or falling through the towel tray opening. TowelMate fits Gamco and most manufacturers' similar models.

OPERATION:

Unit dispenses C-fold and multifold paper towels 3-1/8" to 3-13/16" (79–97mm) deep. Slots in sides of cabinet indicate refill time. Capacity: 400 C-fold or 525 multifold paper towels. To dispense narrower towels 2-1/2" to 3-1/8" (64–79mm) deep, order optional TowelMate accessory Bobrick Part No. 262-130.

INSTALLATION:

Mount unit on wall with four #10 x 1-1/4" (4.8 x 32mm) sheet-metal screws (not furnished) at four of the eight mounting holes indicated by an *S* (top slots and bottom holes preferable). For plaster or dry wall construction, provide concealed backing to comply with local building codes, then secure with sheet-metal screws. For other wall surfaces, provide fiber plugs or expansion shields for use with sheet-metal screws, or provide 1/8" (3mm) toggle bolts or expansion bolts.

SPECIFICATION:

Surface-mounted paper towel dispenser shall be type-304 stainless steel with all-welded construction; exposed surfaces shall have satin finish. Door shall be secured to cabinet with a full-length stainless steel piano-hinge and equipped with a tumbler lock keyed like other Bobrick washroom accessories. Paper towel tray shall have hemmed opening to dispense paper towels without tearing. Unit shall be capable of dispensing 400 C-fold or 525 multifold paper towels measuring 3-1/8" to 3-13/16" (79 to 97mm) deep. Narrower paper towels 2-1/2" to 3-1/8" (65 to 79mm) deep may be efficiently dispensed with the use of an optional TowelMate accessory, Bobrick Part No. 262-130. TowelMate accessory allows for paper towels to dispense one at a time without bulging, sagging or falling through the towel tray opening.

Surface-Mounted Paper Towel Dispenser shall be Model B-262 of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.

The illustrations and descriptions herein are applicable to production as of the date of this Technical Data Sheet.
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Revised 6/30/15

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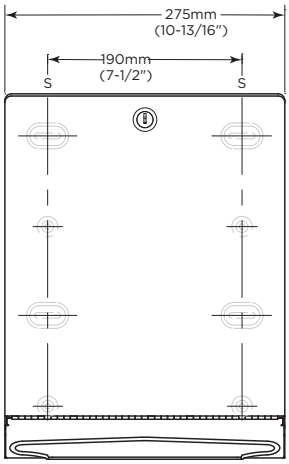
BOBRICK

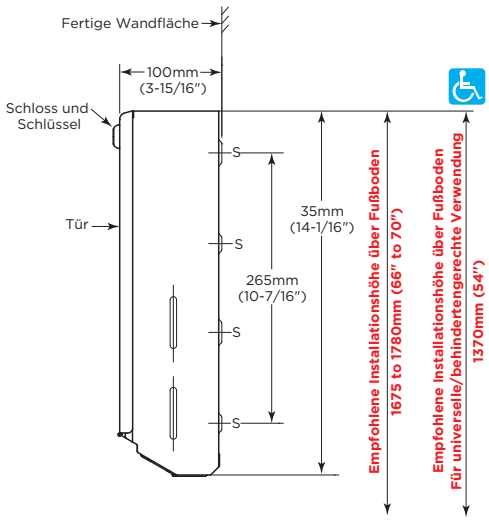
Technische Daten

ClassicSeries®
AUFPUTZMONTAGE PAPIERHANDTUCHSPENDER

B-262







MATERIALIEN:

Kabinett — 18-8, Typ 304, 22 Maßstab (0,8 mm) Edelstahl. Vollverschweißte Konstruktion. Sichtbare Oberflächen haben eine satinierte Oberfläche. Der Handtuchhalter hat eine gesäumte Öffnung, um Papiertücher ohne Reißen auszugeben.

Tür — 18-8, Typ 304, 22 Maßstab (0,8 mm) Edelstahl mit Satin-Finish. Mit einem durchgehenden Klavierscharnier aus Edelstahl am cabinet befestigt. Ausgestattet mit einem Zylinderschloss mit Schlüssel wie andres Waschraumzubehör von Bobrick.

Optional: Bestellen Sie Bobrick Teilenummer 262-130 TowelMate® als optionales Zubehör erhältlich. Mit dem TowelMate-Zubehör können Papiertücher einzeln ausgegeben werden, ohne dass sie sich wölben, durchhängen oder durch die Öffnung der Handtuchablage fallen. TowelMate passt zu Gamco und ähnlichen Modellen der meisten Hersteller.

BETRIEB:

Das Gerät gibt C- und mehrfach gefaltete Papierhandtücher mit einer Tiefe von 79 bis 97mm (3-1/8" bis 3-13/16") aus. Schlitze an den Seiten des Gehäuses zeigen den Fülllstand an. Kapazität: 400 C-gefaltete oder 525 mehrfach gefaltete Papiertücher. Um schmalere Handtücher mit einer Tiefe von 64 bis 79mm (2-1/2" bis 3-1/8") auszugeben, bestellen Sie das optionale TowelMate-Zubehör Bobrick Teilenummer 262-130.

INSTALLATION:

Montieren Sie das Gerät mit vier Blechschrauben Nr. 10 x 32mm (1-1/4") (nicht im Lieferumfang enthalten) an der Wand an vier der acht Montagelöcher, die durch ein *S* (vorzugsweise obere Schlitze und untere Löcher). Sorgen Sie bei Gips- oder Trockenbauwänden für eine verdeckte Rückwand, um den örtlichen Bauvorschriften zu entsprechen, und befestigen Sie diese anschließend mit Blechschrauben. Stellen Sie für andere Wandoberflächen Faserdübel oder Spreizdübel zur Verwendung mit Blechschrauben bereit oder stellen Sie Kippdübel oder Spreizdübel mit einem Durchmesser von 3mm (1/8") bereit.

SPEZIFIKATION:

Der Aufput-Papierhandtuchspender besteht aus Edelstahl Typ 304 und ist eine vollverschweißte Konsktruktion; die freiliegenden Oberflächen sind satiniert. Die Tür wird mit einem durchgehenden Klavierscharnier aus Edelstahl am Gehäuse befestigt und ist wie andere Waschraumzubehörteile von Bobrick mit einem Zylinderschloss ausgestattet. Die Papierhandtuchablage muss eine gesäumte Öffnung haben, damit die Papierhandtücher ohne Reißen entnommen werden können. Das Gerät muss in der Lage sein, 400 C-gefaltete oder 525 mehrfach gefaltete Papierhandtücher mit einer Tiefe von 79 bis 97mm (3-1/8" bis 3-13/16") auszugeben. Schmalere Papiertücher mit einer Tiefe von 64 bis 79mm (2-1/2" bis 3-1/8") können mithilfe des optionalen TowelMate-Zubehörs, Bobrick-Teilenummer 262-130, effizient ausgegeben werden. Mit dem TowelMate-Zubehör können Papiertücher einzeln ausgegeben werden, ohne dass sie sich wölben, durchhängen oder durch die Öffnung der Handtuchablage fallen.

Der Aufputz-Papierhandtuchspender ist das Modell B-262 von Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, Kalifornien; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australien; und Bobrick Washroom Equipment Limited, Vereinigtes Königreich.

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Überarbeitet am 30/6/15

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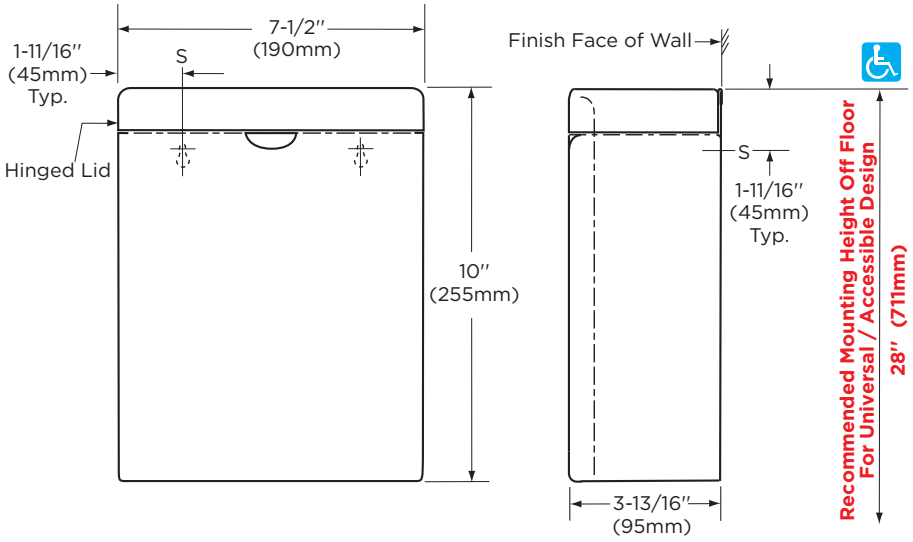
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Technical Data

ConturaSeries® SURFACE-MOUNTED SANITARY NAPKIN DISPOSAL

B-270





MATERIALS:

Container — 18-8, type-304, 22-gauge (0.8mm) stainless steel. All-welded construction. Exposed surfaces have satin finish. Integral finger depression for opening cover. Front of container has same degree of arc as front of cover and other Bobrick ConturaSeries washroom accessories. Radius on side edges of container match corners and edges of cover and other ConturaSeries accessories.

Cover — 18-8, type-304, 22-gauge (0.8mm) stainless steel with satin finish. Drawn, one-piece, seamless construction. Front of cover has same degree of arc as front of container and other Bobrick Contura Series washroom accessories. Radius on corners and edges of cover match side edges of container and other Contura Series accessories. Secured to container with a full-length stainless steel piano-hinge.

OPERATION:

Cover flips up for disposal of sanitary napkins and for servicing container.

INSTALLATION:

For partitions with particle-board or other solid core, secure with two #8 x 3/4" (4.2 x 19mm) sheet-metal screws (not furnished) at all points indicated by an *S*, or provide through-bolts, nuts, and washers.

For hollow-core metal partitions, provide solid backing into which sheet-metal screws can be secured. If two units are installed back-to-back, then provide threaded sleeves and machine screws for the full thickness of partition.

For masonry walls, provide fiber plugs or expansion shields for use with sheet-metal screws, or provide 3/16" (5mm) toggle bolts or expansion bolts.

For plaster or dry wall construction, provide concealed backing to comply with local building codes, then secure unit with sheet-metal screws.

SPECIFICATION:

Surface-mounted sanitary napkin disposal shall be type-304 stainless steel with all-welded construction; exposed surfaces shall have satin finish. Front of sanitary napkin disposal shall have same degree of arc and match other Bobrick ConturaSeries accessories in the washroom. Radius on corners and edges of sanitary napkin disposal shall complement other Bobrick ConturaSeries washroom accessories. Cover shall be drawn, one-piece, seamless construction and secured to container with a full-length stainless steel piano-hinge. Container shall have integral finger depression for opening cover.

Surface-Mounted Sanitary Napkin Disposal shall be Model B-270 of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.

The illustrations and descriptions herein are applicable to production as of the date of this Technical Data Sheet.
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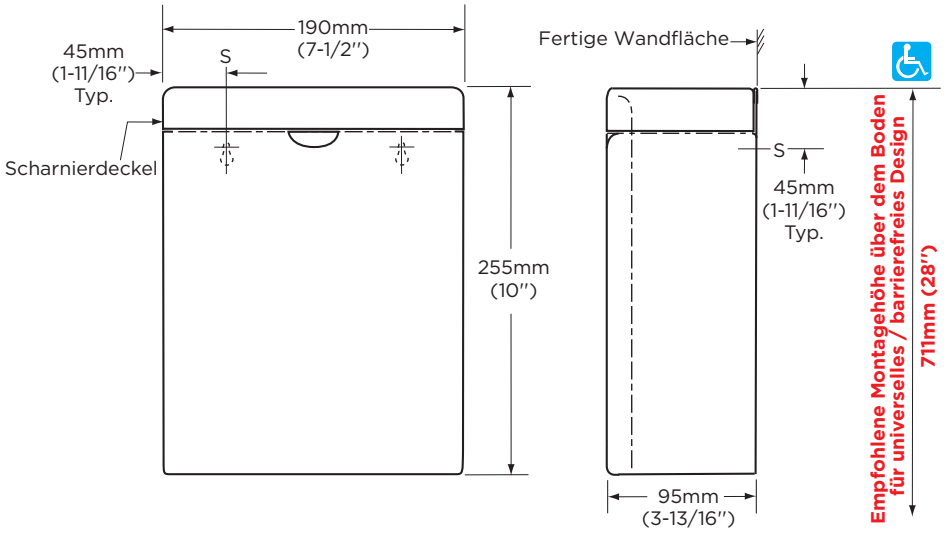
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Technische Daten

ConturaSeries® AUFPUTZ-HYGIENEBEHÄLTER

B-270





MATERIALIEN:

Behälter – 18-8, Typ 304, 22 Metalldicke (0,8mm) Edelstahl. Vollverschweißte Konstruktion. Sichtbare Oberflächen haben eine satinierte Oberfläche. Integrierte Metalldicke zum Öffnen des Deckels. Die Vorderseite des Behälters weist den gleichen Bogengrad auf wie die Vorderseite der Abdeckung und anderes Waschraumzubehör der Bobrick ConturaSeries. Der Radius an den Seitenkanten des Behälters entspricht den Ecken und Kanten der Abdeckung und anderem Zubehör der ConturaSerie.

Abdeckung - 18-8, Typ 304, 22 Metalldicke (0,8mm) Edelstahl mit Satin-Finish. Gezogene, einteilige, nahtlose Konstruktion. Die Vorderseite der Abdeckung weist den gleichen Bogengrad auf wie die Vorderseite des Behälters und anderes Washraumzubehör der Bobrick Contura-Serie. Der Radius an den Ecken und Kanten der Abdeckung entspricht den Seitenkanten des Behälters und anderem Zubehör der Contura-Serie. Mit einem durchgehenden Klavierscharnier aus Edelstahl am Schrank befestigt.

BETRIEB:

Zum Entsorgen von Damenbinden und zum Warten des Behälters lässt sich der Deckel hochklappen.

INSTALLATION:

Bei Trennwänden mit Spanplatte oder anderem Vollkernmaterial sind an allen mit einem "S" gekennzeichneten Stellen zwei Blechschrauben Nr. 8 x 3/4" (4,2 x 19 mm) (nicht im Lieferumfang enthalten) zu verwenden oder alternativ Schrauben mit Durchsteckmontage, Muttern und Unterlegscheiben bereitzustellen.

Sorgen Sie bei Hohlkerntrennwänden aus Metall für eine solide Unterlage, in die Blechschrauben eingedreht werden können. Wenn zwei Einheiten Rücken an Rücken installiert werden, müssen Gewindehülsen und Maschinenschrauben für die gesamte Dicke der Trennwand vorgesehen werden.

Stellen Sie für Mauerwerkswände Faserdübel oder Spreizdübel zur Verwendung mit Blechschrauben bereit oder stellen Sie Kippdübel oder Spreizdübel mit einem Durchmesser von 5mm (3/16") bereit.

Sorgen Sie bei Gips- oder Trockenbauwänden für eine verdeckte Rückwand, um die örtlichen Bauvorschriften einzuhalten, und befestigen Sie die Einheit anschließend mit Blechschrauben.

SPEZIFIKATION:

Der Aufputz-Hygienebehälter besteht aus Edelstahl Typ 304 und ist eine vollverschweißte Konstruktion; die freiliegenden Oberflächen sind matt geschliffen. Die Vorderseite des Hygieneabfallbehälters muss das abgerundete Design des Hygieneabfallbehälters ergänzt das Design des anderen ConturaSerie-Waschraumzubehörs im Waschraum. Weist den gleichen Bogengrad auf wie die das andere Zubehör in der Bobrick Contura serie im Waschraum. Der Deckel hat besteht aus einen gezogenen, einteiligen, nahtlosen Konstruktion und wird über die gesamte Länge mit einem Klavierscharnier aus Edelstahl am Behälter befestigt. Der Behälter verfügt über eine integrierte Fingermulde zum Öffnen des Deckels

Der Aufputz-Hygieneabfallbehälter ist das Modell B-270 von Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, Kalifornien; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australien; und Bobrick Washroom Equipment Limited, Vereinigtes Königreich sein.

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Technical Data

MIRROR WITH STAINLESS STEEL CHANNEL FRAME

B-165 SERIES

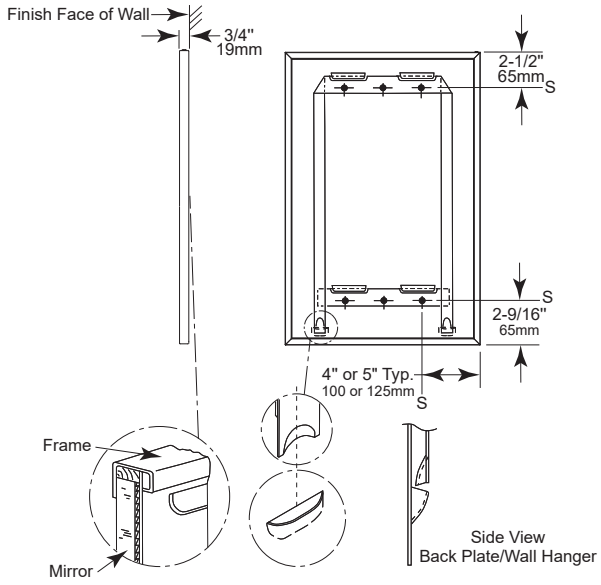


Designer's Notes:

1. Special-order sizes available on request.
2. Maximum size mirror available, 96" x 72" (244 x 183cm); minimum size, 12" x 12" (30 x 30cm).
3. All Bobrick framed mirrors are manufactured to overall width and height dimensions. EXAMPLE: A 24" x 36" (61 x 91cm) mirror will be furnished 24" x 36" (61 x 91cm) outside-of-frame to outside-of-frame.
4. To specify special sizes use Series Number followed by width x height in inches. EXAMPLE: B-165 2024 20" x 24" (51 x. 61cm)
5. Bobrick framed mirrors are manufactured to a tolerance 1/8" (3.2mm).
6. For sufficient space to lift mirror onto wall hanger(s), provide 1" (25mm) minimum clearance above top of mirror frame.
7. Provide 1/2" (12.7mm) minimum clearance on each side.

Snap Locking Design (Rear View)

Figure: 1

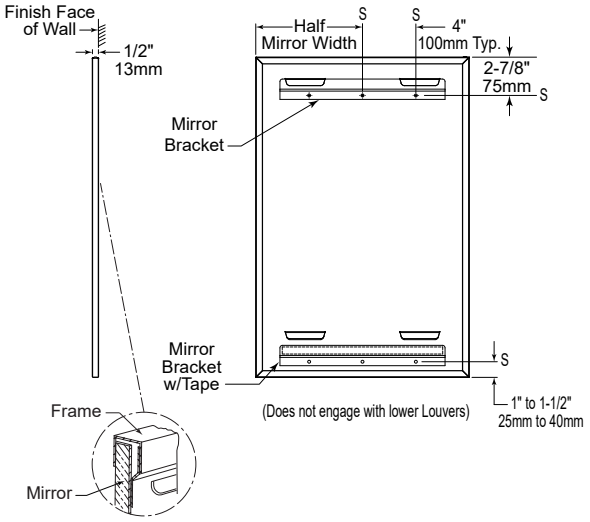


STANDARD B-165 SERIES MIRRORS

MODEL NO.	OVERALL SIZE	
	W	H
B-165 1824	18" (46cm)	24" (61cm)
B-165 1830	18" (46cm)	30" (76cm)
B-165 1836	18" (46cm)	36" (91cm)
B-165 2430	24" (61cm)	30" (76cm)
B-165 2436	24" (61cm)	36" (91cm)
B-165 2448	24" (61cm)	48" (122cm)
B-165 2460	24" (61cm)	60" (152cm)

"2S" Tab Design (Rear View) - for all other mirrors up to a width of 36"

Figure: 2



Note: Mirrors greater than 36" in width will have multiple hanger brackets with a typical 8" off each edge.

continued . . .

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MATERIALS:

Frame — Type-430 stainless steel, 1/2" x 1/2" x 3/8" (13 x 13 x 9.5mm) channel with 1/4" (6mm) return at rear for Snap Locking Design; 1/2" x 1/2" x 1/2" (13 x 13 x 13mm) channel for Lock Tab Design, with bright polished finish. One piece frame with 90 degree mitered corners. Galvanized steel back has integral horizontal hanging brackets near the top for hanging the mirror and near the bottom to prevent the bottom of the mirror from pulling away from the wall.

Mirror — No. 1 quality, 1/4" (6mm) select float glass: selected for silvering, electrolytically copper-plated by the galvanic process, and guaranteed for 15 years against silver spoilage. Back is protected by full-size, shock-absorbing, water-resistant, nonabrasive, polyethylene padding.

Concealed Wall Hanger — For snap locking design: Heavy gauge steel construction. Incorporates upper and lower members, which engage backplate louvers to keep mirror against the wall. For "2S"-Tab design: Incorporates upper bracket engaging in upper louver and double sided tape below the bottom louver securing mirror to concealed wall hanger.

INSTALLATION:

Mount wall hanger on wall with screws (not furnished) at points indicated by an *S*. For plaster or dry wall construction, provide backing to comply with local building codes, then secure wall hanger with screws (not furnished). When providing a concealed backing, allow backing to cover minimum range of mounting hole locations shown on drawing. For other wall surfaces, provide fiber plugs or expansion shields for use with screws (not furnished), or provide 1/8" (3mm) toggle bolts or expansion bolts.

Snap Locking Design: Hang mirror on wall hanger with all four backplate louvers engaged behind horizontal wall hanger members. To do this, mirror must be centered in front of the wall hanger horizontally, pressed flat against the wall approximately 1" (25mm) above final position and then lowered into final position.

"**2S" Tab Design**: Comprises of two brackets, while the bottom one is furnished with double side tape. Bottom hanger bracket's mounting holes must be 1" - 1 1/2" above mirror's bottom edge. Note: Bottom hanger bracket is not supposed to engage with louvers of mirror's backplate. Hang mirror on wall top hanger bracket with the top two louvers engaged behind top wall hanger bracket.To do this, mirror must be centered in front of the wall hanger horizontally, pressed only at the top against the wall approx. 1" (25mm) above final position an then lowered into final position. When lowering, pull mirror's bottom edge off the wall by preventing bottom bracket from engaging. Once lowered, mirror must be pressed against wall to engage with double sided tape of lower wall hangar bracket.

Snap Locking Design — Locking devices automatically secure mirror to concealed wall hanger when it is lowered into final position (see figure 3). Locking devices may be unlocked by inserting two flat blade screwdrivers behind each side of mirror near the bottom or under the bottom of the mirror and pulling mirror bottom forward and then up.

"**2S" Tab Design —** Secure mirror to concealed wall hanger by pressing mirror against double sided tape of lower hanger once it is lowered into final position (see figure 4).

Snap Locking Design
(Front View)

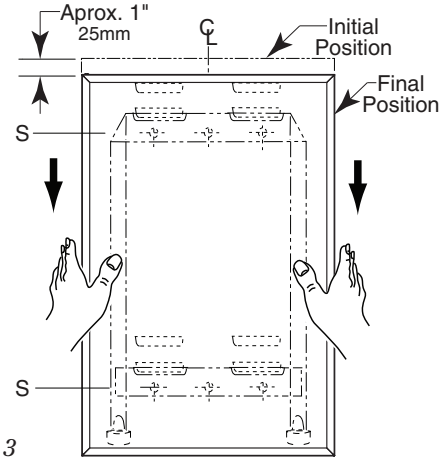


Figure: 3

"2S"-Tab Design - up to 36" Width
(Front View)

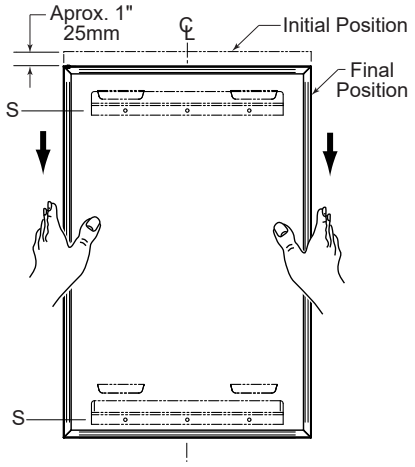


Figure: 4

SPECIFICATION:

Mirror shall have a one-piece type-430 stainless steel channel frame, with 90° mitered corners; all exposed surfaces shall have bright polished finish. Select float glass mirror shall be guaranteed for 15 years against silver spoilage. The back shall be protected by full-size, shock-absorbing, water-resistant, nonabrasive, polyethylene padding. Galvanized steel back shall have integral horizontal hanging brackets located at top and bottom for mounting on concealed wall hanger to prevent the mirror from pulling away from the wall. Locking devices secure mirror to concealed wall hanger. Mirror shall be removable from the wall.

Framed Mirror shall be Model B-165 _____ (insert width and height) of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.

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Technical Data

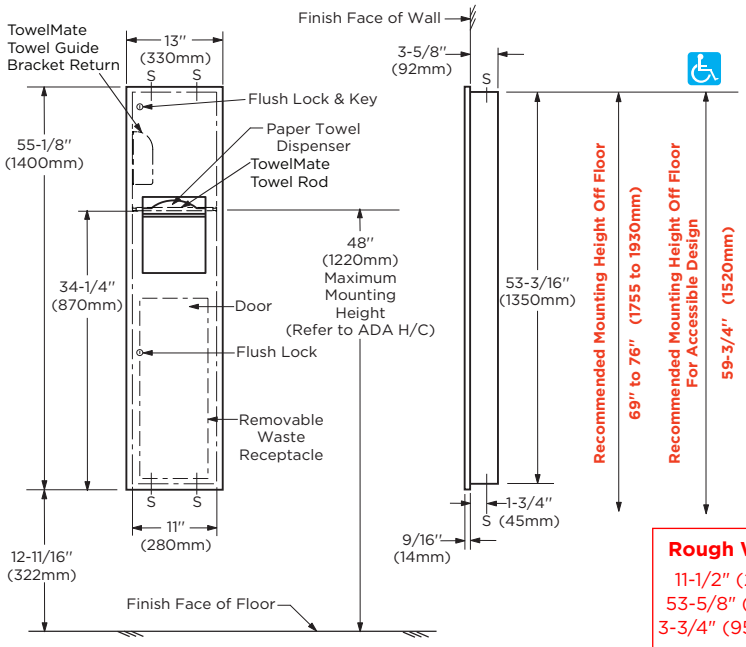
TrimLineSeries™ RECESSED PAPER TOWEL DISPENSER AND WASTE RECEPTACLE

B-38034

Specify Finish Required

- ☐ Stainless Steel, Satin Finish
- ☐ Matte Black Finish, please use model no. B-38034.MBLK





Rough Wall Opening
11-1/2" (292mm) wide
53-5/8" (1362mm) high
3-3/4" (95mm) minimum recessed depth

MATERIALS:

Cabinet — 18-8, Type-304, heavy-gauge stainless steel. All-welded construction.

Door — 18-8, Type-304, 18-gauge (1.2mm) stainless steel with satin finish or matte black, as specified. 9/16" (14mm) 90° return for maximum rigidity. Secured to cabinet with a concealed, full-length, stainless steel piano-hinge. Equipped with a stainless steel cable door-swing limiter and two tumbler locks keyed like other Bobrick washroom accessories. Tumbler locks flush with the door - no protrusion.

Paper Towel Dispenser — 18-8, Type-304, 22-gauge (0.8mm) stainless steel with satin finish or matte black, as specified. Rounded towel tray has hemmed opening to dispense paper towel without tearing. Capacity: 600 C-fold or 800 multifold paper towels. Unit equipped with TowelMate consisting of a 90° return towel guide angle inside cabinet to prevent paper towels from falling forward out when door is opened for servicing.

TowelMate® Towel Rod Assembly — Consisting of a round Nylon Rod and (2) stainless steel Rod Screws for attachment, is field replaceable. Stainless steel Stop Screws (2) lock TowelMate Rod assembly in place. To retrofit TowelMate into existing install units manufactured prior to Feb. 2021, order TowelMate Accessory Bobrick Model No. 3944-130.

Waste Container — Leak-proof rigid molded plastic. Removable for servicing. Capacity: 3.8-gal. (14.4-L).

OPERATION:

Paper towel dispenser is adjustable to dispense C-fold, multifold, or singlefold paper towels without use of additional adapters or towel trays. To service waste receptacle, unlock door with key provided and remove waste container. Cable door-swing limiter prevents damage to washroom accessories and walls.

INSTALLATION:

Provide framed rough wall opening 11-1/2" wide x 53-5/8" high (292 x 1362mm). Minimum recessed depth required from finish face of wall is 3-3/4" (95mm). Allow clearance for construction features that may protrude into rough wall opening from opposite wall. Coordinate with mechanical engineer to avoid pipes, vents, and conduits. If unit projects above top of wainscot, provide aluminum channel or other filler to eliminate gap between flange and finish face of wall. Mount cabinet with shims between framing and cabinet at all points indicated by an *S*, then secure unit with #8 x 1-1/4" (4.2 x 32mm) sheet-metal screws (not furnished).

SPECIFICATION:

Recessed paper towel dispenser and waste receptacle shall be Type-304 stainless steel with all-welded construction; exposed surfaces shall be satin finish or matte black, as specified. Unit equipped with TowelMate consisting of a 90° return towel guide angle inside cabinet to prevent paper towels from falling forward out when door is opened for servicing and a Nylon Rod across the center of the towel tray to dispense paper towels one at a time. Door shall be 18 gauge (1.2mm); have 9/16" (14mm) 90° return edges; be secured to cabinet with a concealed, full-length stainless steel piano-hinge; and equipped with a stainless steel cable door-swing limiter and two tumbler locks keyed like other Bobrick washroom accessories. Tumbler locks flush with the door - no protrusion. Paper towel dispenser shall dispense 600 C-fold or 800 multifold paper towels. Waste receptacle shall be furnished with a removable, leak-proof, rigid molded plastic waste-container with a capacity of 3.8-gal. (14.4-L).

Recessed Paper Towel Dispenser and Waste Receptacle shall be Model B-38034 of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.

The illustrations and descriptions herein are applicable to production as of the date of this Technical Data Sheet.
The manufacturer reserves the right to, and does from time to time, make changes and improvements in designs and dimensions.

Revised 6/28/23

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PRODUCT BROCHURE

TRUEBRO®
IPS CORPORATION



ADA-COMPLIANT UNDERSINK PIPE PROTECTION

ADA-COMPLIANT PROFESSIONAL DURABLE

Since 1990, the Truebro® brand of products has been dedicated to "Making America Accessible" by creating products that comply with the Americans with Disabilities Act, mandated undersink accessibility standards. Engineering expertise, uncompromising production standards, and commitment to ongoing product development has positioned Truebro® as the leading supplier in both the new construction and retrofit markets.

Specifying Truebro® is assurance of protecting people with disabilities while providing quality, durability, and improved aesthetics.

Truebro® offers the most complete line of undersink protection products to meet any installation need, including:

- LAV SHIELD®
- LAV GUARD 2®
- BASIN GUARD™

TRUEBRO
IPS CORPORATION

LAV SHIELD®

Overview

Lav Shield® represents the "next generation" of ADA compliant undersink protection by meeting mandated knee and toe clearance requirements for wheelchair users. Durable, single-piece construction prevents pipe and component tampering, and conceals all lavatory piping, electronic faucet connections, mixing valves, trap primers, and instantaneous water heaters*— a truly attractive alternative to individual component covers that will satisfy even the most discriminating designer.

TOTAL ENCLOSURE DESIGN
Heavy-duty, vandal-resistant enclosure shields all piping, electronic faucet components, mixing valves, trap primers, and instantaneous water heaters*. Vandal-resistant fasteners are available upon request.

SANITARY ADVANTAGES
Lav Shield contains an antimicrobial additive to resist fungal and bacterial growth making the Lav Shield an excellent cover to use in medical and health care facilities. Installing Lav Shield in these facilities eliminates the need to sanitize P-Traps, angle stops, supply lines and electrical components.

ADA-CONFORMING ATTRACTIVE PROFILE
The Lav Shield tastefully conceals all unsightly plumbing and components while satisfying ADA dimensional requirements.

STRICT CODE COMPLIANCE MINIMIZES RISK
The Lav Shield complies with ASME A112.18.9-2001, ADA article 4.19.4 (606.5), California P 1504B, ANSI A117.1, BOCA P 1203.4, and other state and local regulations.

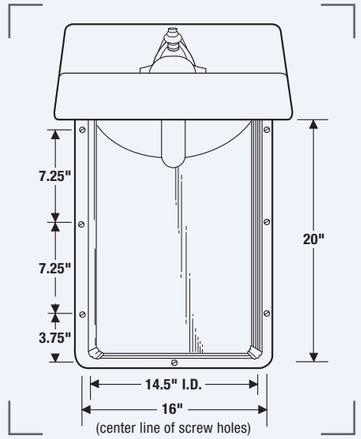
EASY-TO-SERVICE SINGLE-PIECE CONFIGURATION
The Lav Shield may be quickly removed for convenient, unhindered access to all plumbing and mechanical components. Reinstallation takes just minutes.

WIDE VARIETY OF CUSTOM OPTIONS
Available in our standard field fit model which allows contractor to custom fit Lav Shield to underside of lavatory. For an even faster and more tailored fit, Lav Shield can be purchased factory pre-cut to the underside geometry of the actual lavatory being installed. Pre-cut models are listed on following page.

RIGID HIGH-IMPACT, STAIN-RESISTANT PVC
The Lav Shield is molded from impact-resistant, stain-resistant and chemical-resistant rigid vinyl for durability, safety and long life.

NOW AVAILABLE IN CUSTOM FINISHES





MADE IN THE USA

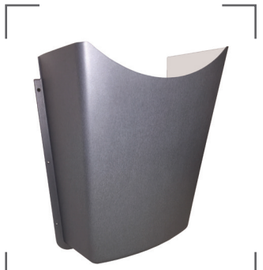
ADA COMPLIANT

ATTRACTIVE DESIGNER-STYLE, TAMPER-RESISTANT, THE ULTIMATE ADA-ENGINEERED PROTECTIVE LAVATORY ENCLOSURE

*Lavatory "rough in" should be considered to allow mounting room for instantaneous water heater behind enclosure. Contact TRUEBRO for specifications.

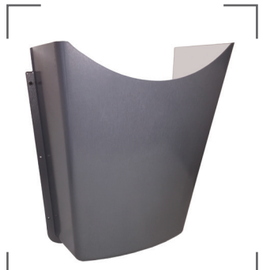
Custom Finish Lav Shields

The already attractive ADA compliant Lav Shield is now available in 10+ custom finishes to meet any designer needs. Custom finish Lav Shields are only available in the standard, fit to field, Lav Shield.



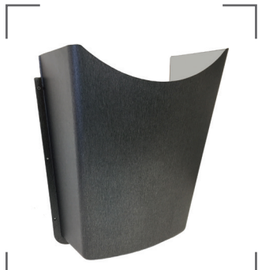
ARCHITECTURAL BRUSHED ALUMINUM

Model: WTP-907 • Product: 82721



STAINLESS STEEL

Model: WTP-270 • Product: 82722



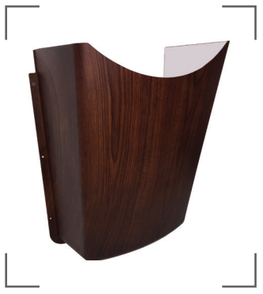
STAINLESS STEEL OVER BLACK

Model: WTP-270B • Product: 82723



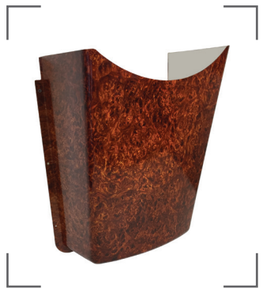
ITALIAN LEATHER ESPRESSO

Model: WTP-715 • Product: 82736



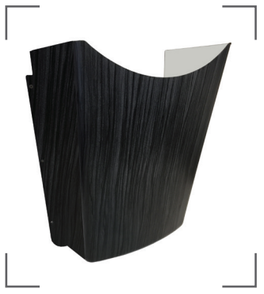
ROSEWOOD

Model: WTP-488 • Product: 82726



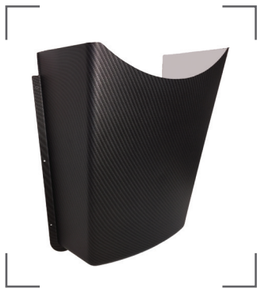
BURLWOOD

Model: WTP-496 • Product: 82727



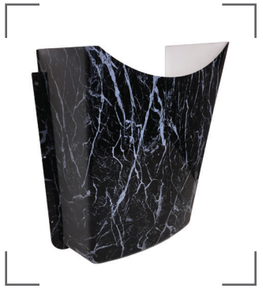
MONACO WALNUT

Model: WTP-538 • Product: 82728



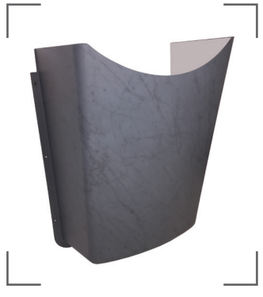
SPORT CARBON

Model: WTP-940 • Product: 82741



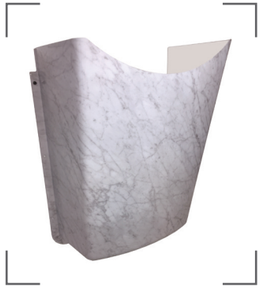
BLACK MARBLE

Model: WTP-512 • Product: 82731



GRAY MARBLE

Model: WTP-659G • Product: 82732



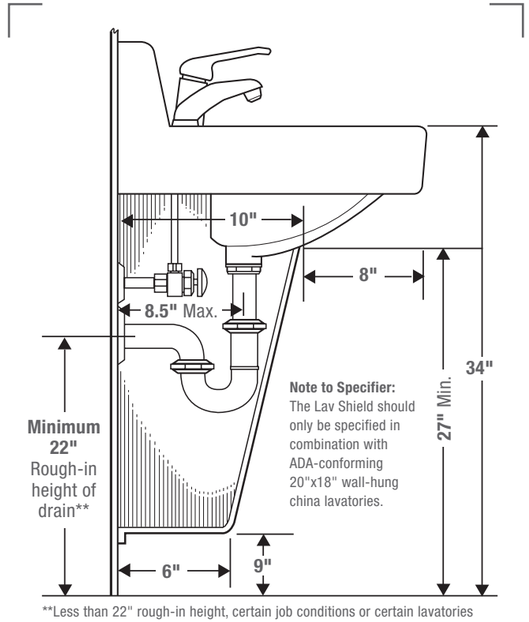
ARCHITECTURAL WHITE MARBLE

Model: WTP-659W • Product: 82733

LAV SHIELD® LAVATORY PROTECTIVE ENCLOSURES

SPECIFICATIONS

Material	Rigid high-impact, stain-resistant PVC
Nominal Wall	.093"
Finish	Fine haircell
UV Protection	Will not fade or discolor
Durability	Virtually indestructible — tamper resistant screws available
Fasteners	7 stainless steel screws and wall anchors provided
Color	China white
Compatibility	Fits all ADA-conforming 20"x18" wall-hung lavatories
Paintability	Acrylic enamel or latex
UL Listing	In accordance with ADA Article 4.19.4 (606.5)
Flammability	UL-94 V-0, 5VA ASTM D-635-91 4 (ATB) 2.1 (AEB)
Bacterial/Fungal	ASTM G21 and G22 — Result 0



**Less than 22" rough-in height, certain job conditions or certain lavatories may require an offset tail piece or offset grid strainer

Note: Model numbers listed on this page are for single pack Lav Shields. For bulk pack items, change the 1 in the model to a 4.

STANDARD MODELS

Model 20181	Standard (For field fit)

CUSTOM FACTORY PRE-CUT MODELS

Pre-cut models are not returnable

Model: 2018-AS-C1	American Standard Comrade
Model: 2018-AS-D1	American Standard Declyn
Model: 2018-AS-L1	American Standard Lucerne
Model: 2018-AS-M1	American Standard Muro
Model: 2018-AS-OL1	American Standard Lucerne (old)
Model: 2018-AS-P1	American Standard Penlyn
Model: 2018-AS-R1	American Standard Roxalyn
Model: 2018-BD-I1	Bradley Imperial
Model: 2018-BR-M1	Briggs Milton
Model: 2018-BR-W1	Briggs Whitman
Model: 2018-CR-H1	Crane Harwich
Model: 2018-CR-N1	Crane Norwich
Model: 2018-CR-W1	Crane Westmont
Model: 2018-CR-Y1	Crane Yorkshire
Model: 2018-EL-B1	Eljer Blair
Model: 2018-EL-D1	Eljer Delwyn
Model: 2018-EL-M1	Eljer Mayburne
Model: 2018-EL-S1	Eljer Signature
Mode: 2018-EL-U1	Eljer Bucknell
Model: 2018-GR-H1	Gerber Hayes
Model: 018-GR-M1	Gerber Monticello
Model: 2018-GR-P1	Gerber Plymouth
Model: 2018-KO-B1	Kohler Brenham
Model: 2018-KO-C1	Kohler Chesapeake
Model: 2018-KO-G1	Kohler Greenwich, Model 202
Model: 2018-KON-G1	Kohler Greenwich, Model 203
Model: 2018-KO-H1	Kohler Hudson
Model: 2018-KO-K1	Kohler Kingston
Model: 2018-KO-P1	Kohler Pinoir
Model: 2018-KO-S1	Kohler Soho
Model: 2018-MAN1	Mansfield Grand Isle
Model: 2018-SL-SS1	Sloan SS-3003
Model: 2018-TO-L1	Toto LT307
Model: 2018-ZN-Z1	Zurn Z5344
Model: 2018-ZN-NZ1	Zurn Z5344

Manufactured under one or more of the following U.S. or Canadian patents.
D373,412, D372,077, D384,732, D393,700, D390,643, 79,064, 79,063

*TRUEBRO reserves the right to change specifications without notice.

LAV GUARD®2

Overview

Lav Guard® 2 provides the durable, attractive protection Lav Guard is famous for. Built-in fasteners and internal Tear-To-Fit trimming feature eliminate the need for tools, and provide for a clean, tamper-resistant, fast and professional installation. Lav Guard 2 can be installed over cast brass or tubular P-trap assemblies and angle stop assemblies. Lav Guard 2 provides a professional and quick-to-install ADA compliant solution for all public lavatories.

INTERNAL RIB DESIGN MAXIMIZES SAFETY

Lav Guard 2 features a patented internal rib design that increases thermal protection while providing a soft, resilient cushioning.

ANTIMICROBIAL VINYL MINIMIZES MAINTENANCE

Lav Guard 2 is molded from impact-resistant, stain-resistant, antimicrobial vinyl. Its smooth surface makes it exceptionally easy to clean and maintain.

STRICT CODE COMPLIANCE MINIMIZES RISK

Lav Guard 2 complies with ASME A112.18.9-2001, ADA article 4.19.4 (606.5), CABO/ANSI 4.20.4, UFAS 4.19.4, Calif. Title 24, UPC, IPC, ICC, Canada Barrier-Free Code.

LAV GUARD 2 MAKES INSTALLATION FAST & EASY

Tear-To-Fit feature makes trimming fast and contractor friendly—no tools required.

Built-in fasteners are quick, strong, and reusable.

Universal design fits more P-traps and thumb wings on plastic compression nuts.



MADE IN THE USA

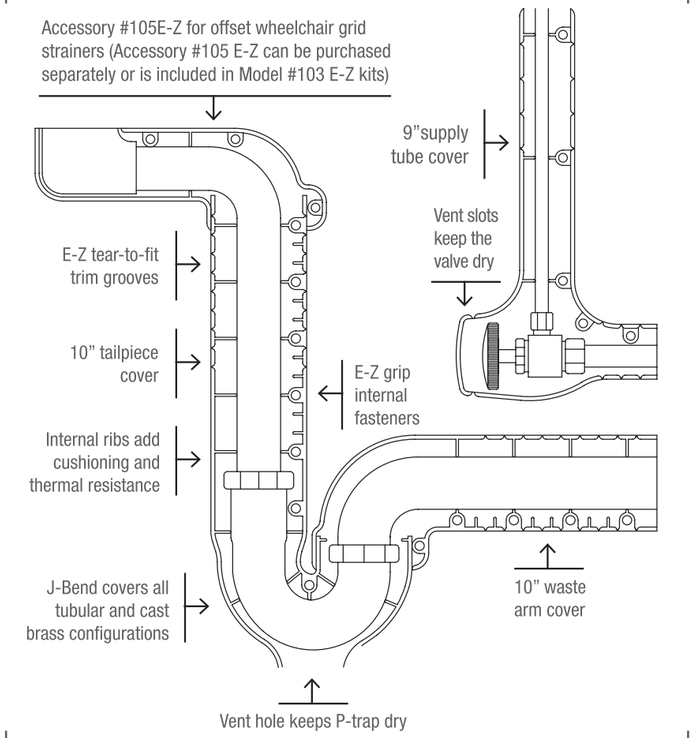
ADA COMPLIANT

IMPROVED, FAST-INSTALLING ANTIMICROBIAL MOLDED UNDERSINK SAFETY COVERS FOR ADA ACCESSIBILITY COMPLIANCE

LAV GUARD® 2 UNDERSINK PIPING COVERS

SPECIFICATIONS

Material	Soft, resilient molded vinyl
Nominal Wall	1/8" constant with internal ribs
Durometer	70-80 — Shore A
UV Protection	Will not fade or discolor
Durability	Virtually indestructible
Trimming (E-Z Series)	Internal E-Z Tear-To-Fit trim feature
Fasteners (E-Z Series)	Internal E-Z Grip fasteners, reusable
Color	China white
Compatibility #100 Series	Fits all 1-1/4" or 1-1/2" cast brass or tubular P-trap assemblies and 3/8" or 1/2" angle stop assemblies
Compatibility #400* Series	Fits all 1-1/2" schedule 40 plastic P-traps
Paintability	Apply latex paint
Burning Characteristics ASTM D-635	Self extinguished 0 sec (ATB) mm (AEB)
Bacteria/Fungus Resistance	ASTM G21 and G22 — Result: 0 growth
Maintenance	Wipe clean using common detergents



LAV GUARD®2

Two-step Installation





STEP 1

Tear-To-Fit on internal, dimensioned tear lines for quick, clean, accurate trimming to fit virtually any piping configuration. Covers flex to install over pipes.



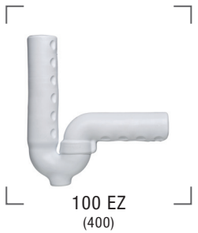


STEP 2

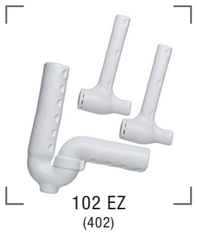
Press seams together at finger recesses to engage internal fasteners for a secure, safe, tamper-resistant installation. To remove cover, firmly pull seam apart using a strong grip. To reinstall, press seams back together.

LAV GUARD® 2 UNDERSINK PIPING COVERS


99 EZ


100 EZ (400)


101 EZ (401)


102 EZ (402)


103 EZ


105 EZ


106 EZ


107 EZ


EX99 EZ


EX100 EZ

MODELS AVAILABLE

PRODUCT	DESCRIPTION	MODEL	UNITS/CASE
100 Series - Fits all 1¼" or 1½" cast brass or tubular P-trap assemblies and ⅜" or ½" angle stop assemblies			
82188	One angle valve and supply cover	99 E-Z	15
82190	One P-trap cover	100 E-Z	15
82192	One P-trap cover, one angle valve and supply cover	101 E-Z	15
82193	One P-trap cover, two angle valve and supply covers	102 E-Z	15
82194	One P-trap cover, two angle valve and supply covers, one 5" offset tailpiece wheelchair strainer cover	103 E-Z	15
400 Series - Fits all 1½" Schedule 40 Plastic P-traps			
82199	One P-Trap Cover	400	15
82200	One P-Trap Cover, One angle Valve and Supply Cover	401	15
82201*	One P-Trap Cover, Two angle Valve and Supply Cover	402	15
ACCESSORIES			
82195	One 5" offset tailpiece wheelchair strainer assembly	105 E-Z	15
82196	Kohler 6" offset	105K	15
82197	One basket strainer cover and offset waste cover (adjustable to 18")	106 E-Z	15
82198	Two basket strainer covers and center or end outlet waste cover (adjustable)	107 E-Z	15
EXTENSIONS			
82189	One 14" extension for water supply	EX99 E-Z	15
82191	One 14" extension for drain waste arm or tailpiece	EX100 E-Z	15

*105 EZ can be used in conjunction with the 400 series if a tailpiece is required..

Manufactured under one or more of the following U.S. or Canadian patents. Other patents pending.
7,032, 615; 7,264,431; 8,196,612; 2,482,548

BASIN GUARD®

Overview

Basin Guard® is the latest design in undersink protection from Truebro. This smooth, attractive enclosure conceals unsightly piping and mechanical connections, and still maintains ADA mandated knee and foot clearance. Basin Guard can be installed under kitchen, classroom, and lavatory sinks where counter tops and sidewalls are present. Bottom opening allows for easy service access.

ADA-CONFORMING DESIGN AND PROTECTION

The Basin Guard's ADA-conforming design protects wheelchair users from scalding and sharp, abrasive surfaces. When installed, all plumbing and mechanical components are concealed.

EASY INSTALLATION

The Basin Guard may be used with virtually any ADA-compliant sink or restroom lavatory where countertops and sidewalls are present. Such sinks are commonly specified in H.U.D. housing, elderly housing, condominiums, hotels, motels, and schools with in-classroom sinks.

PROTECTIVE "FRONT SHIELD" DESIGN

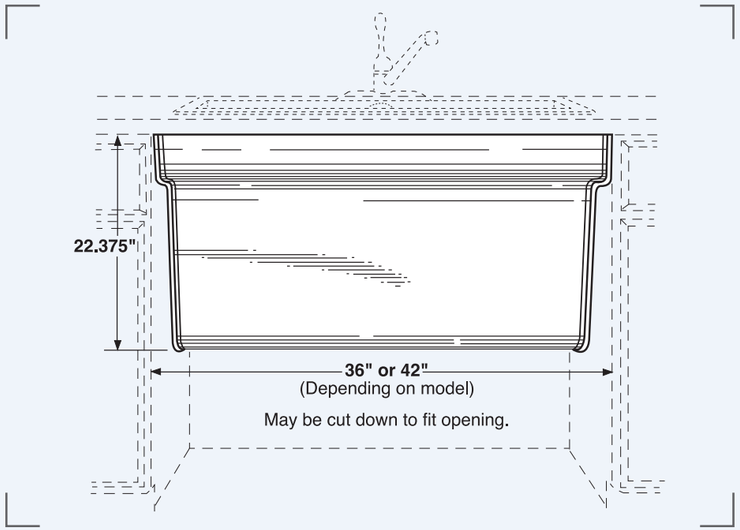
Durable, heavy-duty enclosure conceals all continuous-waste piping, electronic faucet connections, dishwasher connections, garbage disposals, mixing valves, trap primers, and instantaneous hot water heaters.

RIGID HIGH-IMPACT, STAIN-RESISTANT PVC

The Basin Guard is molded from impact-resistant, stain-resistant, and chemical-resistant protective vinyl for durability, safety, and long life.

STRICT CODE COMPLIANCE MINIMIZES RISK

The Basin Guard complies with ASME A112.18.9-2001, ADA article 4.19.4 (606.5) California Plumbing Code 1504.2.1, ANSI A117.1, BOCA P 1203.4, and other state and local regulations. Basin Guard also has a flammability resistance, tested in accordance with Underwriters Laboratories for the UL 94 standard with a V-0 rating.



MADE IN THE USA

ADA COMPLIANT

CLEAN DESIGN AND DURABLE PROTECTION FOR ADA-COMPLIANT SINKS AND LAVATORIES INSTALLED INTO COUNTERTOPS

BASIN GUARD® UNDERSINK PROTECTIVE ENCLOSURES

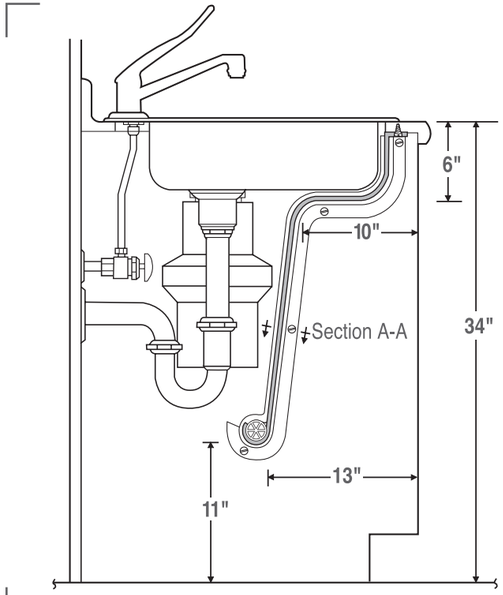
SPECIFICATIONS

Material	Rigid high-impact, stain-resistant PVC
Nominal Wall	.093" constant
Finish	Fine haircell
UV Protection	Will not fade or discolor
Durability	Virtually indestructible
Fasteners	Eight (8) – #6 X1/2" screws
Color	White or beige
Paintability	Apply acrylic enamel or latex paint
Flammability	UL-94 V-0, 5VB

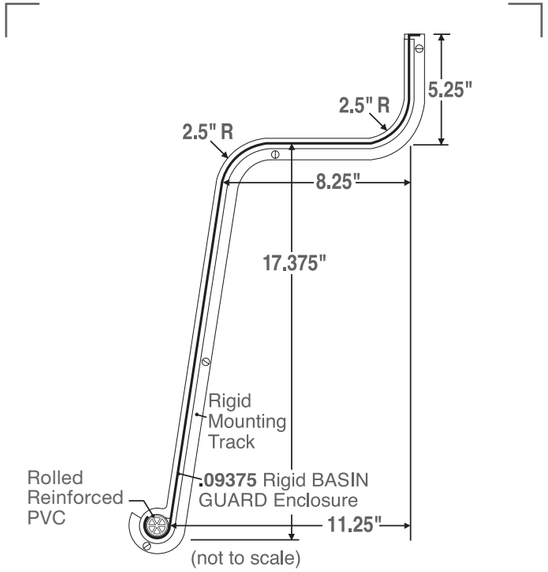
MODELS AVAILABLE

PRODUCT	DESCRIPTION	MODEL
82234	36", White	36W
82233	36", Beige	36B
82236	42", White	42W
82235	42", Beige	42B

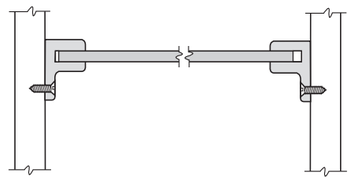
The Basin Guard must be specified in combination with ADA-conforming sinks (example, Elkay GECR or LRAD Line, or Just Manufacturing ADA Line with rear drain) with a maximum 6" deep bowl and rear waste outlet. Two sizes are available: Model #36 for maximum cabinet opening of 36" and Model #42 for a maximum cabinet opening of 42". Basin Guard may be trimmed smaller to fit actual opening size.



CROSS SECTION VIEW



CROSS SECTION DETAIL



SECTION A-A

IPSCORP.COM

Plumbing Division
500 Distribution Parkway
Collierville, Tennessee 38017
USA

plumbing@ipscorp.com

Tel (800) 888-8312
Fax (901) 853-5008

TRBR010_122018-RevC

BOBRICK

Technical Data

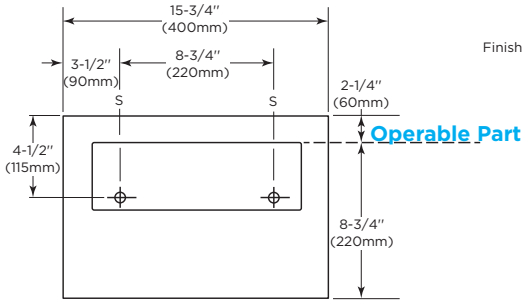
ClassicSeries® SURFACE-MOUNTED SEAT-COVER DISPENSER

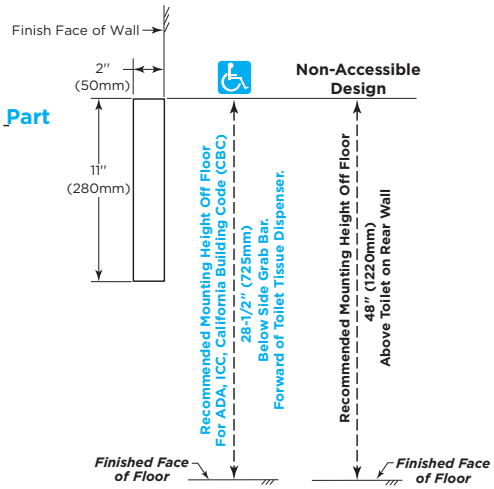
B-221

Specify Finish Required

☐ Stainless Steel, Satin Finish
☐ Matte Black Finish, please use model no. B-221.MBLK







ADA/ICC and CBC Installation Guidance

***Operable Part:** Top of toilet seat cover dispenser opening.

Maximum mounting height of Operable Part:

ADA/ICC: 48" maximum above finished floor (AFF)
CBC: 40" maximum above finished floor (AFF)

*For more information regarding operable parts, please refer to Bobrick Planning Guide for Accessible Restrooms, page 9.

MATERIALS:

18-8, type-304, 22-gauge (0.8mm) stainless steel with satin finish or matte black, as specified. All-welded construction with beveled opening.

OPERATION:

Dispenses single- or half-fold paper toilet seat covers from beveled opening. Dispenser fills from bottom through concealed opening. Capacity: 250 toilet seat covers or one box.

INSTALLATION:

Mount unit on wall or toilet partition with two flat-head screws, not furnished by manufacturer, at points indicated by an *S*. For plaster or dry wall construction, provide concealed backing that complies with local building codes, then secure unit with flat-head screws not furnished. For other wall surfaces, provide fiber plugs or expansion shields for use with screws, not furnished, or provide 1/8" (3mm) toggle bolts or expansion bolts.

Note: Provide a 5" (125mm) minimum clearance from bottom of dispenser to top of any horizontal projection to provide room for filling dispenser from bottom.

SPECIFICATION:

Surface-mounted toilet-seat-cover dispenser shall be type-304, 22-gauge (0.8mm) stainless steel with all-welded construction; exposed surfaces shall have satin finish or matte black, as specified. Dispenser shall have a concealed opening in bottom for filling. Capacity shall be 250 paper toilet seat covers or one box.

Surface-Mounted Seat-Cover Dispenser shall be Model B-221 of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.

The illustrations and descriptions herein are applicable to production as of the date of this Technical Data Sheet.
The manufacturer reserves the right to, and does from time to time, make changes and improvements in designs and dimensions.

Revised 6/27/24
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BOBRICK

Technical Data

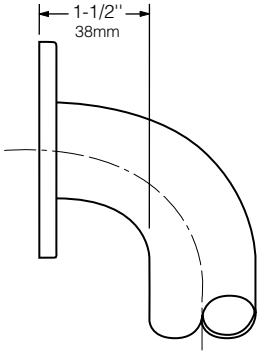
1½" (38mm) DIAMETER STAINLESS STEEL GRAB BARS WITH EXPOSED MOUNTING

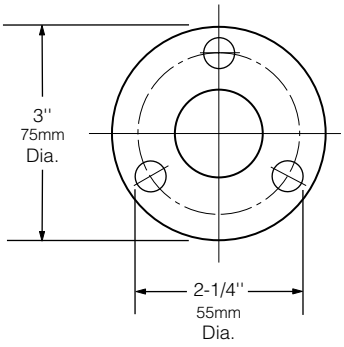
B-6106 SERIES

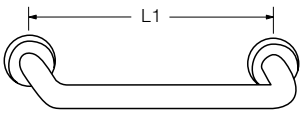
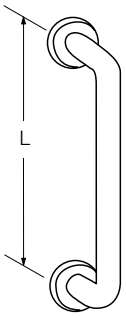
Specify Finish Required:

- ☐ Satin finish
- ☐ Satin finish with peened gripping surface; add suffix .99 to model number







	
HORIZONTAL	VERTICAL
B-6106 x 24, 36, 42, 48	

continued . . .

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MATERIALS:

Grab Bar — 18-8 S, type-304, 18-gauge (1.2mm) stainless steel tubing with satin finish. 1-1/2" (38mm) outside diameter. Ends are heliarc welded to flanges. Clearance between the grab bar and wall is 1-1/2" (38mm).

Flanges — 18-8 S, type-304, 1/8" (3mm) thick stainless steel plate with satin finish. 3" (75mm) diameter with three screw holes for attachment to wall.

STRENGTH:

Bobrick grab bars that provide 1-1/2" (38mm) clearance from wall can support loads in excess of 900 pounds (408kg) if properly installed. Other grab bar configurations can support loads in excess of 250 pounds (113kg) if properly installed, complying with barrier-free accessibility guidelines (including ADAAG in the U.S.A.) for structural strength

Caution: Grab bars are no stronger than the anchors or walls to which they are attached and, therefore, must be firmly secured in order to support the loads for which they are intended.

INSTALLATION:

Provide concealed anchor device or backing as specified or required in accordance with local building codes before wall is finished. Fasten grab bar anchor device or backing with three screws in each flange. Concealed anchor devices and mounting screws are not included with Bobrick grab bars and must be specified as an accessory.

Important Notes:

1. **Mounting Kits —** Bobrick has a selection of mounting screws and fasteners available for different types of installations; **one Bobrick mounting kit is required for each flange.**

Mounting Kit No.	Description
252-30	Consists of (3) #14 x 2½" (M6.3 x 64mm) type-304 stainless steel, Phillips round-head, sheet-metal screws.
2521-30	Consists of (3) 1/4"–20 x 3½" (M6.3–1 x 89mm) type-304 stainless steel, Phillips round-head, machine screws with plated-steel toggle nuts.
2522-30	Consists of (3) 1/4"–20 x 2" (M6.3–1 x 51mm) type-304 stainless steel, Phillips round-head, machine screws with metal expansion shields.

2. **Concealed Anchor Devices —** Bobrick has a complete selection of grab bar anchor devices available for all types of installations. All Bobrick concealed anchor devices include stainless steel machine screws to be used for attaching grab bars to anchors.

Concealed Anchor No.	Type of Installation
2571	Anchor for solid wall construction; 1 anchor required for each flange.
2581	Anchor for installation of grab bar through toilet partition; 1 anchor required for each flange.

3. **Grab Bar Fastener —** Bobrick has a grab bar fastening system that secures all Bobrick grab bar series; **one Bobrick fastener is required for each flange.** Install grab bar without backing in wall requires min. 5/8" (16mm) thick painted or tiled dry wall.

WingIt™ Fastener No.	Description
251-4	Consists of (3) 10–32 x 5/16" round-head, Phillips 18/8 stainless steel screws. (1) WingIt grab bar fastener.

For installation where vandalism is a concern, vandal-resistant, stainless steel, one-way, round-head machine screws are available and should be ordered separately; order Bobrick Part No. 1002193.

SPECIFICATION:

Grab bar shall be type-304 stainless steel with satin finish. Grab bar shall have 18-gauge (1.2mm) wall thickness and 1-1/2" (38mm) outside diameter. Clearance between the grab bar and wall shall be 1-1/2" (38mm). Flanges shall be 1/8" (3mm) thick stainless steel plate, 3" (75mm) diameter, and equipped with three screw holes for attachment to wall. Ends of grab bar shall pass through flanges and be heliarc welded to form one structural unit. Grab bar shall comply with barrier-free accessibility guidelines (including ADAAG in the U.S.A.) for structural strength. Manufacturer's service and parts manual shall be provided to the building owner/manager upon completion of project.

Grab Bar shall be Model _____ (insert model number) of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.

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SECTION 220000
PLUMBING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. The Bidding Requirements and Contract Forms, including General Conditions and Supplemental General Conditions, and Division 01 Sections apply to all work herein.

1.2 SUMMARY

A. Section includes: Furnishing, fabrication, and installation of complete plumbing systems as indicated on the Drawings. Plumbing work includes, but is not necessarily limited to, the following items:

1. A complete system of soil, waste, vent and sanitary sewer piping and structures, including provisions for mechanical equipment drainage; and connection of same to public sanitary sewers, located as indicated on the Drawings.
2. Cold water distribution system, complete, from points of contact with site domestic water systems, located approximately as indicated on the Drawings, to all plumbing fixtures, mechanical equipment, building specialties, and Owner supplied equipment scheduled for service on the Drawings.
3. Hot water distribution system, complete, from serving water to all plumbing fixtures scheduled for service on the Drawings.
4. All plumbing fixtures and trim as scheduled on the Drawings, inclusive of setting of fixtures and connections to drainage and water supply systems.
5. Flashing of all plumbing pipe penetrations through exterior walls, roofs, and foundations.
6. Excavation and backfill as required for the work of this Section in conformity with Division 31 of these Specifications.
7. Final connection of water to equipment furnished under other Sections.
8. Condensate drainage piping and connections from points of attachment to equipment to indirect waste locations, as noted on the Drawings.
9. Protection of all piping specified herein and/or shown on the Drawings, from freezing. Buried piping shall be a minimum of 12" below the local frost line. If ambient design temperature is 30ºF or less, all pipes in unconditioned spaces shall be insulated.
10. Testing and adjusting of all piping systems and equipment herein specified.
11. Sterilization of domestic water systems.
12. Pipe wrapping and insulation.

B. Related Sections

1. Sealants, Firestopping, Sheet Metal Flashing and Trim: Division 07.
2. Sheet Metal Storm Water Leaders, Downspouts, and Gutters: Division 07.
3. Basic Electrical Requirements, Line Voltage Wiring: Division 26.
4. Finish Painting: Division 09.

C. Unless specified otherwise, provide all supervision, labor, materials, transportation, equipment, hauling and services necessary for a complete and operational system. Provide all incidental items such as offsets, fittings, etc. required as part of the work even though not specifically shown on Contract Drawings or Specifications.

1.3 QUALITY ASSURANCE

A. Regulatory compliance: All work performed under this Section shall comply with the latest currently adopted editions of all codes and regulations and all requirements of all Authorities having Jurisdiction.

B. All work shall be done in conformity with all applicable local and state safety codes, ordinances and regulations. Additionally, all work shall conform to the latest editions of the following codes and standards:

1. California Mechanical Code
2. California Plumbing Code
3. California Building Code
4. California Fire Code
5. California Green Building Code
6. California Electric Code
7. California Code of Regulations, including Titles 8, 17, 19, 20, 21, 22 and 24
8. Comply with all ADA and California Title 24 requirements for disabled access.
9. NSF/ANSI 61 Standard, Drinking Water System Components - Health Effects for fixture materials that will be in contact with potable water.
10. AB 1953, Amendments to Section 116875 of the Health and Safety Code relating to lead plumbing.

C. Minimum requirements: The requirements of these are the minimum that will be allowed unless such requirements are exceeded by applicable codes or regulations, in which the regulatory codes or regulation requirements shall govern.

D. When the Contract Documents call for materials or construction of a higher standard than is required by the above, the Contract Document requirements shall take precedence over the requirements of the said laws, rules, and/or regulations, accepting that nothing in the Contract Documents shall be interpreted as permitting work in violation of said laws, rules, and/or regulations. The Contractor for this work shall furnish any additional materials and/or labor as may be required for compliance with these laws, rules, and/or regulations though such materials and/or labor are not specifically set forth in the Contract Documents, with no additional charges to Owner.

E. Seismic construction and restraints shall be in accordance with the requirements of the California Building Code and Title 17 and Title 24 of the California Code of Regulations. All equipment mounts, isolators, and hanging systems must meet DSA approval requirements.

F. Comply with the Safety Orders issued by Cal-OSHA and any other regulations of the State of California and any districts having jurisdictional authority.

1.4 SUBMITTALS

A. All submittals shall be submitted under the provisions of Division 01 and the following.

1. Product Data: for each type of product.
   a. Submit cut sheets for each plumbing fixture. Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports and indicate materials and finishes, dimensions, construction details, and flow control rates for each fixture indicated.

b. Submit manufacturer's product data for all plumbing piping, fittings, materials, and equipment.

2. Shop Drawings:
   a. Prepare complete consolidated and coordinated layout drawings for all new systems, and for existing systems that are in the same areas. Shop drawings shall be prepared using AutoCAD 2014 or newer and shall be drawn at a minimum ¼" = 1' - 0" scale. Sections, details, and diagrams shall be to required scales for specified areas. Include diagrams for all piping, and power, signal and control wiring.
   b. Complete and detailed shop drawings shall be maintained throughout the coordination and construction phase, indicating all equipment and trades' work clearly. All equipment, including piping, etc. shall clearly identify both top and bottom elevations as well as distances from equipment to established building lines. Coordinate with other trades and field conditions and show dimensions and details including building construction and access for service.
   c. Use of contract documents for shop drawings is not acceptable.
   d. Submit shop drawings to Architect for approval prior to fabrication or installation of any work. Do not install equipment or piping until layout drawings have been approved. Any work installed without prior shop drawing approval shall be removed at the Contractor's expense.
3. Welding Procedure
   a. Before any welding is performed, the contractor shall submit to the Architect copies of any welding procedure specifications and their supporting procedure qualification records for review and acceptance. Copies of welder qualification records shall be made available for review to the owner or his representative at the construction site.
4. As-Built Drawings
   a. A complete set of Contract Drawings shall be maintained at the work site, and all changes in the work shall be recorded on this set on a daily basis. In addition to changes made during course of work, show the following:
      1) Exact location, type and function of concealed valves and controllers.
      2) Exact size, elevations and location of underground and under floor piping.
   b. Submit to Architect for final approval.
5. Operation & Maintenance Data
   a. Contractor shall provide all operating and maintenance instructions provided by the manufacturer, describing proper operation and maintenance of any equipment and devices installed. Operating and maintenance instructions shall cover maintenance, adjustment, and operation of each piece of apparatus, including preventative maintenance schedule and procedures.
   b. Contractor shall also provide a parts list of all equipment and component parts for all equipment under this Section. The equipment list shall include manufacturer's name, model number, and local representative, service facilities and normal channel of supply for each item.
   c. Also include the following:
      1) Manufacturer's certified shop drawings, and lubrication charts and data. Mark each sheet with equipment identification number and actual installed condition or system and location of installation. Specifically identify which options are provided.
      2) Description of start-up and operating procedures for each system. including controls diagrams and description of operating sequences.
      3) Recommend preventative maintenance schedule and procedures.

B. Submit data to the Architect for approval. Final acceptance of the work will not be made until a satisfactory submission of this material is received and approved by the Architect.

1.5 ACCURACY OF DATA

A. The data given herein and on the Drawings are as exact as could be reasonably secured, but absolute accuracy is not guaranteed. Exact locations, distances, elevations, etc. will be governed by shop drawings, the building itself, and actual field conditions.

1.6 UTILITY CONNECTIONS

A. Provide all services within the building to a point five feet outside of building. Arrange for all utility connections, determine their exact requirements, and pay all costs incurred unless indicated otherwise.

B. Send proper notices, make necessary arrangements, and perform other services required for care and maintenance of all utilities and assume all responsibility concerning same. Observe all rules and regulations of the respective utilities in executing the work.

1.7 DAMAGE BY LEAKS

A. Contractor shall be responsible for any damage to work of other Contractors that is caused by leaks in any temporary or permanent piping systems due to pipe rupture, disconnected pipes or fittings, or by overflow of equipment.

1.8 COOPERATION WITH OTHER TRADES

A. Cooperate fully with other trades doing work on the project as may be necessary for the proper completion of the project. Refer to the Structural, Plumbing, and Electrical Drawings for details of the building structure and equipment installation that will tend to overlap, conflict with, or require coordination with the work of this Section, and schedule this work accordingly.

B. Priority of right of way in space shall be as follows, in decreasing order of authority:

1. Electrical lights, electrical panels and drain piping.
2. Ductwork.
3. Fire protection piping, domestic hot water, domestic cold water and condenser water piping.

C. Any work done without regard for other trades shall be moved, replaced, or redone as required, without extra charges to Owner.

1.9 COORDINATION

A. All work shall be coordinated with water, gas, sanitary sewer, and other services on the site. The locations of points of connection to the site services shall be confirmed prior to commencement of any and all work required under this Section of the Specifications.

B. Coordinate roughing-in and final plumbing fixture locations and verify that fixtures can be installed to comply with original design and referenced standards.

1.10 LICENSING REQUIREMENTS

A. All plumbing systems shall be installed by a C-36 Plumbing Contractor. Plumbing systems include: waste removal and connection of on-site waste disposal systems; piping, storage tanks, and venting for supply of gases and liquids for any purpose; all gas appliances, flues, and gas connections; water and gas piping from the owner's side of utility meter to the structure or fixed works; installation of any type of equipment to heat water or fluids to a suitable temperature; and maintenance and replacement of the items described above, including health and safety devices.

PART 2 - PRODUCTS

2.1 PRODUCTS CRITERIA

A. All materials, appliances, and equipment shall be new and best of their respective kinds, free from defects, and of the latest design.

B. Multiple Units: When two or more units of materials or equipment of the same type or class are required, these units shall be products of one manufacturer.

C. All fixtures, materials, and equipment equal in quality and utility to these herein mentioned will be accepted. When specific names are used in describing fixtures, materials, and equipment they are mentioned as standards only, but this implies no right on the part of the Contractor to use other fixtures, materials and equipment, or methods, unless approved as equal in quality and utility by the Architect. The decision of the Architect shall govern as to what fixtures, materials, and equipment are equal to those mentioned, but the burden of proof as to the quality of any proposed fixtures, materials, or equipment shall be upon the Contractor. If any tests are necessary to determine the quality of proposed fixtures, materials, or equipment, an unbiased laboratory shall make such tests at the expense of the Contractor. The chosen laboratory shall be satisfactory to the Architect.

D. Only specified materials shall be utilized in the work of this Section unless substitutions have been approved in accordance with the General Conditions and Division 01 Sections of these Specifications.

2.2 PIPE, FITTINGS

A. General

1. Tracer wire shall be installed with all non-metallic piping below grade. Tracer wire shall be solid core copper, 14 gauge minimum, laid continuously along pipes. Wire shall be "ty-wrapped" to pipe at eight feet on center. Tracer wire shall terminate in concrete access boxes at the beginning and terminal ends of the buried pipe.
2. All accessible pipe 2" and smaller shall be threaded. Fittings for threaded pipe shall be 150-lb. malleable iron, screwed and banded.
3. Vent piping shall have vandal resistant mushroom vent caps.
4. At penetrations through building walls, provide link seal around pipe.

B. Underground Soil, Waste, Drain, and Vent Pipe: Because of the highly corrosive nature of the native soil at the project site, no steel or cast iron pipe shall be used below grade.

1. Solid wall Schedule 40 PVC pipe meeting the requirements of ASTM D 2665, drain, waste and vent

2. PVC socket fittings: ASTM D 2665, made to ASTM D 3311, drain, waste and vent patterns and to fit Schedule 40 pipe.
3. Solvent cement: ASTM D 2564

C. Above Ground Soil, Waste, Drain, and Vent Pipe:

1. Lines 2 inches and larger shall be of standard weight no-hub cast iron soil pipe and fittings and shall conform to the requirements of CISPI Standard 301 and ASTM A88. All pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute ® and listed by NSF® International. All pipes and fittings shall be produced by a single manufacturer. AB&I, Charlotte, or Tyler.
2. Lines under 2 inches shall be galvanized steel, with threaded cast iron drainage fittings.
3. Joints: Hubless Couplings shall conform to CISPI Standard 310 and local code requirements. Couplings shall be manufactured in the United States and be certified by NSF® International. Heavy Duty and Medium Duty couplings shall conform to ASTM C 1540. Hubless coupling gaskets shall conform to ASTM C-564. Couplings 1 ½ inches through 4 inches shall have four bands and 5 inches through 10 inches shall have six bands.
   a. Piping 2 inches and smaller: Medium duty no-hub couplings, Husky 2000, Tyler Wide Body, Clamp-All 80.
   b. Piping 2½ inches and larger: Heavy duty no-hub couplings, Husky 4000, Mission, or Clamp-All 12.
   c. Couplings shall be installed in accordance with the manufacturer's band tightening sequence and torque recommendations. Tighten bands with a properly calibrated torque limiting device.
4. At the option of this Contractor, all soil, waste, and vent piping above ground may be DWV copper, with wrought copper fittings, with "Stay-Safe 50" lead free solder and a suitable non-corrosive flux.

D. Hot & Cold-Water Piping:

1. All domestic hot and cold-water piping 3 inches and smaller shall be Type L, hard temper, copper pipe with wrought copper or cast brass solder joint fittings or Viega "ProPress" fittings. Pipe shall be NSF 61 Certified and bear the NSF Certification mark. All joints shall be made up with lead free solder. A suitable non-corrosive flux shall be used at all joints.
   a. Viega Copper Press fittings: Copper and copper alloy press fittings shall conform to material requirements of ASME B16.18 or ASME B16.22 and performance criteria of IAPMO PS 117. Sealing elements for press fittings shall be EPDM. Sealing elements shall be factory installed or an alternative supplied by fitting manufacturer. Press end shall have SC (Smart Connect) feature design (leakage path).
2. Pipes below grade inside buildings shall be soft drawn, Type L or K copper with no joints below slabs. Pipes shall be sleeved with 20-mil plastic sheathing.

E. Condensate Drainage Pipe:

1. Condensate drainage piping shall be Anvil, Mueller, Watts, or equal.
   a. 1 ¼ inch and larger shall be type DWV copper tube, ASTM B306.
   b. 1 inch and smaller shall be type M, hard temper copper, standard copper fittings.
2. Drainage fittings shall be ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings. 1 ¼ inches & smaller, standard pressure fittings.
3. Solder shall be ASTM B 32, lead free with ASTM B 813, water-flushable flux.

2.3 VALVES, SPECIALTIES

A. General Requirements:

1. All valves, except pressure reducing and control valves, shall be the same size as the pipe to which they are installed.
2. All valves of a particular type and size range shall be the product of one manufacturer.
3. Valve body materials shall be compatible with piping system materials.
4. Provide a union immediately downstream from each valve, unless the valve is flanged.
5. All valves shall be installed with the stem 45 degrees above horizontal, if possible. In no case shall the stem be installed below horizontal.
6. Where insulation is indicated, install extended stem valves arranged in proper manner to receive insulation.

B. Ball Valves (threaded): Valves shall be rated 600 PSI non-shock CWP and have 2-pc. Lead-free dezincification-resistant body, end piece, stem and ball, TFE seats, full port, separate pack nut with adjustable stem packing and anti-blowout stems. Valves ends shall have full depth ANSI threads. Valves shall be 3rd party certified to Annex G of NSF/ANSI 61. NIBCO T-685-80-LF, Watts LFB-6080, or KITZ 858.

C. Ball Valves (solder): NIBCO S-685-80-LF, Watts LFB-6081, or KITZ 859; two piece, full port, lead free, lever handle, 600 psi CWP

D. Gate Valves:

1. 3" and smaller shall be NIBCO T134, Stockham B-120, KITZ 42T; bronze body, union bonnet, rising stem, solid wedge, 150 lb. with wheel handle.
2. Larger than 3" shall be NIBCO F-617-0 or KITZ 72; iron body, bolted bonnet, outside screw and yoke, solid wedge, 125 lb. with wheel handle.

E. Lift Check Valves (vertical): NIBCO T-480-Y-LFor KITZ 836; bronze body, inline lift type, Teflon seat, and discs, spring actuated, 125 lb.

F. Swing Check Valves (horizontal): NIBCO T-413-Y-LF, Stockham B-345, or KITZ 822T; bronze body, Y-pattern swing-type, rated 200 PSI non-shock CWP. Body, bonnet, and disc hanger shall be of lead-free dezincification-resistant material and TFE seat disc. Valve ends shall be threaded type. Valves shall be 3rd party certified to Annex G of NSF/ANSI 61.

G. Water Pressure Regulating Valves: Wilkins 500 YSBR series. Install where pressure to building exceeds 70 psi.

H. Backflow Preventers (Where shown on the Drawings or required by local code):

1. Reduced pressure type:
   a. ¼ to 2 inches - Wilkins #975-XLMS series
   b. 2½" to 10" - Wilkins #375 series

I. Hose Bibbs

1. HB-1: Interior Hose Bibbs: Chicago No. 293-E27CP with vacuum breaker, polished chrome plated, tee handle, adjustable threaded flange inlet, hose thread outlet. Provide a Chicago No. 1771ABCP loose key stop at each hose bibb.

2.4 UNIONS

A. Steel pipe unions shall be malleable iron, 150 lb., ground joint, Anvil Fig. 463 or equal.

B. Copper pipe unions shall be soldered joint, NIBCO series 733-LF, Mueller, or equal.

C. Dielectric unions shall be Watts LF3001A or equal; lead free construction, female iron pipe thread to solder connection, NSF Certified, max. temperature 180° F, max. pressure 250 psi

2.5 DIELECTRIC FITTINGS

A. Precision Plumbing Products, “Clear Flow” series, threaded dielectric fittings, sizes 19100P thru 19195P.

B. Dielectric fittings shall have zinc electroplated steel casing, and NSF/FDA listed lining. Fittings shall meet the requirements of ASTM standard F1545 for continuous use at temperatures up to 225°F (- +5°F) and for pressures up to 300 psi, and shall achieve a dielectric waterway in all potable water and appropriate HVAC applications

2.6 PIPE INSULATION

A. General

1. Products shall not contain asbestos, lead, mercury, or mercury compounds.
2. Water lines installed in conditioned spaces can be installed without insulation.
3. Removable insulation jackets shall be provided on all valves.

B. All insulation shall have composite (insulation, jacket, tape seal, and adhesive used to adhere the jacket to the insulation) Fire and Smoke Hazard ratings as tested under Procedure ASTM E 84, NFPA 255 or UL 723, not exceeding: Flame Spread - 25, Smoke Developed - 50. PVC fitting covers, jacketing and accessories such as adhesives, mastics, cements and cloth for fittings should have the same component ratings.

C. Insulate all hot water supply piping, all hot water return piping, all tempered water supply piping, all tempered water return piping, all piping above ceilings, all cold water supply lines in unconditioned spaces, and all storm and overflow piping (including the body of the drain) with pre-formed fiberglass pipe insulation complying with ASTM C547, with factory applied all service vapor retarder jacket (ASJ), self-sealing longitudinal closure laps (SSL), and butt strips. Johns Manville "Micro-Lok HP®" or Owens Corning "SSL II with ASJ Max Jacketed Fiberglas®" pipe insulation, Armacell LLC Armaflex, or equal.

D. Insulate all cold-water supply lines in unconditioned spaces, and all storm and overflow piping (including the body of the drain) with Johns Manville "Micro-Lok HP", or equal Owens Corning or Armacell LLC Armaflex, pre-formed fiber glass pipe insulation, with all service vapor-retarder jacket (ASJ).

E. The All-Service vapor retarder Jacket (ASJ) shall be constructed of high density, white kraft paper, reinforced with a glass fiber yarn and bonded to aluminum foil with self-sealing longitudinal closure laps (SSL) and butt strips. Adhesives or staples will not be required to seal the jacket and butt strips.

F. Fittings, valves and flanges shall be covered with Manville “Zeston 2000” insulated PVC fitting covers and Hi-Lo Temp insulation inserts or Knauf “Proto LoSmoke”. Insulation for all exposed piping and all piping in crawl spaces shall be covered with Zeston PVC jacketing. PVC jackets shall be 20 mils thick and shall be bonded with Zeston Perma-Weld adhesive. In crawl spaces, Knauf Earthwool RediKlad 1000° pipe covering shall serve as an acceptable alternate to standard pipe covering and PVC.

G. Insulation for all exposed piping and all piping in crawl spaces shall be covered with Zeston or LoSmoke PVC jacketing. PVC jackets shall be 20 mil thick and shall be bonded with Zeston “Perma-Weld” or equal adhesive.

H. All piping exposed to the weather shall be finished with field applied aluminum jacketing, 0.016” thick with a factory-applied moisture retarder/protective liner. Johns Manville, ITW Insulation Systems, or equal. Aluminum jacketing shall be overlapped 2 to 3 inches and held in place with stainless steel bands to form a weather tight system Elbows and tees shall be fitted with matching two-piece aluminum fitting covers. Other fittings in metal-jacketed systems shall be finished with conventional weather-resistant insulation materials with painted aluminum finish.

I. Provide removable covers on pumps, backflow devices, valves greater than 2 inches, flanges, strainers, etc., where periodic maintenance or removal of insulation may be required.

J. All domestic water piping below grade shall be insulated with flexible elastomeric insulation, Armacell "Armaflex", Trymer 2000XP, or equal. Pipes shall be sleeved with 30 mil PVC jacket, with glued joints.

K. Insulation thickness shall conform to Title 24, Part 6 requirements as indicated in the following table:

FLUID TEMPERATURE RANGE (°F)	CONDUCTIVITY RANGE (in Btu-inch per hour per square foot per °F)	INSULATION MEAN RATING TEMPERATURE (°F)	NOMINAL PIPE DIAMETER (in inches)				
			1 and less	1 to <1.5	1.5 to < 4	4 to < 8	8 and lrgr
			INSULATION THICKNESS REQUIRED (in inches)				
Space heating, Hot Water systems (steam, steam condensate and hot water) and Service Water Heating Systems							
Above 350	0.32-0.34	250	4.5	5.0	5.0	5.0	5.0
251-350	0.29-0.31	200	3.0	4.0	4.5	4.5	4.5
201-250	0.27-0.30	150	2.5	2.5	2.5	3.0	3.0
141-200	0.25-0.29	125	1.5	1.5	2.0	2.0	2.0
105-140	0.22-0.28	100	1.0	1.5	1.5	1.5	1.5

2.7 FLOOR DRAINS

A. Drains in membrane dampproofed floors shall have flashing flange and membrane clamp.

B. Drains in sheet vinyl floors shall have a 14" square latex flange.

1. HD-1: Watts Drainage FD-830-7, 2-inch pipe size; epoxy coated cast iron hopper drain with 12" x 12" square open top; trap primer tapping.

2.8 CLEANOUTS

A. Cleanouts in membrane dampproofed floors shall have flashing flange and membrane clamps. Plugs shall be bronze, with cast iron body ferrule for cast iron pipe.

B. Floor Cleanouts (FCO): Zurn ZN1400-HD, “Level-trol” adjustable floor cleanouts, dura-coated cast iron with gas and water-tight ABS tapered thread plug, and round scoriated top, adjustable to finished floor.

C. Grade (COTG): Zurn Z1474-N or equal Jay R Smith. Housing to be dura-coated cast iron body with integral anchor flange and scoriated cover with lifting device. Cleanouts in un-paved areas shall be set in 18" x 18" x 4" concrete pads.

D. Accessible:

1. Cast iron pipe: Zurn Z-1440, dura-coated with gas and water-tight, bronze, taper thread plug
2. Steel pipe: Zurn Z-1470-A bronze, raised head, cleanout plug.
3. Copper tubing: NIBCO figure 816 or 817.

E. Wall Cleanouts (WCO):

1. Copper tubing: NIBCO figure 816 or 817, with Zurn Z-1462, 6” x 6” polished chrome-plated bronze wall plate and frame.
2. Cast iron pipe: Zurn Z-1441, dura-coated with gas and water-tight bronze, taper thread plug and round smooth stainless steel access cover with securing screw
3. Steel pipe: Zurn Z-1468, round stainless steel wall access cover, complete with securing screw and bronze raised hex head plug for steel pipe.

2.9 SLEEVES, WALL PLATES

A. Service pipe through exterior walls, roofs; interior walls, ceilings: Sioux Chief or equal, wall and ceiling plates; chrome plated at finished rooms.

B. Pipes through, under footings: 18 gauge iron sleeves two diameters larger than pipe, cast in concrete, annular space filled with mastic or plastic bituminous cement.

C. Pipes through fire rated walls and through 1-hour walls shall be protected with fire retardant mastic as detailed on the drawings. Installation shall be in full accordance with the requirements of the UL system number. Hilti or approved equal.

D. Pipes through floors, interior concrete walls, and through fire rated walls and smoke stop partitions: 18 gauge iron sleeves, two diameters larger than pipe, annular space filled with 3M Brand Fire Barrier CP-25 caulk.

2.10 SHOCK ABSORBERS

A. Zurn Z1700 “Shoktrol” series, or equal Jay R Smith, stainless steel bellows. Install with gate valve shut-off and access door at all flush valves or other automatic valves. A single unit sized in accordance with the manufacturer’s recommendations may serve batteries of valves.

2.11 TRAP PRIMERS

A. Precision Plumbing Products model P-2, adjustable to line pressure, automatic trap primer with all bronze body, integral vacuum breaker, non-liming internal operating assembly with gasketed bronze cover. Install with shut off valve and access doors in Janitor's closets, Mechanical Rooms and other areas not served by, or in close proximity to, flushometer valve operated water closets.

2.12 ACCESS PANELS

A. Where construction is not inherently accessible, provide adequately sized and conveniently located access doors in ceilings, walls, and furring for access to controls and for servicing valves, equipment, etc.

1. Fire Rated walls and ceilings: Milcor, Style UFR, U.L. Class B, 1½ hour rating, insulated, self closing, self latching, flush key operated cylinder lock, interior latch release. Minimum size shall be 12” x 12”. Provide larger sizes where required.
2. Drywall ceilings or walls: Milcor, Style DW, prime coated steel, flush screwdriver-operated cam lock. Minimum size shall be 12” x 12”. Provide larger sizes where required.
3. Masonry and tiled walls: Milcor, Style M, prime coated steel, flush screwdriver-operated cam lock. Tiled walls shall have satin finish stainless steel. Minimum size shall be 12” x 12”. Provide larger sizes where required.
4. Plastered walls and ceilings: Milcor, Style K, prime coated steel, flush screwdriver-operated cam lock. Minimum size shall be 12” x 12”. Provide larger sizes where required.

B. Doors shall be delivered to the General Contractor for installation.

2.13 VALVE BOXES

A. Christy #F-08, complete with concrete cover and required extensions. Index all covers "WATER" as required for service use.

2.14 STRAINERS

A. For pipes 1 ½” – 2”: NIBCO T/S 221/222-A or Wilkins S or YB series strainer, 20 mesh type 304 stainless steel screen, bronze construction 200 psi CWP or approved equal. Provide with hose bibb drain.

B. For pipes 2 ½” & larger: NIBCO F-721A or Wilkins F series, flanged, 125 lb., tapped bolted bonnet with plug and stainless steel screen.

2.15 THERMOMETERS

A. Weksler “Adjust-Angle”, or equivalent Weiss, with separable sockets and 6" minimum scale reading 30-240°F.

2.16 VIBRATION AND SOUND CONTROL

A. Make all necessary provisions to prevent the transmission of vibration to the building structure and the passage of noise from the equipment rooms to other rooms. Provisions shall include: vibration isolators for motor driven equipment; flexible pipe connections to motor driven

equipment; resilient mounting for piping; sealing off pipe and duct penetrations of walls, floors and ceilings of equipment rooms.

B. Provide pipe and sound isolation for all piping through walls, Acoustoplumb by LSP Products, Holdrite Silencer by Hubbard Enterprises, or equal.

2.17 FIXTURES

A. The quantity and location of fixtures shall be taken from the Architectural and Plumbing drawings. Provide adequate support and all standard trim normally furnished for fixtures. All enamel shall be acid resisting. Traps, unless otherwise noted shall be 17-gauge brass tubing, chrome plated when exposed.

B. Submit catalog cut sheets on all fixtures.

C. Except as otherwise shown, provide ¼" steel backing plates, 36" wide by 12" high minimum size, secured to a minimum of three studs by welding, or with ¼" x 2½" lag screws for all wall hung fixtures for which no other means of support is specified.

D. Stops and supplies: Provide stops for all fixtures. Unless otherwise specified, stops exposed at lavatories and similar fixtures shall be Chicago #1016ABCP chrome plated, loose key. Concealed stops shall be Chicago #1771ABCP.

E. All vitreous china fixtures shall be Zurn, Kohler, or American Standard except where specifically noted otherwise. All fixtures shall be standard white color, except as noted.

F. All plumbing fixtures providing domestic water shall comply with AB 1953, lead free. This includes, but is not limited to, lavatory faucets, sink faucets, shower valves, emergency showers, hose bibbs, and drinking fountains.

1. <u>P-1A - WATER CLOSET (ADA)</u>

   a. Fixture: Zurn Z5615-BWL; wall mounted; vitreous china; elongated bowl; ADAS compliant; 1.28 gpf

   b. Flush Valve: Sloan “Royal” #111-1.28 or Zurn Z6000, ADA compliant; exposed diaphragm-type, chrome plated; synthetic rubber diaphragm with dual filtered bybass; Install flush valve on wide side of ADA water closet enclosures; 1.28 gpf

   c. Seat: Bemis #95SSCT or Zurn Z5955SS-EL; extra heavy duty; elongated; open front; less cover; integral bumpers; self-sustaining check hinge; white.

   d. Carrier: Zurn Z1201/Z1202 EZ Carry series; 500 lb. capacity

2. P-2A – LAVATORY (ADA)

   a. Fixture: Zurn Z5344; 20” x 18”, vitreous china, wall hung, punched for 4” centers. See Architectural Drawings for ADA mounting height.

   b. Faucet: Chicago 802-VE2805-665ABCP; deck mounted, 4" fixed centers; metering (HW/CW)

   c. Drain: McGuire #155WC; offset tailpiece; open grid P.O. plug.

d. P-Trap: McGuire #PW2150; insulated adjustable trap with cleanout; includes covers for riser, angle stop, and tailpiece

e. Carrier: Zurn Z1251

3. P-5A SINK (ADA)

a. Fixture: Elkay Dayton GE12522; ADA compliant; single bowl stainless steel drop-in sink, fully coated underside; 25" x 22" x 5 3/8" sink dimensions; punched for 8" centers faucet; center rear drain

b. Faucet: Chicago 201-AGN2AE35V317AB; deck mounted; 8" fixed centers, 5 ¼" rigid/gooseneck swing spout; 1.5 gpm vandal proof aerator; 4" vandal proof wristblade handles; Quaturn™ compression cartridges (HW/CW)

c. Drain: Just J-ADA-35-FS; Chrome plated brass drain with flat strainer and 1-1/2" O.D. 17-gauge chrome plated brass offset tailpiece system.

d. P-Trap: McGuire 8903C trap with cleanout or equal, with ProWrap 2000 or Truebro Lav Guard2 undersink piping covers

e. Mixing Valve: Watts series LFMMV-M1 installed on hot water supply to fixture. Lead free cast copper silicon alloy body

2.18 ELECTRIC WATER HEATERS

A. A.O. Smith "Dura-Power" series, model DEL-6 as scheduled on the Drawings or approved equal. Heater(s) shall be listed by Underwriters' Laboratories. Models shall meet the standby loss requirements of the U.S. Department of energy and current edition of ASHRAE/IES 90.1.

B. Heater(s) shall have 150 psi working pressure and be equipped with extruded high-density anode rod. All internal surfaces of the heater(s) exposed to water shall be glass-lined with an alkaline borosilicate composition that has been fused-to-steel by firing at a temperature range of 1400°F to 1600°F. Electric heating elements shall be medium watt density with zinc plated copper sheath. Each element shall be controlled by an individually mounted thermostat and high temperature cutoff switch. The outer jacket shall be of backed enamel finish and shall enclose the tank with foam insulation. Electrical junction box with heavy duty terminal block shall be provided. The drain valve shall be located in the front for ease of servicing.

2.19 EXPANSION TANK

A. Amtrol "Therm-x-trol", model ST-8. Tank shall be constructed of high strength steel with antimicrobial liner, a heavy-duty Butyl NSF/ANSI 61 diaphragm, a projection welded air valve with "InSight™" indicator cap, and a patented "Turbulator™" water circulator.

2.20 INSTANTANEOUS WATER HEATERS

A. Chronomite model CMI-30L/208, "Instant-Flow CompliantMix" series, thermostatic tankless water heater with integral thermostatic mixing valve. Housing is fabricated from cast aluminum alloy. Element assembly is fabricated from Celcon plastic. Heating coils are nichrome. Faucet flow controls supplied with each unit. 3/8" compression fittings (standard). Digital microprocessor for temperature control.

B. Wall sleeve shall be Chronomite "Invizible" model Z-S1616D with prewired electrical disconnect.

2.21 HANGERS AND SUPPORTS

A. Pipe supports shall be manufactured by Thomas & Betts, “Superstrut” or equivalent Cooper B-Line/Tolco, NIBCO, or Anvil.

B. All hangers shall be electro-chromate finished. Hanger rods shall have electro-galvanized finish.

C. Copper tubing:

1. C-711 copper tube hanger complete with C-716 isolator.
2. Copper pipe shall be attached to channels with A-716 “Cush-A-Clamp”.

D. Insulated pipe:

1. C-711 pipe hanger fitted to outside of insulation with C-790 galvanized shields.

E. Trapeze hangers:

1. Grouped pipes may be supported by A-1200 channel bolted to rods.

F. Point of support connectors:

1. Wood construction:
   a. Stationary pipes: 540 side beam hanger
   b. Pipes subject to movement: S541
2. New concrete construction: 452 inserts.
3. Existing concrete construction: Phillips “Red-Head” 3-piece concrete anchors or Hilti “Quik-Bolt”, drilled-in, concrete anchors.
4. Steel beams: Series 500 beam brackets.
5. Plywood decks: machine bolts, nuts and washers.

G. Vertical pipe risers:

1. Vertical pipe risers shall be securely supported with C-720 pipe clamps anchored to construction.
2. C-720P for bare cold water pipe, anchored to construction.

H. Pipes through studs or joists shall be isolated from structure with properly sized Hubbard "Hold-Rite" suspension clamps or LSP “Acousto-Plumb” system

2.22 VIBRATION AND SOUND CONTROL

A. Make all necessary provisions to prevent the transmission of vibration to the building structure and the passage of noise from the equipment rooms to other rooms. Provisions shall include: vibration isolators for motor driven equipment; flexible pipe connections to motor driven equipment; resilient mounting for piping; sealing off pipe and duct penetrations of walls, floors and ceilings of equipment rooms.

B. All piping which is not isolated from contact with the building by its insulation shall be installed with a manufactured type isolator. Isolators shall be B-Line "Vibra Clamp" and "Vibra Cushion", Super Strut, "Trisolator", or equal. Piping shall be installed and supported in a manner to provide for expansion without strain. Guides shall be properly installed to ensure this requirement.

C. Provide pipe and sound isolation for all piping through walls, Acoustoplumb by LSP/Specialty Products, Holdrite Silencer by Hubbard Enterprises, or equal.

2.23 PIPE LABELS

A. Brady, Seton or approved equal pipe labels. Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

D. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.

E. Label Sizes (per ANSI A13.1 / ASME A13.1-2022 Standards):

1. For pipes or covering with outside diameter ¾ to 1¼ inches, minimum length of label: 8 inches, minimum height of letters: ½ inch.
2. For pipes or covering with outside diameter 1½ to 2 inches, minimum length of label: 8 inches, minimum height of letters: ¾ inch.
3. For pipes or covering with outside diameter 2 ½ to 6 inches , minimum length of label: 12 inches, minimum height of letters: 1¼ inch.

PART 3 - EXECUTION

3.1 SITE CONDITIONS

A. This Contractor shall be held to have examined the site and compared it with the Contract Documents, and to have satisfied himself as to the conditions under which the work is to be performed. In the event of discrepancy, he shall notify the Architect and proceed as he directs. He shall be held responsible for all existing conditions, whether accurately described, and no allowance shall subsequently be made on his behalf for any error, omission, or extra expense to which he may be put due to failure or neglect on his part to make such examination and notification.

B. Prior to commencing the work of this Section, this Contractor shall inspect the installed work of other trades and verify that their work is sufficiently complete to permit the start of work under this Section and that the completed work will be in complete accordance with the original design. In the event of discrepancy immediately notify the Architect and proceed as directed.

3.2 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall be responsible for delivery, storage, protection and placing of all equipment and materials.

B. Contractor shall protect the work and materials from damage during construction. Equipment stored at the jobsite shall be protected from dust, water or other damage, and be covered if equipment is exposed to weather. Protect interiors of new equipment and piping systems against entry of foreign matter. Clean both inside and outside before painting or placing equipment in operation.

C. Any items damaged shall be repaired or replaced, at no additional cost to the Owner.

D. Cleanliness of Piping and Equipment Systems:

1. Exercise care in storage and handling of equipment and piping material to be incorporated in the work. Remove debris arising from cutting, threading and welding of piping.
2. Piping systems shall be flushed, blown or pigged as necessary to deliver clean systems.
3. Contractor shall be fully responsible for all costs, damage, and delay arising from failure to provide clean systems.

3.3 COORDINATION

A. All work shall be coordinated with water, gas, sanitary sewer, and other services on the site. The locations of points of connection to the site services shall be confirmed prior to commencement of work.

B. Coordinate roughing-in and final plumbing fixture locations and verify that fixtures can be installed to comply with original design and referenced standards.

3.4 COOPERATION WITH OTHER TRADES

A. Cooperate fully with other trades doing work on the project as may be necessary for the proper completion of the project. Refer to the Architectural and Structural Drawings for details of the building structure and equipment installation that will tend to overlap, conflict with, or require coordination with the work of this Section, and schedule this work accordingly.

B. Priority of right of way in space shall be as follows, in decreasing order of authority:

1. Electrical lights, electrical panels and drain piping.
2. Ductwork.
3. Fire protection piping, domestic hot water, domestic cold water and condenser water piping.

C. Verify clearance requirements of all electrical and mechanical equipment/systems prior to installation of any new work. Plumbing equipment, piping, systems, etc. shall not interfere with electrical equipment spaces.

D. Any work done without regard for other trades shall be moved, replaced, or redone as required, without extra charges to Owner.

3.5 VERIFICATION OF EXISTING CONDITIONS AND DEMOLITION

A. Before installation of any new work, verify the location, size and other conditions at all points of connection to services or other existing piping, and at all locations where new work will cross or pass near existing piping, electrical, or other facilities.

B. Information shown relative to existing services is based upon available records and data during preparation of the Drawings but shall be verified. Make reasonable deviations found necessary to conform with actual locations and conditions, without extra charge.

C. Remove piping, controls, fixtures, and equipment that is not to remain in service as shown on the Drawings or as required. This includes the removal of associated appurtenances and supports.

D. Patch, cap, or repair existing works affected by this demolition in concealed spaces within 6" of a live main or branch.

E. Deliver removed material to the Owner as directed by the Architect. Dispose of all other removed material offsite.

3.6 ACCESSIBILITY

A. Equipment shall be placed and piping connections made in such a manner that all routine adjustments and maintenance operations may be carried out without inconvenience and so that all code requirements for clearances are maintained.

3.7 VIBRATION AND SOUND CONTROL

A. Make all necessary provisions to prevent the transmission of vibration to the building structure and the passage of noise from the equipment rooms to other rooms. Provisions shall include: vibration isolators for motor driven equipment; flexible pipe connections to motor driven equipment; resilient mounting for piping; sealing off pipe and duct penetrations of walls, floors and ceilings of equipment rooms.

3.8 INSTALLATION, GENERAL

A. Provide all necessary cutting in connection with the work of this Section. No structural members shall be drilled, bored, or notched in a manner that will impair their structural capacity.

B. Cutting or boring of joists or other structural members shall be done only when alternative routing is impossible and only upon written approval of the Architect or Owner.

C. All penetrations of concrete or masonry shall be made with core drills. No cutting shall be done without the approval of the Architect.

3.9 INSULATION

A. Insulation shall be applied in complete accordance with the manufacturer's published installation instructions. All insulation shall be applied on clean, dry surfaces and shall be continuous through wall and ceiling openings and sleeves, except where fire stop materials are required.

B. All joints shall be firmly butted together, and longitudinal jacket laps and butt strips shall be smoothly secured.

C. Specified adhesives, mastics and coatings shall be applied at the manufacturer’s recommended minimum coverage per gallon.

D. Insulation on all cold surfaces must be applied with a continuous, unbroken vapor seal. Hangers, supports, anchors, etc. that are secured directly to cold surfaces must be adequately insulated and vapor sealed to prevent condensation. Seal all pipe terminations with vapor barrier mastic.

E. All surface finishes are to be extended to protect all surfaces, ends and raw edges of insulation.

F. Inserts shall be installed at outside hangers. Inserts between the pipe and pipe hangers shall consist of rigid closed cell pipe insulation of thickness equal to the adjoining insulation. Inserts shall not be less than 12" long for pipe sizes through 2½" and not less than 18" long for pipes larger than 2 ½". Refer to manufacturer's recommendations for densities, sectional length, gauge of metal shield and distance between centering.

G. Galvanized metal shields shall be applied between hangers or supports and the pipe insulation. Shields shall be formed to fit the insulation and shall extend up to the centerline of the pipe and the length specified for hanger inserts less 4" to allow for vapor retarding butt joints on each side of shields.

H. All pipe insulation ends shall be tapered and sealed, regardless of service

3.10 EQUIPMENT

A. Equipment shall operate quietly and without objectionable vibration. Such problems, other than from equipment operating at optimum conditions, shall be the Contractor's responsibility and shall be eliminated at the direction of the Architect.

B. Install equipment to provide good appearance, easy access, and adequate space to allow replacement and maintenance. Provide bases, supports, anchor bolts, and other items required to achieve this. Installation shall be level, above moisture level, and adequately braced.

C. Extend ¼" schedule 40 black steel lubrication pipes from hard-to-reach locations to front of equipment or to access doors. Terminate with proper lubrication fittings.

D. Move equipment into building through available openings. Dismantle equipment where necessary to accomplish this. After reassembly, test equipment to verify its satisfactory operating condition.

E. Thoroughly lubricate equipment before operating. Repairing damage resulting from failure to comply with this requirement shall be the Contractor's responsibility.

F. Connections to pipe shall be secured and properly aligned and all utility and control connections shall be properly isolated from the building structure by means of vibration isolators and flexible connections. Any equipment not meeting this requirement will be modified and properly reinstalled at no expense to the Owner.

3.11 PAINTING

A. Properly prepare work under this Section to be painted.

B. Painting shall be applied under the Painting section requirements, except preservative and special painting as described herein.

C. Priming as required herein, shall conform to the Painting section requirements and be of a material compatible with paint for finish painting.

D. Equipment in equipment rooms and like spaces, shall be furnished with a factory applied baked prime coat or at Contractor's option, a standard factory baked enamel finish in approved colors. Machinery such as fans, or motors shall be furnished with a factory applied baked on prime coat, or at the Contractor's option, a standard paint finish (air dried or baked enamel) in approved

colors. Mechanical equipment in other locations shall be furnished with a factory applied baked prime coat, unless noted otherwise.

E. All equipment and materials shall be cleaned of grease, wax, oil, rust or dirt in preparation for finish painting. Any prime coated surfaces showing signs of rust before being finish painted shall be thoroughly cleaned and a new prime coat applied.

F. Prime paint both sides of flashings prior to installation.

G. Furnish can of touch-up paint with each factory finished piece of equipment.

H. Paint all piping in mechanical rooms. Color as selected by the Architect.

I. Black steel piping exposed to the environment shall be painted with rust-inhibiting paint. Color as selected by Architect.

3.12 IDENTIFICATION OF SYSTEMS

A. Piping

1. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
   a. Adjacent to all valves and flanges
   b. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
   c. At both sides of wall, or floor penetrations.
   d. Near penetrations through ceilings, and inaccessible enclosures.
   e. Adjacent to changes in direction.
   f. At access doors, manholes, and similar access points that permit view of concealed piping.
   g. Near major equipment items and other points of origination and termination.
   h. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
   i. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

B. Valves

1. For identification and Owner's maintenance records, all valves shall be numbered and identified with clearly stamped 1¼" diameter brass tags, in accordance with drawings and service performed.
2. Control valves shall be also marked whether normally open (N.O.) or normally closed (N.S.).
3. Affix Underwriter's standard porcelain enameled identification signs to all fire protection sprinkler control valves, drain valves, and flow switches.

C. A typewritten schedule of all stencils and valve tags used, with identification, shall be framed and posted in mechanical rooms, at locations as directed..

3.13 INSTALLATION, HANGERS & SUPPORTS

A. Pipe supports shall be spaced according to CPC 2022, Table 313.3 and sufficiently close to support pipes properly without formation of pockets. Hangers shall be installed at ends of mains and branches.

B. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

C. Provide resilient mounting for domestic water piping. Thermal insulation may serve as resilient mounting for insulated piping.

D. Suspended water piping shall be anchored with steel struts installed at midpoint of each run.

E. No valve or piece of equipment shall be used to support piping.

F. Pipes through studs or joists shall be isolated from structure with properly sized Hubbard "Hold-Rite" suspension clamps.

G. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

H. Install lateral bracing with pipe hangers and supports to prevent swaying.

I. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, 2-½ inches and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

J. Installation of piping shall be such that damage cannot result through loading, expansion or contraction of piping. Anchors shall be installed to obtain uniformity of pipe movement.

3.14 INSTALLATION, PIPING

A. General

1. Rough in shall proceed as rapidly as general construction will permit. All rough-in shall be complete, at locations verified by Architect and Owner, and tested and inspected prior to installation of concrete, lath, plaster, gypsum wallboard, or other finishes.
2. All piping shall be concealed in finished rooms, installed in furred walls and partitions. Where furred or suspended ceilings occur, piping shall be installed in the concealed space at points adjacent to beams and/or other structural members and coordinated with ductwork and equipment. Where exposed piping occurs, it shall be installed parallel to or at right angles to building walls, unless specifically shown otherwise on the Drawings.
3. Installation of piping shall be such that damage cannot result, through thermal expansion or contraction, to piping, building, or pipe hangers and supports. Anchors shall be installed at midpoints of all runs in main piping for the purpose of localizing pipe expansion or prevention of creepage.
4. All pipelines shall be installed free from traps and air pockets, true to line and grade, with suitable supports properly spaced. All piping shall be installed without undue stresses and with provision for expansion and contraction.

5. All piping shall be new and free from foreign substances. American standard pipe threads shall be used for IPS threaded work. Joints in threaded piping shall be made up with Teflon tape applied to the male threads only. No screwed pipe joints shall be caulked or packed with rope or other packing materials. Pipe shall be free from tool marks, threads cut accurately with not more than 2 threads showing beyond fitting. Friction wrenches shall not be used with plated, polished, or soft metal piping. All changes in pipe size shall be made with reducing fitting. Bushings will not be permitted.
6. Protect unattended openings in piping during construction.
7. All copper tubing shall be formed in a workmanlike manner, in accordance with the Pipe and Tube Bending Handbook of the Copper and Brass Research Association. A tube bender giving support to the periphery of the tube shall be used. The tubing shall be protected against flatting or other injury.
8. All copper connections and joints shall be made in accordance with the Copper Tube Handbook, Copper and Brass Research Association. No swaged connections will be permitted. All valves, pumps, and similar equipment shall be connected to copper piping through union or flange adapter fittings.
9. No water or drainage piping shall pass over electrical equipment unless adequate protection is provided to prevent damage by leaks or condensation.
10. Install air vents at all water piping high points when direction of flow is downward.
11. Install sediment drain faucets at all low points.
12. Valves, cocks, etc., shall be installed to allow convenient accessibility and operation.
13. Unions and flanges shall be installed to allow convenient replacement of all equipment and cleaning tubes.
14. A union connection shall be installed downstream from all valves, at equipment connections and at other locations as required or directed.
15. Shut-off valves shall be provided in all main services and where required to permit proper servicing of equipment. Valves of one type shall be of one manufacturer.
16. All valves shall be of the same size as the pipelines in which they are installed, unless specifically sized on the Drawings. All hand-controlled line valves shall be ball valves, except where throttling control or frequent operation is required, in which case globe or angle valves shall be used. Globe valves in horizontal lines shall be installed with stem in horizontal to permit line draining. All globe and angle valves shall be installed to close against pressure. Disc valves shall have discs suitable for the services for which they are to be used.
17. All valves shall be accessible and shall not be installed with the stems below the horizontal plane. Provide access panels at walls, ceilings, or floors.
18. Provide prime coated escutcheon plates at all points where exposed piping penetrates finished wall ceilings or floors.

B. Waste, Drain and Vent Piping:

1. Soil, waste, and vent piping occurring within the building shall be installed to a uniform minimum grade of ¼" per foot unless otherwise noted. Vent piping shall be graded so that all condensation shall flow directly to a soil or waste line.
2. Exterior soil and waste lines shall be installed to inverts or grades indicated on the drawings.
3. Changes in direction of drainage piping shall be accomplished by the use of appropriate drainage and sanitary fittings.
4. Drilling and tapping of drains, soil, waste, or vent pipes and the use of saddle hubs and bands are prohibited.
5. Protection against breakage of piping passing under or through walls shall be provided using specified sleeves and caulking.
6. Adapters shall be installed between threaded iron and soil pipe.
7. Test tees shall be installed at the foot of all soil, waste, and storm water stacks.

8. Cleanouts shall be located where indicated on the Drawings; at all horizontal offsets; at ends of waste or sewer branches more than 5' in length; at intervals of 100' in straight runs of piping, or at closer intervals if directed or required by local code. Location of cleanouts in finished spaces shall be approved by the Architect prior to installation.

C. Hot, Cold-Water Systems:

1. Di-electric unions shall be installed where copper pipe is connected to galvanized steel piping or stub outs.
2. Connections from copper pipe to fixture supply fittings shall be made with copper or brass nipples.
3. Provide 18" high vertical air chambers at all domestic water connections to fixtures and/or equipment that are not specified to have shock absorbers.
4. All domestic water piping shall be kept clear of the building structure. Where it is within 1" of the building structure it shall be wrapped with felt (3/16" minimum thickness).
5. To the greatest extent possible, domestic cold-water piping shall be kept separated from hot piping and where there is a choice shall be run in the coolest portion of the available space.

D. PVC Piping

1. Because cements and primers are flammable, care shall be taken to avoid sparks, heat or open flames in both work and storage areas. Avoid direct contact with eyes and skin. Proper ventilation is mandatory when working indoors.
2. Temperature extremes are not conducive to good solvent cementing. Environments with temperatures above 110°F and below 40°F should be avoided.
3. Pipes shall be cut square with a tubing cutter (no hack saws shall be used). Ends of pipe shall be beveled and deburred with a deburring tool.
4. Pipe ends shall be cleaned with a dry rag, and all foreign material shall be removed.
5. Dissolve the inside socket of the fitting with appropriate primer by repeated strokes of a well wetted applicator. Dissolve the end surface of the pipe in a similar manner. Then, immediately apply a generous amount of cement to the outside of the pipe and a moderate amount of cement to the inside of fitting. Do not allow cement to puddle in fittings.
6. Apply a second coat of cement to the outside of the pipe, and while both surfaces are still liquid, bottom the pipe into the fitting, rotating the pipe 90° if possible. Hold until the pipe will not push out.
7. Wipe any excess cement from the pipe and observe the following cure times: 30 minutes at 60-100°F; 1 hour at 40-60°F; 2 hours at 20-40°F; and 4 hours at 0-20°.

E. Plumbing Fixtures:

1. Space between wall mounted fixtures and wall surface shall be neatly pointed up with G.E. silicone rubber compound of color matching fixture.
2. All exposed bolt heads and nuts used to secure fixtures shall be concealed with vitreous china caps.

F. Flashing:

1. All roof and wall penetrations shall be flashed and counter flashed watertight with 26-gauge sheet metal, except as noted.
2. Vents through roof shall be flashed with Semco #1100-4 lead flashing assemblies. Flashing shall be extended over top of pipe and shall be turned down inside top of pipe.

G. Excavation, Backfill:

1. Provide all excavation, trenching, and backfill in connection with the work of this Section.
2. Excavation shall be carried to 4" below the bottom of pipes. Provide a sand bedding for all sloped drainage piping and provide smooth uniformly graded bedding of firm but yielding material for all other piping, catch basins, and similar structures.
3. Backfill material shall be non-corrosive and free from all foreign material that could damage pipes. Installation shall be in accordance with "Earthwork" Section.

H. Indirect Waste Piping:

1. Indirect waste piping shall be installed to a uniform minimum grade of ¼" per foot unless otherwise noted.
2. Changes in direction of indirect waste piping shall be accomplished by the use of appropriate drainage fittings.
3. Drilling and tapping of indirect waste pipes and the use of saddle hubs and bands are prohibited.
4. Protection against breakage of piping passing under or through walls shall be provided using specified sleeves and caulking.

3.15 TESTING, INSPECTIONS

A. General:

1. This Contractor shall not allow or cause any work of this Section to be covered or enclosed until it has been inspected, tested, and approved by the Architect and the authorities having jurisdiction over the Work. Should any of this work be enclosed or covered up before such inspection, testing, and approval, this Contractor shall uncover the work, have the necessary inspections, tests, and approvals made and, at NO expense to the Owner, make all repairs necessary to restore both his work and that of other contractors which may have been damaged to be in conformity with the Contract Documents.

B. Tests:

1. This Contractor shall make all tests required by all local, state, and federal laws, codes, ordinances, and regulations having jurisdiction over this work.
2. Furnish all necessary labor, materials, and equipment for conducting tests, and pay all expenses in connection therewith. Should leaks develop while testing, repairs shall be made, and tests shall be repeated until a satisfactory test is obtained.
   a. Water Piping: Shall be hydrostatically tested for six (6) hours at 150 psi. All equipment shall be tested watertight at utility pressure.
   b. Drainage and Vent Piping: Shall be tested for 1 hour by plugging all outlets and filling the pipes with water to the top of vertical sections of pipes. No loss of water shall be permitted.

3.16 CLEANING

A. Flush all water piping systems. Remove, clean and replace all strainer baskets prior to final inspection.

B. Blow out all compressible fluid piping with compressed air before connecting with regulators or equipment.

3.17 DOMESTIC WATER SYSTEM STERILIZATION

A. Upon completion of this work, the new domestic water system shall be thoroughly flushed, sterilized and re-flushed. Sterilization and re-flushing shall be performed using the procedure below. All work shall be performed in the presence of the inspector.

B. All domestic water outlets shall have signs posted at their location stating that the water has not been sterilized and shall not be used for human consumption. The signs shall remain until the sterilization process is complete.

C. Procedure

1. Introduce chlorine or a solution of sodium hypochlorite, filling the lines slowly and supplying the sterilization agent at a rate of 200 parts of chlorine per million. The entire system shall be completely filled with the solution. All valves shall be operated and ends of all branches tested for residual chlorine. Continue to inject the solution until at least 200 ppm of free chlorine is indicated.
2. After the sterilizing agent has been applied, the system shall be isolated with the solution retained for at least 3 hours. Test for residual chlorine after retention. If less than 200 ppm is indicated, repeat the sterilization procedure.
3. After satisfactory sterilization, flush the system until all traces of the chemical are removed or until the chlorine content is no greater than that in the existing supply.

D. After a period of 48 hours minimum, bacteriological tests, using samples from at least 3 representative points, shall be made by recognized testing agency, who shall certify to the Architect that the system is bacteriologically safe and at least equal in safety to that of the principal water supply. The laboratory report and certification shall be transmitted to the Architect.

3.18 ADJUSTING

A. Properly adjust all stops, and controls, and demonstrate safe and satisfactory operation of all equipment.

3.19 CLEANING OF PIPING

A. All new piping shall be thoroughly cleaned of rust, scale, etc., prior to enclosing and placing in operation. Flush all water piping systems. Water shall be forced through pipes until the systems are free from foreign substances.

B. Remove, clean and replace all strainer baskets prior to final inspection.

C. Blow out all compressible fluid piping with compressed air before connecting with regulators or equipment.

3.20 CLEANUP

A. Upon completion of the work of this Section, remove all surplus material, debris, and equipment associated with or used in the performance of this work.

END OF SECTION

HET ELONGATED WALL HUNG ECOVANTAGE® FLUSH VALVE TOILET
Z5615-BWL

TAG _____

ARCHITECTURAL & ENGINEERING SPECIFICATION

☐ **Z5615-BWL**

EcoVantage High Efficiency Toilet System

Vitreous China, 1.1 gpf [4.2 Lpf] or greater high efficiency wall hung toilet with siphon jet flushing action, elongated front rim with 1-1/2" [39mm] top spud. Universal high efficiency toilet is designed to exceed industry standards with flush volumes of 1.1 gallons per flush.

☐ **Z5615-BWL-AM**

EcoVantage High Efficiency Toilet System

Vitreous China, 1.1 gpf [4.2 Lpf] or greater high efficiency wall hung toilet with siphon jet flushing action, ZurnSHIELD™ ceramic glaze and elongated front rim with 1-1/2" [39mm] top spud. Universal high efficiency toilet is designed to exceed industry standards with flush volumes of 1.1 gallons per flush.

☐ **Z5616-BWL**

EcoVantage High Efficiency Toilet System

Vitreous China, 1.1 gpf [4.2 Lpf] or greater high efficiency wall hung toilet with siphon jet flushing action, ZurnSHIELD™ ceramic glaze and elongated front rim with integral bedpan lugs 1-1/2" [39mm] top spud. Universal high efficiency toilet is designed to exceed industry standards with flush volumes of 1.1 gallons per flush.

PRODUCT FEATURES

Z5615 HET Series

- Zurn High Efficiency Toilets and paired performance flush valve systems are designed to exceed industry standards, while using as little as 1.1 gallons of water per flush
- Universal high efficiency toilet can be specified with 1.1 gpf [4.2 Lpf], 1.28 gpf [4.8 Lpf], 1.6 gpf [6.0 Lpf] or dual flush valves
- Vitreous china
- ZurnSHIELD™ ceramic glaze creates a permanent surface that protects the fixture by inhibiting the growth of stain and odor causing mold, mildew, and bacteria, thus reducing the amount of time, chemicals and water needed to clean the bowl
- Elongated front rim
- 2-1/8" [54mm] fully glazed trapway
- High efficiency siphon jet flush action
- Shipping Weight: 40 lbs
- System MaP score of 1,000 grams at 1.28 gpf with Zurn Flush Valve
- Static weight load of 1,000 lbs*
  *Not intended for bariatric use

COMPLIANCE AND CERTIFICATION:

- Complies with ASME A112.19.2 / CSA B45.1

This product should be used with a WaterSense labeled counterpart with a compatible flush volume to ensure that the entire system meets the requirements for water efficiency and performance.

NOTE: To ensure system performance:
Minimum Running Water Pressure = 25 psi.



VARIANT OPTIONS

☐ Z5615-BWL	Z5615 Series Top spud toilet
☐ Z5615-BWL-AM	Z5615 Series top spud toilet with ZurnSHIELD™ glaze
☐ Z5616-BWL	Z5615 Series top spud toilet with Top Spud Toilet with integral bed pan lugs and ZurnSHIELD™ glaze

Z5615-BWL SERIES ACCESSORIES

☐ Z5610-NUT-EXT-KIT	Retrofit nut kit for extending carrier studs from existing wall

RECOMMENDED CARRIER

☐ Z1201 or Z1202	EZCarry™ 500 lbs load rated High Efficiency Carrier

Z5615-BWL ZURN ONE SYSTEMS

Complete fixture package with bowl, flush valve, seat and trim

ITEM NUMBER	DESCRIPTION	FLUSH VOLUME GPF
☐ **Z.WC1.M**	Manual Z6000AV-ONE system	1.1
☐ **Z.WC1.S**	EZ Flush ZER6000AV-ONE-SM system	1.1
☐ **Z.WC1.S.TM**	Top Mount Sensor ZER6000AV-ONE system	1.1
☐ **Z.WC2.M**	Manual Z6000AV-HET system	1.28
☐ **Z.WC2.S**	EZ Flush ZER6000AV-HET-SM system	1.28
☐ **Z.WC2.S.TM**	Top Mount Sensor ZER6000AV-HET system	1.28

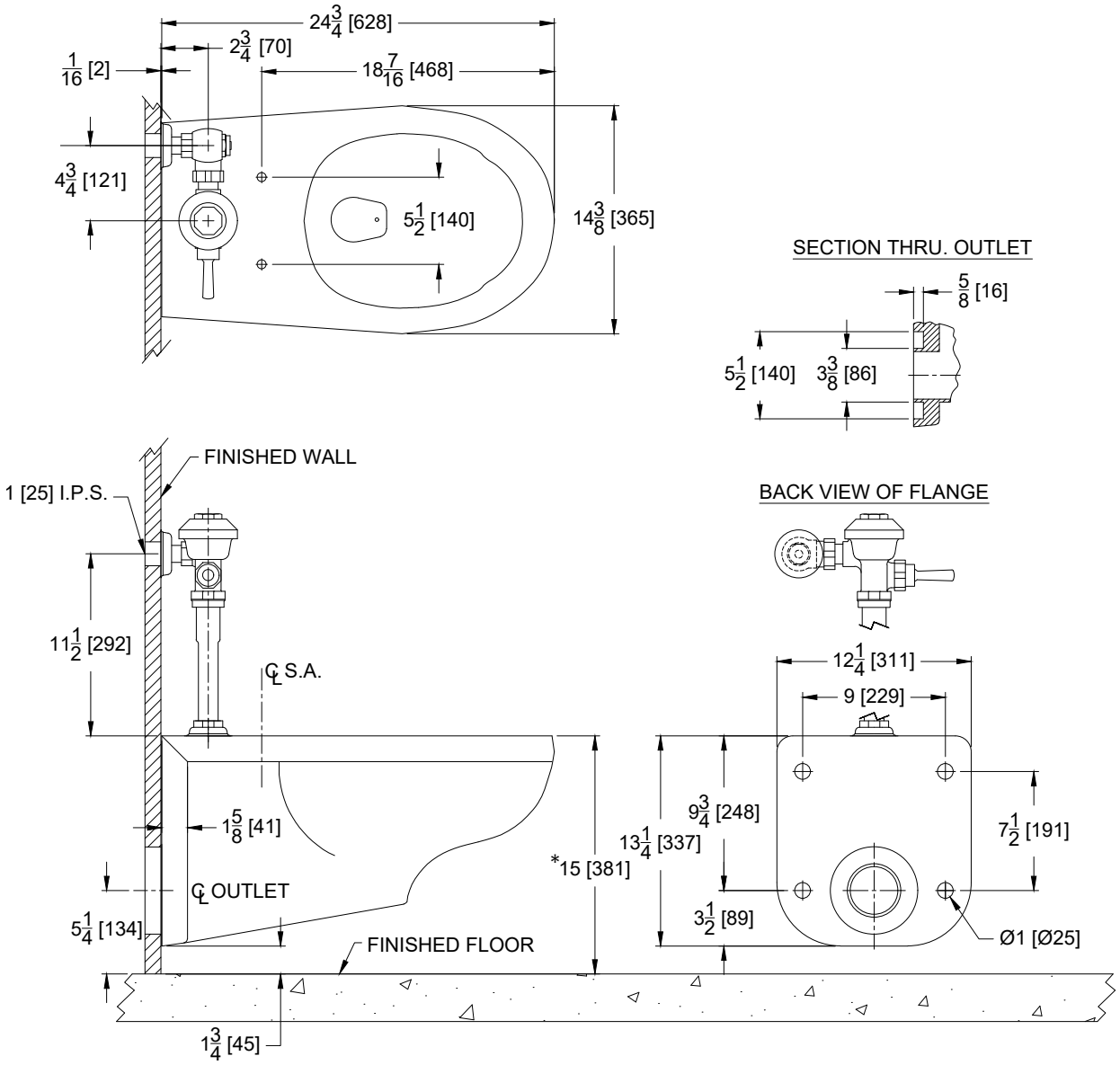
ARCHITECTURAL & ENGINEERING APPROVAL

The information contained in this document is subject to change without notice.
Please contact Zurn for most up to date information.

Rev. E | Date: 12/18/24 | C.N. No. 146476 | Prod./Dwg. No. SS Z5615-BWL

TAG _____

Rough-in/Overview dimensions



NOTE: All dimensions are for reference only. Do not use for pre-plumbing.

*NOTE: For ADA compliance, top of seat height should be installed at 17" [431mm] - 19" [482mm] from finished floor.

Patent zurn.com/patents
US 1.855.ONE.ZURN **CANADA** 1.877.892.5216
ZURN.COM
by zurn ELKAY Water Solutions

OPTIONS

Flush Volume

- 1.6 gpf (6.0 Lpf) (1.6)
- 1.28 gpf (4.8 Lpf) (1.28)
- 1.1 gpf (4.2 Lpf) (1.1)

Finish

- Polished Chrome (CP)
- Polished Brass (PB)
- Brushed Nickel (BN)
- Brushed Stainless (SF)
- Graphite (GR)

Water Efficiency

- Low Consumption
- High Efficiency

Handle

- Front of Valve (H)
- Saniguard®
- Left of Valve (G)
- Nickel-Silver (YA)
- CV
- Right of Valve (I)

Push Button

- Metal Index (L)
- 3" Metal Oscillating (L3)
- Front of Valve (HL3)

Control Stop

- 1" Straight (E)
- Wheel Handle (K)
- Ground Joint (GJ)
- Less (L/STOP)

Tailpiece

- H551A 3 1/16" (H551A-3-1/16)
- H551A 4 1/16" (H551A-4-1/16)
- H551A 5 1/16" (H551A-5-1/16)

Inlet

- Back of Valve (B)
- Left of Valve (C)

Vacuum Breaker

- Less (XYV)

Offset

- 1 ½" (38mm) (1-1/2-OFST)
- 1" (25mm) (1-OFST)



Image for a standard ROYAL 111 shown

DESCRIPTION

Royal® Exposed Manual Water Closet Flushometer

FEATURES

- Water conservation is aided by the ADA-compliant, non-hold-open handle, which prevents toilet from exceeding intended flush volume
- Flush accuracy is controlled by CID™ technology, also enhancing water efficiency
- Integrity of the product is maintained with the vandal-resistant stop cap
- Durability is facilitated with high copper, low zinc brass castings for dezincification resistance
- Adjustable tailpiece
- PERMEX synthetic rubber diaphragm with Dual Filtered Fixed Bypass
- Valve body, Cover, Tailpiece and Control Stop shall be in compliance with ASTM Alloy Classification for Semi-Red Brass
- Valve shall be in compliance to the applicable sections of ASSE 1037.

DOWNLOADS

- Royal Exposed Installation Instructions
- Control Stop Repair and Maintenance Guide
- Flush Connections Flanges Repair and Maintenance Guide
- Tail Piece Repair and Maintenance Guide
- Royal Manual Diaphragm Flushometer Repair and Maintenance Guide
- Tools/Accessories
- Bumper Pipe and Tube Supports Repair & Maintenance Guide

Sloan 10500 Seymour Ave, Franklin Park, IL 60131
Phone: 800.982.5839 • Fax: 800.447.8329 • sloan.com

2" (51mm) (2-OFST)

Outlet Tube

Trap Primer (TP)
F189
F188
F190

Adapter

Cast Set Screw Wall Flange (YBC)

Bumper

Angle Stop (YO)
Angle Stop Extended (YG)

Pipe Support

Solid Ring (YK)

Special Features

Less Logo (LL)
Carbon Offset (CO)
Whitworth Thread (WWT)

Compliances & Certifications

BAA Compliant
cUPC Certified
BABAA Compliant
Made in the USA
ADA Compliant
UPC Certified
Satisfies LEED Credits
WaterSense Listed
cUPC Green Certified
BREEAM Water Credit

NOTES

For product line drawings, view model-specific spec sheets.

All information contained within this document subject to change without notice.

- Flushometer Pressure gauges
- Additional Downloads

VIDEOS

PVD Special Finishes

Sloan 10500 Seymour Ave, Franklin Park, IL 60131
Phone: 800.982.5839 • Fax: 800.447.8329 • sloan.com

Z5340

20” x 18” Wall Hung Lavatory

TAG _____

Architectural/Engineering Specification:

20” x 18” vitreous china wall hung lavatory. Provided with hanger plate and holes for concealed arm carrier systems.

Product Features:

- 20” [508 mm] x 18” [457 mm]
- Vitreous china
- Faucet holes for single, 4”, or 8” centers
- Available with right or left side soap hole punching (Single centers only)
- Wall hung lavatory provided with wall hanger or for use with concealed arm carrier systems
- Front overflow
- Waste: 1-1/4” O.D.
- Depth: 6-3/8”
- Shipping Weight: 42 lbs.

Suffix Options:

☐ -LS	Left Side Soap Hole (Z5341 only)
☐ -RS	Right Side Soap Hole (Z5341 only)
☐ -N	Less Front Overflow Hole
☐ -PED	Vitreous china half pedestal (for use with Z5341 & Z5344 Only)

Recommended Trim:

☐ Z8743-PC	Grid Strainer
☐ Z8700 Series	P-Trap
☐ Z8800 Series	Top with Flexible Supplies
☐ Z8946-1-NT	ADA Trap, Stop, and Supply Protectors

Optional Trim:

☐ Z8746-PC	ADA Grid Strainer
☐ Z8946-3-NT	ADA Trap, Stop, and Supply Protectors for Offset Grid Strainer

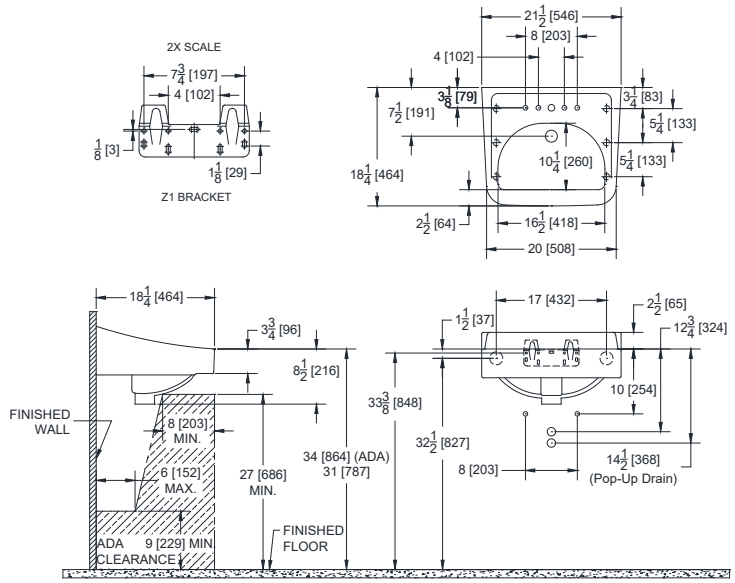
Compliance and Certification:

- ADA Compliant



Configurations:

☐ Z5341	Lavatory with single faucet hole
☐ Z5344	Lavatory with 4” center faucet holes
☐ Z5348	Lavatory with 8” center faucet holes



Rough-in/Overview dimensions for Z5340 Series
Z5341 Lavatory with single hole faucet
Z5344 Lavatory with 4” center faucet holes
Z5348 Lavatory with 8” center faucet holes

See Zurn One Systems for suggested packages.

Architectural/Engineering Approval

Meets the American Disabilities Guidelines and ANSI A117.1 requirements when installed 34”[864mm] from finished floor.
Fixture dimensions meet ASME A112.19.2/CSA B45.1 requirements.
In Canada - Consult local codes and standards.

The information contained in this document is subject to change without notice.
Please contact Zurn for most up to date information.

Rev. D | Date: 05/22/25 | C.N. No. 146916 | Prod./Dwg. No. SS Z5340

Metering Faucets
802-VE2805-665ABCP

CHICAGO FAUCETS
Geberit Group

Product Type

Deck-mounted manual faucet with 4" centers

Features & Specifications

- 4" fixed centers
- Vandal Proof Pressure compensating Econo-Flo™ non-aerating laminar spray, 0.5 GPM
- Vandal Proof 1-3/4" MVP® metering push handle (pair)
- MVP® metering cartridge and actuator
- ECAST® design provides durable cast brass construction with total lead content equal to or less than 0.25% by weighted average
- Complies with the requirements of the Buy American Act of 1933.
- CFNow! Item Ships in 3 Days

Performance Specification

- Rated Operating Pressure: 20-125 PSI
- Rated Operating Temperature: 40-140°F

Warranty

- 5-Year Limited Cartridge Warranty
- Lifetime Limited Faucet Warranty
- 1-Year Limited Finish Warranty

Codes & Standards

- ASME A112.18.1/CSA B125.1
- ADA ANSI/ICC A117.1
- Complies with CALGreen requirements
- NSF/ANSI/CAN 372 Low Lead Content
- NSF/ANSI/CAN 61: Q ≤ 1

Job Name _____

Item Number _____

Section/Tag _____

Model Specified _____

Architect _____

Engineer _____

Contractor _____

[ ] Submitted as Shown [ ] Submitted with Variations

Date _____



ECAST

ECAST products are intended for installation where state laws and local codes mandate lead content levels or in any location where lead content is a concern.

BUY AMERICAN ACT COMPLIANT

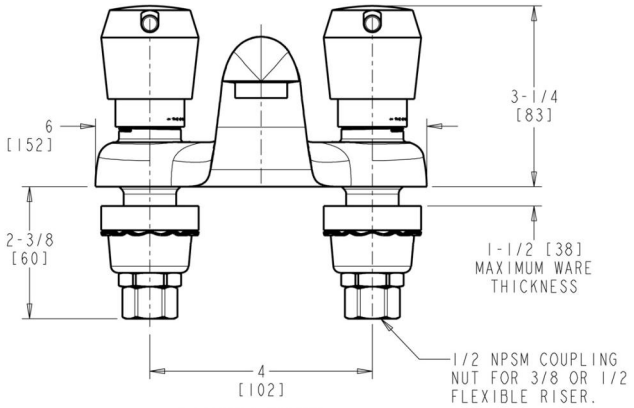
BUILD AMERICA BUY AMERICA BABA

2100 South Clearwater Drive
Des Plaines, IL
P: 847/803-5000
F: 847/803-5454
Technical: 800/TEC-TRUE
www.chicagofaucets.com

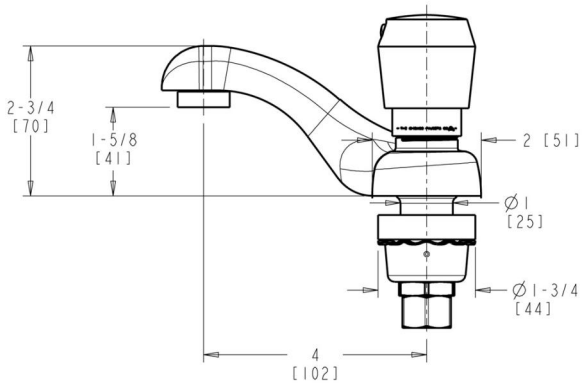
802-VE2805-665ABCP

Architect/Engineer Specification

Chicago Faucets No. 802-VE2805-665ABCP, Sink Faucet for hot and cold water, metering, deck-mounted with 4" fixed centers, chrome plated. Integral, cast brass spout, 4" center-to-center. 0.5 GPM (1.9 L/min) vandal-proof, pressure compensating, Econo-Flo, non-aerating spray. 1-3/4" metal, vandal-proof, push handles with blue and red index buttons. MVP® self-closing, auto-timed metering cartridge, adjustable run time from 2 to 25 seconds, opens with push, 0.20 max gallon/cycle. 1/2" NPSM supply inlets and coupling nut for 3/8" or 1/2" flexible riser. ECAST® construction with less than 0.25% lead content by weighted average. CALGreen compliant. This product meets ADA ANSI/ICC A117.1 requirements and is tested and certified to industry standards: ASME A112.18.1/CSA B125.1, Certified to NSF/ANSI 61, Section 9, California Health and Safety Code 116875 (AB1953-2006), Vermont Bill S.152, NSF/ANSI 372 Low Lead Content, and California Green Building Standards Code (CALGreen).



FRONT VIEW



SIDE VIEW

Operation and Maintenance

Installation should be in accordance with local plumbing codes. Flush all pipes thoroughly before installation. After installation, remove spout outlet or flow control and flush faucet thoroughly to clear any debris. Care should be taken when cleaning the product. Do not use abrasive cleaners, chemicals or solvents as they can result in surface damage. Use mild soap and warm water for cleaning and protecting the life of Chicago Faucet products. For specific operation and maintenance refer to the installation instructions and repair parts documents that are located at www.chicagofaucets.com.

Chicago Faucets, member of the Geberit Group, is the leading brand of commercial faucets and fittings in the United States, offering a complete range of products for schools, laboratories, hospitals, office buildings, food service, airports and sport facilities. Call 1.800.TECTRUE or 1.847.803.5000 Option 1 for installation or other technical assistance.

2100 South Clearwater Drive
Des Plaines, IL
P: 847/803-5000
F: 847/803-5454
Technical: 800/TEC-TRUE
www.chicagofaucets.com

ELKAY®
SPECIFICATIONS

Dayton® Stainless Steel 25" x 22" x 5-3/8" Single Bowl Drop-in Sink

Model(s) GE12522

PRODUCT SPECIFICATIONS

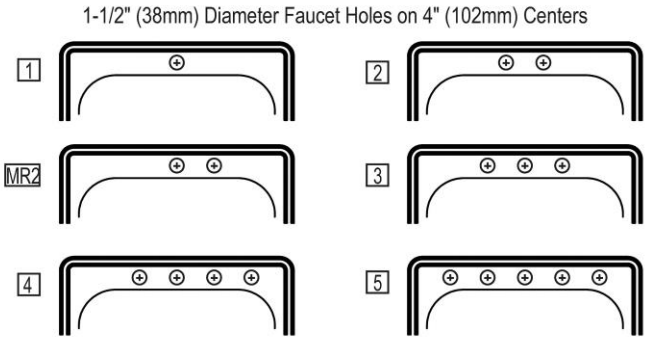
Dayton® Stainless Steel 25" x 22" x 5-3/8" Single Bowl Drop-in Sink. Sink is manufactured from 22 gauge 300 series Stainless Steel with a Satin finish, Rear Center drain placement, and Bottom only pads.

Installation Type:	Drop-in
Material:	300 series Stainless Steel
Finish:	Satin
Gauge:	22
Sound Deadening:	Bottom only pads
Number of Bowls:	1
Sink Dimensions:	25" x 22" x 5-3/8"
Bowl 1 Dimensions:	21" x 15-3/4" x 5-1/4"
Drain Size:	3-1/2" (89mm)
Drain Location:	Rear Center
Minimum Cabinet Size:	30"
Mounting Hardware:	Part # 64090012 included for countertops up to 3/4" (19mm) thick
Template Included:	No
Cutout Template #:	1000001188

Template is available for download at elkay.com. CAD software will be required to open the template.

Cutout Dimensions for Drop-in Installation:
24-3/8" x 21-3/8" (619mm x 543mm) with 1-1/2" (38mm) corner radius

Hole Drilling Configurations:





A Century of Tradition and Quality.
For more than 100 years, Elkay has been making innovative products and providing exceptional customer care. We take pride in offering plumbing products that make life easier, inspire change and leave the world a better place.

Product Compliance: ADA & ICC A117.1
ASME A112.19.3/CSA B45.4

Sinks are listed by IAPMO® as meeting the applicable requirements of the Uniform Plumbing Code®, International Plumbing Code®, and National Plumbing Code of Canada.

Complies with ADA & ICC A117.1 accessibility requirements when installed according to the requirements outlined in these standards.

Clean and Care Manual (PDF)
Installation Instructions (PDF) - 1000005236
Warranty (PDF)

PART:_____QTY: _____
PROJECT:_____
CONTACT:_____
DATE:_____
NOTES:_____
APPROVAL:_____

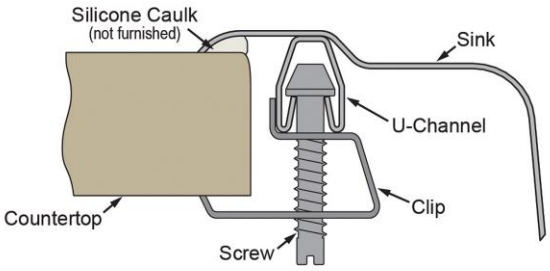
In keeping with our policy of continuing product improvement, Elkay reserves the right to change product specifications without notice. Please visit elkay.com for the most current version of Elkay product specification sheets. This specification describes an Elkay product with design, quality, and functional benefits to the user. When making a comparison of other producers' offerings, be certain these features are not overlooked.

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Dayton® Stainless Steel 25" x 22" x 5-3/8" Single Bowl Drop-in Sink

Model(s) GE12522

Installation Profile:



In keeping with our policy of continuing product improvement, Elkay reserves the right to change product specifications without notice. Please visit elkay.com for the most current version of Elkay product specification sheets. This specification describes an Elkay product with design, quality, and functional benefits to the user. When making a comparison of other producers' offerings, be certain these features are not overlooked.

Manual Sink Faucets
201-AGN2AE35V317AB

CHICAGO FAUCETS
Geberit Group

Product Type

Deck-mounted manual faucet with 8" centers

Features & Specifications

- 8" fixed centers
- 5-1/4" Rigid/swing gooseneck spout
- Vandal Proof Pressure compensating Softflo aerator, 1.5 GPM
- Vandal Proof 4" Wristblade handle (pair)
- Quaturn™ compression operating cartridge, left-hand
- Quaturn™ compression operating cartridge, right-hand
- ECAST® design provides durable cast brass construction with total lead content equal to or less than 0.25% by weighted average

Performance Specification

- Rated Operating Pressure: 20-125 PSI
- Rated Operating Temperature: 40-140°F

Warranty

- 5-Year Limited Cartridge Warranty
- Lifetime Limited Faucet Warranty
- 1-Year Limited Finish Warranty

Codes & Standards

- ASME A112.18.1/CSA B125.1
- ADA ANSI/ICC A117.1
- NSF/ANSI/CAN 61: Q ≤ 1
- Certified to WaterSense by ICC-ES

Job Name _____

Item Number _____

Section/Tag _____

Model Specified _____

Architect _____

Engineer _____

Contractor _____

[ ] Submitted as Shown [ ] Submitted with Variations

Date _____



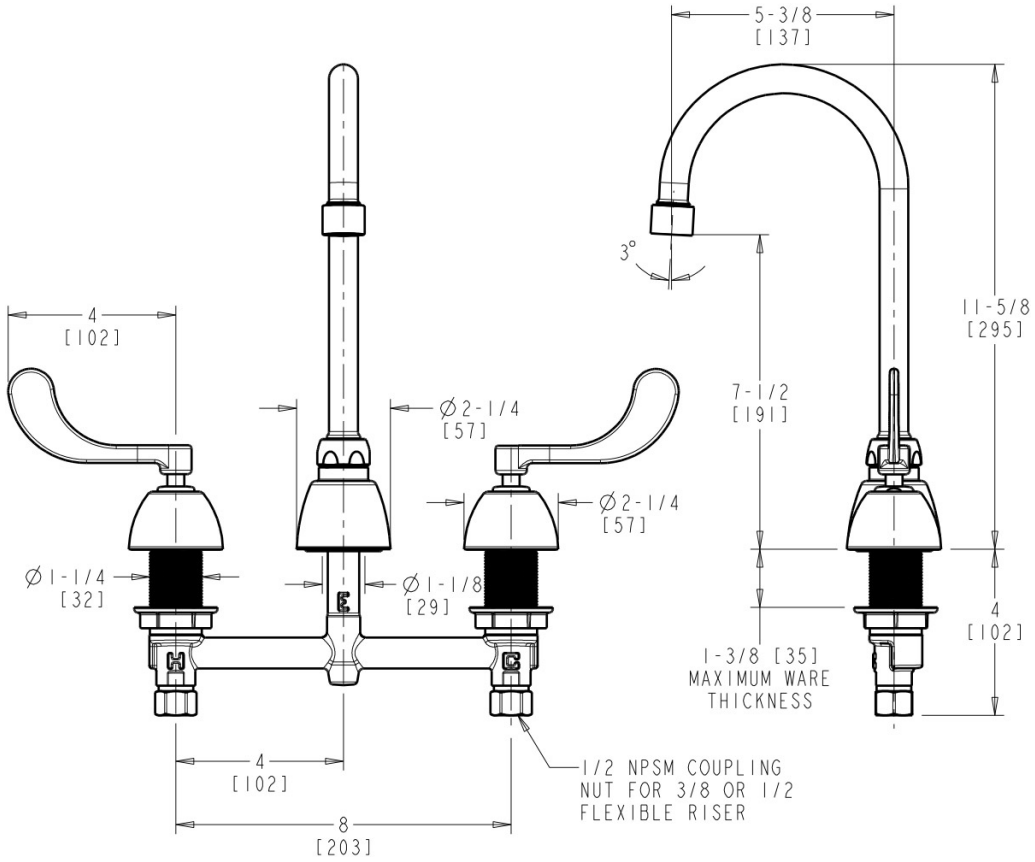
ECAST products are intended for installation where state laws and local codes mandate lead content levels or in any location where lead content is a concern.

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201-AGN2AE35V317AB

Architect/Engineer Specification

Chicago Faucets No. 201-AGN2AE35V317AB, Sink Faucet for hot and cold water, concealed deck-mount with 8" fixed centers, chrome plated. Rigid/swing gooseneck spout, 5-1/4" center-to-center. 1.5 GPM (5.7 L/min) vandal-proof, pressure compensating Softflo aerator. 4" metal, vandal-proof, wristblade handles with sixteen-point, tapered broach and secured blue and red index buttons. Quaturn™ rebuildable compression cartridge, opens and closes 90°, closes with water pressure, features square, tapered stem. 1/2" NPSM supply inlets and coupling nut for 3/8" or 1/2" flexible riser. ECAST® construction with less than 0.25% lead content by weighted average. This product meets ADA ANSI/ICC A117.1 requirements and is tested and certified to industry standards: ASME A112.18.1/CSA B125.1, and Certified to NSF/ANSI 61, Section 9. NOTE: This item discontinued as of June 1, 2022 and replaced by model 786-E35VPCABCP.



Operation and Maintenance

Installation should be in accordance with local plumbing codes. Flush all pipes thoroughly before installation. After installation, remove spout outlet or flow control and flush faucet thoroughly to clear any debris. Care should be taken when cleaning the product. Do not use abrasive cleaners, chemicals or solvents as they can result in surface damage. Use mild soap and warm water for cleaning and protecting the life of Chicago Faucet products. For specific operation and maintenance refer to the installation instructions and repair parts documents that are located at www.chicagofaucets.com.

Chicago Faucets, member of the Geberit Group, is the leading brand of commercial faucets and fittings in the United States, offering a complete range of products for schools, laboratories, hospitals, office buildings, food service, airports and sport facilities. Call 1.800.TECTRUE or 1.847.803.5000 Option 1 for installation or other technical assistance.

2100 South Clearwater Drive
Des Plaines, IL
P: 847/803-5000
F: 847/803-5454
Technical: 800/TEC-TRUE
www.chicagofaucets.com

Washdown & Sill Fittings
293-E27CP

CHICAGO FAUCETS
Geberit Group

Product Type

Inside sill fitting

Features & Specifications

- Full-flow hose thread outlet with inline vacuum breaker
- Vandal Proof 2-1/4" Tee handle
- Slow compression operating cartridge, left-hand
- Atmospheric vacuum breaker, not intended for continuous pressure applications
- Complies with the requirements of the Buy American Act of 1933.
- CFNow! Item Ships in 3 Days

Performance Specification

- Rated Operating Pressure: 20-125 PSI
- Rated Operating Temperature: 40-140°F

Warranty

- 5-Year Limited Cartridge Warranty
- Lifetime Limited Faucet Warranty
- 1-Year Limited Finish Warranty

Codes & Standards

- ES ASME A112.18.1/CSA B125.1

Job Name _____

Item Number _____

Section/Tag _____

Model Specified _____

Architect _____

Engineer _____

Contractor _____

[ ] Submitted as Shown [ ] Submitted with Variations

Date _____



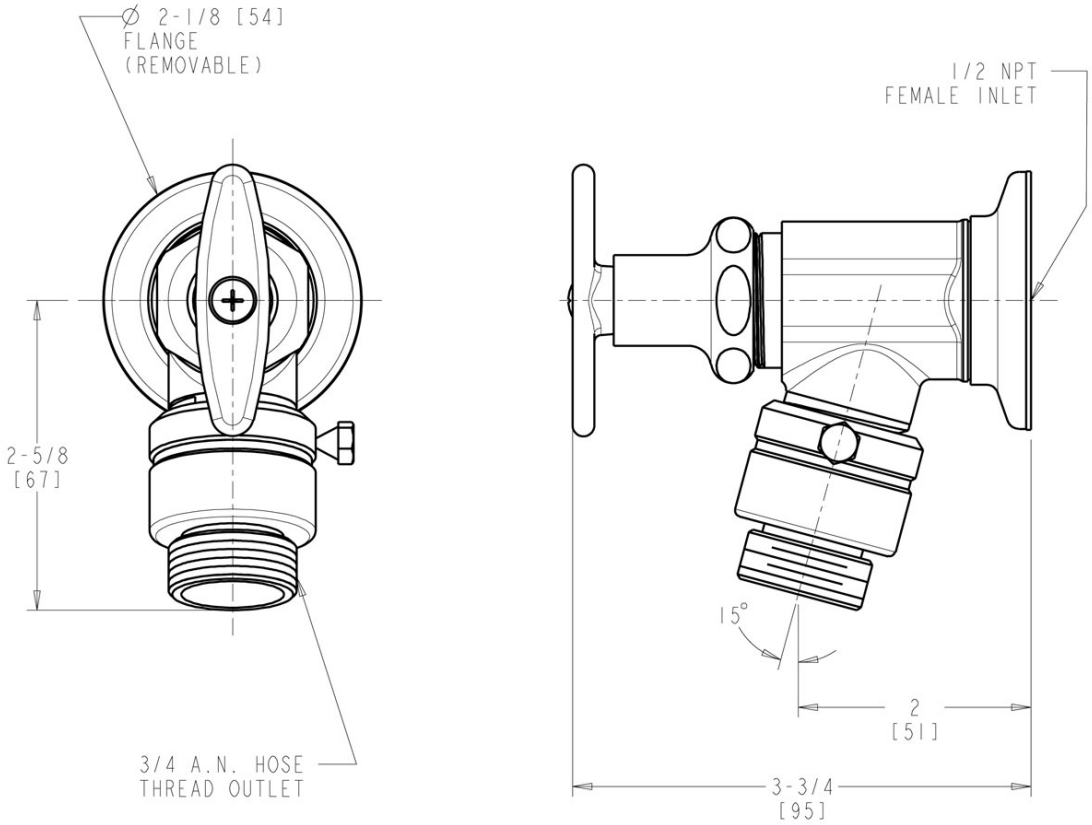
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293-E27CP

Architect/Engineer Specification

Chicago Faucets No. 293-E27CP, Inside Sill Fitting, wall-mounted, chrome plated. Full-flow, in-line vacuum breaker with hose thread outlet. 2-1/4" metal tee handle with square, tapered broach. Slow compression rebuildable cartridge, opens and closes 360° for fine adjustment, closes with water pressure, features square, tapered stem. 1/2" NPT female thread inlet. Slip wall flange. Hose connection vacuum breakers specially made to permit the attachment of portable hoses to hose thread faucets. Designed to prevent the flow of contaminated water back into the potable water supply, these devices require no plumbing changes, and screw directly onto a sill cock. NOTE: Atmospheric vacuum breaker is NOT intended for continuous pressure applications.



Operation and Maintenance

Installation should be in accordance with local plumbing codes. Flush all pipes thoroughly before installation. After installation, remove spout outlet or flow control and flush faucet thoroughly to clear any debris. Care should be taken when cleaning the product. Do not use abrasive cleaners, chemicals or solvents as they can result in surface damage. Use mild soap and warm water for cleaning and protecting the life of Chicago Faucet products. For specific operation and maintenance refer to the installation instructions and repair parts documents that are located at www.chicagofaucets.com.

Chicago Faucets, member of the Geberit Group, is the leading brand of commercial faucets and fittings in the United States, offering a complete range of products for schools, laboratories, hospitals, office buildings, food service, airports and sport facilities. Call 1.800.TECTRUE or 1.847.803.5000 Option 1 for installation or other technical assistance.

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Des Plaines, IL
P: 847/803-5000
F: 847/803-5454
Technical: 800/TEC-TRUE
www.chicagofaucets.com

Engineering Specification

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

FD-830
Hopper Drain

Specification

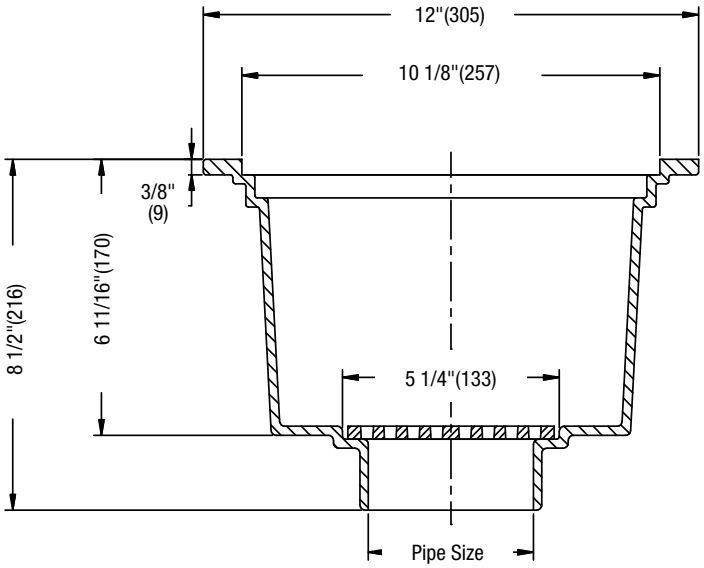
Watts FD-830 epoxy coated cast iron hopper drain with 12" x 12" square open top, flat bottom strainer and no hub outlet.



Call customer service if you need assistance with technical details.

Pipe Sizing		
Suffix	**Description**	
2	2"(51) Pipe Size	☐
3	3"(76) Pipe Size	☐
4	4"(102) Pipe Size	☐

Options		
Suffix	**Description**	
-1	Nickel Bronze Top Grate	☐
-5	Sediment Bucket	☐
-7	Trap Primer Tapping	☐
-150	1/2 Grate (NB Only)	☐
-175	3/4 Grate (NB Only)	☐
-TG	Top Grate - Ductile Iron	☐



NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.

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Commercial Electric Water Heaters

DURA-POWER™

Designed for use as a recovery heater having its own storage tank. Available in upright standard models (DEN) and lowboy models (DEL).

GLASSLINED TANK

- Thirteen sizes; 6 thru 119 gallon capacity. Tank interior is coated with glass specially designed by A. O. Smith for water heater use.

ELEMENTS

- Zinc plated copper sheaths for longer life. Medium watt density means lower surface temperature to minimize scale build-up and more surface to heat water. Element sizes from 1.5 to 6.1 KW. Maximum input KW (see chart).

STANDARD VOLTAGES

- 120, 277 single phase and 208, 240 and 480V unbalanced three-phase delta; easily converted to single-phase at terminal block with limited exceptions. Single element heaters, single-phase only.

TERMINAL BLOCK

- Factory-installed. Just bring the service to heater and connect to block. Terminal block not supplied on 120V & 277 volt models. (No junction box on DEL6-20)

CONTROLS

- Temperature control (adjustable through a range of 110° to 170°F on single element and 120° to 181°F on dual element) and manual reset high temperature cutoff per element

CSA CERTIFIED AND ASME RATED T&P RELIEF VALVE

SIMPLIFIED CIRCUITRY, COLOR CODED FOR EASE OF SERVICE

ANODE ROD FOR MAXIMUM CORROSION PROTECTION

CABINET HAS BONDERIZED UNDERCOAT WITH BAKED ENAMEL FINISH

TOP INLET AND OUTLET OPENINGS

DRAIN VALVE (EXCLUDES DEL 6-20)

UL APPROVED FIELD CONVERSION PROGRAM

COMPLIANCE

- Meets the standby loss Requirements of the U.S. Department of Energy and current edition of ASHRAE/IES 90.1

LIMITED WARRANTY OUTLINE

- If the tank should leak any time during the first three years, under the terms of the warranty, A. O. Smith will furnish a replacement heater; installation, labor, handling and local delivery extra. THIS OUTLINE IS NOT A WARRANTY. For complete information consult the written warranty or A. O. Smith Water Products Company.



DEN-40

DEL-30

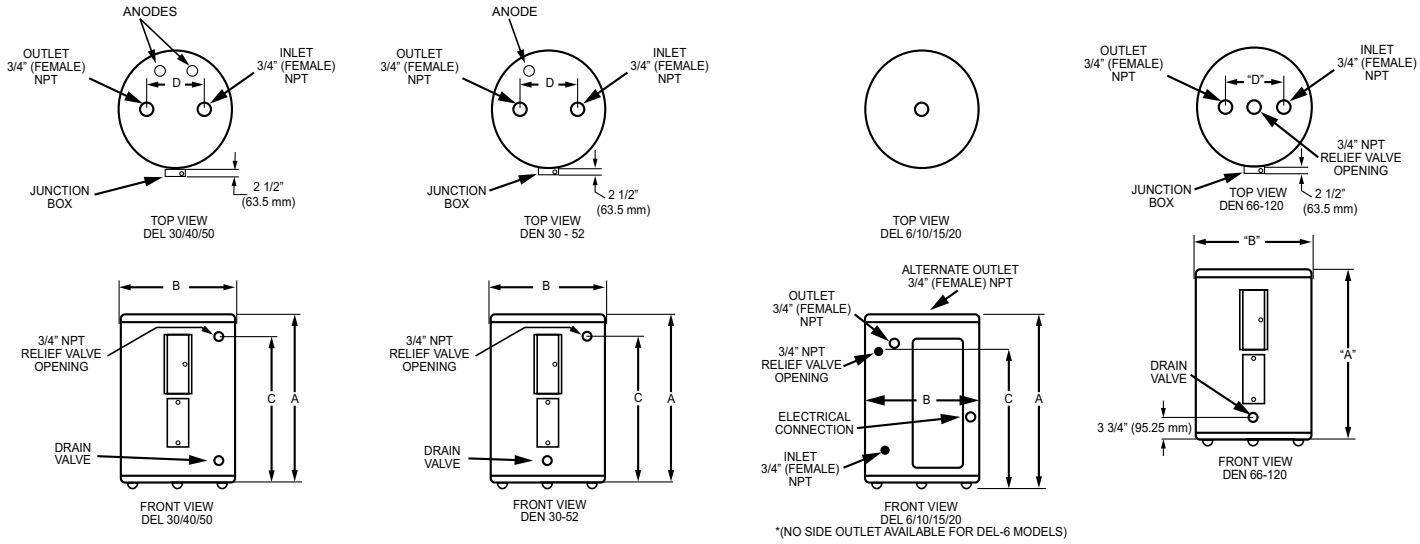
Low Lead Content

AHRI CERTIFIED® www.ahridirectory.org

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www.hotwater.com | 800-527-1953 Toll-Free USA | A. O. Smith Corporation | 500 Tennessee Waltz Parkway | Ashland City, TN 37015

Commercial Electric Water Heaters



ROUGH-IN DIMENSIONS

Models	UEF	No. of Elements	Nominal Capacity	Rated Storage Volume	A		B		C		D		Shipping Weight	
					Inches	mm	Inches	mm	Inches	mm	Inches	mm	lbs.	Kg.
DEL-6	N/A	1	6	6	15-1/2	394	14-1/4	362	11	279	N/A	N/A	35	15.9
DEL-10	N/A	1	10	10	18-1/4	464	18	457	12-1/2	318	N/A	N/A	54	24.5
DEL-15	N/A	1	15	15	26	660	18	457	20-1/2	521	N/A	N/A	58	26.3
DEL-20	N/A	1	20	19	22-1/4	565	21-3/4	552	15-3/8	391	N/A	N/A	73	33.1
DEL-30	0.92	2	36	33	32	813	24	610	24	610	8	203	118	53.5
DEL-40**	0.92	2	38	35	32	813	23	584	24	610	8	203	118	53.5
DEL-50	0.92	2	51	48	36	914	26-1/2	673	25	635	8	203	172	78
DEN-30	0.92	2	40	37	49-3/4	1264	20-1/2	521	53-1/4	1353	8	203	118	53.5
DEN-40	0.92	2	50	46	59	1499	20-1/2	521	51-1/4	1302	8	203	125	56.7
DEN-52	0.92	2	55	55	56-1/2	1435	24	610	48-1/2	1232	8	203	145	65.8
DEN-66	N/A	2	66	60	60-3/4	1543	21-3/4	552	N/A	N/A	8	203	176	79.8
DEN-80	N/A	2	80	76	59-3/8	1508	24	610	N/A	N/A	8	203	211	95.7
DEN-120	N/A	2	120	108	62-7/16	1586	29-3/8	746	N/A	N/A	8	203	326	147.9

U.S Gallons/HR and Litres/HR at Temperature Rise Indicated													
Element Wattage (Upper/Lower)	Input KW	F°	36 F°	40 F°	54 F°	60 F°	72 F°	80 F°	90 F°	100 F°	108 F°	120 F°	126 F°
		C°	20 C°	22.2 C°	30 C°	33.3 C°	40 C°	44.4 C°	50 C°	55.5 C°	60 C°	66.6 C°	70 C°
6100/6100**	12.2	GPH	138	124	92	82	69	62	55	49	46	41	39
		LPH	522	469	348	310	261	235	208	184	174	153	146

*No side outlet available on DEL-6 Model

**Blanket model

Note: All 66, 80, 120 models can only be ordered 277V, 240V, or 480V

ELEMENT AVAILABILITY CHART (LIGHT-DUTY COMMERCIAL ELECTRIC)

Models & Elements	Voltage	Wiring	kW Input Available									
6-Gallon Models Single-Element	120V	-	1.5	2	2.5	3						
	208V	-	1.5	2	2.5	3						
	240V	-	1.5	2	2.5	3						
	277V	-	1.5	2	2.5	3						
	480V	-		2	2.5	3						
10-Gallon through 20-Gallon Models Single-Element	120V	-	1.5	2	2.5	3						
	208V	-	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
	240V	-	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
	277V	-	1.5	2	2.5	3		4	4.5	5		6
	480V	-		2	2.5	3		4	4.5	5	5.5	6

6 gallon model not available above 3kW
6/10/15/20 gallon models all A6 circuit (2 wire) only

Model	Element Wattage					
		120V	208V	240V	277V	480V
DEL-30	Min Watts	N/A	4500	4500	4500	4500
	Max Watts	N/A	6000 (*)	6000 (*)	6000	6000
DEL-40	Min Watts	N/A	4500	4500	4500	4500
	Max Watts	N/A	6000 (*)	6000 (*)	6000	6000
DEL-50	Min Watts	N/A	4000	4000	4000	4000
	Max Watts	N/A	6000 (*)	6000 (*)	6000	6000
DEN-30	Min Watts	N/A	4500	4500	4500	4500
	Max Watts	N/A	6000 (*)	6000 (*)	6000	6000
DEN-40	Min Watts	3000 (*)	3000	3000	3000	3000
	Max Watts	3000 (*)	6000 (*)	6000 (*)	6000	6000
DEN-52	Min Watts	2500	2500	2500	2500	2500
	Max Watts	3000 (*)	6000 (*)	6000 (*)	6000	6000

Additional limitations apply to 120V, 208V, and 240V - Simultaneous Operation are not available (*) for these voltages.
3 phase only on 240 6000 watt for simultaneous operation

Commercial Electric Water Heaters

RECOVERY CAPACITIES

Element Wattage (Upper/ Lower)	Input	U. S. Gallons/Hr and Litres/Hr at Temperature Rise Indicated											
		F°	36	40	54	60	72	80	90	100	108	120	126
	kW	C°	20	22.2	30	33.3	40	44.4	50	55.5	60	66.6	70
Non-Simulataneous Operation													
/1500	1.5	GPH	17	15	11	10	8	8	7	6	6	5	5
		LPH	64	58	43	38	32	29	26	23	21	19	18
/2000	2	GPH	23	20	15	14	11	10	9	8	8	7	6
		LPH	85	77	57	51	43	38	34	31	28	26	24
/2500	2.5	GPH	28	25	19	17	14	13	11	10	9	8	8
		LPH	107	96	71	64	53	48	43	38	36	32	30
3000/3000	3	GPH	34	30	23	20	17	15	14	12	11	10	10
		LPH	128	115	85	77	64	58	51	46	43	38	37
4000/4000	4	GPH	45	41	30	27	23	20	18	16	15	14	13
		LPH	170	153	114	102	85	77	68	61	57	51	49
4500/4500	4.5	GPH	51	46	34	30	25	23	20	18	17	15	14
		LPH	192	173	128	115	96	86	77	69	64	58	55
5000/5000	5	GPH	56	51	38	34	28	25	23	20	19	17	16
		LPH	213	192	142	128	107	96	85	77	71	64	61
6000/6000	6	GPH	68	61	45	41	34	30	27	24	23	20	19
		LPH	256	230	170	153	128	115	102	92	85	77	73
Simulataneous Operation													
3000/3000	6	GPH	68	61	45	41	34	30	27	24	23	20	19
		LPH	256	230	170	153	128	115	102	92	85	77	73
4000/4000	8	GPH	90	81	60	54	45	41	36	32	30	27	26
		LPH	341	307	227	205	170	153	136	123	114	102	97
4500/4500	9	GPH	101	91	68	61	51	46	41	36	34	30	29
		LPH	384	345	256	230	192	173	153	138	128	115	110
5000/5000	10	GPH	113	101	75	68	56	51	45	41	38	34	32
		LPH	426	384	284	256	213	192	170	153	142	128	122
6000/6000	12	GPH	135	122	90	81	68	61	54	49	45	41	39
		LPH	511	460	341	307	256	230	205	184	170	153	146

Recovery capacities at 100° F rise equal: for non-simultaneous element operation = 4.1 gal. x kW of one element; for simultaneous element operation = 4.1 gal. x 2/3 kW of both elements.
For other rises multiply element kW as previously explained by 410 and divide by temperature rise. Full load current for single phase = total watts/voltage.

SPECIFICATION

The water heaters(s) shall be Dura-Power™ Model(s) No. _____ as manufactured by A. O. Smith or an approved equal. Heater(s) shall be rated at _____kW, _____volts, _____-phase, 60 cycle AC, and listed by Underwriters' Laboratories. Models shall meet the standby loss requirements of the U.S. Department of energy and current edition of ASHRAE/IES 90.1. Tank(s) shall be _____gallon capacity. Heater(s) shall have 150 psi working pressure and be equipped with extruded high density anode rod. All internal surfaces of the heater(s) exposed to water shall be glasslined with an alkaline borosilicate composition that has been fused-to-steel by firing at a temperature range of 1400°F to 1600°F. Electric heating elements shall be medium watt density with zinc plated copper sheath. Each element shall be controlled by an individually mounted thermostat and high temperature cutoff switch. The outer jacket shall be of backed enamel finish and shall enclose the tank with foam insulation. Electrical junction box with heavy duty terminal block shall be provided (except on 120V & 277V {no junction box on DEL-6 thru 20}). The drain valve shall be located in the front for ease of servicing. Heater tank shall have a three year limited warranty as outlined in the written warranty. Fully illustrated instruction manual to be included.

For technical information, call 800-527-1953. A. O. Smith Corporation reserves the right to make product changes or improvements without prior notice.

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Since 1966
CHRONOMITE
Electric Tankless Water Heaters

ELECTRIC TANKLESS WATER HEATER - POINT OF USE

Invizible™ Water Heater

IDEAL APPLICATIONS: Public Lavatory



Z-C1616 Shown

Invizible™ PRODUCT FEATURES

- *Invizible™ wall sleeve conceals your Chronomite Heater inside the wall*
- *Chassis is ideally suited for new installations or for remodeling in masonry, tile, wood or other wall surfaces*
- *Series starts with 3-1/4" Depth Chassis allowing for standard wall depth installations*
- *6 entry points to route electrical and water connections in any direction as needed per installation*
- *4 bottom entry points constructed with knockouts for bulkhead and or sealed installation*
- *Slots in Chassis allow for different wall thicknesses and allow easy adjustment to align Wall Frame*
- *1/4" mounting holes (Quantity 12 in chassis)*
- *Door/Frame (16 gage) and Chassis (20 gage) are fabricated from galvannealed steel with a prime coat white finish*
- *Concealed Pivoting Rod Hinge prevents distortion and closes door squarely*
- *Pem Studs #8-32 are provided on chassis for easy mounting of CMI series heater*
- *Models with Electrical Disconnect are pre-wired for ease of installation*
- *Latch is screwdriver operated (Standard Models)*
- *Door Frame is one piece construction, 1" wide and provides perfect concealment of the rough wall opening*
- *Door has rounded safety corners*
- *Patent Pending*

GUIDE SPECIFICATION

Wall Sleeve shall be a Chronomite Laboratories Model

Z - _____ _____ OPTIONS

Unit shall be fabricated from galvannealed steel with a white prime coat finish suitable for painting. Access door shall have rounded safety corners and concealed pivoting rod hinge. Door/Frame 16 gage and wall sleeve 20 gage thickness. Latch shall be screwdriver operated. Wall Sleeve to have 10 entry points including 4 knockouts for bulkhead and or sealed installation.

OPTIONS

- ❍ -AKL Allen Key Latch
- ❍ -CL Cylinder Lock (one per door)
- ❍ -SS Stainless Steel Construction (Type 304 No. 4 Satin Finish)
- ❍ -SRK Semi Recess Kit

MODEL NUMBERS	NOMINAL SIZE	WALL OPENING	ELECTRICAL DISCONNECT
Z-C1616	16" x 16"	16-1/2" X 16-1/2" x 3-1/4"	NO
Z-C1616D	16" x 16"	16-1/2" X 16-1/2" x 5-1/4"	YES / PRE-WIRED

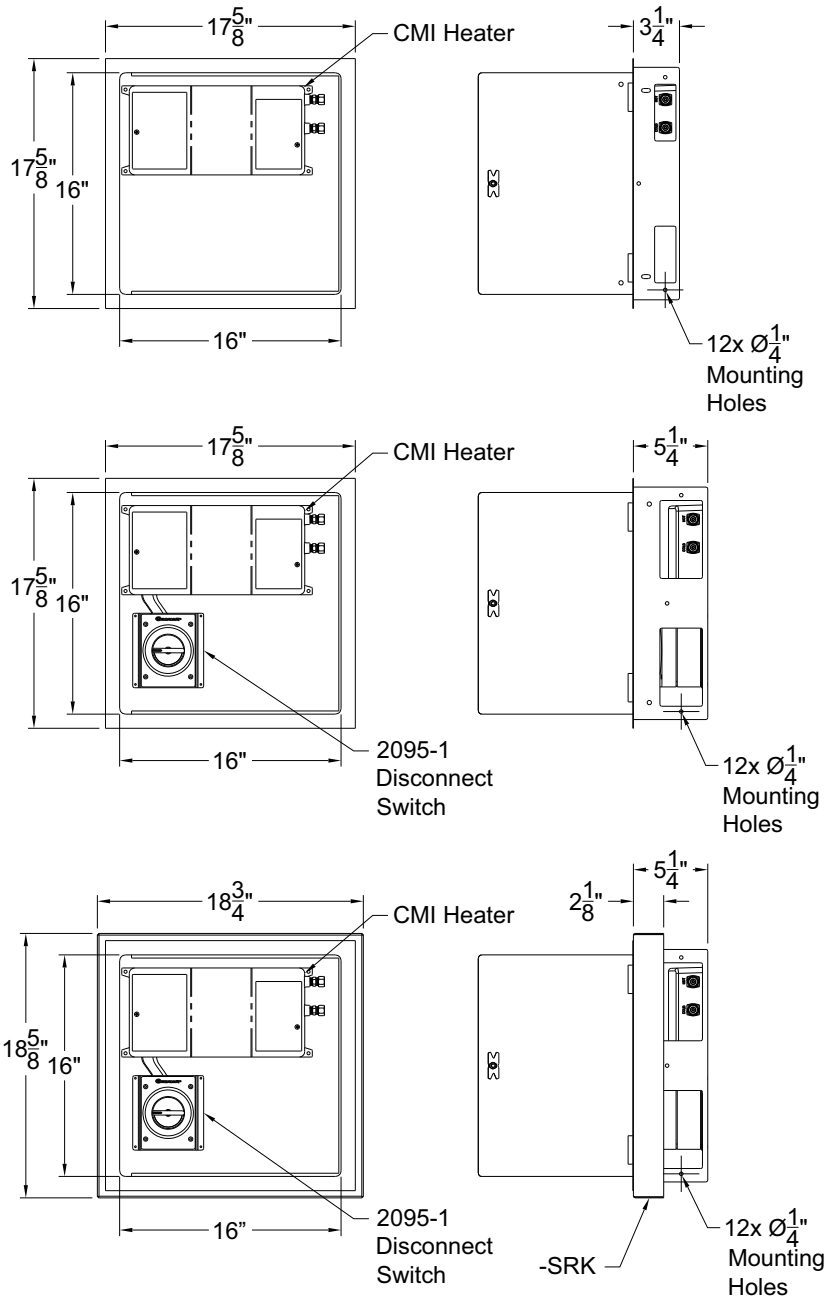
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⚠ WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

Invizible™ Water Heater



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Since 1966
CHRONOMITE
Electric Tankless Water Heaters

ELECTRIC TANKLESS WATER HEATER - POINT OF USE

Invizible™ Water Heater

CMI Series Heater

GUIDE SPECIFICATION

Tankless Water Heater shall be a Chronomite Laboratories Model

CMI - _____L / _____
AMPS VOLTS

_____
OPTIONS

with _____ Amps and _____ Volts

to heat to a preset temperature of

❍ 104°F (40°C) ❍ 110°F (43°C)
(Meets ADA)

Unit shall be provided with Celcon waterways, and Nichrome heating coils. Temperature controlled by microprocessor and integrated thermostatic mixing valve meeting ASSE 1069, CSA B125.3-12 and ASSE 1070 compliancy.

OPTIONS

❍ ½" Male NPT (NPT08)
❍ Disconnect Switch, Rotary 40A - Lockable Nema 4X (2095-1)

For the model being selected, please place the corresponding amps and volts values in the Guide Specifications to the right.

MODEL	AMPS	VOLTS	90°C WIRE	WATTS	ACTIVATION GPM	°F TEMPERATURE RISE @ 0.35 GPM	0.50 GPM	1.00 GPM	1.50 GPM	2.00 GPM
CMI-12L/120	12	120	14 AWG	1440	0.20	28	20	---	---	---
CMI-12L/208	12	208	14 AWG	2500	0.20	49	34	---	---	---
CMI-12L/240	12	240	14 AWG	2880	0.20	56	39	20	---	---
CMI-12L/277	12	277	14 AWG	3320	0.20	65	45	23	---	---
CMI-15L/120	15	120	14 AWG	1800	0.20	35	25	---	---	---
CMI-15L/208	15	208	14 AWG	3120	0.20	61	43	21	---	---
CMI-15L/240	15	240	14 AWG	3600	0.20	70	49	25	---	---
CMI-15L/277	15	277	14 AWG	4150	0.20	70+	57	28	---	---
CMI-20L/120	20	120	12 AWG	2400	0.20	47	33	---	---	---
CMI-20L/208	20	208	12 AWG	4160	0.20	70+	57	28	---	---
CMI-20L/240	20	240	12 AWG	4800	0.20	70+	66	33	22	---
CMI-20L/277	20	277	12 AWG	5540	0.20	70+	70+	38	25	---
CMI-30L/120	30	120	10 AWG	3600	0.20	70	49	25	16	---
CMI-30L/208	30	208	10 AWG	6240	0.20	70+	70+	43	28	21
CMI-30L/240	30	240	10 AWG	7200	0.20	70+	70+	49	33	25
CMI-30L/277	30	277	10 AWG	8310	0.20	70+	70+	57	38	28
CMI-40L/208	40	208	8 AWG	8320	0.20	70+	70+	57	38	28
CMI-40L/240	40	240	8 AWG	9600	0.20	70+	70+	66	44	33
CMI-40L/277	40	277	8 AWG	11080	0.20	70+	70+	70+	50	38

Note 1: Maximum temperature rise may be governed by preset outlet temperature.
Note 2: Local plumbing and electrical codes must be followed for installation of water heater and the accessories.

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*Member of Morris Group International, City of Industry, CA Please visit **www.chronomite.com** for most current specifications.*

SELECTION SUMMARY & APPROVAL FOR MANUFACTURING

Company_____

Model Number & Options_____Quantity_____

Contact_____Title_____

Signature (Approval for Manufacturing)_____Date _____

CHRONOMITE
LABORATORIES, INC.
PH. 800-447-4962
626-937-4270
FAX 626-937-4279
www.chronomite.com

SECTION 23 0000
HEATING, VENTILATING, AIR CONDITIONING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. The requirements of the General Conditions, Supplemental General Conditions, Division 01 Sections and Section 23 0500 - General Mechanical apply to all work herein.

1.2 DESCRIPTION

A. This Specification establishes the required standards for all labor, materials, equipment and workmanship in connection with the furnishing, fabrication and installation of complete “Heating, Ventilating, Air Conditioning” systems.

B. The HVAC Contractor shall furnish all materials and labor under the scope of the Contract, unless otherwise noted. Anything accepted as standard trade practice reasonably incidental to the completion of the system shall be furnished without additional cost to the Owner. The Contractor shall understand that the work herein described shall be complete in every detail, notwithstanding every item necessarily involved is not particularly mentioned, and the Contractor shall be held to provide all labor and material necessary for the entire completion of the work intended to be described.

1. Heating, ventilating, air conditioning work includes but is not necessarily limited to the following:
2. Variable Refrigerant Volume split system heat pumps;
3. Ceiling mounted and duct mounted exhaust fans;
4. Air terminals;
5. Thermal and sound insulation for all piping and ductwork supplied under this Section;
6. Refrigerant piping and appurtenances;
7. Ductwork, inclusive of all air turns, dampers, grilles, diffusers, fire dampers, sound traps, supports, bracing and fresh air/combustion air ducts;
8. Flashings, curbs and caps in connection with all equipment, piping and ductwork supplied under this Section;
9. Temperature control wiring and control devices;
10. Start up, adjusting, and balancing.

1.3 RELATED WORK

A. Sheet metal flashing and trim: Division 07.

B. Domestic water piping: Section 22 0000 - Plumbing.

C. Line voltage wiring, disconnect switches, conduit for temperature control wiring, and final connection of electrical equipment: Division 26.

D. Finish painting: Division 09.

E. Condensate drainage piping to points adjacent to equipment: Section 22 0000 - Plumbing.

F. HVAC Controls: Section 23 0923 - Direct Digital Controls for HVAC.

G. Air Balancing: Section 23 0593, Testing, Adjusting and Balancing of HVAC

1.4 QUALITY ASSURANCE

A. Regulatory compliance: All work performed under this Section shall comply with the latest currently adopted editions of all codes and regulations and all requirements of all Authorities having Jurisdiction.

B. All work shall be done in conformity with all applicable local and state safety codes, ordinances and regulations. Additionally, all work shall conform to the latest editions of the following codes and standards:

1. California Mechanical Code
2. California Plumbing Code
3. California Building Code
4. California Fire Code
5. California Green Building Code
6. California Electric Code
7. California Code of Regulations, including Titles 8, 17, 19, 20, 21, 22 and 24
8. Comply with all ADA and California Title 24 requirements for disabled access.
9. NSF/ANSI 61 Standard, Drinking Water System Components - Health Effects for fixture materials that will be in contact with potable water.
10. AB 1953, Amendments to Section 116875 of the Health and Safety Code relating to lead plumbing.

C. Minimum requirements: The requirements of these are the minimum that will be allowed unless such requirements are exceeded by applicable codes or regulations, in which the regulatory codes or regulation requirements shall govern.

D. When the Contract Documents call for materials or construction of a higher standard than is required by the above, the Contract Document requirements shall take precedence over the requirements of the said laws, rules, and/or regulations, accepting that nothing in the Contract Documents shall be interpreted as permitting work in violation of said laws, rules, and/or regulations. The Contractor for this work shall furnish any additional materials and/or labor as may be required for compliance with these laws, rules, and/or regulations though such materials and/or labor are not specifically set forth in the Contract Documents, with no additional charges to Owner.

E. Seismic construction and restraints shall be in accordance with the requirements of the California Building Code and Title 17 and Title 24 of the California Code of Regulations. All equipment mounts, isolators, and hanging systems must meet DSA approval requirements.

F. Comply with the Safety Orders issued by Cal-OSHA and any other regulations of the State of California and any districts having jurisdictional authority.

G. ASHRAE Compliance

1. Comply with applicable requirements in ASHRAE 62.1 and ASHRAE 90.1

1.5 SUBMITTALS

A. All submittals shall be in accordance with the requirements of Section 01 3300 and the following.

B. General

1. Before any fixtures, materials, or equipment are purchased, the Contractor shall submit to the Architect for approval, a complete list of materials, fixtures, and equipment, giving the manufacturers' names, capacity, size, power requirements, and other pertinent data. Submittal lists and drawings shall be specifically applicable to this project and shall include identifying marks assigned by Specifications and Drawings and shall not contain extraneous material or optional choices.
2. Submittal of substitutions shall be limited to one (1) proposal for each type or kind of item, unless otherwise permitted by the Architect. If the first proposed product submittal is rejected, the Contractor shall then submit the first named or scheduled product.
3. Contractor shall make all necessary field measurements and investigations to assure that the equipment and assemblies will meet contract requirements. Review of drawings and other material submitted shall not be construed as a complete check or constitute a waiver of the requirements of the Drawings and Specifications but will indicate that the material submitted is acceptable in quality and utility. This review shall not relieve the Contractor of the responsibility to fit the proposed materials to the spaces provided, and to effect necessary rearrangement or construction of other work.

C. Product Data

1. For each type of product indicated, include manufacturer’s specifications, data sheets, and certified drawings on major equipment. Include physical and performance data such as weights, sizes, capacities, required clearances, performance curves, acoustical characteristics, finishes, color selection, and accessories.
2. Include certified drawings on major equipment.

D. Coordination/Layout Shop Drawings

1. The Contractor shall submit for the approval of the Architect, shop drawings of proposed material and equipment that differ from the specified materials and equipment, and of any specified materials and equipment with special conditions and/or arrangements. These drawings shall show necessary modifications to plumbing, electrical, and mechanical work required by the proposed materials and equipment.
2. Prepare complete consolidated and coordinated layout drawings for all new systems, and for existing systems that are in the same areas. Shop drawings shall be prepared using AutoCAD 2016 or newer and shall be drawn at a minimum ¼” = 1’ - 0” scale.
3. All drawings shall be fully coordinated with HVAC, Plumbing, Fire Protection, Electrical, Structural, and Architectural work. Drawings shall be coordinated and dimensioned indicating equipment, pipe, duct, fire protection, and electrical in relation to architectural and structural features. Indicate exact locations of valves, piping specialties, access doors, etc.
4. Clearly identify and dimension the proposed locations of the principal items of equipment and adequate clearance for all equipment, piping, pumps, valves and other items. Provide detailed layout of all piping systems showing the proposed routes.
5. Show the access means for all items requiring access for operations and maintenance.

6. Submit shop drawings to Architect for approval, prior to fabrication or installation of any work. Do not install equipment or piping until layout drawings have been approved. Any work installed without prior shop drawing approval shall be removed at the Contractor's expense.
7. Shop-wiring diagrams of temperature controls and air conditioning unit controls as specified in controls section and/or shown on Drawings.

E. Field quality-control test reports.

F. Operation and maintenance data

1. Contractor shall provide all operating and maintenance instructions provided by the manufacturer, describing proper operation and maintenance of any equipment and devices installed. Operating and maintenance instructions shall cover maintenance, adjustment, and operation of each piece of apparatus.
2. Contractor shall also provide a parts list of all equipment and component parts for all equipment under this Section. The equipment list shall include manufacturer's name, model number, and local representative, service facilities and normal channel of supply for each item.
3. Data shall include a table of contents identifying items therein, and index tabs for each system. Neatly obscure or cross out inapplicable data from manufacturer's literature. Include the following:
    a. Manufacturer's brochures, ratings, certified shop drawings, lubrication charts and data, and parts list with part numbers. Mark each sheet with equipment identification number and actual installed condition or system and location of installation. Specifically identify which options are provided.
    b. Description of start-up and operating procedures for each system, including controls diagrams and description of operating sequences.
    c. Recommend preventative maintenance schedule and procedures.
    d. Submit data to the Architect for approval. Final acceptance of the work will not be made until a satisfactory submission of this material is received and approved by the Architect.

G. As-built Drawings

1. Complete and detailed shop drawings shall be maintained throughout the coordination and construction phase, indicating all equipment and trades' work clearly. All equipment including piping, etc. shall clearly identify both top and bottom elevations as well as distances from equipment to established building lines. Coordinate with other trades and field conditions and show dimensions and details including building construction and access for servicing. All changes in the work shall be recorded on this set on a daily basis. In addition to changes made during course of work, show the following:
    a. Exact location, type and function of concealed valves and controllers.
    b. Exact size, elevations and location of underground and under floor piping.
2. Submit to Architect for approval.

H. Warranty

1. Equipment warranties shall be provided for all equipment, with all necessary information filled in, except purchase date, in favor of the Owner.

I. Refer to mechanical equipment specified herein for additional requirements

1.6 DEMONSTRATION & TRAINING

A. The Owner's authorized representative shall be instructed in the operation and servicing of all heating, ventilating, and air conditioning systems, subsystems and equipment.

B. Provide a minimum of one day of instruction time. All instruction shall be provided at no cost to the Owner.

C. Final acceptance of the work will not be made until a satisfactory submission of this material is received and approved by the Engineer.

PART 2 PRODUCTS

2.1 GENERAL

A. Only specified materials shall be utilized in the work of this Section unless substitutions have been approved by the Architect and in accordance with Division 01 Sections for Substitutions and Product Options.

B. Provide fan drives rated at 150% of motor horsepower. Drives shall be adjustable sheave type unless specified otherwise. Listed fan speeds are only approximate; select and/or change drives to operate at approximately midpoint of adjustable range after final balancing

C. Provide guards to enclose exposed moving equipment components in accordance with Title 8, California Code of Regulations. Fabricate belt guards with rigid angle iron frame, expanded metal screen, pivoted 4" diameter tachometer opening covers, and in two pieces to permit lubrication or sheave and belt adjustment without removing guard. Provide removable sheet metal guards at shafts and couplings and removable framed wire mesh guards at openings in mechanical systems.

2.2 REFRIGERANT PIPING AND APPURTENANCES:

A. Refrigerant piping shall be Type “ACR” drawn temper, seamless copper tube, ASTM B 280. .

B. Mechanical joints on refrigerant piping systems are prohibited. All refrigerant piping joints shall be brazed. Use lead-free, silver solder, minimum 15% silver content.

C. Pipe fittings shall be wrought-copper with soldered joints; ASME B16.22.

D. Flexible connections shall be bronze, double braided, sweat solder ends.

E. Moisture/liquid indicators (sight glasses) shall be color change moisture indication type, replaceable element, filter screen and pad, sweat solder ends; Sporlan “See-All”, Henry, or equal.

F. Charging and purge valves shall be forged brass, diaphragm packless, globe type, angle or straight through, one end solder, one end flare; Henry 623 and 643 series, Sporlan, or equal.

G. Solenoid valves shall be forged brass, extended end connections, solder ends, molded coil;

Sporlan “E” series or equal. Comply with ARI 760 & UL 429.

H. Filter driers shall be replaceable media, angle type; Henry “Dri-Cor” or equal; ARI 730.

I. Electronic thermostatic expansion valves shall have stainless steel body and connections, ceramic slide and port, linear flow capacity, continuous modulation, and direct coupling of motor and valve. Emerson "EX" series or equal.

J. Pipe hangers: All refrigerant piping shall be supported 8’ on center.

K. Split system fan-coil units and heat pump units shall have brazed sweat-fitting connections on the refrigerant piping between the units with a flexible piping section at the outdoor unit.

2.3 FILTERS FOR A/C AND AIR HANDLING EQUIPMENT

A. Unless otherwise specified, air filters shall be Model Pre-Pleat M13 panel filters, as manufactured by Flanders.

B. Each filter shall consist of synthetic only media, with corrosion-resistant expanded metal backing and moisture resistant enclosing frame. The filter shall be 2” nominal depth. The grid shall be 100% bonded to the media on the air exiting side to eliminate media vibration and pull-away.

C. The grid shall be formed to provide a uniform V-wedge shaped pleat with the open area on the air exiting side for maximum utilization of the media and low airflow resistance. The filter shall be classified for flammability by Underwriters Laboratories, Standard 900 as Class 2.

D. The filter shall have a Minimum Efficiency Reporting Value (MERV) of 13 by ASHRAE Standard 52.2.

2.4 CABINET DUCT MOUNTED IN-LINE EXHAUST FANS

A. Greenheck “CSP-A” series, or approved equal, direct drive, premium inline cabinet centrifugal exhaust fans, as scheduled on the Drawings.

B. The fan wheel shall be forward curved, centrifugal, and constructed of galvanized steel or calcium carbonate filled polypropylene. The fan wheel shall be dynamically balanced in accordance to AMCA Standard 204-05.

C. The motor enclosures shall be open drip-proof (ODP), opening in the frame body and or end brackets. Motors shall be permanently lubricated sleeve bearing type to match with the fan load and furnished at the specific voltage and phase. Motors shall be mounted on vibration isolators and be accessible for maintenance. Motors shall be compatible for use with speed controls and have thermal overload protection.

D. The fan housing shall be constructed of heavy gauge galvanized steel. The interior shall be lined with 0.5 inches of acoustical insulation.

E. The outlet shall be field rotatable from horizontal to vertical discharge and the duct collar shall include a spring loaded aluminum backdraft damper. The access for wiring shall be external.

F. Each fan shall be complete with all options and accessories as scheduled on the Drawings.

2.5 SPLIT SYSTEM VRF UNITS

A. The variable capacity, heat pump heat recovery air conditioning systems shall be a Mitsubishi Electric CITY MULTI VRF (Variable Refrigerant Flow) zoning systems. The systems shall consist of an R2-series "PURY" outdoor unit, "PEFY" and "PLFY" series CITY MULTI indoor units, and M-NET DDC (Direct Digital Controls). Each CITY MULTI indoor unit or group of CITY MULTI indoor units shall be independently controlled.

B. Quality Assurance

1. The units shall be listed by Electrical Testing Laboratories (ETL) and bear the ETL label.
2. All wiring shall be in accordance with the National Electrical Code (N.E.C.).
3. The units shall be manufactured in a facility registered to ISO 9001 and ISO14001 which is a set of standards applying to environmental protection set by the International Standard Organization (ISO).
4. All units must meet or exceed the 2010 Federal minimum efficiency requirements and the proposed ASHRAE 90.1 efficiency requirements for VRF systems. Efficiency shall be published in accordance with the DOE alternative test procedure, which is based on the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Standards 340/360, 1230 and ISO Standard 13256-1.
5. A full charge of R-410A for the condensing unit only shall be provided in the condensing unit.

C. Warranty

1. The units shall be covered by the manufacturer's limited warranty for a period of one (1) year from date of installation.
    a. If the systems are:
        1) designed by a certified CITY MULTI Diamond Designer,
        2) installed by a contractor that has successfully completed the Mitsubishi Electric 3-day service course, AND
        3) verified with a completed commissioning report submitted to and approved by the Mitsubishi Electric Service Department,
    b. then the units shall be covered by an extended manufacturer's limited warranty for a period of five (5) years from date of installation.
2. In addition, the compressor shall have a manufacturer's limited warranty for a period of 7 years from date of installation.
3. If, during this period, any part should fail to function properly due to defects in workmanship or material, it shall be replaced or repaired at the discretion of the manufacturer.
4. This warranty shall not include labor.

D. General:

1. Manufacturer shall have a minimum of 29 years of HVAC experience in the U.S. market.
2. All manufacturer technical and service manuals must be readily available for download by any local contractor should emergency service be required. Registering and sign-in requirements which may delay emergency service reference are not allowed.
3. The CITY MULTI VRF system shall be installed by a contractor with extensive CITY MULTI install and service training. The mandatory contractor service and install training should be performed by the manufacturer.

E. Controls

1. The control system shall consist of a low voltage communication network of unitary built-in controllers with on-board communications and a web-based operator interface. A web controller with a network interface card shall gather data from this system and generate web pages accessible through a conventional web browser on each PC connected to the network. Operators shall be able to perform all normal operator functions through the web browser interface.
2. System controls and control components shall be installed in accordance with the manufacturer's written installation instructions.
3. Furnish energy conservation features such as optimal start, night setback, request-based logic, and demand level adjustment of overall system capacity as specified in the sequence.
4. System shall provide direct and reverse-acting on and off algorithms based on an input condition or group conditions to cycle a binary output or multiple binary outputs.
5. Provide capability for future system expansion to include monitoring and use of occupant card access, lighting control and general equipment control.
6. System shall be capable of email generation for remote alarm annunciation.
7. Control system start-up shall be a required service to be completed by the manufacturer or a duly authorized, competent representative that has been factory trained in Mitsubishi controls system configuration and operation. The representative shall provide proof of certification for Mitsubishi CMCN Essentials Training and/or CMCN Hands-On Training indicating successful completion of no more than 2 years prior to system installation. This certification shall be included as part of the equipment and/or controls submittals. This service shall be equipment and system count dependent and shall be a minimum of one 8-hour period to be completed during normal working hours.

2.6 R2-SERIES OUTDOOR UNIT (PURY)

A. General:

1. The R2-Series PURY outdoor unit shall be used specifically with CITY MULTI VRF components. The PURY outdoor units shall be equipped with multiple circuit boards that interface to the M-NET controls system and shall perform all functions necessary for operation. Each outdoor unit module shall be completely factory assembled, piped and wired and run tested at the factory.
2. Outdoor unit shall have a sound rating no higher than 60 dB(A) individually or 64 dB(A) twinned. Units shall have a sound rating no higher than 50 dB(A) individually or 53 dB(A) twinned while in night mode operation. If an alternate manufacturer is selected, any additional material, cost, and labor to meet published sound levels shall be incurred by the contractor.
3. Both refrigerant lines from the PURY outdoor unit to the BC (Branch Circuit) Controller shall be insulated.
4. The outdoor unit shall have an accumulator with refrigerant level sensors and controls.
5. The outdoor unit shall have a high pressure safety switch, over-current protection, crankcase heater and DC bus protection.
6. The outdoor unit shall have total refrigerant tubing length of 1,804 feet maximum. The greatest length is not to exceed 541 feet between outdoor unit and the indoor units without the need for line size changes or traps.
7. The outdoor unit shall be capable of operating in heating mode down to -13°F ambient temperatures or cooling mode down to 23°F ambient temperatures, without additional low ambient controls. If an alternate manufacturer is selected, any additional material, cost,

and labor to meet low ambient operating condition and performance shall be incurred by the contractor.

8. The outdoor units shall have a high efficiency oil separator plus additional logic controls to ensure adequate oil volume in the compressor is maintained.
9. Unit must defrost all circuits simultaneously in order to resume full heating more quickly. Partial defrost which may extend “no or reduced heating” periods shall not be allowed.

B. Unit Cabinet:

1. The casing(s) shall be fabricated of galvanized steel, bonderized and finished.

C. Fan:

1. Each outdoor unit module shall be furnished with one direct drive, variable speed propeller type fan. The fan shall be factory set for operation under 0 in. WG external static pressure, but capable of normal operation under a maximum of 0.24 in. WG external static pressure via dipswitch.
2. All fan motors shall have inherent protection, have permanently lubricated bearings, and be completely variable speed.
3. All fan motors shall be mounted for quiet operation.
4. All fans shall be provided with a raised guard to prevent contact with moving parts.
5. The outdoor unit shall have vertical discharge airflow.

D. Refrigerant

1. R410A refrigerant shall be required for the outdoor unit systems.
2. Polyolester (POE) oil shall be required. Prior to bidding, manufacturers using alternate oil types shall submit material safety data sheets (MSDS) and comparison of hygroscopic properties for alternate oil with list of local suppliers stocking alternate oil for approval at least two weeks prior to bidding.

E. Coil:

1. The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
2. The coil fins shall have a factory applied corrosion resistant blue-fin finish.
3. The coil shall be protected with an integral metal guard.
4. Refrigerant flow from the outdoor unit shall be controlled by means of an inverter driven compressor.
5. The outdoor coil shall include 4 circuits with two position valves for each circuit, except for the last stage.

F. Compressor:

1. Each outdoor unit module shall be equipped with one inverter driven scroll hermetic compressor. Non inverter-driven compressors, which cause inrush current (demand charges) and require larger wire sizing, shall not be allowed.
2. A crankcase heater(s) shall be factory mounted on the compressor(s).
3. The outdoor unit compressor shall have an inverter to modulate capacity.
4. The compressor will be equipped with an internal thermal overload.
5. The compressor shall be mounted to avoid the transmission of vibration.
6. Field-installed oil equalization lines between modules are not allowed. Prior to bidding, manufacturers requiring equalization must submit oil line sizing calculations specific to each system and module placement for this project.

G. Controls

1. The outdoor unit shall have the capability of up to 8 levels of demand control for each refrigerant system

H. Electrical:

1. The outdoor unit electrical power shall be 208/230 volts, 3-phase, 60 hertz.
2. The outdoor unit shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz), 207-253V (230V/60Hz).
3. The outdoor unit shall be controlled by integral microprocessors.
4. The control circuit between the indoor units, BC Controller and the outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

2.7 BRANCH CIRCUIT (BC) CONTROLLERS FOR R2-SERIES SYSTEMS

A. General

1. The BC (Branch Circuit) Controllers shall include multiple branches to allow simultaneous heating and cooling by allowing either hot gas refrigerant to flow to indoor unit(s) for heating or subcooled liquid refrigerant to flow to indoor unit(s) for cooling. Refrigerant used for cooling must always be subcooled for optimal indoor unit LEV performance; alternate branch devices with no subcooling risk bubbles in liquid supplied to LEV and are not allowed.
2. The BC (Branch Circuit) Controllers shall be specifically used with R410A R2-Series systems. These units shall be equipped with a circuit board that interfaces to the M-NET controls system and shall perform all functions necessary for operation. The unit shall have a galvanized steel finish. The BC Controller shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory. This unit shall be mounted indoors, with access and service clearance provided for each controller. The sum of connected capacity of all indoor air handlers shall range from 50% to 150% of rated capacity.

B. BC Unit Cabinet:

1. The casing shall be fabricated of galvanized steel.
2. Each cabinet shall house a liquid-gas separator and multiple refrigeration control valves.
3. The unit shall house two tube-in-tube heat exchangers.

C. Refrigerant

1. R410A refrigerant shall be required.

D. Refrigerant valves:

1. The unit shall be furnished with multiple branch circuits which can individually accommodate up to 54,000 BTUH and up to three indoor units. Branches may be twinned to allow more than 54,000 BTUH.
2. Each branch shall have multiple two-position valves to control refrigerant flow.
3. Service shut-off valves shall be field-provided/installed for each branch to allow service to any indoor unit without field interruption to overall system operation.
4. Linear electronic expansion valves shall be used to control the variable refrigerant flow.

E. Integral Drain Pan:

1. An Integral drain pan and drain shall be provided

F. Electrical:

1. The unit electrical power shall be 208/230 volts, 1 phase, 60 Hertz.
2. The unit shall be capable of satisfactory operation within voltage limits of 187-228 (208V/60Hz) or 207-253 (230/60Hz).
3. The BC Controller shall be controlled by integral microprocessors
4. The control circuit between the indoor units and outdoor units shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

2.8 PLFY-P**NCMU (4-WAY CEILING-RECESSED CASSETTE WITH GRILLE) INDOOR UNIT

A. General:

1. The PLFY-P**NCMU-ER4 shall be a four-way cassette style indoor unit that recesses into the ceiling with a ceiling grille. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, an emergency operation function and a test run switch. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.

B. Unit Cabinet:

1. The cabinet shall be a compact 22-7/16” wide x 22-7/16” deep so it will fit within a standard 24” square suspended ceiling grid.
2. The cabinet panel shall have provisions for a field installed filtered outside air intake.
3. Four-way grille shall be fixed to bottom of cabinet allowing two, three or four-way blow.

C. Fan:

1. The indoor fan shall be an assembly with a turbo fan direct driven by a single motor.
2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
3. The indoor fan shall consist of three (3) speeds, Low, Mid, and High.
4. The indoor unit shall have an adjustable air outlet system offering 4-way airflow, 3-way airflow, or 2-way airflow.
5. The auto air swing vanes shall be capable of automatically swinging up and down for uniform air distribution.

D. Filter:

1. Return air shall be filtered by means of a long-life washable filter.

E. Coil:

1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing.
2. The tubing shall have inner grooves for high efficiency heat exchange.
3. All tube joints shall be brazed with phos-copper or silver alloy.
4. The coils shall be pressure tested at the factory.
5. A condensate pan and drain shall be provided under the coil.
6. The unit shall be provided with an integral condensate lift mechanism that will be able to

raise drain water 19-3/4” inches above the condensate pan.

7. Both refrigerant lines to the PLFY indoor units shall be insulated.

F. Electrical:

1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.
2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

G. Controls:

1. This unit shall use controls provided by Mitsubishi Electric to perform functions necessary to operate the system.
2. Indoor unit shall compensate for the higher temperature sensed by the return air sensor compared to the temperature at level of the occupant when in HEAT mode. Disabling of compensation shall be possible for individual units to accommodate instances when compensation is not required.
3. Control board shall include contacts for control of external heat source. External heat may be energized as second stage with 1.8°F – 9.0°F adjustable deadband from set point.
4. Indoor unit shall include no less than 4 digital inputs capable of being used for customizable control strategies.
5. Indoor unit shall include no less than 3 digital outputs capable of being used for customizable control strategies.

2.9 PEFY-NMAU (CEILING-CONCEALED DUCTED) INDOOR UNIT

A. Indoor Unit

1. The PEFY shall be a ceiling-concealed ducted indoor fan coil design that mounts above the ceiling with a 2-position, field adjustable return and a fixed horizontal discharge supply and shall have a modulating linear expansion device. The PEFY shall support individual control using M-NET DDC controllers.
2. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, and an auto restart function. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.

B. Unit Cabinet:

1. The unit shall be ceiling-concealed, ducted.
2. The cabinet panel shall have provisions for a field installed filtered outside air intake.

C. Fan:

1. PEFY-NMAU models shall feature external static pressure settings from 0.14 to 0.60 in. WG.
2. The indoor unit fan shall be an assembly with one or two Sirocco fan(s) direct driven by a single motor.
3. The indoor fan shall be statically and dynamically balanced and run on a motor with permanently lubricated bearings.
4. The indoor fan shall consist of three (3) speeds, High, Mid, and Low plus the Auto-Fan function

5. The indoor unit shall have a ducted air outlet system and ducted return air system.

D. Filter:

1. Return air shall be filtered by means of a standard factory installed return air filter.
2. Optional return filter box (rear or bottom placement) with high-efficiency filter shall be available for all PEFY indoor units.

E. Coil:

1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing.
2. The tubing shall have inner grooves for high efficiency heat exchange.
3. All tube joints shall be brazed with phos-copper or silver alloy.
4. The coils shall be pressure tested at the factory.
5. A condensate pan and drain shall be provided under the coil.
6. The condensate shall be gravity drained from the fan coil.
7. Both refrigerant lines to the PEFY indoor units shall be insulated.

F. Electrical:

1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.
2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

2.10 REGISTERS, GRILLES AND DIFFUSERS

A. Air terminals shall be Titus, as scheduled on the Drawings or equal Price.

B. All terminals shall be steel and shall be factory painted “off-white”, unless otherwise noted. Air terminals for installation in gypsum board shall have a 1” border for surface mounting. All air terminals for installation in lay-in ceilings shall have a lay-in frame to match the specified grid system.

2.11 ACCESS PANELS

A. Where construction is not inherently accessible, provide adequately sized and conveniently located access doors in ceilings, walls, and furring for access to controls and for servicing valves, equipment, etc.

1. Fire Rated walls and ceilings: Milcor, Style UFR, U.L. Class B, 1½ hour rating, insulated, self closing, self latching, flush key operated cylinder lock, interior latch release. Minimum size shall be 12” x 12”. Provide larger sizes where required.
2. Drywall ceilings or walls: Milcor, Style DW, prime coated steel, flush screwdriver-operated cam lock. Minimum size shall be 12” x 12”. Provide larger sizes where required.
3. Masonry walls: Milcor, Style M, prime coated steel, flush screwdriver-operated cam lock. Minimum size shall be 12” x 12”. Provide larger sizes where required.
4. Tiled walls: Milcor, Style MS, satin finish stainless steel, flush screwdriver-operated cam lock.
5. Plastered walls and ceilings: Milcor, Style K, prime coated steel, flush screwdriver-operated cam lock. Minimum size shall be 12” x 12”. Provide larger sizes where required.

B. Doors shall be delivered to the General Contractor for installation.

2.12 VIBRATION ISOLATORS

A. Unless otherwise noted on the equipment schedule, all mechanical equipment shall be mounted on vibration isolators to prevent the transmission of vibration and mechanically transmitted sound to the building structure. All isolators shall be Mason Industries, Kinetics, or approved equal. Rated deflections and model numbers shall be as scheduled on the drawings.

B. Spring equipment mounts, earthquake motioned restrained:

1. Mounts shall incorporate a single spring vibration isolator built into a welded steel mount assembly, designed and engineered to limit movement of supported equipment during an earthquake without degrading the vibration isolation of the spring during normal equipment operating conditions.
2. Mounts shall incorporate a welded steel plate and motion limit assembly, and steel spring isolator, engineered as a system to accept a force of 1.3 times the rated load capacity of the spring isolator without yield or failure, and shall limit movement of the point of level bolt connection to supported equipment to 0.75 inches in any direction, relative to any fixed point on the mount assembly, while subjected to the minimum force specified.
3. The motion limit assembly shall be welded to a steel base plate having a ¼" thick ribbed neoprene noise stop pad, and drilled holes for bolting to supporting structures.
4. Springs shall be wound steel, using high strength, heat treated spring alloy steel and shall have a horizontal spring stiffness equal to or greater than 1.3 times the rated vertical spring stiffness. The outside diameter of each spring shall be a minimum of 0.8 times the rated vertical spring height.
5. Springs shall be selected to provide the tabulated minimum operating static deflections and shall provide a 50% overload capacity before reaching solid state. Springs shall be designed to reach solid state before exceeding the spring steel fatigue point.

2.13 DUCTWORK

A. Sheet Metal Ductwork:

1. Ducts and plenums shall be fabricated and installed in conformance with the latest editions of: NFPA Pamphlet No. 90A; California Building Code; California Mechanical Code and the SMACNA HVAC Duct Construction Standards (Metal & Flexible). Ducts and plenums shall be constructed of G-60 coated galvanized steel of lockforming grade conforming to ASTM A653 and A924 standards. Seals shall be airtight Class "B" seals at all transverse joints and longitudinal seams. Tables and figures hereinafter referenced are from the 2005 edition of the SMACNA HVAC Duct Construction Standards (Metal and Flexible).
2. Rectangular duct construction shall conform to Table 2-3. All transverse joints shall be flanged per Table 2-32, with corner closures or "Duct Mate" flanged connections with corner closures per Figure 2-16 or 2-17. Elbows shall be standard radius (Type RE 1) or square throat with vanes (Type RE 2) per Figure 4-2, with double thickness turning vanes per Figures 4-3 and 4-4. Offsets and transitions shall be per Figure 4-7. Supply, return, and exhaust branch connections shall be per Figure 4-5 or 4-6. Splitters SHALL NOT be used.
3. Round ducts shall be spiral, United McGill or equal. All transverse joints and longitudinal seams shall have Class "B" seals. All branches in round duct systems shall be made with factory fabricated reducing wye branches. Duct turns shall be made with standard, factory

fabricated, three-piece elbows.

4. Lined ducts shall be fabricated such that the net inside dimensions equals the duct sizes shown on the Drawings.
5. Flexible ducts shall be acoustical type, Flexmaster “6M”, Casco "Silent Flex – SF-18M", or approved equal. Flexible ducts shall be used only where shown on the Drawings, and maximum length of any given flexible duct shall not exceed 7 feet. Galvanized sheet metal elbows shall be used for turns greater than 45 degrees on flexible ducts 10 inches and larger. Connections to rectangular ducts shall be made with “spin-in” fittings with air scoops. The installation of flexible ducts shall conform to Figure 3-10, with the exceptions noted herein.
6. Supports for horizontal ducts and plenums shall be fabricated per Figures 5-5 and 5-6 and Tables 5-1, 5-2 and 5-3. The maximum distance between hangers shall be 8 feet for rectangular ducts and 12 feet for round ducts. Attachments to the structure shall be made with adequately sized lag bolts for strap hangers and adequately sized machine bolts and side beam brackets for rod hangers. Supports for vertical ducts shall be band iron strap or angle bracket type per Figures 5-8 and 5-9.
7. All roof-mounted ductwork shall be water tight and sloped to shed water. All transverse joints shall be T-25 flanged Ductmate “25”, or approved equal.
8. Outside air intakes shall be type 316 stainless steel.
9. Ducts and plenums shall be fabricated and installed in conformance with the latest editions of: NFPA Pamphlet No. 90A; California Building Code; California Mechanical Code and the SMACNA HVAC Duct Construction Standards (Metal & Flexible). Ducts and plenums shall be constructed of hot dipped galvanized mild steel and shall have airtight Class “B” seals at all transverse joints and longitudinal seams. Tables and figures hereinafter referenced are from the 2005 edition of the SMACNA HVAC Duct Construction Standards (Metal and Flexible).
10. Rectangular duct construction shall conform to Table 2-3. All transverse joints shall be flanged per Table 2-32, with corner closures or “Duct Mate” flanged connections with corner closures per Figure 2-17. Elbows shall be standard radius (Type RE 1) or square throat with vanes (Type RE 2) per Figure 4-2, with double thickness turning vanes per Figures 4-3 and 4-4. Offsets and transitions shall be per Figure 4-7. Supply, return, and exhaust branch connections shall be per Figure 4-5 or 4-6. Splitters SHALL NOT be used.
11. Round ducts shall be spiral, United McGill or equal. All transverse joints and longitudinal seams shall have Class “B” seals. All branches in round duct systems shall be made with factory fabricated reducing wye branches. Duct turns shall be made with standard, factory fabricated, three-piece elbows.
12. Lined ducts shall be fabricated such that the net inside dimensions equals the duct sizes shown on the Drawings.
13. Flexible ducts shall be Flexmaster “8M” or approved equal. Flexible ducts shall be used only where shown on the Drawings, and maximum length of any given flexible duct shall not exceed 7'. Galvanized sheet metal elbows shall be used for turns greater than 45° on flexible ducts 10" and larger. Connections to rectangular ducts shall be made with “spin-in” fittings with air scoops. The installation of flexible ducts shall conform to Figure 3-10, with the exceptions noted herein.
14. Supports for horizontal ducts and plenums shall be fabricated per Figures 5-5 and 5-6 and Tables 5-1, 5-2 and 5-3. The maximum distance between hangers shall be eight feet for rectangular ducts and twelve feet for round ducts. Attachments to the structure shall be made with adequately sized lag bolts for straphangers and adequately sized machine bolts and side beam brackets for rod hangers. Supports for vertical ducts shall be band iron strap or angle bracket type per Figure 5-8 and 5-9.
15. All roof-mounted ductwork shall be water tight and sloped to shed water. All transverse joints shall be T-25 flanged, Ductmate “25”, or approved equal.

16. Outside air intakes shall be type 316 stainless steel.

B. Fiberglass Ductwork:

1. Fiberglass ductwork is unacceptable and may not be used on this project.

C. Specialties:

1. Duct Mounted Access Doors
   a. Including those for removing filters, duct access doors shall be fabricated as detailed in Figure 7-2, with sash locks, piano hinges, and cam latches. Round duct shall be fabricated as detailed in Figure 7-3.
   b. Access doors shall be double wall, rectangular, insulated or uninsulated same as duct. Insulation fill and thickness shall be as indicated for pressure class.
   c. Access doors shall have a vision panel and an unobstructed full swing.
   d. Fabricate doors airtight and suitable for duct pressure class.
2. Dampers:
   a. Provide butterfly or multiple blade dampers where indicated on the Drawings or as required for balancing air quantities, to values shown without generating excessive noise. Provide Duro-Dyne “ KS-385”, or approved equal, locking quadrants on each manual damper. Locate dampers in furred ceilings near access panels where possible.
   b. Butterfly dampers shall be constructed as per Figure 7-4, Figures A, B, and C.
   c. Multi-blade dampers shall conform to Figure 7-5.
   d. Motorized dampers - See Temperature Controls.
3. Remote Actuators: Young Regulator Company, Round Cable Controlled Dampers Model 5020-CC or 830A-CC (rectangular) and Remote Cable Control System Kit Model 270-301EZ. All dampers in inaccessible ceilings shall have remote actuators.
4. Air Extractors: Duct mounted volume extractors made of galvanized steel with 1-inch blade spacing, Titus model “AG-45”, or equal.
5. Flexible Duct Connections: Duro-Dyne “Metal-Fab” with Durolon, Ventfabrics “Ventglas”, or approved equal. Install at each point where a blower unit is connected to a duct. A minimum clearance of 3" between the duct and the source of vibration shall be maintained. Install per Figure 7-8.
6. Screens: Install removable bird screens at ALL outside air intakes and exhaust air discharges. Screens shall be fabricated from ½" x 14 gauge mesh secured in full frames. Screens and frames shall be constructed of the same material as the duct, hood, or equipment to which attached.
7. Access Panels: Milcor, Style M, prime coated steel, or approved equal. Minimum size shall be 10” x 10”. Provide larger sizes where required. Locks shall be flush, screwdriver operated. Provide as required for concealed ducts at all fire dampers, electric duct heaters, and automatic dampers except at suspended acoustic ceilings.
8. Joints: Tape all joints airtight using Hardcast - Carlisle, type “DT” pressure-less tape and “RTA 50” sealant, or McGill AirSeal, “Uni-Flex” duct sealer. Install per manufacturer’s directions.

2.14 INSULATION

A. General

1. All duct insulation materials including jackets, tapes, adhesives and coatings shall meet ASTM E84 25/50 Flame Spread/Smoke Development requirements.

B. Exterior of Ductwork: (Flexible Duct Wrap)

1. Unless specified to be lined, all ductwork shall be wrapped with formaldehyde-free, flexible glass-fiber or mineral-wool, blanket type insulation with factory applied FSK aluminum foil facing. Thickness shall be 2 inches unless noted otherwise.
   a. Johns Manville “Microlite EQ”, Knauf Insulation “Friendly Feel”, Owens Corning “SoftR Duct Wrap”, or approved equal.

C. Interior of Ductwork: (Duct Liner)

1. All ducts exposed to the weather shall be internally insulated. All other ductwork within 10 feet of a fan (supply and return) shall be internally insulated. Duct liner shall be installed in supply and return ducts and plenums where noted on the Drawings. Exhaust ductwork need not be insulated.
2. Duct liner shall meet the requirements of ASTM C 1071, NFPA 90A or NFPA 90B Type I and Type II. Operating temperature shall meet ASTM C411. Microbial growth shall meet ASTM C1338, G21 and G22.
   a. Type I - Plenum Liner Board: Johns Manville “Permacote Linacoustic R-300” or Knauf “Rigid Plenum Liner”, or approved equal. Thickness shall be 1 ½ inches, unless otherwise noted.
   b. Type II - Flexible Duct Liner: Johns Manville “Linacoustic RC” or Knauf “Sonic XP Duct Liner”, with fire resistant facing; or approved equal. Thickness shall be 1 ½ inches, unless otherwise noted.

D. Refrigerant Piping:

1. Insulate all refrigerant lines, fittings, and valves with flexible elastomeric thermal insulation, Resolco Insul-Phen rigid closed cell phenolic foam, or equal, according to manufacturer’s suggested installation procedures, UV protected.
2. Liquid, suction, and hot gas (where applicable) lines shall be insulated individually.
3. Oil equalization lines between multiple condensing units shall be insulated.

E. Piping insulation thickness shall be as follows:

FLUID TEMPERATURE RANGE (°F)	CONDUCTIVITY RANGE (in Btu-inch per hour per square foot per °F)	INSULATION MEAN RATING TEMPERATURE (°F)	NOMINAL PIPE DIAMETER (in inches)				
			1 and less	1 to <1.5	1.5 to < 4	4 to < 8	8 and larger
			INSULATION THICKNESS REQUIRED (in inches)				
Space heating, Hot Water systems (steam, steam condensate and hot water) and Service Water Heating Systems							
Above 350	0.32-0.34	250	4.5	5.0	5.0	5.0	5.0
251-350	0.29-0.31	200	3.0	4.0	4.5	4.5	4.5
201-250	0.27-0.30	150	2.5	2.5	2.5	3.0	3.0
141-200	0.25-0.29	125	1.5	1.5	2.0	2.0	2.0
105-140	0.22-0.28	100	1.0	1.5	1.5	1.5	1.5
Space cooling systems (chilled water, refrigerant and brine)							
40-60	0.21-0.27	75	0.5	0.5	1.0	1.0	1.0
Below 40	0.20-0.26	50	1.0	1.5	1.5	1.5	1.5

F. All tanks, expansion tank, pumps, volutes, valves and strainers shall be completely insulated with

½”Armaflex glued and sealed, vapor tight, in place with Armstrong #520 adhesive.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Prior to commencing the work of this Section, the Contractor shall inspect the installed work of other trades and verify that their work is sufficiently complete to permit the start of work under this Section, and that the completed work will be in complete accordance with the original design. In the event of discrepancy, immediately notify the Architect and proceed as directed.

3.2 GENERAL INSTALLATION

A. Provide all necessary cutting in connection with the work of this Section. No structural members shall be drilled, bored, or notched in a manner which will impair their structural capacity. All penetrations of concrete or masonry shall be made with core drills. No cutting shall be done without the approval of the Architect.

3.3 HEATING & AIR CONDITIONING EQUIPMENT INSTALLATION

A. All units shall be set with curbs plumb, level, and securely attached through framed opening with bolts and/or lag screws as noted on the Drawings. Connections to ductwork shall be secured, filter racks shall be aligned, enclosures and ductwork connections shall be fully waterproofed, and all utility and control connections shall be complete.

3.4 INSULATION

A. Exterior Ductwork:

1. Duct wrap shall be cut in a manner to meet the manufacturers’ stretch-out guidelines to provide a 2-inch staple lap and have minimum compression at the corners. All joints shall be lapped 2 inches and stapled with outward clinching staples 2-inches on center. The insulation shall be mechanically fastened to the underside of all ducts 24 inches wide or more using cup-head pins, weld pins, or stick pins with speed clips 18 inches on center. Insulation shall not be compressed to comply with required installed R-value. All joints and penetrations of the vapor barrier jacket shall be sealed with a minimum 3-inch wide matching pressure sensitive tape. Pressure-sensitive tape shall be firmly rubbed in place immediately after application using a “squeegee” type tool.
2. When a vapor seal is required, two coats of vapor retarder mastic reinforced with one layer of 4 inches wide, open weave glass fabric may be used in lieu of pressure-sensitive tape. Mastic shall be brushed onto joint and glass fabric imbedded in it. A second coat of mastic shall be brushed over the glass fabric until the fabric is filled. Mastics shall be applied in accordance with application instructions on the container.

B. Interior Duct Liner

1. Apply to the inside face of ducts, coated side facing air stream. Fasten using fire retardant adhesive and secure with mechanical fasteners at 12 inches maximum o.c., both

directions, for velocities up to 2,500 fpm. Velocities over 2,500 fpm shall have fastener spacing of 6 inches o.c.

2. Exposed edges must be factory or field coated with adhesive. Metal nosing shall be installed in all liner leading edges facing the airstream at fan discharge, at access doors, and at any interval of lined duct preceded by unlined duct.
3. Insulation with torn or broken coatings shall be removed and replaced. Loose corners, edges, and butt joints will not be accepted.
4. Maximum velocity: 5,000 ft/min.

C. Refrigerant Piping:

1. The insulation shall be installed in accordance with the manufacturer's instructions. All joints and seams shall be sealed with waterproof vapor retarder adhesive. All pipes exposed to the weather shall be coated to protect the insulation from ultra-violet radiation in accordance with the manufacturer's published instructions.

D. All pipe insulation ends shall be tapered and sealed, regardless of service.

3.5 FILTERS

A. During construction, protect all filters upstream of air handling units with blankets of 2-inch fiberglass filter media or 2-inch disposable panel filters. UL Class 2 listed.

B. Systems shall not be operated without properly installed filters. Filters used during construction shall be removed and replaced with new filters after construction is completed and the systems are ready for final acceptance by the owner.

3.6 VRF SPLIT SYSTEM INSTALLATION

A. Contractor's Qualifications

1. The mechanical Contractor shall show having successfully installed a minimum of 2 Mitsubishi City Multi projects within the past 5 years. Provide for approval prior to construction, a written statement indicating the project names, dates completed, owners name and contact information.

B. Installer Qualifications

1. Installers for the Mitsubishi systems shall have at least one person factory trained and certified for installation and service of the systems by Mitsubishi Electric. This person shall at all times supervise the installation of all other installers and assure that all work is done in accordance with Mitsubishi requirements. All other installers shall be trained and certified in HVAC installation (included but not limited to refrigerant piping and controls) by a national or regionally recognized organization. Provide for approval, prior to construction, copies of installers certificates or other proof of qualifications.

C. All units shall be set with curbs plumb, level, and securely attached through framed opening with bolts and/or lag screws as noted on the Drawings. Connections to ductwork shall be secured, filter racks shall be aligned, enclosures and ductwork connections shall be fully waterproofed, and all utility and control connections shall be complete.

D. General:

1. Rig and install in full accordance with manufacturer's requirements, project drawings, and contract documents. Refer to the manufacturer's installation manual for full requirements.

E. Location:

1. Locate indoor and outdoor units as indicated on drawings. Provide service clearance per manufacturer's installation manual. Adjust and level outdoor units on support structure.

F. Components / Piping:

1. Installing Contractor shall provide and install all accessories and piping for a fully operational system. Refer to manufacturer's installation manual for full instructions.
2. Traps, filter driers, and sight glasses are NOT to be installed on the refrigerant piping or condensate lines.
3. Standard ACR fittings rated for use with R410A are to be used for all connections. Proprietary manufacturer-specific appurtenances are not allowed.
4. Refrigerant pipe for CITY MULTI shall be made of phosphorus deoxidized copper, and has two types.
   a. ACR Type-L "Annealed Temper": Soft copper pipe, can be easily bent with human's hand.
   b. ACR Type L "Drawn Temper": Hard copper pipe (Straight pipe), being stronger than Type-O pipe of the same radical thickness.
5. The maximum operation pressure of R410A air conditioner is 4.30 MPa [623psi] . The refrigerant piping should ensure the safety under the maximum operation pressure. Refer to recommend piping specifications in Mitsubishi Electric's engineering manual. Pipes of radical thickness 0.7mm or less shall not be used.
6. Flare connection should follow dimensions provided in manufacturer's installation manuals.

G. Insulation:

1. Refrigerant lines, as well as any valves, shall be insulated end to end with ½" closed-cell pipe insulation. If state or local codes require insulation other than that specified above, the greater insulation shall be used.

H. Electrical:

1. Installing Contractor shall coordinate electrical requirements and connections for all power feeds with electrical Contractor. Refer to Division 26 for additional information.

I. Third Party Controls:

1. Installing Contractor shall coordinate all BAS/BMS control requirements and connections with controls contractor.

3.7 DUCTWORK

A. All ductwork shall be installed within spaces provided, where possible. Ducts shall be installed true to line and grade, fully secured to structural framing with specified hangers and supports, insulated, and vibration isolated.

B. Each section of supply air ductwork shall be cleaned, dust and oil free, at the shop using a degreasing agent and detergent and sealed airtight at both ends with visqueen and tape. Supply

ducts shall be additionally cleaned with a disinfecting solution. Ends of all supply and internally insulated exhaust ducts shall be kept sealed until the time they are joined. When duct sections are joined, wipe down all interior surfaces with a clean tack cloth. If tack cloth shows any dust, then re-clean duct as described above. The intent is that no foreign matter be allowed to enter the ductwork at any time after factory cleaning and during construction.

1. Submit detailed shop and field duct handling procedures for review.
2. Unlined exhaust ducts shall be vacuum cleaned when installed but shall otherwise be exempt from shop cleaning and sealing.

3.8 INSTALLATION, HANGERS AND SUPPORTS

A. Pipe supports shall be spaced according to CMC 2022, Table 313.3 and sufficiently close to support pipes properly without formation of pockets. Hangers shall be installed at ends of mains and branches.

B. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

C. No valve or piece of equipment shall be used to support piping.

D. Pipes through studs or joists shall be isolated from structure with properly sized Hubbard "Hold-Rite" suspension clamps.

E. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

F. Install lateral bracing with pipe hangers and supports to prevent swaying.

G. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, 2-½ inches and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

H. Installation of piping shall be such that damage cannot result through loading, expansion or contraction of piping. Anchors shall be installed to obtain uniformity of pipe movement.

I. Flexibility of piping systems must be maintained by the use of flexible devices at critical points at junctions of separate building structures. Braces or anchors shall be designed to damp oscillations or check excessive movement. Flexible devices for piping of gas shall be loops or offsets. Flexible devices for other piping may be loops, Victaulic grooved, or roustabout couplings. Piping at tops and bottoms of risers are critical points where flexibility is required, as well as at changes in direction on long runs of piping 4" and larger.

J. Tops of risers shall be restrained from motion in horizontal direction, and midpoints shall be anchored in all directions.

3.9 INSTALLATION, REFRIGERANT PIPING

A. Piping installation shall comply with all federal, state, and local regulations and industry guidelines. In addition, the following practices shall be followed.

1. All piping shall be stored with ends sealed to prevent entry of moisture and debris.
2. A pipe cutter specific to the piping material applied shall be used.
3. All factory and field cut tube ends shall be de-burred and cleaned.
4. Flared fittings shall be formed using tools recommended by the equipment manufacturer.
5. Flare nuts shall be tightened with torque wrench furnished by the equipment manufacturer.
6. Piping shall be continuously purged with dry nitrogen while soldering. Care shall be taken when soldering near valves or other equipment that may be damaged by extreme heat.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.

C. Install refrigerant piping according to ASHRAE 15.

D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

G. Install piping adjacent to machines to allow service and maintenance.

H. Install piping free of sags and bends. Install fittings for changes in direction and branch connections. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

I. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Division 08 Section "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.

J. Install refrigerant piping in protective conduit where installed below ground. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.

K. Slope refrigerant piping as follows:

1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
2. Install horizontal suction lines with a uniform slope downward to compressor.
3. Use double-suction riser for maximum compressor efficiencies if load variation is expected.
4. Install traps and double risers to entrain oil in vertical runs.
5. Liquid lines may be installed level.

L. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply

heat near expansion-valve bulb.

M. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.

N. All refrigerant piping and valves shall be identified.

3.10 TESTS, INSPECTIONS

A. Make all necessary control adjustments and balancing of air and water flows. Operate the entire system for a period of time not less than 3 working days for the purpose of proving satisfactory performance. During this period, instruct such persons as the Owner and/or Architect may designate in the proper operation of the systems. Should further adjustment prove necessary, operating tests shall be repeated until a satisfactory test is obtained.

B. This Contractor shall not allow or cause any work of this Section to be covered or enclosed until it has been inspected, tested, and approved by the Architect and the authorities having jurisdiction over the Work. Should any of this work be enclosed or covered up before such inspection, testing, and approval, this Contractor shall uncover the work, have the necessary inspections, tests, and approvals made and, at NO expense to the Owner, make all repairs necessary to restore both his work and that of other contractors which may have been damaged to be in conformity with the Contract Documents.

C. Furnish all necessary labor, materials, and equipment for conducting tests, and pay all expenses in connection therewith. Should leaks develop while testing, repairs shall be made, and tests shall be repeated until a satisfactory test is obtained.

D. Acceptance Testing

1. The California Energy Code Section 10-103 requires Acceptance Testing on all newly installed mechanical systems envelopes after installation and before project completion. An Acceptance Test is a functional performance test to help ensure that newly installed equipment is operating and in compliance with the Energy Code. The systems must pass the required acceptance criteria. Any deficiencies must be corrected by the installing Contractor until the specified systems conform and pass the required acceptance criteria. As of October 2021, all mechanical system acceptance tests must be performed by a certified mechanical acceptance test technician (CMATT).
2. A listing of certified ATT can be found at https://www.energy.ca.gov/programs-and-topics/programs/acceptance-test-technician-certification-provider-program/acceptance.
3. The acceptance testing procedures must be repeated, and deficiencies must be corrected by the builder or installing contractor until the construction/installation of the specified systems conform and pass the required acceptance criteria. Project inspectors will collect the forms to confirm that the required Acceptance Tests have been completed.

E. Ductwork Testing

1. Acceptance testing is required for single zone units serving <5,000 ft^2 of floor area where >25% of duct surface area is in an unconditioned space. A HERS Rater or CMATT can perform the test.
2. New duct systems that are not subject to testing under the Title 24 Part 6 - Building Energy Efficiency Code, Section 120.4(g)1 shall instead meet the duct leakage testing

requirements of CMC Section 603.9.2.

F. Condenser water piping shall be hydrostatically tested at 125-psi pressure and proved tight before covering. Tests may be made in sections provided connection to service previously tested is included in each succeeding test. Systems shall be tight for eight hours.

G. Refrigerant Piping Testing

1. Pressure and leak tests on refrigeration piping and equipment shall be done in accordance with manufacturer's instructions, local code requirements, and ASHRAE Standard 15-2024. When system components have been strength tested under pressure by the component manufacturer according to the standard, no further testing on the premises, other than leak testing, is required unless component has been modified or repaired.
2. Be sure that all controls, relief valves or rupture discs that could be damaged by test pressure are removed before beginning pressure test. Examine pipe before pressure is applied to ensure that it is tightly connected. All items not subject to the pressure test shall be disconnected or isolated by valves, blanks, plugs, or other suitable means.
3. The medium used for pressure testing the refrigeration system shall be oxygen free nitrogen or a premixed nonflammable oxygen free nitrogen with a tracer gas of hydrogen or helium. Do not use oxygen, air, combustible gases, and mixtures containing combustible gases as the pressure test medium.
4. The means used to pressurize the refrigeration system piping shall have either a pressure limiting device or a pressure reducing device and a test pressure measuring device on the outlet side. The test pressure measuring device shall have an accuracy of ±3% or less of the test pressure and shall have a resolution of 3% or less of the test pressure
5. Pressure test all refrigerant copper piping from the service valves at the condensing unit up to the isolation valves of the evaporator unit, if the system is so equipped. The high and low side of each completed refrigeration piping system must be pressure tested. Pressurize with test gas for a minimum of ten (10) minutes to not less than the lower of (a) the lowest design pressure for any refrigeration system component or (b) the lowest value of set pressure for any pressure relief devices in the refrigeration system. The design pressures for determination of test pressure shall be the pressure identified on the label nameplate. The pressure shall hold for a period of 24 hours.
6. After successful completion of the required strength test and before being placed into operation, system components and field installed connections shall be leak tested for tightness in accordance with ASHRAE 15, 2024.
7. A vacuum of 0.00967 psi (66.7 Pa) absolute or lower shall be achieved (0.0197 in. of mercury [32°F]. After achieving a vacuum, the refrigeration system shall be isolated from the vacuum pump. The refrigeration system pressure shall not rise above 0.029 psi (200 Pa) absolute (0.059 in. of mercury [32°F]) for a period of 24 hours.
8. The installing Contractor shall issue a certificate of test, verifying strength test and leakage test in accordance with ASHRAE 15 to the AHJJ for all refrigeration systems containing 55 lb (25 kg) or more of refrigerant. The certificate shall give the test date, photograph of the pressure gage at the test pressure, refrigerant designation, test medium, and the field test pressure applied to the high side and the low side of the refrigeration system. The certification of test shall be signed by the installing contractor and shall be made part of the public record.

3.11 CLEANUP

A. Upon completion of the work of this Section, remove all material, debris, and equipment

associated with or used in the performance of this Work.

END OF SECTION

SECTION 23 0500
GENERAL MECHANICAL

PART 1 - GENERAL

1.1 SUMMARY

A. The requirements of this Section shall apply to all work of Division 23.

1.2 QUALITY ASSURANCE

A. Regulatory compliance: All work performed under Division 23 shall comply with the latest currently adopted editions of all codes and regulations and all requirements of all Authorities having Jurisdiction. The following references and standards are hereby made a part of these sections and work shall conform to applicable requirements herein, except as otherwise specified herein or shown on the Drawings.

B. Codes, Standards: Conform to all applicable codes and standards as stated herein and as described in Division 01 of the Specifications, including the following:

1. American Gas Association (AGA)
2. American National Standards Institute (ANSI)
3. American Society of Mechanical Engineers (ASME)
4. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Standards 55 and 62.1
5. American Society for Testing and Materials (ASTM)
6. California Building Code (CBC)
7. California Code of Regulations Titles 8, 17, 19, 20, 21 & 22
8. California Electric Code (CEC)
9. California Energy Conservation Code (Title 24)
10. California Fire Code (CFC)
11. California Mechanical Code (CMC)
12. California Plumbing Code (CPC)
13. CAL Green Building Standards
14. City Fire Marshal requirements
15. National Electrical Manufacturers Association (NEMA)
16. National Fire Protection Association (NFPA)
17. NSF/ANSI 61 Standard, Drinking Water System Components – Health Effects for fixture materials that will be in contact with potable water
18. Sheet Metal and Air Conditioning Contractors Nation Association (SMACNA) Standards
19. Underwriters Laboratories (UL)

C. Comply with all ADA requirements for disabled access.

D. Minimum requirements: The requirements of these are the minimum that will be allowed unless such requirements are exceeded by applicable codes or regulations, in which the regulatory codes or regulation requirements shall govern.

E. When the Contract Documents call for materials or construction of a higher standard than is required by the above, the Contract Document requirements shall take precedence over the requirements of the said laws, rules, and/or regulations, accepting that nothing in the Contract Documents shall be interpreted as permitting work in violation of said laws, rules, and/or regulations. The Contractor for this work shall furnish any additional materials and/or labor as may be required for compliance with these laws, rules, and/or regulations though such materials and/or labor are not specifically set forth in the Contract Documents, with no additional charges to Owner.

F. Seismic construction and restraints shall be in accordance with the requirements of Title 17 and Title 24 of the California Code of Regulations. All equipment mounts, isolators, and hanging systems must meet local authority approval requirements.

G. Comply with the Safety Orders issued by Cal-OSHA and any other regulations of the State of California and any districts having jurisdictional authority.

1.3 LICENSES, PERMITS, FEES

A. The Contractors for this Section of work shall provide, procure and pay for all licenses, permits, fees, etc. as required to carry on and complete their work.

1.4 LICENSING REQUIREMENTS

A. All work of Division 23 shall be performed by an appropriately licensed contractor. The licenses shall be current, valid through the term of the contract and in the name of the contractor.

1. All HVAC work, which includes warm air heating systems and water heating pumps, ventilating systems, air conditioning systems, and ductwork, registers, flues, humidity, and thermostatic controls in connection with these systems, shall be performed by a C-20 - Warm-Air Heating, Ventilating and Air-Conditioning Contractor.

1.5 CONTRACT DRAWINGS

A. The Contract Drawings indicate diagrammatically the general layout of the mechanical systems and other related work. Field verification of scaled dimensions taken from the Drawings is required. The Contractors for this Section of the work shall review and compare the Architectural, Structural, Plumbing, Mechanical and Electrical Drawings and all Owner supplied equipment Drawings and adjust their work to be in conformity with the conditions indicated thereon. Discrepancies between different Drawings, between Drawings and actual field conditions, or between Drawings and Specifications, shall be brought to the attention of the Architect promptly for a determination of the modifications to be affected.

1.6 SUBMITTALS

A. General:

1. Before any fixtures, materials, or equipment are purchased, the Contractor shall submit to the Architect for approval a complete list of materials, fixtures, and equipment, giving the

manufacturers' names, catalog number, capacity, size, power requirements, and other pertinent data. Submittal lists and drawings shall be specifically applicable to this project, shall include identifying marks assigned by Specifications and Drawings, and shall not contain extraneous material or optional choices.

2. The Contractor shall submit for the approval of the Architect, shop drawings of proposed material and equipment that differ from the specified materials and equipment, and of any specified materials and equipment with special conditions and/or arrangements. These drawings shall show necessary modifications of Owner, plumbing, electrical and mechanical work required by the proposed materials and equipment.
3. Submittal of substitutions shall be limited to one proposal for each type or kind of item. If the first proposed product submittal is rejected, the Contractor shall then submit the first named or scheduled product.
4. Contractor shall make all necessary field measurements and investigations to assure that the equipment and assemblies will meet contract requirements. Review of drawings and other material submitted shall not be construed as a complete check or constitute a waiver of the requirements of the Drawings and Specifications, but will indicate that the material submitted is acceptable in quality and utility. This review shall not relieve the Contractor of the responsibility to fit the proposed materials to the spaces provided, and to effect necessary rearrangement or construction of other work.

B. Welding

1. Before any welding is performed, the contractor shall submit to the Architect, copies of any welding procedure specifications and their supporting procedure qualification records for review and acceptance. Copies of welder qualification records shall be made available for review to the owner or his representative at the construction site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall be responsible for delivery, storage, protection and placing of all equipment and materials.

B. Contractor shall protect the work and materials from damage during construction. Equipment stored at the jobsite shall be protected from dust, water or other damage, and be covered if equipment is exposed to weather. Protect interiors of new equipment and piping systems against entry of foreign matter. Clean both inside and outside before painting or placing equipment in operation.

C. Any items damaged shall be repaired or replaced, at no additional cost to the Owner.

D. Cleanliness of Piping and Equipment Systems:

1. Exercise care in storage and handling of equipment and piping material to be incorporated in the work. Remove debris arising from cutting, threading and welding of piping.
2. Piping systems shall be flushed, blown or pigged as necessary to deliver clean systems.
3. Contractor shall be fully responsible for all costs, damage, and delay arising from failure to provide clean systems.

1.8 COOPERATION WITH OTHER TRADES

A. Cooperate fully with other trades doing work on the project as may be necessary for the proper completion of the project. Refer to the Structural, Plumbing, and Electrical Drawings for details of the building structure and equipment installation that will tend to overlap, conflict with, or require coordination with the work of this Section, and schedule this work accordingly.

B. Priority of right of way in space shall be as follows, in decreasing order of authority:

1. Electrical lights, electrical panels and drain piping.
2. Ductwork.
3. Fire protection piping, domestic hot water, and domestic cold water piping.

C. Any work done without regard for other trades shall be moved, replaced, or redone as required, without extra charges to Owner.

1.9 VERIFICATION OF EXISTING CONDITIONS AND DEMOLITION

A. Before installation of any new work, verify the location, size and other conditions at all points of connection to services or other existing piping, and at all locations where new work will cross or pass near existing piping, electrical, or other facilities.

B. Information shown relative to existing services is based upon available records and data during preparation of the Drawings but shall be verified. Make reasonable deviations found necessary to conform with actual locations and conditions, without extra charge.

C. Remove piping, controls, fixtures, and equipment that is not to remain in service as shown on the Drawings or as required. This includes the removal of associated appurtenances and supports.

D. Patch, cap, or repair existing works affected by this demolition in concealed spaces within 6" of a live main or branch.

E. Deliver removed material to the Owner as directed by the Architect. Dispose of all other removed material offsite.

1.10 ACCURACY OF DATA

A. The data given herein and on the Drawings is as exact as could be reasonably secured, but absolute accuracy is not guaranteed. Exact locations, distances, elevations, etc. will be governed by shop drawings, the building itself, and actual field conditions.

1.11 UTILITY CONNECTIONS

A. Arrange for all utility connections, determine their exact requirements, and pay all costs incurred.

B. Send proper notices, make necessary arrangements, and perform other services required for care and maintenance of all utilities and assume all responsibility concerning same. Observe all rules and regulations of the respective utilities in executing the work.

1.12 DAMAGED WORK

A. Each Contractor shall be held responsible for all damage that is caused by their work, including leaks in any temporary or permanent piping systems due to pipe rupture, disconnected pipes or fittings, or by overflow of equipment.

B. Patching and replacing of damaged work shall be done by the Contractor who installed the work, as directed by the Architect, but the cost of same shall be paid by the Contractor who is responsible for the damage.

PART 2 - PRODUCTS

2.1 PRODUCTS CRITERIA

A. All materials, appliances, and equipment shall be new and best of their respective kinds, free from defects, and of the make, brand or quality specified or as accepted by the Architect.

B. Multiple Units: When two or more units of materials or equipment of the same type or class are required, these units shall be products of one manufacturer.

C. Apply and install all items in accordance with the manufacturer's written instructions. Refer conflicts between the manufacturer's instructions and the contract drawings and specifications to the Architect for resolution.

D. All fixtures, materials, and equipment equal in quality and utility to these herein mentioned will be accepted. When specific names are used in describing fixtures, materials, and equipment they are mentioned as standards only, but this implies no right on the part of the Contractor to use other fixtures, materials and equipment, or methods, unless approved as equal in quality and utility by the Architect. The decision of the Architect shall govern as to what fixtures, materials, and equipment are equal to those mentioned, but the burden of proof as to the quality of any proposed fixtures, materials, or equipment shall be upon the Contractor. If any tests are necessary to determine the quality of proposed fixtures, materials, or equipment, an unbiased laboratory shall make such tests at the expense of the Contractor satisfactory to the Architect.

2.2 PIPE LABELS

A. Brady, Seton or approved equal pipe labels. Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

D. Label Sizes (per ANSI A13.1 / ASME A13.1-2007 Standards):

1. For pipes or covering with outside diameter ¾ to 1¼ inches, minimum length of label: 8 inches, minimum height of letters: ½ inch.
2. For pipes or covering with outside diameter 1½ to 2 inches, minimum length of label: 8

inches, minimum height of letters: ¾ inch.

3. For pipes or covering with outside diameter 2 ½ to 6 inches , minimum length of label: 12 inches, minimum height of letters: 1¼ inch.
4. For pipes or covering with outside diameter 8 to 10 inches, minimum length of label: 24 inches, minimum height of letters: 2½ inches.

2.3 ELECTRICAL MOTORS

A. With exception of motors in UL labeled equipment, motors for HVAC blowers and fans, pumps, and other general purpose applications using an adjustable speed drive shall be Baldor Premium Efficient Super-E®, three phase, foot mounted, Class H insulated motor with AEGIS shaft grounding ring installed internally, re-greasable ball bearings, dynamically balanced rotors.

B. Motors shall be certified for quiet operation and shall bear a label so stating. Motors shall be drip-proof frame, 1.15 minimum service factor in 40°C, ambient windings specially impregnated and epoxy coated for outdoor service.

C. Torque characteristics of motors shall be as required to accelerate machine to 100% full load speed within 10 seconds. Motors shall be dynamically balanced to maximum deflection as follows:

1. 15 HP and larger: 0.0003 inches.
2. 10 HP and smaller: 0.0002 inches.

D. Motors shall be Inverter duty, meet NEMA MG-1 and part 30 and 31, and shall be guaranteed to satisfactorily operate at ± 10% voltage shown on Drawings. Transformers of adequate capacity shall be provided if necessary to satisfy this requirement.

E. All 3-phase motors shall be provided with phase and brown-out protection to shut down all motors in the unit if the phases are more than 10% out of balance on voltage or the voltage is more than 10% under design voltage.

F. Fractional horsepower fan motors (¼ hp, ½ hp, ¾ hp) shall be Greenheck “Vari-Green” series motors, DC electronic commutation type, specifically designed for fan applications. Motors shall be permanently lubricated with heavy duty ball bearings to match the fan load and pre-wired to the specific voltage and phase. Internal motor circuitry shall convert AC power supplied to the fan to DC power to operate the motor. Motor shall be controllable down to 20% of full speed (80% turndown). Speed shall be controlled by either a potentiometer dial mounted at the motor or by a 0-10 VDC signal. Motor shall be a minimum of 85% efficient at all speeds.

G. Provide fan drives rated at 150% of motor horsepower. Drives shall be adjustable sheave type unless specified otherwise. Listed fan speeds are only approximate; select and/or change drives to operate at approximately midpoint of adjustable range after final balancing.

2.4 HANGERS, SUPPORTS

A. Pipe supports shall be manufactured by Thomas & Betts, “Superstrut” or equivalent Cooper B-Line/TOLCO, Nibco, or Anvil.

B. All hangers shall be electro-chromate finished. Hanger rods shall have electro-galvanized finish.

C. Copper tubing:
   1. C-711 copper tube hanger, complete with C-716 isolator.
   2. Copper pipe shall be attached to channels with A-716 “Cush-A-Clamp”.

D. Insulated pipe:
   1. C-711 pipe hanger fitted to outside of insulation with C-790 galvanized shields.

E. Trapeze hangers:
   1. Grouped pipes may be supported by A-1200 channel bolted to rods.

F. Point of support connectors:

   1. Wood construction:
      a. Stationary pipes: 540 side beam hanger
      b. Pipes subject to movement: S541
   2. New concrete construction: 452 inserts.
   3. Existing concrete construction: Phillips “Red-Head” 3-piece concrete anchors or Hilti “Quik-Bolt”, drilled-in, concrete anchors.
   4. Steel beams: Series 500 beam brackets.
   5. Plywood decks: machine bolts, nuts and washers.

G. Vertical pipe risers:

   1. Vertical pipe risers shall be securely supported with C-720 pipe clamps anchored to construction.
   2. C-720P for bare cold water pipe, anchored to construction.

H. Insulated pipe supports: K.B. Enterprises “Snapp Itz”.

I. Pipes through studs or joists shall be isolated from structure with properly sized Hubbard "Hold-Rite" suspension clamps or LSP “Acousto-Plumb” system.

J. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

K. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

L. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

M. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

N. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

O. Trapeze and Riser Supports:

   1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
   2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.

3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Provide all necessary sleeving, core drilling, carpentry, cutting and patching required for proper installation of material and equipment specified.

B. No structural members shall be drilled, bored, or notched in a manner that will impair their structural capacity. No structural cutting or drilling shall be done without the approval of the Architect.

C. All penetrations of concrete or masonry shall be made with core drills. Verify location of all core drills with structural engineer prior to execution.

3.2 EQUIPMENT

A. Equipment shall operate quietly and without objectionable vibration. Such problems, other than from equipment operating at optimum conditions, shall be the Contractor's responsibility and shall be eliminated at the direction of the Architect.

B. Install equipment to provide good appearance, easy access, and adequate space to allow replacement and maintenance. Provide bases, supports, anchor bolts, and other items required to achieve this. Installation shall be level, above moisture level, and adequately braced.

C. Extend ¼" schedule 40 black steel lubrication pipes from hard-to-reach locations to front of equipment or to access doors. Terminate with proper lubrication fittings.

D. Move equipment into building through available openings. Dismantle equipment where necessary to accomplish this. After reassembly, test equipment to verify its satisfactory operating condition.

E. Thoroughly lubricate equipment before operating. Repairing damage resulting from failure to comply with this requirement shall be the Contractor's responsibility.

F. Connections to pipe shall be secured and properly aligned and all utility and control connections shall be properly isolated from the building structure by means of vibration isolators and flexible connections. Any equipment not meeting this requirement will be modified and properly reinstalled at no expense to the Owner.

3.3 ACCESS

A. All items that require access, such as for operating, cleaning, servicing, maintenance, and calibration shall be easily and safely accessible by persons standing at floor level, or standing on permanent platforms, without the use of portable ladders. Examples of these items include, but are not limited to all types of valves, filters and strainers, transmitters and control devices. Prior to commencing installation work, refer conflicts between this requirement and contract Drawings

to Architect for resolution.

3.4 MECHANICAL SERVICES

A. Terminals and services weighing no more than 20 pounds, may be supported directly on the runners of a heavy-duty grid system but, in addition, they must have a minimum of (2) #12 gage slack safety wires attached at diagonally opposite corners and anchored to the structure above.

3.5 CONCRETE EQUIPMENT BASES

A. Concrete work that is part of the mechanical installations, as such is shown and/or detailed on the Drawings, shall conform to the requirements of the Concrete Section of these Specifications.

B. Concrete bases: Anchor equipment to concrete base according to equipment details on mechanical and structural Drawings.

C. Bases shall be neatly finished, have rounded corners and smooth trowel finish.

3.6 ELECTRICAL REQUIREMENTS

A. Electrical work in this Section shall conform to the requirements of Division 26. Equipment shall conform to the standards of the National Electric Manufacturer's Association. Electrical equipment shall bear the label of Underwriters' Laboratories, Inc., where examination and listing service is available for such materials. Motors and motor control equipment shall be as specified below.

1. The work shall include the furnishing of:
   a. Motor controls mounted as integral part of equipment assemblies.
   b. Pre-wired control panels as described and shown.
   c. Electronic control panels and their components.
   d. Wiring for low voltage controls and "interlock work" except where specifically shown otherwise.
2. Installing of:
   a. All motors.
   b. All control panels and their components.
   c. Low voltage wiring, line voltage "interlock" wiring, control wiring for safety devices, alarms, and refrigeration.

B. Wiring includes all connections to devices, and all wiring shall be installed in conduit.

1. Conduit fittings and devices shall be as specified in the basic electrical materials section of Division 26 - Electrical.
2. Line voltage work (in equipment assemblies) shall be as specified in Division 26 - Electrical.
3. Devices shall be installed in NEMA enclosures of type required for location.
   a. Flush enclosures: Keystone "Telephone Cabinets" type PF with pull box knockouts.
   b. Surface enclosures: Keystone LJC.

C. Electrical Controls:

1. Submit shop-wiring diagrams of temperature controls and air conditioning unit controls for approval. Furnish approved wiring diagrams and assistance to Electrician.

2. Refer to Electrical, Fire Protection, Plumbing and Mechanical documents for work and devices required. All wiring required by plumbing and heating, ventilating and air conditioning work shall be performed by the Controls Contractor.

D. The following work will be furnished and installed under Division 26.

1. Disconnect switches, remote switches, motor starters, relays and test switches not mounted as integral part of equipment assemblies or in temperature control panels.
2. All line voltage controls and interlocks, all other controls, circuits from electric panel board to disconnect switches, starters, motors, switches and/or other motor controls, to temperature controls and safety devices.

3.7 PAINTING

A. Properly prepare work to be painted per the requirements of Division 09, except preservative and special painting as described herein. Priming shall conform to Division 09 requirements and be of a material compatible with paint for finish painting.

B. All equipment and materials shall be cleaned of grease, wax, oil, rust or dirt in preparation for finish painting. Any prime coated surfaces showing signs of rust before being finish painted shall be thoroughly cleaned and a new prime coat applied.

C. Prime paint both sides of flashings prior to installation.

D. Furnish can of touch-up paint with each factory finished piece of equipment.

E. Black steel piping exposed to the environment shall be painted with rust-inhibiting paint. Color as selected by Architect.

3.8 IDENTIFICATION OF SYSTEMS

A. Nameplates

1. Nameplate bearing manufacturer's name or identifiable trademark shall be securely affixed in a conspicuous place on equipment, or name or trademark cast integrally with equipment, stamped or otherwise permanently marked on each item of equipment.

B. Piping

1. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
   a. Adjacent to all valves and flanges
   b. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
   c. At both sides of wall or floor penetrations.
   d. Before and after all wall, floor and ceiling penetrations and inaccessible enclosures.
   e. Adjacent to changes in direction.
   f. At access doors, manholes, and similar access points that permit view of concealed piping.

g. Near major equipment items and other points of origination and termination.
h. Spaced at maximum intervals of 25 feet along each run. Reduce intervals in areas of congested piping and equipment.
i. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

2. All piping shall be identified.
3. Pipe Label Color Schedule: (per ANSI A13.1 / ASME A13.1)
   a. Potable, Cooling, and other Water Piping:
      1) Background Color: Green.
      2) Letter Color: White.
   b. Flammable Fluids:
      1) Background Color: Yellow.
      2) Letter Color: Black.
   c. Combustible Fluids:
      1) Background Color: Brown.
      2) Letter Color: White
   d. Compressed Air:
      1) Background Color: Blue.
      2) Letter Color: White.

C. Valves

1. For identification and Owner's maintenance records, all valves shall be numbered and identified with clearly stamped 1¼" diameter brass tags, in accordance with drawings and service performed.
2. Control valves shall be also marked whether normally open (N.O.) or normally closed (N.S.).

D. Equipment

1. All equipment shall be labeled with 1" high stencils showing identifying mark noted on drawings, and usage.
2. Warning signs shall be placed on machines driven by electrical motors that are controlled by fully automatic starters, per California Code of Regulations, Title 8, Subchapter 7 - General Industry Safety Orders, Article 7, Section 3320.

E. A typewritten schedule of all stencils and valve tags used, with identification, shall be framed and posted in mechanical rooms, at locations as directed.

3.9 INSTALLATION, HANGERS AND SUPPORTS

A. Pipe supports shall be spaced according to CPC 2022, Table 313.3 and sufficiently close to support pipes properly without formation of pockets. Hangers shall be installed at ends of mains and branches.

B. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

C. Provide resilient mounting for domestic water piping. Thermal insulation may serve as resilient mounting for insulated piping.

D. Suspended water piping shall be anchored with steel struts installed at midpoint of each run.

E. No valve or piece of equipment shall be used to support piping.

F. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

G. Flexibility of piping systems must be maintained by the use of flexible devices at critical points at junctions of separate building structures. Braces or anchors shall be designed to damp oscillations or check excessive movement. Flexible devices for piping of gas shall be loops or offsets. Flexible devices for other piping may be loops, Victaulic grooved, or roustabout couplings.

H. Piping at tops and bottoms of risers are critical points where flexibility is required, as well as at changes in direction on long runs of piping 4" and larger.

I. Tops of risers shall be restrained from motion in horizontal direction, and midpoints shall be anchored in all directions.

J. Install lateral bracing with pipe hangers and supports to prevent swaying. The following table shows maximum lengths of shapes used for sway bracing:

TYPE/SIZE Angle	MAX. LENGTH (l/r=200)	TYPE/SIZE Flat Bar	MAX. LENGTH (l/r=200)
1½ x 1½ x ¼"	4'-10"	1½ x ¼"	1'-2"
2 x 2 x ¼"	6'-6"	2 x ¼"	1'-2"
2½ x 2½ x ¼"	8'-2"	2 x ⅜"	1'-9"
3 x 3 x ¼"	9'-10"		
Threaded Rod	Pipe (Schedule 40)		
⅜"	1'-7"	1"	7'-0"
½"	2'-1"	1¼"	9'-0"
⅝"	2'-7"	1½"	10'-4"
¾"	3'-1"	2"	13'-1"
1"	4'-2"		

K. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, 2-½ inches and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

3.10 PIPE WELDING

A. All hot and chilled water, steam and steam condensate, compressed air and vacuum piping shall be installed, examined, inspected and tested in accordance with the requirements of ASME B31.9, Building Services Piping, current edition.

B. Weld all pipe 2.5 inches and larger. Use the following procedure. All welders must be AWS certified. AWS B2.1 SMAW 6G Pipe Welding Procedure Specifications

Welding process: SMAW	Grove Angle: 60 degrees
Position: 6G Fixed position	Material/Spec: A 106
Weld Progression: Up	Thickness (pipe/tube): Groove (in) .280
Backing: No	Notes: Sch. 40 Pipe
Current/Polarity: DCEP	Filler Metal Class: E6010Rt/E7018F1
Root Opening: 1/16 to 1/8	Other Filler Metal Class: Rt. 1/8, 3/32 Filler

C. Welded joints shall be beveled and butt-welded. Reductions of pipe shall be made with forged steel welding fittings. Branch reductions of two or more pipe sizes smaller than the main, may be Bonney "Weld-O-Let" fittings, or equal. Job fabricated reductions and branches shall not be used. All pipe burrs shall be reamed out. Welding rods shall be as follows, or approved equal:

Pipe Size	Arc Welding	Gas Welding
2" and larger	Fleetweld #5	Oxweld #1 or Page Hi-Test M
1½" and smaller	None	Oxweld #1 or Page Hi-Test M

3.11 INSTALLATION, PIPING

A. Installation of piping shall be such that damage cannot result through thermal expansion or contraction, to piping, building, or pipe hangers and supports. Anchors shall be installed at midpoints of all runs in main piping for the purpose of localizing pipe expansion or prevention of creepage.

B. Rough in shall proceed as rapidly as general construction will permit. All rough-in shall be complete, at locations verified by Architect and Owner, and tested and inspected prior to installation of concrete, lath, plaster, gypsum wallboard, or other finishes.

C. All piping shall be concealed in finished rooms, installed in furred walls and partitions. Where furred or suspended ceilings occur, piping shall be installed in the concealed space at points adjacent to beams and/or other structural members and coordinated with ductwork and equipment. Where exposed piping occurs, it shall be installed parallel to or at right angles to building walls, unless specifically shown otherwise on the Drawings.

D. All pipelines shall be installed free from traps and air pockets, true to line and grade, with suitable supports properly spaced. All piping shall be installed without undue stress and with provision for expansion and contraction.

E. All piping shall be new and free from foreign substances. American standard pipe threads shall be used for IPS threaded work. Joints in threaded piping shall be made up with Teflon tape applied to the male threads only. No screwed pipe joints shall be caulked or packed with rope or other packing materials. Pipe shall be free from tool marks; threads cut accurately with not more than 2 threads showing beyond fitting. Friction wrenches shall not be used with plated, polished, or soft metal piping. All changes in pipe size shall be made with reducing fitting. Bushings will not be permitted.

F. Protect unattended openings in piping during construction.

G. All copper tubing shall be formed in a workmanlike manner, in accordance with the Pipe and Tube Bending Handbook of the Copper and Brass Research Association. A tube bender giving support to the periphery of the tube shall be used. The tubing shall be protected against flatting or other

injury.

H. All copper connections and joints shall be made in accordance with the Copper Tube Handbook, Copper and Brass Research Association. No swaged connections will be permitted. All valves, pumps, and similar equipment shall be connected to copper piping through union or flange adapter fittings.

I. No water or drainage piping shall pass over electrical equipment unless adequate protection is provided to prevent damage by leaks or condensation.

J. Install air vents at all water piping high points when direction of flow is downward.

K. Install sediment drain faucets at all low points.

L. Valves, cocks, etc., shall be installed to allow convenient accessibility and operation.

M. Unions and flanges shall be installed to allow convenient replacement of all equipment and cleaning tubes.

N. A union connection shall be installed downstream from all valves, at equipment connections and at other locations as required or directed.

O. Shut-off valves shall be provided in all main services and where required to permit proper servicing of equipment. Valves of one type shall be of one manufacturer.

P. All valves shall be of the same size as the pipelines in which they are installed, unless specifically sized on the Drawings. All hand-controlled line valves shall be ball valves, except where throttling control or frequent operation is required, in which case globe or angle valves shall be used. Globe valves in horizontal lines shall be installed with stem in horizontal to permit line draining. All globe and angle valves shall be installed to close against pressure. Disc valves shall have discs suitable for the services for which they are to be used.

Q. All valves shall be accessible and shall not be installed with the stems below the horizontal plane. Provide access panels at walls, ceilings, or floors.

R. Provide prime coated escutcheon plates at all points where exposed piping penetrates finished wall ceilings or floors.

S. Cutting or boring of joists or other structural members shall be done only when alternative routing is impossible and only upon written approval of the Architect or Owner.

3.12 CLEANING OF PIPING

A. All new piping shall be thoroughly cleaned of rust, scale, etc., prior to enclosing and placing in operation. Water shall be forced through pipes until the systems are free from foreign substances.

3.13 CLEANUP

A. Upon completion of the work of this Section, remove all material, debris, and equipment associated with or used in the performance of this work.

END OF SECTION

SECTION 23 0593
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Balancing Air Systems

2. Additional Tests

a. Sound testing

b. Duct leakage testing

c. Controls verification

1.3 SCOPE

A. The T&B Agency will provide the following services:

1. Provide all supervision, personnel, instruments, calibration equipment, and all other materials necessary to perform balancing and testing, and compile test data including calculations and services necessary for the heating, ventilating, and air conditioning systems for this project, all in accordance with the project Drawings and Specifications and as specified herein.

2. The Testing & Balancing Agency (T&B) shall be responsible for inspecting, balancing, adjusting, testing, and logging the data of the performance of fans, all dampers in the duct systems, all air distribution devices or heat exchangers, and the flows of water through all coils.

3. The T&B Agency shall balance, test, and adjust the systemic components to obtain optimum conditions in each conditioned space in the building. If construction deficiencies are encountered which preclude obtaining optimum conditions, the deficiencies will be recorded and given to the Owner's Representative. The T&B Agency is advised that deficiencies in the HVAC construction are often encountered during final T&B services, and should include in the bid an amount deemed advisable to compensate for time in identifying the deficiencies.

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B. During construction, the T&B Contractor shall inspect the installation of pipe systems, sheet metal work, temperature controls, and other component parts of the HVAC systems. Inspections shall be conducted a minimum of three times. Typically this is performed when 60% of the ductwork and piping are installed and again when 90% of the total system is installed and prior to insulation. A copy of the written report is to be issued to the Mechanical Engineer for review.

1.4 SUBMITTALS

A. Strategies and Procedures Plan: Within 30 days of Contractor's Notice to Proceed, submit T&B strategies and step-by-step procedures.

B. System Readiness Checklists: Within 30 days of Contractor's Notice to Proceed, submit system readiness checklists for use by systems installers in verifying system readiness for T&B. Examination Report: Within 30 days of Contractor's Notice to Proceed, provide a summary report of the examination review required in Part 3 “Examination”, if issues are discovered that may preclude the proper testing and balancing of the systems.

C. Examination Report: Provide a summary report of the examination review if issues are discovered that may preclude the proper testing and balancing of the systems.

D. Certified T&B reports: Within 30 days of completion of balancing work, submit AABC-certified T&B report.

1. Submit one copy of the final T&B Report directly to the design professional of record. Provide three additional copies to the contractor.

1.5 QUALITY ASSURANCE

A. T&B Contractor Qualifications:

1. General Contractor will employ a T&B Agency that is certified by the Associated Air Balancing Council (AABC). The T&B Agency will have experience in the field of air system balancing, possess calibrated instruments, and employ qualified Supervisors and skilled Technicians to perform all required tests. The T&B Agency shall have a minimum of 10 years of experience in the Testing, Adjusting, and Balancing field.

B. T&B technician shall perform the following:

1. Review field data reports to validate accuracy of data and to prepare certified T&B reports.

2. Certify that the T&B team complied with the approved T&B plan and the procedures specified and referenced in this Specification.

3. Certify the T&B report

C. T&B Conference: If requested by the Owner or Construction Manager after approval of the T&B Agency’s submittals, meet to develop a mutual understanding of the details

1. Agenda Items:

a. The examination report.

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b. The Strategies and Procedures plan.

c. Systems readiness checklists.

d. Coordination and cooperation of trades and subcontractors.

e. Coordination of documentation and communication flow.

D. Approved Test and Balance agencies in the area:

RS Analysis, Inc.
Corporate Office
1035 Suncast Lane, Suite 130
El Dorado Hills, CA 95762
(888) 330-1935
www.rsanalysis.com

South San Francisco Branch (650) 583-9400

Fairfield Branch (Pacific Test & Balance) (707) 696-2444

National Air Balance Company, Inc.
4171 Business Center Drive
Fremont, CA 94538
(510) 623-7000
www.nabco.biz

Raglen System Balance, Inc.
(775) 747-0100 (main office)
www.raglensystembalance.com

E. T&B Report Forms: Use standard T&B contractor's forms.

F. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in “AABC National Standards for Total Systems Balance.”

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION & REVIEW

A. Review the Contractor shop drawing submittals for their effect on the test and balance process and overall performance of the HVAC system. Submit recommendations for enhancements or changes to the system.

B. Review location and type of volume damper inlet conditions to air terminals, air valves, and HVAC equipment.

C. Review location, type, and size of balancing valves, flow metering stations, and automatic control valves in the water flow station.

D. Review location of pressure sensors in the air and water distribution system.

E. Review automatic control systems as they affect the test and balance procedure.

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F. Review sheet metal and piping shop drawings to verify the installation of flow control devices.

G. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Note the locations of devices that are not accessible for testing and balancing.

H. Review the approved submittals for HVAC systems and equipment.

I. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they are properly separated from adjacent areas.

J. Review equipment performance data including fan and pump curves.

K. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, clean permanent filters are installed, and controls are ready for operation.

L. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected, configured by the controls contractor and functioning.

M. Examine strainers to verify that Mechanical Contractor has replaced startup screens with permanent screens and that all strainers have been cleaned.

N. Examine two-way valves for proper installation and function.

O. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.

P. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

3.2 PREPARATION

A. Prepare a T&B plan that includes:

1. Equipment and systems to be tested.

2. Strategies and step-by-step procedures for balancing the systems.

3. Instrumentation to be used.

4. Sample forms with specific identification for all equipment.

B. Prepare system-readiness checklists, as described in the *AABC National Standards for Total System Balance*, for use by contractors in verifying system readiness for T&B. These shall include, at a minimum:

1. Airside:

a. All ductwork is complete with all terminals installed.

b. All volume, smoke and fire dampers are open and functional.

c. Clean filters are installed.

d. All fans are operating, free of vibration, and rotating in correct direction.

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e. VFD start-up is complete and all safeties are verified.

f. Automatic temperature-control systems are operational.

g. Ceilings are installed.

h. Windows and doors are installed.

i. Suitable access to balancing devices and equipment is provided.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" and in this Section.

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for T&B procedures.

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain approved submittals and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare single-line schematic diagram of systems for the purpose of identifying HVAC components.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

F. Verify that motor starters are equipped with properly sized thermal protection.

G. Check condensate drains for proper connections and functioning.

H. Check for proper sealing of air-handling-unit components.

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

a. Set outside air, return air and relief air dampers for proper position that simulates minimum outdoor air conditions.

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b. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.

c. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.

d. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.

2. Measure fan static pressures as follows:

a. Measure static pressure directly at the fan outlet or through the flexible connection.

b. Measure static pressure directly at the fan inlet or through the flexible connection.

c. Measure static pressure across each component that makes up the air-handling system.

d. Report any artificial loading of filters at the time static pressures are measured.

3. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.

1. Measure airflow of submain and branch ducts.

2. Adjust sub-main and branch duct volume dampers for specified airflow. Re-measure each sub-main and branch duct after all have been adjusted.

C. Adjust air inlets and outlets for each space to indicated airflows.

1. Set airflow patterns of adjustable outlets for proper distribution without drafts.

2. Measure airflow at all inlets and outlets.

3. Adjust each inlet and outlet for specified airflow.

4. Re-measure each inlet and outlet after all have been adjusted.

D. Verify final system conditions.

1. Re-measure and confirm minimum outdoor air, return and relief airflows are within design. Readjust to design if necessary.

2. Re-measure and confirm total airflow is within design.

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3. Re-measure all final fan operating data, rpms, volts, amps, static profile.

4. Mark all final settings.

5. Test system in economizer mode. Verify proper operation and adjust, if necessary.

6. Measure and record all operating data.

E. Record final fan-performance data

3.6 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

A. Adjust the variable-air-volume systems as follows:

1. Verify that the system static pressure sensor is located 2/3 of the distance down the duct from the fan discharge.

2. Verify that the system is under static pressure control.

3. Select the terminal unit that is most critical to the supply-fan airflow. Measure inlet static pressure, and adjust system static pressure control setpoint so the entering static pressure for the critical terminal unit is not less than the sum of the terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.

4. Calibrate and balance each terminal unit for maximum and minimum design airflow as follows

a. Adjust controls so that terminal is calling for maximum airflow (note some controllers require starting with minimum airflow. Verify calibration procedure for specific project).

b. Measure airflow and adjust calibration factor as required for design maximum airflow. Record calibration factor.

c. When maximum airflow is correct, balance the air outlets downstream from terminal units.

d. Adjust controls so that terminal is calling for minimum airflow.

e. Measure airflow and adjust calibration factor as required for design minimum airflow. Record calibration factor. If no minimum calibration is available, note any deviation from design airflow.

f. When in full cooling or full heating, ensure that there is no mixing of hot deck and cold deck airstreams unless so designed.

g. On constant volume terminals, in critical areas where room pressure is to be maintained, verify that the airflow remains constant over the full range of full cooling to full heating. Note any deviation from design airflow or room pressure.

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5. After all terminals have been calibrated and balanced, test and adjust system for total airflow. Adjust fans to deliver total design airflows within the maximum allowable fan speed listed by fan manufacturer.

    a. Set outside air, return air and relief air dampers for proper position that simulates minimum outdoor air conditions.

    b. Set terminals for maximum airflow. If system design includes diversity, adjust terminals for maximum and minimum airflow so that connected total matches fan selection and simulates actual load in the building.

    c. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.

    d. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.

    e. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.

6. Measure fan static pressures as follows:

    a. Measure static pressure directly at the fan outlet or through the flexible connection.

    b. Measure static pressure directly at the fan inlet or through the flexible connection.

    c. Measure static pressure across each component that makes up the air-handling system.

    d. Report any artificial loading of filters at the time static pressures are measured.

7. Set final return and outside airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.

    a. Balance the return-air ducts and inlets the same as described for constant-volume air systems.

    b. Verify all terminal units are meeting design airflow under system maximum flow.

8. Re-measure the inlet static pressure at the most critical terminal unit and adjust the system static pressure setpoint to the most energy-efficient setpoint to maintain the optimum system static pressure. Record setpoint and give to controls contractor.

9. Verify final system conditions as follows:

    a. Re-measure and confirm minimum outdoor air, return and relief airflows are within design. Readjust to design if necessary.

    b. Re-measure and confirm total airflow is within design.

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c. Re-measure all final fan operating data, rpms, volts, amps, static profile.

d. Mark all final settings.

e. Test system in economizer mode. Verify proper operation and adjust, if necessary. Measure and record all operating data.

f. Verify tracking between supply and return fans.

B. TOLERANCES

1. Set HVAC system's air flow rates and water flow rates within the following tolerances:

a. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.

b. Air Outlets and Inlets: Plus or minus 10 percent.

c. Heating-Water Flow Rate: Plus or minus 10 percent.

d. Cooling-Water Flow Rate: Plus or minus 10 percent.

C. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.7 FINAL TEST AND BALANCE REPORT

A. The report shall be a complete record of the HVAC system performance, including conditions of operation, items outstanding, and any deviations found during the T&B process. The final report also provides a reference of actual operating conditions for the owner and/or operations personnel. All measurements and test results that appear in the reports must be made on site and dated by the AABC technicians or test and balance engineers.

B. The report must be organized by systems and shall include the following information as a minimum:

1. Title Page:

a. AABC certified company name

b. Company address

c. Company telephone number

d. Project identification number

e. Location

f. Project Architect

g. Project Engineer

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h. Project Contractor

i. Project number

j. Date of report

k. AABC Certification Statement

l. Name, signature, and certification number of AABC TBE

2. Table of Contents.

3. AABC National Performance Guaranty.

4. Report Summary:

a. The summary shall include a list of items that do not meet design tolerances, with information that may be considered in resolving deficiencies.

5. Instrument List:

a. Type.

b. Manufacturer.

c. Model.

d. Serial Number.

e. Calibration Date.

6. T&B Data:

a. Provide test data for specific systems and equipment as required by the most recent edition of the "AABC National Standards."

7. Print or sketch, reduced in size, showing all supply, return and exhaust air outlets for easy reference to report data.

C. One copy of the final test and balance report shall be sent directly to the Mechanical Engineer of record. Provide five additional copies to the contractor.

D. An approved copy of the balancing report shall be included in the maintenance manual submittal.

3.8 ADDITIONAL TESTS

A. Duct Leakage Test

1. All ductwork shall be tested for leaks, using necessary instruments before insulating any ductwork. Conduct test as follows and as recommended in SMACNA Balancing Manual.

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a. Seal all openings in duct section and plenum to be tested.

b. Connect test apparatus to test section of cuts, using a flexible duct connection or hose (fitting provided by Mechanical Contractor).

c. Close damper on blower suction side, to prevent excessive build-up of pressure.

d. Start blower and gradually open damper on suction side of blower.

e. Determine amount of air leakage and make repairs as required.

f. Leakage factor allowable shall be 5% based on the total operating cfm of the section of duct under testing.

g. Tested sections of ductwork shall be visually marked with certification sticker and initials of field test inspector. Tests shall be made before duct sections are concealed.

2. Witness the duct pressure testing performed by the mechanical/installing contractor.

3. Verify that proper test methods are used and that leakage rates are within specified tolerances.

4. Report any deficiencies observed.

B. Sound Level Reading

1. After the systems are balanced and the spaces are architecturally complete, sound level readings shall be taken in at least ten locations in the building with an Octave Band Analyzer.

2. In order to reduce the ambient noise level, the reading shall be taken at night.

3. Instrumentation:

a. The sound-testing meter shall be a portable, general-purpose testing meter consisting of a microphone, processing unit, and readout.

b. The sound-testing meter shall be capable of showing fluctuations at minimum and maximum levels, and measuring the equivalent continuous sound pressure level (LEQ).

c. The sound-testing meter must be capable of using 1/3 octave band filters to measure mid-frequencies from 31.5 HZ to 8000 HZ.

d. The accuracy of the sound-testing meter shall be ±1 decibel.

4. Test Procedures

a. Perform test at the quietest background noise period. Note any cause of unpreventable sound that may affect the test outcome.

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b. Equipment should be operating at design values.

c. Calibrate the sound-testing meter prior to taking measurements.

d. Use a microphone suitable for the type of noise levels measured that is compatible with the meter. Provide a windshield for outside or in-duct measurements.

e. Record a set of background measurements in dB(A), and sound pressure levels in the eight un-weighted octave bands with the equipment off.

f. Take sound readings in dB(A), and sound pressure levels in the eight un-weighted octave bands with the equipment on.

g. Take readings no closer than 3' from a wall or from the operating equipment, and approximately 5' from the floor, with the meter held or mounted on a tripod.

h. For outdoor measurements, move the sound-testing meter slowly and scan the area that has the greatest exposure to the noise source being tested. (This type of reading is generally performed using the A-Weighted scale).

5. Reporting

a. The test data for each area will be recorded on Noise Criteria curves indicating the decibel level read in each Frequency Band - the NC level required and the NC level measured. The sound level shall not exceed NC 30 in all areas.

b. The report must record: the location, the system tested, the dB(A) reading, and the sound pressure level in each octave band with equipment on and off.

c. Plot all the sound pressure levels on the [work sheet, with the equipment on and off.

6. The T&B Agency will submit the test data and test equipment data to the Architect and Engineer for review, and include the approved forms in the T&B report.

C. Controls Verification

1. In conjunction with system balancing perform the following:

a. Work with the temperature control contractor to ensure the system is operating within the design limitations, and gain a mutual understanding of intended control performance.

b. Verify the integrity of valves and dampers in terms of tightness of close-off and full-open position. This includes dampers in multi-zone units.

c. Check that all valves are properly installed in the piping system in relation to direction of flow and location.

d. Verify the proper application of all normally open and normally closed valves.

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e. Check the locations of all thermostats and humidistats for potential erratic operation from outside influences such as sunlight, drafts or cold walls.

f. Check the locations of all sensors to determine whether their position will allow them to sense only the intended temperatures, humidities, or pressures. Control Contractor will relocate as deemed necessary by the TAB Agency.

g. Check the sequence of operation for any control mode is in accordance with approved shop drawings. Verify that only minimum simultaneous heating and cooling occurs. Observe that heating cannot take place until the cooling zone of valve is completely closed.

h. Verify that all controller set points meet the design intent.

i. Verify the operation of all interlock systems.

j. Verify that controllers are calibrated and function as intended.

k. Verify that controller setpoints are as specified.

l. Verify the operation of lockout or interlock systems.

m. Verify the operation of all valve and damper actuators.

n. Verify that all controlled devices are properly installed and connected to the correct controller.

o. Verify that all controlled devices travel freely and are in the position indicated by the controller: open, closed, or modulating.

p. Perform all system verification to assure the safety of the system and its components.

2. Reporting

a. The report shall include a summary of verifications performed, remaining deficiencies, and any variations from specified conditions.

3. A systematic check of the above requirements shall be included in the final TAB report.

3.9 FINAL ACCEPTANCE

A. At the time of final inspection, the T&B Agency shall recheck, in the presence of the Owner's Representative, specific and random selections of data, i.e. water and air quantities, recorded in the Certified Report.

B. Points and areas for recheck shall be selected by the Owner's Representative.

C. Measurement and test procedures shall be the same as approved for work forming basis of Certified Report.

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D. Selections for recheck, specific plus random, will not normally exceed 25% of the total number tabulated in the report, except that special air systems may require a complete recheck for safety reasons.

E. If random tests elicit a measured flow deviation of 10% or more from that recorded in the Certified Report listings, by 10% or more of the selected recheck stations, the report shall be automatically rejected. In the event the report is rejected, all systems shall be readjusted and tested, new data recorded, new Certified Report submitted, and new inspection tests made, all at no additional cost to the Owner.

F. Following final acceptance of the Certified Report by the Owner's Representative the settings of all valves, splitters, dampers, and other adjustment devices shall be permanently marked by the T&B Agency, so that adjustment can be restored if disturbed at any time. Devices shall not be marked until after final acceptance.

END OF SECTION

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SECTION 23 0923
ENERGY MANAGEMENT SYSTEM FOR HVAC (EMS)

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes equipment and performance criteria for furnishing all labor and materials for the installation and programming for Energy Management System for HVAC Systems utilizing wireless communication with cloud based servers.

1.2 SUBMITTALS

A. Shop Drawings and product data in accordance with the specifications.

B. All shop drawings shall be prepared in AutoCAD 2014 or newer. In addition, Contractor shall provide drawings in electronic format with x-ref and layer information to other trades as required.

C. All submittals shall be bound or in a three ring binder with a table of contents and related section tabs. Five (5) copies shall be submitted to the Architect for distribution and review prior to ordering or fabrication of the equipment. The Contractor, prior to submitting, shall check all documents for accuracy.

D. Shop drawings shall include basic floor plans depicting locations of all equipment and wiring installed by others, to be controlled by system and locations of thermostats, gateways and other equipment provided under this section. Drawings shall also show location of electrical power, low voltage wiring and data ports, provided by others, required for proper installation of systems of this section.

E. Submittal data shall contain manufacturer's data on all hardware and software products required by the specification.

1.3 SCOPE OF WORK

A. Except as otherwise noted, the control system shall consist of all thermostats, and gateways to fill the intent of the specification and provide for a complete and operable system.

B. The EMS Contractor shall review and study existing building/site conditions where applicable and all new construction drawings for the project, including HVAC drawings, and the entire project specifications to familiarize themselves with the equipment and system operation prior to prior to bidding and submittal of a bid/price. The Contractor shall notify the Owner immediately of any conflicts between the project and the scope of work of this Section, including work to be completed by others.

C. All equipment and installation of control devices associated with the equipment listed below shall be provided under this Contractor.

D. When the EMS system is fully installed and operational, the EMS Contractor shall make themselves available to meet with the designated representatives of the Owner to review the as-installed condition of the system. At that time, the EMS Contractor shall demonstrate the operation of the system and prove that it complies with the intent of the Drawings and Specifications.

E. The Contractor shall furnish and install a complete EMS control system including all necessary hardware and all operating and applications software necessary to perform the control sequences of operation. Provide and install EMS controls for the HVAC equipment as noted on the Drawings:

1. Provide technical support necessary for commissioning of system in coordination with the HVAC Contractor, Balancing Contractor and the owner's team.
2. Contractor shall provide one training session in the operation of the system, for owner's personnel.

F. EMS Contractor shall provide all wiring between sensors and wireless thermostats.

G. All work performed under this Section of the Specifications shall be in compliance with all codes and regulations as mandated by the authority having jurisdiction.

1.4 SYSTEM DESCRIPTION

A. The Energy Management System (EMS) shall consist of thermostats, gateways and related accessories as indicated below and all related programming for a complete and fully operational web based management system, using a cloud server program complying with the following specifications.

B. The entire Energy Management Solution (EMS) shall include a network of commercial Internet programmable thermostats which use IEEE 802.15.4 mesh wireless communication protocol to reach a Wireless Gateway (WG). The WG must connect to the owner’s wide area network (WAN) over a TCP/IP connection. Access and control of EMS is through a web based management tool which sits on a cloud server and must be accessible either locally or remotely via the Internet.

1.5 WORK BY OTHERS

A. The EMS Contractor shall coordinate with other Contractors prior to performing the work on this project and cooperate as necessary to achieve a complete and neat installation. To that end, each Contractor shall consult the Drawings and Specifications for all trades to determine the nature and extent of others’ work prior to fabrication and installation. The Owner's representative shall be immediately notified if an area of conflict occurs between trades prior to fabrication and installation. EMS Contractor shall provide field supervision to the Mechanical Contractor for pre-installation of control components.

B. Low voltage thermostat wiring between equipment and thermostat locations shall be furnished and installed by others. Unless noted otherwise all new low voltage wiring shall be multiple conductor thermostat wiring (wire count as indicated in thermostat manufacture's installation instructions) installed per Owner's specifications. (Wiring in existing installations shall be minimum 3 conductor / 24 gauge wires per EMS manufacturer's standard specifications,

multiple c conductor/24-gauge thermostat wiring preferred - see Installation Instructions for specific conductor counts depending on heating and cooling modes of existing equipment.)

C. Related work provided by others:

1. 110 V outlets shall be provided within 5 feet of each gateway location.
2. 1 Data port shall be provided within 10 feet of each gateway location.

D. Equipment start-up and servicing

1.6 CODE COMPLIANCE

A. Provide EMS components and ancillary equipment which are code compliant.

B. All wiring shall conform to the National Electrical Code.

C. All products of the EMS shall reside with the following agency approvals.

1. California 2022 Title 24 Compliant.
2. California Energy Commission Occupant Control Smart Thermostat (OCST) certified.
3. Open ADR2.0 certified.

1.7 SYSTEM STARTUP & COMMISSIONING

A. Each EMS component in the system shall be tested for both hardware and software functionality. In addition, each mechanical and electrical system under control of the EMS shall be tested against the appropriate sequence of operation specified herein. Successful completion of the system test shall constitute the beginning of the warranty period. A written report shall be submitted to the Owner indicating that the installed system functions in accordance with the Drawings and Specifications.

B. The EMS Contractor shall provide all manpower and engineering services required to assist the HVAC Contractor and Balancing Contractor in testing, adjusting, and balancing all systems in the building. The EMS Contractor shall have a trained technician available on request during the balancing of the systems. The EMS Contractor shall coordinate all requirements to provide a complete air balance with the Balancing Contractor and shall include all labor and materials in his contract to assist with functional testing of system as it relates to EMS.

1.8 TRAINING

A. The EMS Contractor shall provide training for two owner's representatives and/or maintenance personnel. The EMS Contractor shall provide on-site training to the District’s representative(s) and maintenance personnel per the following description:

1. On-site training shall consist of a minimum of one hour of hands-on instruction geared at the operation and maintenance of the systems. The curriculum shall include

a. System Overview
b. System Software and Operation
c. System access

d. Software features overview
e. Changing set points and other attributes
f. Scheduling
g. Editing programmed variables
h. Displaying color graphics
i. Running reports
j. Workstation maintenance
k. Application programming
l. Operational sequences including start-up, shutdown, adjusting and balancing.
m. Equipment maintenance

1.9 OPERATING AND MAINTENANCE MANUALS

A. The operation and maintenance manuals shall contain all information necessary for the operation, maintenance, replacement, installation, and parts procurement for the entire EMS. This documentation shall include specific part numbers.

B. Following project completion and testing, the EMS Contractor shall submit as-built documentation reflecting the exact installation of the system.

1.10 WARRANTY

A. The EMS contractor shall warrant the system for 12 months after system acceptance and beneficial use by the District. During the warranty period, the EMS contractor shall be responsible for all necessary revisions to the software as required to provide a complete and workable system consistent with the letter and intent of the Sequence of Operation section of the specification. EMS equipment shall be warranted for a period of 5 years from the time of system acceptance.

B. Warranty of equipment is limited to replacement of defective products.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Unless noted otherwise, all products shall be of a single manufacturer. The standard of design and quality shall be products as manufactured by Pelican Wireless Systems.

B. Products of other manufacturers shall be considered for acceptance provided they equal or exceed the material requirements and functional requirements of the specified product. A request for Architect's approval must be submitted with complete technical data to allow for proper evaluation. All materials for evaluation must be received by Project Manager at least 10 days prior to bid due date.

2.2 WIRELESS GATEWAY (WG)

A. A single WG shall be capable of providing communication between a dedicated cloud server using TCP/IP and the on-site Internet Programmable Thermostats using the IEEE 802.15.4

wireless communication protocol. Additional WGs can be used for a single site, but each WG must meet or exceed these requirements.

B. The WG must provide the following hardware features as a minimum:

1. Single Ethernet Port.
2. One micro-USB 5VDC power input.
3. 2.4 GHz IEEE std. 802.15.4 built-in communication processor.

C. The WG shall provide the communication link between the entire system and a cloud based server. Communication with cloud server shall be secured using AES (Advanced Encryption Standard).

D. The WG shall be able to support 2000 Internet Programmable Thermostats.

2.3 INTERNET PROGRAMMABLE THERMOSTAT (IPT)

A. Internet Programmable Thermostat shall be a wireless communicating commercial programmable thermostat that uses IEEE 802.15.4 for networking communication and a wiring terminal block for controlling a single zone HVAC unit.

B. The IPT shall provide a keypad for setting:

1. Temperature Set points.
2. System Mode (Heat, Cool, Auto, Off).
3. Fan Mode (Auto, On).
4. Light Button.

C. The IPT shall include a wiring terminal for controlling a single zone HVAC unit. The wiring terminal must be able to be removed from the IPT for installations where only 3-wires exist or are available between where the IPT shall be placed and its connection with the HVAC unit it shall be controlling. Over these 3-wires the thermostat must still be able to control the HVAC unit based on these specifications.

D. The IPT must be configurable using a Web Based App. No thermostat configuration, other than setting the IPT to Conventional, Heat Pump - O, or Heat Pump -B, shall be done at the thermostat. Web based Configuration Setting options shall include:

1. Naming the thermostat
2. Grouping multiple thermostats.
3. Heat Pump or Conventional system setting.
4. If Heat Pump; reversing valve O or B setting.
5. Cycles Per Hour (1 - 6).
6. Anticipation Degrees (0˚F - 0.5˚F)
7. Calibration Degrees (2.0˚F - -2.0˚F)
8. Heat Stages (0 - 2)
9. If Heat Pump; Aux Heat (Disabled and/or Enabled Option)
10. Cool Stages (0 - 2)
11. Fan Stages (1 - 2)
12. Fan Circulation Minutes Per Hour.
13. Temperature Display (Fahrenheit or Celsius)

14. Heat Range Temperature Setting Limitation
15. Cool Range Temperature Setting Limitation
16. Ability to disable and enable Keypad Control through schedule.
17. Heat consumption (kw, btu, ton, or watt)
18. Cool consumption (kw, btu, ton, or watt)
19. Notification Sensitivity (High, Medium, Low)
20. Alarm of exceeding temperature based on a Safe Range
21. Schedule set times (2, 3, 4, or Variable).

E. IPT settings and control through the Web Base App shall be in real-time and include:

1. Space Temperature
2. System Mode (Heat, Cool, Auto, Off).
3. Fan Mode (Auto, On).
4. Current set point.
5. Relay status (Heat/Cool and Fan).
6. Historical Trend Graphs.
7. Scheduling
8. Lock and Unlock Entire Thermostat's Keypad
9. Lock and Unlock the Thermostat's Fan Mode setting Only

2.4 WEB BASED GRAPHICAL USER INTERFACE

A. The Web Based App (WBA) shall be able to run on any PC that uses Safari, Chrome, Firefox, or any other web browser that meets these browsers' functionality.

B. The WBA Platform shall be able to run on any Internet Accessible Smartphone and/or Tablet that has a Web Browser compatible with HTML5.

C. The WBA shall allow up to a minimum of 100 simultaneous users/clients to access the Energy Management System.

D. The Web Based client shall support at a minimum, the following functions:

1. User log-on identification and password shall be required.
2. HTML programming shall not be required to display any graphics or data on the Web page.
3. Storage of data shall reside within the cloud server and shall not sit within the client's computer or device. EMS that requires data storage on a client computer or an on-site server is not acceptable.
4. Users shall have administrator and user definable access privileges.
5. Open API interface with XML data output.

E. Schedules:

1. The WBA shall provide user with access to setting Internet Programmable Thermostat (IPT) schedules. Up to 12 schedule periods per day shall be available for each IPT.
2. Schedules shall be available as Weekly (7-day), Daily, or Weekday/Weekend (5-2).
3. The WBA shall provide the user the ability to:

a. View Schedules.

b. Add/Modify Schedules.
c. Assign Thermostat to a Group Schedule.
d. Delete Schedules.

F. Trending

1. The WBA shall provide real-time trend information on:

a. Each IPT's space temperature.
b. Each IPT's temperature set points.
c. Each IPT's current call; heat, cool, and/or fan.
d. Each IEE's call for economization

2. The WBA shall be able to record and provide at least two years of past trend data for every thermostat in the wireless network. Trend data shall include:

a. space temperature; with resolution of every 1/10th of a degree Fahrenheit.
b. IPT's temperature set points.
c. indication of whether the thermostat was calling for; heat, cool, and/or fan.

3. Trend data shall be viewable on the WBS

G. Alarm Notifications

1. The WBA shall provide automatic alarming functionally based on real-time monitoring of at least:

a. space temperature and temperature change.
b. IPT's temperature set points.
c. IPT's current call; heat, cool, and/or fan.

2. The WBA shall be able to provide a user with the ability to:

a. View Alarms.
b. Set Alarm Notification sensitivity level to High, Medium, or Low.
c. Delete Alarms.

3. Alarms shall be able to be sent via email and/or text message to up to 100 or more clients.

2.5 WIRED REMOTE TEMPERATURE SENSORS AND DIGITAL ALARM INPUT

A. Input Temperature Sensor (ITS).

1. The ITS shall connect to the Internet Programmable Thermostat over 3-wires.
2. ITS shall provide at least one external 10K Type II thermistor temperature sensor input.
3. Web Based App shall be able to record and provide at least two years of past temperature data for ITS.
4. The trend data shall be viewable on the WBA.
5. ITS must be accurate to ±1.0℉
6. ITS must be able to be installed up to 500' away from IPT using standard thermostat wiring.

2.6 WIRELESS PROXIMITY SENSORS

A. Wireless Proximity Sensor (WPS).

1. The WPS shall connect with the Internet Programmable Thermostat over the 802.15.4 wireless network.
2. WPS shall be powered by 2 AA batteries or equivalent.
3. WPS must be able to be used for either:

a. Accepting a motion sensor's 2-wire dry contact output.

1) The WPS shall be able to notify an Internet Programmable Thermostat if a motion sensor's dry contact is in either the open or closed position.
2) Dry contact open positions shall indicate that the space is occupied and the IPT must be able to automatically setback its temperature setting by a range of 0℉ - 10℉ or OFF.
3) Dry contact closed position shall indicate that the space is unoccupied and set the temperature to a comfort setting when the space is occupied.
4) Setback settings and comfort settings must be settable through the Internet Programmable Thermostat's schedule through the Web Based App (cannot be settable at thermostat).
5) Web Based App must be able to display when a space is "Unoccupied".

b. Detecting if a Window or Door is Opened or Closed.

1) The WPS must have a built-in magnetic sensor and come with a magnet that can be installed on a door or window.
2) The WPS must be able to notify an Internet Programmable Thermostat if the door is open and the IPT must automatically turn to the OFF position.
3) The WPS must be able to notify an Internet Programmable Thermostat if the door is closed and the IPT must automatically return to its last temperature and system settings.
4) Web Based App must be able to display when the Door or Window is Open and must be able to be set to indicate "Door" or "Window".

c. Web Based App shall be able to notify if the WPS batteries are low and record and provide at least two years of past history on occupancy and/or door/window status for each space a WPS is installed in.

d. The trend data shall be viewable on the Web Based App.

e. Internet Programmable Thermostat must be able to connect with at least 8 WPS, each WPS must have a unique serial number and each WPS shall be settable, through the Web Based App, as either a motion sensor input or as a door/window sensor.

PART 3 - EXECUTION

3.1 CONTRACTOR RESPONSIBILITIES

A. General

1. Installation of the Energy Management System shall be performed by an approved Contractor. The Contractor shall certify all work as proper and complete. Under no circumstances shall the design, scheduling, coordination, programming, training, and warranty requirements for the project be delegated to a subcontractor without prior written approval of the owner.

B. Demolition

1. Remove controls which do not remain as part of the Energy Management System. The Owner shall inform the Contractor of any equipment which is to be removed that shall remain the property of the Owner. All other equipment which is removed shall be disposed of by the Contractor.

C. Access to Site

1. Unless notified otherwise, entrance to building is restricted. No one shall be permitted to enter the building unless their names have been cleared with the District or the District's Representative.

D. Code Compliance

1. All wiring shall be installed in accordance with all applicable electrical codes and shall comply with equipment manufacturer's recommendations.

E. Cleanup

1. At the completion of the work, all equipment pertinent to this Section shall be checked and thoroughly cleaned, and all other areas shall be cleaned around equipment provided under this Section.

3.2 WIRING, CONDUIT, AND CABLE

A. All control wires between HVAC units and thermostat locations to be furnished and installed by others. The EMS contractor shall not begin work on this contract until all wiring is installed to the satisfaction of the EMS contractor. The EMS contractor shall provide wiring between remote temperature sensors, TA1 and thermostats as required, unless noted otherwise in Drawings or Specifications.

3.3 HARDWARE INSTALLATION

A. Installation Practices for Devices

1. All devices are to be mounted level/plumb and per the manufacturer's installation documentation.

B. Identification

1. Identify all control wires with labeling tape or sleeves using either words, letters, or numbers that can be exactly cross-referenced with as-built drawings.

2. All field enclosures, other than controllers, shall be identified with a back lite nameplate. The lettering shall be in white against a black or blue background.
3. Junction box covers shall be marked to indicate that they are a part of the EMS system.
4. All I/O field devices (except space sensors) that are not mounted within FIP's shall be identified with name plates.
5. All I/O field devices inside FIP's shall be labeled.

C. Existing Controls.

1. Existing controls are not to be reused. All EMS devices shall be new.

D. Control System Switch-over

1. The Contractor shall minimize control system downtime during switch-over. Sufficient installation mechanics shall be on site so that the entire switch-over can be accomplished in a reasonable time frame.

E. Location

1. The location of sensors is per mechanical and architectural drawings.
2. Space humidity or temperature sensors shall be mounted away from machinery generating heat, direct light and diffuser air streams.
3. If Input Temperature Sensor(s) (ITS) is used as Outdoor air sensor, Outdoor air sensors shall be mounted on the north building face directly in the outside air. Install sensors such that the effects of heat radiated from the building or sunlight is minimized.
4. If any line voltage electrical control is being installed, field enclosures shall be located immediately adjacent to the controller panel(s) to which it is being interfaced.

3.4 SYSTEM PROGRAMMING

A. General.

1. The Contractor shall provide all labor necessary to install, initialize, start-up and debug all system software as described in this section. This includes any operating system software.
2. Contractor shall work with owner's representative to determine programming parameters including but not limited to hours of operation, set points, system variables, thermostat naming, and site naming. Thermostat & Site naming shall be performed by the contractor. Naming convention (equipment # or name, or space served) shall be provided by or agreed upon with the Owner.

3.5 COMMISSIONING AND SYSTEM STARTUP

A. EMS device functional testing.

1. Each system for which a EMS device has been installed shall be tested for proper installation and functional operation. Test shall include on-site control test to verify each wireless device is responding to signals sent from cloud based servers and responding in accordance with manufacture's specifications.

END OF SECTION

DOCUMENT 260000

GENERAL ELECTRICAL REQUIREMENTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

This section includes general requirements specifically applicable to Divisions 26, 27, & 28; including requirements form Division 1.

1.2 RELATED SECTIONS

A All included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A Standards
  1 AEIC – Association of Edison Illuminating Companies
  2 ANSI – American National Standards Institute
  3 ASTM – American Society of Testing and Materials
  4 CBM – Certified Ballast Manufacturers Association
  5 EIA – Electronic Industry Association
  6 ICEA – Insulated Cable Engineers Association
  7 IEEE – Institute of Electrical and Electronics Engineers
  8 NEMA – The Association of Electrical and Medical Imaging Equipment Manufacturers
  9 FM - Factory Mutual
  10 UL – Underwriter's Laboratory's, Inc., Standards for Safety
B Local codes and authorities having jurisdiction
  1 City codes
  2 County codes
  3 Local fire department
C State codes and authorities having jurisdiction
  1 CBC – California Building Code
  2 CEC – California Electrical Code
  3 State of California Codes
D National codes and authorities having jurisdiction
  1 NESC – National Electrical Safety Code
  2 OSHA – Occupational Safety and Health Act
E Utilities

1 Local cable company
2 Local electrical company
3 Local telephone company

F Code compliance
1 All work and materials shall comply with the latest rules, codes and regulations, including, but not limited to the following:
a Occupational Safety and Health Act Standards (OSHA).
b CCR, Title 24, Part 3: California Electrical Code (CEC)
c All other applicable Federal, State and Local laws and regulations.
2 Code compliance is mandatory. Nothing in these Drawings and Specifications permits work not conforming to National, State, and Local electrical and building codes. Where work is shown to exceed minimum code requirements, comply with Drawings and Specifications.
3 No work shall be concealed until after inspection and approval by proper authorities. If work is concealed without inspection and approval, the Contractor shall be responsible for opening the concealed areas, making any required corrections and/or modifications to his work, and restoring the area to its previous condition.

1.4 DEFINITIONS (APPLICABLE TO DRAWINGS AND SPECIFICATIONS)

A Provide: To supply, install and connect complete and ready for safe and regular operation of particular work referred to unless specifically otherwise noted.
B Install: To erect, mount and connect complete with related accessories.
C Supply: To purchase, procure, acquire and deliver complete with related accessories.
D Work: Labor, materials, equipment, apparatus, controls, accessories and other items required for proper and complete installation.
E Wiring: Raceway, fittings, wire, boxes, related items and connection.
F Concealed: Embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces or in enclosures.
G Exposed: Either visible or subject to mechanical or weather damage, indoors or outdoors, including areas such as mechanical and storage rooms. In general, any item that is directly accessible without removing panels, walls, ceiling or other parts of structure.
H Indicated, Shown, or Noted: As indicated, shown or noted on Drawings or Specifications.
I Above Grade: Not buried in ground and not embedded in concrete slab on ground.
J Below Grade: Buried in ground or embedded in concrete slab on ground.
K Underground: Buried in ground, including under building slabs.
L Connect: Complete hookup of item with required services, including conduit, wire and other accessories.
M Furnish: Supply and deliver complete.

N Similar or Equal: Of base bid manufacturer, equal in materials, weight, size, design, and efficiency of specified product, equivalent to Base Bid Manufacturer's product.

O Reviewed, Satisfactory, Accepted, or Directed: As reviewed, satisfactory, accepted or directed by or to engineer.

P Motor Controllers: Manual or magnetic starters (with or without switches), individual pushbuttons, or hand-off-automatic (HOA) switches controlling the operation of motors.

Q Control Devices: Automatic sensing and switching devices such as thermostats, pressure, float, electro-pneumatic switches and electrodes controlling operation of equipment.

R Contractor: Electrical Sub Contractor unless stated otherwise.

S Use (verb): Furnish and install as defined above.

1.5 LICENSES, FEES AND PERMITS

Pay for all City, County or State electrical licenses, fees and permits. Arrange for all required inspections by agencies or authorities having local jurisdiction. The owner shall pay for all inspection fees and permits.

1.6 CONDITIONS AT SITE

A A visit to the site is required of all bidders prior to submission of bid. All will be held to have familiarized themselves with all discernible conditions and no extra payment will be allowed for work required because of these conditions, whether specifically mentioned or not.

B Underground or overhead lines or other services that are damaged as a result of this work shall promptly be repaired at no expense to the Owner and to complete satisfaction of the Owner.

1.7 DRAWINGS AND SPECIFICATIONS

A All Drawings and all Divisions of these Specifications shall be considered as a whole and work of this Division shown anywhere therein shall be furnished under this Division.

B The Contract Drawings are diagrammatic and indicate the general arrangement of equipment and wiring. Most direct routing of conduit and wiring is not assured. Exact requirements shall be governed by architectural, structural and mechanical conditions of the job. Consult all other Drawings in preparation of the bid. Extra lengths of wiring or addition of pull or junction boxes, etc., necessitated by such conditions shall be included in the bid. Check all information and report any apparent discrepancies before submitting bid.

C Right is reserved to make change up to ten (10) feet in location of any outlet, device, or equipment prior to roughing in without increasing contract cost.

D Equipment and fixtures shall be connected to provide circuit continuity in accordance with applicable codes, whether or not each piece of conductor,

conduit or protective device is shown between items of equipment or fixtures and the point of circuit origin.

1.8 SAFETY AND INDEMNITY

A Safety: The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and not be limited to normal working hours.

B No act, service, Drawing review or construction review by Owner, the Architect, the Engineers or their Consultants, is intended to include review of the adequacy of the Contractor's safety measures, in on or near the construction site.

1.9 RECORD DRAWINGS

A Submit record Drawings under provisions of Section 013000.

B Submit prior to final acceptance inspection, one complete marked-up set of reproducible engineering design Drawings.

1 Fully illustrate revisions made by crafts in course of work.

2 Include field changes, adjustments, variances, substitutions and deletions, including Change Orders.

3 Indicate exact location of raceways, equipment, and devices.

4 Indicate exact size and location of underground and under floor raceways, grounding conductors, and duct banks.

5 The record Drawings shall show all the work actually constructed and originally shown on the Drawing based upon the field construction by the Contractor.

C These Drawings shall be for record purposes for Owner's use and are not considered Shop Drawings.

1.10 MANUFACTURER'S INSTRUCTIONS

A Where the Specifications call for an installation to be made in accordance with manufacturer's recommendations, a copy of such recommendations shall at all times be kept in the job superintendent's office and shall be available to the Owner's representative.

B Follow manufacturer's instructions where they cover points not specifically indicated on Drawings and Specifications. If they are in conflict with the Drawings and Specifications, obtain clarification from the Architect or Engineer before starting work.

C One (1) set of equipment manufacturer's Drawings shall be submitted to the Engineer for their record.

1.11 OPERATING AND MAINTENANCE MANUALS

A Operating and maintenance manuals and close-out documents are used interchangeably

B Submit operating and maintenance manuals of equipment in the following format. Owner shall decide which format they prefer.
1 Three (3) hardcopy sets
2 PDF format

C For specific requirements, see the sections in which the equipment is specified.

1.12 QUALITY ASSURANCE

A Provide a meaningful quality assurance program. To assist the Contractor in this program, the Specifications contained herein are set forth as the minimum acceptable requirements. This does not relieve the Contractor from executing other quality assurance measures to obtain a complete operating facility within the scope of this project.

B The Contractor shall insure that workmanship, materials employed, required equipment and the manner and method of installation conforms to accepted construction and engineering practices, and that each piece of equipment is in satisfactory working condition to satisfactorily perform its functional operation.

1.13 GUARANTEE

Guarantee the installation free from defects of workmanship and materials for a period of one (1) year after Date of Certificate of final payment and promptly remedy any defects developing during this period, without charge.

1.14 BIDDING

A The contractor shall bid on the plans, specifications, etc. that constitute the contract documents.

B The contractor shall not attempt to modify the contract documents without the approval of the electrical engineer.

C All “value engineering” proposals shall be submitted in to the electrical engineer writing.

D If the contractor makes changes to the contract documents not approved by the electrical engineer, the contractor will still be responsible for installing all devices, conductors, conduits, etc. the contract documents call for.

1.15 ABBREVIATIONS

AIC	Amps interrupting capability
ANSI	American National Standards Institute
ASTM	ASTM International, formerly American Society for Testing and Materials
ATC	Astronomical time clock
ATS	Automatic transfer switch
CAD	Computer aided design
CATV	Cable television
CBC	California Building Code
CCTV	Closed circuit television

CEC	California Electrical Code
CFC	California Fire Code
CFR	Code of Federal Regulations
CMC	California Mechanical Code
CPC	California Plumbing Code
CSFM	California State Fire Marshal
DPDT	Double pole, double throw
DPST	Double pole, single throw
DVR	Digital video recorder
EIA	Electronic Industries Association
EMT	Electrometallic conduit
EOR	Engineer of record
EPA	Effective projected area
FACP	Fire alarm control panel
FMC	Flexible metallic conduit
GRS	Galvanized, rigid steel conduit
HVR	Hybrid video recorder
ICC-ES	International Code Council Evaluation Service
IDF	Intermediate data frame
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineering Society of North America
IMC	Intermediate metallic conduit
I/O	Input/output
IOR	Inspector of record
IP	Internet protocol
ISO	International Organization for Standardization
LAN	Local area network
LCD	Liquid crystal display
LCP	Lighting control panel/lighting relay panel
LED	Light emitting diodes
LPI	Lightning Protection Institute
MDF	Main data frame
NEC	National Electrical Code
NEMA	Association of Electrical Equipment and Medical Imaging Manufacturers
NETA	National Electrical Testing Association
NFPA	National Fire Protection Association
NIST	National Institute of Standards and Technology
OCPD	Overcurrent protection device
PDF	Portable document format
PG&E	Pacific Gas and Electric
PTZ	Pan, tilt, zoom
SCCR	Short circuit current rating
SPD	Surge protective device
SPDT	Single pole, double throw
SPST	Single pole, single throw
THD	Total harmonic distortion
TIA	Telecommunications Industries Association

UL	Underwriters' Laboratories
USB	Universal series bus
UPS	Uninterruptable power supply
VFD	Variable frequency drive
VOIP	Voice over Internet protocol
VPN	Virtual private network
WAN	Wide area network

PART 2 – PRODUCTS

2.1 MATERIAL APPROVAL

A All materials must be new and bear Underwriters' Laboratories label. Materials that are not covered by UL testing standards shall be tested and approved by an independent testing laboratory or a governmental agency.

B Material not in accordance with these Specifications may be rejected either before or after installation.

C Materials or equipment specified by:
1 Name of manufacturer.
2 Brand or trade name.
3 Catalog reference.

2.2 SUBSTITUTIONS

A Base the bid on use of materials specified.

B Equipment other than specified will be considered for approval provided it meets previous items A through C and the following is submitted in writing by the Contractor to the Engineer to allow approval at least 14 days before the bid date:
1 The request for permission to substitute shall be accompanied with a statement of the amount of money to be returned to the contract if the substitution is permitted.
2 Return a completed request for substitution form.

C The engineer is the sole judge of acceptability of preferred substitutions.

D If a substitute is permitted, and any re design effort is thereby necessitated, the required re design shall be at the Contractor's expense.

2.3 SUBMITTALS

Submit to architect, or engineer if no architect is involved, seven (7) copies of complete Shop Drawings and materials lists, as noted below, for review within thirty (35) days after award of contract. All proposed deviations from Specifications must be clearly listed and submitted separately under a prominent heading entitled "Substitutions."

A Fire Alarm Systems

B Communication Systems

C Pull Boxes and Cabinets
D Conduit and Wire
E Service and distribution
F Transformers

2.4 OPERATING AND MAINTENANCE MANUALS

Submit Operating and Maintenance Manuals of equipment as specified under Division 1. Verify exact quantity with architect, or engineer if no architect is involved.

2.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A Equipment shall be shipped in its original packages, to prevent damaging or entrance of foreign matter. Handling and shipping shall be performed in accordance with manufacturer's recommendations. Provide protective covering during construction.
B Replace at no expense to Owner, equipment or material damaged during the storage or handling, as directed by the engineer.
C Equipment shall be tagged with a weatherproof tag identifying equipment by name and purchase order number. Packing and shipping lists shall be included.

PART 3 – EXECUTION

3.1 CLEARANCE

Minimum code required clearances for electrical equipment shall not be violated.

3.2 WORKMANSHIP AND CONTRACTOR'S QUALIFICATIONS

A Only quality workmanship will be accepted. Haphazard or poor installation practice will be cause for rejection of work.
B The Electrical Contractor shall provide a Superintendent in charge of this work at all times to direct the quality of the installation.

3.3 COORDINATION

A Coordinate work with other trades to avoid conflict and to provide correct rough in and connection for equipment furnished under other trades and requiring electrical connections. Inform Contractors of other trades of the required access to and clearances around electrical equipment to maintain serviceability and code compliance.
B Verify equipment dimensions and requirements with provisions specified under this Section. Check actual job conditions before fabricating work. Report necessary changes in time to prevent needless work. Changes or additions

subject to additional compensation and agreed price shall be at Contractor's risk and expense.

C Provide temporary feeds and connections to areas and equipment as required to allow phased construction and operation.

3.4 CUTTING AND PATCHING

All cutting and patching required for work of this Division is included herein. Coordination with General Contractor and other trades is imperative. Contractor shall bear the responsibility for and bear the added expense of adjusting for improper holes, supports, etc.

END OF SECTION

DOCUMENT 260500

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 – GENERAL

1.1 SECTION INCLUDES

Materials, equipment fabrication, installation and tests in conformity with applicable codes and authorities having jurisdiction, for the following:

A Conduit and raceways
B Wire and cables
C Outlet boxes
D Junction boxes
E Pull boxes
F Grounding

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

Published specification standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.

A American Society for Testing and Materials
  1 ASTM B3: Standard Specification for Soft or Annealed Copper Wire
  2 ASTM B33: Standard Specification for Tin-Coated or Annealed Copper Wire for Electrical Purposes
  3 ASTM B738: Standard Specification for Fine-Wire Bunch-Stranded and Rope-Lay Bunch-Stranded Copper Conductors for Use as Electrical Conductors
  4 ASTM B355: Standard Specification for Nickel-Coated, Soft or Annealed Copper Wire
  5 ASTM D412: Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension

B California Electrical Code (CEC)

C Institute of Electrical and Electronic Engineers (IEEE)

1 IEEE 81: Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System Part 1: Normal Measurements

2 IEEE 82: Standard Test Procedure for Impulse Voltage Tests on Insulated Conductors

3 IEEE 95: Standard Test Procedure for Impulse Voltage Tests on Insulated Conductors

4 IEEE 141: Recommended Practice for Electric Power Distribution for Industrial Plants

5 IEEE 142: IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems

6 IEEE 241: Recommended Practice for Electric Power Systems in Commercial Buildings

7 IEEE 242: Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems (IEEE Buff Book)

8 IEEE 399: Recommended Practice for Industrial and Commercial Power Systems Analysis (Brown Book)

9 IEEE 442: Guide for Soil Thermal Resistivity Measurements

10 IEEE 576: Recommended Practice for Installation, Termination, and Testing of Insulated Power Cable as Used in Industrial and Commercial Applications

11 IEEE 1185: Recommended Practice for Cable Installation in Generating Stations and Industrial Facilities

12 IEEE 1584: Guide for Performing Arc Flash Hazard Calculations

13 IEEE 1584a: Guide for Performing Arc-Flash Hazard Calculations--Amendment 1

14 IEEE 1584b: Guide for Performing Arc-Flash Hazard Calculations--Amendment 2: Changes to Clause 4

D Underwriters' Laboratories

1 UL 1: Flexible Metal Conduits

2 UL 4: Armored Cable

3 UL 6: Electrical Rigid Metal Conduit – Steel

4 UL 13: Power Limited Circuit Cables

5 UL 83: Thermoplastic Insulated Wires and Cables

6 UL 310: Electrical Quick-connect Terminals

7 UL 360: Liquid Tight Flexible Steel Conduit

8 UL 444: Communications Cables

9 UL 467: Grounding and Bonding Equipment

10 UL 486A: Wire Connectors

11 UL 486B: Wire Connectors

12 UL 486C: Splicing Wire Connectors

13 UL 486D: Sealed Wire Connector Systems

14 UL 486E: Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors

15 UL 493: Thermoplastic Insulated Underground Feeder and Branch Circuit Cables

- UL 510: Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape
- UL 514A: Metallic Outlet Boxes
- UL 514B: Conduit, Tubing, and Cable Fittings
- UL 514C: Nonmetallic Outlet Boxes, Flush-device Boxes, and Covers
- UL 514D: Cover Plates for Flush-mounted Wiring Devices
- UL 568: Nonmetallic Cable Tray System
- UL 635: Insulating Bushings
- UL 651: Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
- UL 797: Electrical Metallic Tubing – Steel
- UL 854: Service Entrance Cables
- UL 870: Wireways, Auxiliary Gutters, and Associated Fittings
- UL 969: Marking and Labeling Systems
- UL 1242: Standard for Electrical Intermediate Metal Conduit - Steel
- UL 1332: Organic Coatings for Steel Enclosures for Outdoor Use Electrical Equipment
- UL 1446: Systems of Insulating Materials – General
- UL 1479: Fire Tests of Through Penetration Firestops
- UL 1565: Position Devices (includes cable ties and clamps)
- UL 1581: Reference Standard for Electrical Wires, Cables, and Flexible Cords
- UL 1652: Flexible Metallic Tubing
- UL 1685: Vertical-tray Fire Propagation and Smoke Release Test for Electrical and Optical Fiber Cables
- UL 1773: Standard for Termination Boxes
- UL 1977: Component Connectors for Use in Data, Signal, Control, and Power Applications
- UL 2024: Standard for Signaling, Optical Fiber and Communications Raceways and Cable Routing Assemblies
- UL 2196: Test for Fire Resistive Cables
- UL 2239: Hardware for the Support of Conduit, Tubing, and Cable
- UL 2256: Nonmetallic Sheathed Cable Interconnects
- UL 2257: Identification Tests for Jacket and Insulation Materials Used in Plenum Cables
- UL 2277: Flexible Motor Supply Cable and Wind Turbine Tray Cable
- UL 2459: Insulated Multi-pole Splicing Wire Connectors
- UL 2556: Wire and Cable Test Methods

1.4 QUALITY ASSURANCE

A. Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.

B. Supply equipment and accessories new, free from defects.

C. Equipment and accessories in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.

D. Items of a given type shall be the products of the same manufacturer.

E. Deliver, store and protect products under provisions of Section 016000.

F Ship equipment in its original packages, to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.

G Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.

H Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

1.5 SUBMITTALS

A Submit under provisions of Section 013000 or 013300.

B Submittals shall include the following:

1 Table of contents

2 A complete set of detailed manufacturer's specifications describing and illustrating all standard and special components and materials

3 Part numbers

4 Evidence of compliance with the applicable standards listed under Article 1.3 of this section

5 Maintenance instructions and intervals

6 Calibration procedures and intervals

7 A complete set of drawings for any special items

8 Wiring diagrams

C Electronic submittals shall be searchable

D Seismic Restraint and Anchorage: Provide complete seismic anchorage and bracing for the lateral and vertical support of conduit and electrical equipment in accordance with CBC, Title 24, Part 2, Section 1616A.1 and ASCE 7-10 Section 13.6, and all provisions of this Section.

1 Submit calculations prepared and signed by a Structural Engineer licensed in the State of California, showing compliance with the above for all electrical equipment weighing more than 50 pounds, excepting items corresponding exactly in configuration and weight to those specified and detailed. Where anchorage details are not shown on drawings, the field installation shall be subject to the approval of the Electrical Engineer.

2 All equipment mounted on concrete shall be secured with post-installed concrete requiring a drilled hole. Power driven anchors are not acceptable. Minimum spacing shall be 10 diameter center to center and 5 diameters center to edge of concrete. Maximum allowable loads for tension and shear shall be as determined in compliance with ACI 318-14 Chapter 17 and the anchor's ICC or IAPMO evaluation report. Acceptable manufacturers are Hilti, Red Head, and Simpson Strong Tie.

3 Conduit and suspended equipment shall be provided with supports and seismic restraints in accordance with Unistrut, Inc. Seismic Bracing Guide, or Super Strut Inc., Seismic Restraint System guide. Support requirements shall e based upon similar equipment; i.e., water piping as equivalent to conduit with wire fill. A copy of the guide shall be on the job site during construction.

E The submittal shall be substantially complete for all items and equipment furnished under this section.
F Individual drawings and data sheets submitted at random intervals will not be accepted for review.
G Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.
B The manuals shall, at minimum, include the following:
1 Table of contents
2 Manufacturer (including contact information)
3 Model number
4 Voltage ratings
5 Current ratings
6 List of capabilities
7 Environmental ratings
8 NEMA enclosure type
9 Maintenance instructions and intervals
10 Calibration procedures and intervals
11 Installation instructions
12 Repair instructions (where applicable)
13 As-built drawings
C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

PART 2 – PRODUCTS

2.1 CONDUIT AND OTHER RACEWAYS

A Rigid Conduit, also referred to as Galvanized Rigid Steel Conduit (GRS)
1 Material: High strength steel
2 Coating
a All uses: hot-dipped galvanized
b Underground or corrosive areas
1 40-mil, UV stabilized PVC coated
2 Coating shall conform to NEMA RN-1
3 Fittings shall be threaded.
4 Conduit shall be UL-6 listed.
B Intermediate Metal Conduit (IMC)
1 Material: Steel
2 Coating
a All uses: hot-dipped galvanized
b Underground or corrosive areas
1 40-mil, UV stabilized PVC coated

2 Coating shall conform to NEMA RN-1

3 Conduit shall be UL-1242 listed.

C Electrical Metallic Tubing (EMT)

1 Material: Steel

2 Coating

a All uses: hot-dipped galvanized

b Underground or corrosive areas

1 40-mil, UV stabilized PVC coated

2 Coating shall conform to NEMA RN-1

3 Fittings shall be threaded.

4 Connectors and couplings

a Water tight, steel compression type exterior and in wet locations. Use ETP Fittings InspectoRidge or approved equal when possible.

b Steel set screw type in interior, dry locations.

D Non-metallic conduit

1 Conduit shall be schedule 40 PVC (minimum)

2 Approved for use as non-metallic raceway with 90°C conductors

3 Comply with NEMA TC-2 and NEMA TC-3

E Flexible Metallic Conduit

1 Material: High strength, hot-dipped galvanized steel

2 Construction: Interlocked

3 Conduits in damp, wet, or corrosive areas shall be liquid tight type with PVC jacket extruded over the steel conduit.

F Fittings and accessories

1 Fittings and accessories for all conduit types shall be approved for the purpose and equal in all respects to the conduit or raceway.

2 Fittings and accessories for metallic conduits shall be made of ferrous metal and galvanized after fabrication.

G Pull lines

1 Pull line shall be 1/8 inch diameter, yellow color.

2 Pull lines shall be Tubbs Cordage "Polyline" or approved equal.

H Wireways

1 NEMA type

a NEMA-1 for dry locations

b NEMA-3R or NEMA-4 for damp and wet locations

c NEMA-4X for corrosive locations

2 Metal type

a Non-corrosive locations: mild steel

b Corrosive locations: stainless steel

3 Thicknesses

a 6”x6” cross-section and smaller: 16 gauge

b 8”x8” cross-section and larger: 14 gauge

4 Finish: The entire enclosure shall be finished as follows:

a Degreasing

b Cleaning

c Phosphatizing

d Electrostatic deposition of polymer polyester powder coating followed by baking to produce a hard durable finish.

1 The average thickness of the paint film shall be 2.0 mils.
2 Paint film shall be uniform in color and free from blisters, sags, flaking and peeling

e Finish shall conform to UL 50 and UL 50E.
f Color shall match surrounding area.

5 Covers
a Wireways shall have hinged covers.
b NEMA 3R, 4 and 4X wireways shall be a gasket on the inside of the cover to seal the wireway when cover is closed.
c Covers shall have latches to secure the cover in the closed position.

6 Wireways shall be UL listed.

I Raceways shall be UL listed.

2.2 WIRE AND CABLE

A Conductors for power and lighting systems 600V or less:
1 Conductors shall be 90°C rated.
2 Conductors size #12 AWG and larger shall be stranded copper.
3 Type:
a THWN for wet or underground locations
b THHN for dry locations.
c 90°C rated
4 Minimum conductor size for voltage drop:
a Minimum size #12 AWG for runs 50 feet or less for 208/120V systems or 100 feet or less for 480/277V systems
b Increase conductor by one size by one method below:
1 For each additional 50 feet for 208/120V systems or 100 feet for 480/277V systems.
2 Calculate voltage drop and size as directed by CEC Voltage Drop Restrictions.
c Underground circuits shall be #8 AWG minimum wire, unless otherwise noted.
d Once the contractor has determined conductors' route, calculate the minimum size to meet maximum voltage drop allowed per CEC using $D_{min}=C*L*I/(V_D*N)$.
1 D_{min} is the minimum diameter (circular mills)
2 C=24 for copper, C=39 for aluminum
3 L is conductor length (feet)
4 I is the current (amps)
5 V_D is the maximum allowable voltage drop (volts)
6 N is the quantity of parallel conductors per phase
5 Minimum size conductors for OCPD shall be determined from CEC Table 310.16 with ampacity corrected for 115°F.
6 Conductor size shall the largest size to meet maximum voltage drop (2.2 A 4) and to meet CEC ampacity requirements (2.2 A 5).

B For Signal and Communication Circuits:
1 Special Cables: As specified on Drawings.

2 Conductors for general communications use: Stranded copper conductor, #16 AWG minimum, with THWN insulation for underground or wet locations and THHN insulation for dry locations.
3 Ends of stranded conductors shall be tinned.

2.3 OUTLET BOXES, JUNCTION BOXES, AND PULL BOXES

A Above ground locations
1 Outlet Boxes
a Hot-dipped galvanized after fabrication
b Of required size, minimum 4 inches square, for flush mounted devices and lighting fixtures
c Cast type with gasketed covers for outdoor or wet locations.
d Device and fixture back boxes shall be 2-1/4” deep, minimum.
2 Junction and Pull Boxes
a Use outlet boxes with appropriate covers as junction boxes wherever possible.
b Larger junction and pull boxes
1 Sheet steel, hot dipped galvanized after fabrication, finished gray baked enamel
2 Sized according to code
3 Screw-on covers.
B In-ground pull boxes, handholes, and manholes
1 Precast concrete type with required extension collars.
2 Covers
a Lids shall be steel or reinforced concrete, as shown on plans. Pull box lids in traffic areas or large grassy areas subject to mowing by riding mowers shall traffic rated.
b Covers shall include hold down bolts.
c Top of cover shall be flush with top of box.
d Covers shall be identified as ELECTRICAL, SIGNAL, or COMMUNICATIONS unless otherwise specified.
3 Size boxes as indicated on Drawings. If size is not indicated on Drawings, use CEC as a minimum requirement.
4 Boxes shall have 2” thick (minimum), reinforced concrete bottoms with 1” diameter drain hole over 12” of crushed rock.
5 Boxes shall have approved cable supports.
6 Concrete encased stubs for handholes extending five (5) feet beyond handhole.
7 All pull boxes shall be no smaller than a Christy N-9.
8 All pull boxes shall be set flush to finished grade and shall have an 8-inch wide by 3-inch thick concrete mow strip poured around it.
9 Manufacturer shall be Brooks Products, Oldcastle Enclosure Solutions (Christy), Jensen Precast, or approved equal.
10 All sections between box, extension rings, etc. and penetrations shall be sealed with mortar.
C Floor Boxes

1 Provide Walker or equal Modulink non-metallic floor box for concrete areas.
2 Provide quantity of boxes required to accommodate each device.
3 Provide Walker Wood Floor Boxes at wood floors provide quantity required to accommodate each device.
4 Provide brass flip cover lids.

D Outlet boxes, junction boxes, pull boxes, etc. recessed in a concrete wall shall be deep masonry boxes.

2.4 CONDUIT AND EQUIPMENT SUPPORTS

A Conduit supports
1 For Individual conduit runs not directly fastened to the structure: Rod hangers
2 For multiple conduit runs: Trapeze type conduit support designed for maximum loading deflection not exceeding manufacturer's recommendations.

B Materials
1 All materials not otherwise noted:
a Steel with the finished part hot dipped galvanized
b Stainless steel for corrosive or damp environments
2 All bolts and nuts shall be stainless steel.

C Supports anchored to earth shall be anchored in a concrete base per details.

D Manufacturers shall be Caddy, Unistrut, Powerstrut, or approved equal.

E All exposed channels shall have end caps made by the channel manufacturer and designed for use with the channel.

2.5 WIRE CONNECTORS

A For wire size #8 AWG and smaller: Insulated, screw type, rated 105°C, 600V for building wiring and 1000V for fixtures; Scotchlok, Ideal, or approved equal.

B For wire size #6 AWG and larger: T&B or approved equal screw type with 3M "#33+" or Plymouth "Slipknot Gray" tape insulation.

C Underground wire splices
1 Connect ends of conductors with copper compression connectors, 3M Scotchlok or approved equal.
2 Seal splice with inline resin splice kit approved for weather exposure, direct burial, and wet locations, 3M Scotchcast or approved equal.

D Only set screw, compression type connectors may be used for MC cables. Fish hook/open tang connectors are prohibited.

2.6 GROUNDING

A Ground Rods
1 3/4 inch diameter
2 Copper weld type
3 10 feet in length.

B Ground Wire: Conductors shall be medium-hard drawn, copper, and stranded, with sizes as shown on drawings.

C Utilize CADWELD Multi-System Exothermic Welding for below grade ground connections.

D Bolts, nuts, and washers shall be bronze, cadmium plated steel, or other corrosion resistant material approved for the purpose.

2.7 MISCELLANEOUS MATERIALS

A All screws, bolts, nuts, and washers on equipment outdoors or in wet or corrosive environments shall be stainless steel.

2.8 SEALANTS

A General purpose sealant: One part polysulfide or polyurethane, Federal Standard TT-S-00230c or two-part polyurethane, Federal Standard TT-SS-227E of Mameco Vulkem 116 or 227 or approved equal product manufactured by Products Research and Chemical Corporation. Pecora, Sika, Sonneborn, or Tremco may be substituted under provisions of Section 016000.

B Conduit sealant
- 1 Two part, self curing urethane
- 2 Non-sagging
- 3 Liquid and gas tight
- 4 Chemically stable once cured
- 5 Compatible with conduit and conductor materials
- 6 Designed for use as conduit seal

C Fire retardant sealant: Dow Corning Company, Type 3-6548 silicone RTV foam sealant, closed cell, 18 lb. density, 2-part system with UL certification. Type 96-081 one-part sealant shall be used for small spaces and cracks. 3M Fire Barrier Caulk CP25 is also acceptable.

2.9 IDENTIFICATION

A Nameplates:
- 1 White, acrylic plastic suitable for indoor or outdoor use
- 2 Face colored as below with engraved, white, 3/16” minimum, Arial or similar font characters
  - a Equipment on normal systems: Black face
  - b Equipment on emergency systems: Red face
- 3 Clear plastic overlay suitable for indoor or outdoor use that can be replaced if vandalized.
- 4 Sign shall include device name, voltage, and size.
- 5 Outdoor nameplates shall be UV stable and fade resistant.

B Pull line identification tags:
- 1 Aluminum plate
- 2 1/8” tall (minimum), Arial (or similar) font, identifying text stamped on plate
- 3 Tags shall describe conduit’s length, source, and destination.

PART 3 – EXECUTION

3.1 GENERAL

A Electric system layouts indicated on the Drawings are generally diagrammatic but shall be followed as closely as actual construction and work of other trades will permit. Govern exact routing of cable and wiring and the locations of outlets by the structure and equipment served. Dimensions shall be taken from Architectural Drawings.

B Consult all other Drawings. Verify scales and report any dimensional discrepancies or other conflicts to architect, or engineer if no architect is involved, before submitting bid.

C Home runs to panelboards are indicated as starting from the outlet nearest the panel and continuing in the general direction of that panel. Continue such circuits to the panel as though the routes were completely indicated. Terminate homeruns of signal, alarm, and communications system in a similar manner.

D Avoid cutting and boring holes through structure or structural members wherever possible. Obtain prior approval of Architect and conform to structural requirements when cutting or boring the structure is necessary or permitted.

E Furnish and install necessary hardware, hangers, blocking, brackets, bracing, runners, required for equipment specified under this section.

F Provide necessary backing required to insure rigid mounting of outlet boxes.

G Install pull line in all conduits to remain that will have their conductors removed.

3.2 INSTALLATION OF CONDUIT

A Run conduit concealed unless otherwise noted or shown on Drawings.

B Run exposed conduit parallel to or at right angles to center lines of columns and beams.

C Run no conduit in concrete slabs or floors except at point of penetration. Penetrations shall be at right angles to slab surfaces.

D Install conduit above ceilings to avoid obstructing removal of ceiling tiles, lighting fixtures, air diffusers, etc.

E Conduit shall not cross any duct shaft or area designated as future duct shaft. Coordinated with mechanical work to avoid any conflict.

F Install pull line in empty conduit installed under this contract. Provide and install labels as describe in “Identification” sub-section.

G Spare conduits shall be capped to prevent intrusion of moisture and foreign objects.

H Minimum conduit size shall be 1/2 inches when installed above ground and 3/4 inches when installed underground or under building slabs. Increase conduit size as required for wiring. Size for conduit, unless specifically shown otherwise, shall be determined from Table 3 for all conductors, Chapter 9 of latest National Electric Code.

I Conduit shall be rigid conduit, IMC, EMT, or plastic as follows:

1 Above ground and dry locations: Use rigid conduit, IMC or EMT.

a Wet locations: Rigid conduit, IMC.

b Locations subject to mechanical injury: Rigid conduit or IMC only.
c In concrete walls or block walls: Rigid steel conduit or IMC only.
d Dry locations and not subject to mechanical injury: EMT (interior locations only), IMC, or rigid conduit.

2 Underground: Use wrapped rigid steel or plastic.
a Schedule 40 PVC: For use underground where protected by concrete slabs, asphaltic pavement, or concrete walkways. Use steel elbows for plastic conduit runs penetrating floor slabs. Bends in plastic conduit other than normal long sweeps shall be made only with factory formed ells or curved segments. Heat bending may not be used. Sections of rigid steel conduit runs are required where direction changes. In all cases where use of plastic conduit is allowed or specified, Contractor may, at his option, use rigid steel conduit.
b Underground conduits shall have red 4” wide identifying caution tape reading "CAUTION ELECTRICAL LINE BELOW”, length as required and installed 12” above all conduits runs.
c Do not install plastic conduit in rock base.
d Underground conduit entering building shall be provided with one (1) 10 foot section of rigid steel conduit at point of penetration of foundation, footing or basement wall, with approximately equal lengths inside and outside building line, unless otherwise noted.

3 Bends
a Make risers to grade with rigid steel long radius sweep conduit and rigid steel elbow fittings only.
b Minimum radius of sweeps shall be 24 inches.

J Burial depth of conduit shall be as follows:
1 Concrete encased: 24 inch minimum for 600V or lower systems to top of concrete encasement.
2 Conduit without concrete encasement or cap: 24 inch minimum to top of conduit.
3 When installed under buildings, the above minimum depth shall be 18 inches below bottom of floor slab.

K Use flexible steel conduit in the following applications:
1 Recessed lighting fixtures.
2 Motor connections.
3 Connection between fan plenum and structure.
4 At expansion joints.
5 At transformers and other equipment which produce vibration.

L Provide junction boxes/pull boxes as required to limit any power system conduit run to a maximum of four (4) 90 degree bends (two (2) 90 degree bends for signal communication system conduit runs) or to avoid "U" bends.

M Conduit Supports:
1 Support conduit with Underwriters' Laboratories listed conduit support intervals required by the California Electric Code.
2 Wire or sheet metal strips are not acceptable for conduit not directly fastened to structure or for multiple conduit runs.

3 Individual conduit 1/2 inch and 3/4 inch size may be supported from ceiling support wire with Caddy clips only if acceptable to local code. Only one conduit is permitted to be attached to any ceiling support wire. Hang such conduit so as not to affect level of ceiling.

4 Avoid attaching conduit to fan plenums. When it is necessary to support conduit from fan plenum, provide a length of flexible conduit between the section attached to the fan plenum and other sections. Provide a length of flexible conduit between the portion attached to the building to minimize transmission of vibration to the building structure.

N Conduit penetration of roof, walls, floors and ceilings shall be sealed to preserve the integrity of waterproofing, fire rating and soundproofing for which the roof, wall, floor or ceiling is designed. Materials and methods used shall conform to that specified under Architectural sections.

O Underground conduit and ducts 2 inches and larger shall be proven clear by pulling through a mandrel 1/4 inch smaller than the inside diameter.

P Where flush branch circuit panelboards or terminal cabinets are shown on walls, stub a minimum of four (4) 1 inch empty conduit into overhead ceiling spaces and four (4) 1 inch empty conduit into space below floor (if any) in addition to conduit required for circuit wiring.

Q Paint all exposed conduit to match its surroundings.

R Plastic conduits exposed to sun light shall be UV stabilized.

S Where rigid steel conduit runs in direct contact with the earth, conduit shall be wrapped with 10-mill PVC tape to form 40 mil of protection, or shall have factory applied PVC coating.

T Label all conduits at each terminus, pull box, and junction box.

U All conduits shall have a minimum of one pull line.

V All pull lines shall be tagged at both ends so as to indicate the length of the conduit run, source, and the destination.

3.3 INSTALLATION OF WIRE

A Install all wiring in raceway unless specifically shown or noted otherwise.

B Pull no wire into any portion of the conduit system until construction work which may damage the wire has been completed.

C Install wire continuous from outlet to outlet or terminal to terminal. Splices in cables when required shall be made in handholes, pull boxes or junction boxes. Make branch circuit splices in outlet boxes with 8 inches of correctly color-coded tails left in the box.

D Make splices in wires and cables utilizing specified materials and methods.

E Cables and wires passing through handholes shall be full looped inside the handhole (360 degree) and supported on galvanized steel racks, beginning 10” above the bottom of the handhole. Leave handhole in clean condition with debris removed.

F Make ground, neutral, and line connections to receptacle and wiring device terminals as recommended by manufacturer. Provide ground jumper from outlet box to ground terminal of devices when the device is not approved for grounding through the mounting screws.

G Provide Brady wire markers where number of conductors in a box exceed four (4).

H Wiring shall be tested for continuity (600V and below). All systems shall be entirely free from grounds, short circuits, and any or all defects.

I Measure and record the insulation resistance of 600 volt insulated conductors size #4/0 AWG and larger using a 500 volt megger for one minute. Make tests with circuits isolated from source and load.

J All conductor bends must have a radius greater than or equal to the manufacturer's listed bending radius.

K Label all conductors at each terminus, pull box, and junction box.

3.4 WIRE COLOR CODE

A Color code conductors. Wire sized #8 AWG and smaller shall have integral color coded insulation. Wire sizes #6 AWG and larger may have black insulation but shall be identified by color coded electrical tape at junction, splice, pull and termination points. Apply color tape with 1/2 lap to at least 6 inches of the conductor.

B Color code wire as follows:

Conductors	208/120V	480/277V
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	White or Gray (consistent throughout facility)
Ground	Green	Green

3.5 CONNECTIONS TO EQUIPMENT

A General:

1 Furnish and install required power supply conduit and wiring to equipment. See below for other wiring required.

2 Furnish and install a disconnect switch immediately ahead of and adjacent to each magnetic motor starter or appliance unless the motor or appliance is located adjacent to and within sight of the serving panelboard, circuit breaker or switch. Verify equipment nameplate current ratings prior to installation.

3 Mount motor starters including those furnished under other sections or specifications and provide power wiring to them.

4 Install rough-in work for equipment from approved shop drawings to suit the specific requirements of the equipment.

5 Furnish and install magnetic motor starters that are shown on the Drawings or specified under other divisions to be furnished under this division of work. Verify equipment nameplate ratings prior to installation and furnish adequately rated starters for the loads.

6 Furnish and install manual thermal protection for motors not integrally equipped with thermal protection.

7 Furnish and install 120V power to each control panel and time switch requiring a source of power to operate.

B Heating, ventilating, and air conditioning equipment:
1 Coordinate with mechanical contractor for sizes, locations and details of motors, heating units, and control requirements.
2 Provide required power supply conduit and wiring to equipment.
3 Provide a suitable means of disconnect switch immediately ahead of and adjacent to each motor and appliance unless the motor or appliance is located adjacent and within sight of the service panelboard, circuit breaker or switch at a distance allowed by codes. Verify equipment nameplate current ratings prior to installation. Provide a disconnect means at each magnetic motor starter.
4 Provide magnetic motor starters required under this division of work.
5 Provide manual thermal protection for motors not integrally equipped with thermal protection.
6 Line and low voltage temperature control and interlock wiring, conduit, and required connections are a part of other divisions unless specifically shown or noted on the Drawings as to be furnished under this section.
7 Provide 120V power supply to control panels, time switch furnished and installed under other divisions of work.
8 Furnish and install 120V power to each duct detector scheduled for operation of fire dampers or shut down of mechanical equipment. Coordinate the exact quantity and locations with the mechanical drawings.

C Plumbing and other contractor-furnished and Owner-furnished equipment:
1 Required power and control conduit, wiring and connections are included under this section of the work. Control sensing and alarm devices will be furnished under the respective section of the contract supplying the equipment unless noted otherwise. These devices will be located in pipes, ducts, vessels, tanks, etc., and will be mounted in a place by the Contractor furnishing the devices. Other devices shall be mounted under this section of the work.
2 Control panels for packaged equipment will be furnished under the respective section of the contract supplying the equipment unless otherwise noted. Installation and connection of the control panels are under this section of the work.

3.6 SYSTEM NEUTRAL GROUND

A Ground the neutral conductor of each transformer to limit the maximum potential above ground due to normal operating voltage and limit the voltage level due to abnormal conditions.
B Ground transformers with secondary voltage 600V class or less as follows: 3 phase, 4 wire wye connected: ground neutral point.
C For transformers 75kVA size or lower with primary voltage 480V or lower, the primary equipment ground conductor may be used for grounding the secondary neutral provided it is adequately sized in accordance with CEC system ground conductor size.

3.7 EQUIPMENT GROUND

A Ground non-current carrying metal parts of electrical equipment enclosures, frames, or conductor raceways to provide a low impedance path for line to ground fault current and to bond all non current carrying metal parts together. Install a ground conductor in each raceway system. Equipment ground conductor shall be electrically and mechanically continuous from the electrical circuit source to the equipment to be grounded. Size ground conductors per CEC 250.95 unless otherwise shown on drawings.

B Grounding conductors shall be identified with green insulation. Where green insulation is not available, on larger sizes, black insulation shall be used and suitably identified with green tape at each junction box or enclosure device.

C Install metal raceway couplings, fittings and terminations secure and tight to insure good ground continuity. Provide grounding bushing and bonding jumper where metal raceway is not directly attached to equipment metal enclosure and at concentric knockouts.

D Lighting fixtures shall be securely connected to equipment ground conductors. Outdoor lighting standards shall have a factory installed ground for terminating the ground wire.

E Motors shall be connected to equipment ground conductors with a conduit grounding bushing and with a bolted solderless lug connection on the metal frame.

3.8 STRUCTURAL GROUND

A Concrete encased electrode shall be 2 inches above the bottom of concrete footing where shown on drawings. See drawings for details.

B Domestic, chilled and hot water mains and fire protection metallic water pipes shall be connected to the ground bus with #4/0 AWG bare copper conductor at a minimum of two points.

C Miscellaneous metal objects including piping, vessels and structural shapes within six feet of metallic objects connected to the ground system and which are not interconnected mechanically with the grounding system, shall be interconnected with a minimum #6 AWG bare copper conductor.

3.9 IDENTIFICATION

A Provide and install nameplates on all switchboards, distribution boards, panels, motor starters, VFDs, transformers, safety switches/disconnects, push buttons, selector switches, pilot lights, and other similar devices. Fasten nameplates to equipment with one sheet metal screw at each corner.

B Provide and install labels on lighting switches and convenience and special purpose receptacles to show panel and circuit number to which the device is connected.

C Provide and install identification tags on all conduit pull.

D Provide label meeting ANSI Z535 standards on motors reading:
WARNING
AUTOMATIC EQUIPMENT
MAY START AT ANY TIME

3.10 CIRCUIT BREAKER ELECTRICAL COORDINATION STUDY

A If required, contractor shall provide a coordination study to determine trip settings of circuit breakers.
B Contractor may elect to have the engineer of record provide such services at the contractor's expense.

3.11 ARC FLASH STUDY

A If required, contractor shall provide a study to determine potential arc flash energy.
B Contractor may elect to have the engineer of record provide such services at the contractor's expense.

END OF SECTION

DOCUMENT 260526

GROUNDING

PART 1 – GENERAL

1.1 SECTION INCLUDES

Materials, equipment fabrication, installation and tests in conformity with equipment applicable to this project, applicable codes and authorities having jurisdiction, for grounding

1.2 RELATED SECTIONS

A All included sections under Division 1
B All included sections under Division 26
C Plans
D Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS

Published specifications standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 16000.

1.4 QUALITY ASSURANCE

A Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.
B Supply equipment and accessories new, free from defects.
C Supply equipment and accessories in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.
D Items of a given type shall be the products of the same manufacturer.

1.5 SUBMITTALS

A Submit under provisions of Section 01330. Provide detailed description of items supplied, including specifications, performance characteristics, materials, wiring diagrams and schedules.
    1 Submit evidence that products satisfy seismic requirements for the State of California.
    2 Submit evidence of compliance with the applicable standards listed under Article 1.3 of this section.
B Manufacturer's Instructions: Submit manufacturer's installation instructions.
C Product Data: Submit manufacturer's descriptive literature.
D Shop Drawings: Submit complete fabrication details, elevations and sections of switchboard, dimensions, space available for conduit, rating, short circuit withstand ability of bus and lowest rated device, circuit schedule showing circuit number, device description, device frame ampere rating and trip, fuse clip ampere rating, termination lug size, feeder and circuit identification, conductor

ratings and one-line and wiring diagrams. Include both elementary diagram and terminal to terminal wiring diagrams.

E Substitutions: Items of same function and performance shall be in conformance with Division 1.

F Submit field test and operations check report for circuit breakers and motor starters under provisions of Section 16080.

1.6 OPERATION AND MAINTENANCE DATA

A Submit operation instructions, maintenance and repair data under provisions of Division 1.

B Ship equipment in its original packages to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.

C Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.

D Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

PART 2 – PRODUCTS

2.1 GROUND RODS

Ground rods shall be:

A. 3/4 inch diameter
B. Copper weld type
C. 10 feet in length.
D. Ground rings

2.2 BARE COPPER GROUND WIRE

Conductors shall be medium-hard drawn, copper, and stranded, with sizes as shown on drawings.

2.3 BELOW GRADE GROUND CONNECTIONS

Utilize CADWELD Multi-System Exothermic Welding.

2.4 HARDWARE

Bolts, nuts and washers shall be bronze, cadmium plated steel, or other non-corrosive material, approved for the purpose.

PART 3 – EXECUTION

3.1 SYSTEM NEUTRAL GROUND

A Ground the neutral conductor of each transformer to limit the maximum potential above ground due to normal operating voltage and limit the voltage level due to abnormal conditions.

B Ground transformers with secondary voltage 600V class or less as follows: 3-phase, 4-wire wye connected: ground neutral point.

C For transformers 75kVA size or lower with primary voltage 480V or lower, the primary equipment ground conductor may be used for grounding the secondary neutral provided it is adequately sized in accordance with CEC system ground conductor size.

3.2 EQUIPMENT GROUND

A Ground non-current carrying metal parts of electrical equipment enclosures, frames, or conductor raceways, structural metal supports for the mechanical and plumbing equipment to provide a low impedance path for line-to-ground fault current and to bond all non-current carrying metal parts together. Install a ground conductor in each raceway system. Equipment ground conductor shall be electrically and mechanically continuous from the electrical circuit source to the equipment to be grounded. Size ground conductors per CEC 250-95 unless otherwise shown on drawings.

B Grounding conductors shall be identified with green insulation. Where green insulation is not available, on larger sizes, black insulation shall be used and suitably identified with green tape at each junction box or enclosure device.

C Install metal raceway couplings, fittings and terminations secure and tight to insure good ground continuity. Provide grounding bushing and bonding jumper where metal raceway is not directly attached to equipment metal enclosure and at concentric knockouts.

D Lighting fixtures shall be securely connected to equipment ground conductors. Outdoor lighting standards shall have a factory installed ground for terminating the ground wire.

E Motors shall be connected to equipment ground conductors with a conduit grounding bushing and with a bolted solderless lug connection on the metal frame.

3.3 STRUCTURAL GROUND

A Concrete encased electrode shall be 2 inches above the bottom of concrete footing where shown on drawings. See drawings for details.

B Domestic, chilled and hot water mains and fire protection metallic water pipes shall be connected to the ground bus with #3/0 AWG bare copper conductor at a minimum of two points.

C Miscellaneous metal objects including piping, vessels and structural shapes within six feet of metallic objects connected to the ground system and which are not interconnected mechanically with the grounding system, shall be interconnected with a minimum #3/0 AWG bare copper conductor.

3.4 GROUND RESISTANCE TEST

A Building ground electrode resistance testing shall be accomplished with a ground resistance, direct reading, single test meter utilizing the Fall-of-Potential method and two (2) referenced electrodes. Perform test prior to interconnection to other grounding system. Orient the concrete encased ground electrode to be tested and the two referenced electrodes in straight line spaces fifty (50) feet apart. Drive the two (2) reference electrodes ten (10) feet deep.

B Test results shall be in writing, and shall show temperature, humidity and condition of the soil at the time of the tests. In the case where the ground resistance exceeds 25 ohms, add an additional ground rod and retest. Add additional ground rods when necessary in order to bring the ground resistance below 25 Ohms. All testing shall be done prior to concrete pour and in the presence of the inspector of record. Provide test results for engineer review.

END OF SECTION

DOCUMENT 260529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Hangers and supports for electrical equipment and systems.
B. Construction requirements for concrete bases.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A Published specifications standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.
B American Society for Testing and Materials (ASTM)
  1 ASTM A36/A36M: Standard Specification for Carbon Structural Steel
  2 ASTM A167: Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
  3 ASTM A276: Standard Specification for Stainless Steel Bars and Shapes
  4 ASTM A325: Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 KSI Minimum Tensile Strength
  5 ASTM A563: Standard Specification for Carbon and Alloy Steel Nuts
  6 ASTM B221: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
  7 ASTM B632: Standard Specification for Aluminum-Alloy Rolled Tread Plate
  8 ASTM B633: Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel

9 ASTM E488: Standard Test Methods for Strength of Anchors in Concrete Elements
10 ASTM F594: Standard Specification for Stainless Steel Nuts

C American Welding Society (AWS)
1 AWS D1.1: Structural Welding Code - Steel

D California Building Safety Codes (CBSC)
1 California Building Code (CBC)
2 California Electrical Code (CEC)

E General Services Administration
1 FF-S-325
2 W-C-582: Conduit, Raceway, Metal and Fittings: Surface
3 WW-H-171: Hanger and Support, Pipe

F ICC Evaluation Service (ICC-ES)
1 ESR-1917

G Manufacturers Standardization Society (MSS)
1 MSS SP-58: Pipe Hangers and Supports – Materials, Design, Manufacture, Selection, Application, and Installation
2 MSS SP-69: Pipe Hangers and Supports – Selection and Application

H Metal Framing Manufacturers' Association
1 MFMA-4: Metal Framing Standard Publication
2 MFMA-101: Guidelines for the Use of Metal Framing

I National Electrical Contractors Association
1 NECA 1: Standard Practice of Good Workmanship in Electrical Construction
2 NECA 101: Standard for Installing Steel Conduits (Rigid, IMC, EMT)

J Underwriters' Laboratories
1 UL 2239: Hardware for the Support of Conduit, Tubing, and Cable

1.4 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
B. Comply with latest editions of the California Building Code and California Electric Code

1.5 SUBMITTALS

A. Submit under provisions of Section 013000 or 013300.
B. Submittals shall include the following:
1. Table of contents
2. A complete set of detailed manufacturer's specifications describing and illustrating all standard and special components and materials
3. Part numbers
4. Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5. Maintenance instructions and intervals
6. A complete set of drawings for any special items

C. Electronic submittals shall be searchable
D. Shop drawings shall be stamped and signed by a licensed structural engineer. Show fabrication and installation details and include calculations for the following:
   1. Trapeze hangers: include product data for components
   2. Steel slotted channel systems: include product data for components
   3. Equipment supports
E. Welding certificates
F. The submittal shall be substantially complete for all items and equipment furnished under this section.
G. Individual drawings and data sheets submitted at random intervals will not be accepted for review.
H. Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit manuals at close out.
B The manuals shall, at minimum, include the following:
   1 Manufacturer (including contact information)
   2 Model number
   3 Load ratings
   4 Material type(s)
   5 Environmental ratings
   6 Maintenance requirements
   7 Installation instructions
   8 Repair instructions (where applicable)
C Provide manuals in one of the following formats
   1 Three hardcopies
   2 PDF

1.7 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

PART 2 – PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems
   1. Comply with MFMA-4, factory-fabricated components for field assembly.
   2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
   3. Nonmetallic Coatings:
      a. PVC, polyurethane, or polyester coating applied according to MFMA-4.
      b. Minimum thickness shall be 40 mils.
   4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
   5. Channel Dimensions: Selected for applicable load criteria.
   6. Manufacturers:
      a. Cooper B-Line, Inc.
      b. ERICO International Corporation
      c. Hilti Corporation
      d. Thomas & Betts Corporation
      e. Unistrut
      f. Approved equal

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components:
   1. General:
      a. Anchors shall be steel with corrosion resistant, durable coating or stainless steel
      b. Select anchors with strength required for anchor and as tested according to ASTM E488.
      c. Minimum length shall be eight times diameter.
      d. Tension, shear, and pullout capacities shall be appropriate for supported loads and building materials used
      e. Post installed anchors must be listed in a current evaluation report issued by one of the following:
         1. International Code Council Evaluation Service (ICC-ES) (http://www.icc-es.org/reports/index.cfm?search=search)
         2. City of Los Angeles Research Report
   2. Powder-Actuated Fasteners:
      a. Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood
      b. Manufacturers:

1. Hilti Corporation
2. Simpson Strong-Tie Co., Inc.
3. Approved equal

3. Mechanical-Expansion Anchors:
   a. Insert-wedge-type, stainless steel, for use in hardened portland cement
   b. Anchors shall meet the descriptive part of Federal Specifications FF-S-325 Group II, Type 2, Class 2, Style 1.
   c. Anchors shall be equivalent to Hilti Kwik-Bolt TZ.
4. Concrete inserts shall be steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58
5. Clamps for attachment to steel structural elements: MSS SP-58, type suitable for attached structural element
6. Through bolts shall be structural type, hex head, high strength and comply with ASTM A325
7. Toggle Bolts: All-steel springhead type
8. Hanger Rods: Threaded steel

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials:
   1. Comply with requirements with ASTM A36 (ferrous metals), ASTM A167 and ASTM A276 (stainless steel), and ASTM B221 and B632 (aluminum) for shapes and plates.
   2. Hot dipped galvanized steel
   3. Stainless steel for corrosive areas

2.3 CONCRETE BASES

A. Concrete Pad
   1. Concrete shall have strength of 3000 PSI within 28 days.
   2. The pad shall be large enough to achieve the following:
      a. Edge of anchor bolt holes shall be a minimum of 10 times the bolt diameter from edge of pad.
      b. Edge of equipment shall be a minimum of 8 inches from edge.
   3. Minimum thickness shall be 12 inches with 3 inch deep by 12 inch wide footing around perimeter
   4. Bottom of footings shall be a minimum of 8” below finished grade.
   5. Pad shall include #4 rebar at 10 inch intervals in both x direction and y direction.

B. Concrete Pole Bases: Refer to Typical Details

PART 3 – EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by California Electrical Code. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables:
   1. Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
   2. Secure raceways and cables to these supports with two-bolt conduit clamps

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in California Electric Code.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (890 N).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code.
   1. Wood framing: Fasten with lag screws or through bolts.
   2. Light gauge steel framing: self tapping screws
   3. Steel beams: beam clamps
   4. Concrete: expansion fasteners

3.3 CONDUIT SUPPORTS

A Conduit supports
   1 For Individual conduit runs not directly fastened to the structure: Rod hangers
   2 For multiple conduit runs: Trapeze type conduit support designed for maximum loading deflection not exceeding manufacturer's recommendations.

3 Wire or sheet metal strips are not acceptable for conduit not directly fastened to structure or for multiple conduit runs.

B Support conduit with Underwriters' Laboratories listed conduit support intervals required by the California Electric Code.

C Individual conduit 1/2 inch and 3/4 inch size may be supported from ceiling support wire with Caddy clips only if acceptable to local code. Only one conduit is permitted to be attached to any ceiling support wire. Hang such conduit so as not to affect level of ceiling.

D Avoid attaching conduit to fan plenums. When it is necessary to support conduit from fan plenum, provide a length of flexible conduit between the section attached to the fan plenum and other sections. Provide a length of flexible conduit between the portion attached to the building and the rest of the conduit run to minimize transmission of vibration to the building structure.

E Supports anchored to earth shall be anchored in a concrete base per details.

3.4 INSTALLATION OF POST-INSTALLED ANCHORS

A. Minimum distances
   1. Bolt hole edge to edge of concrete: 10 times bolt diameter
   2. Bolt center to bolt center: 12 times bolt diameter

B. Expansion type anchors
   1. Anchor shall be installed and torque per manufacturer’s recommendations.
   2. Setting verification:
      a. Torque-controlled anchors: Following attainment of 10% of the required torque, torque-controlled anchors shall not require more than six (6) additional complete turns of the nut during installation to achieve the manufacturer's specified installation torque. The extent of bolt projection after installation shall be measured to confirm that this requirement has been met.
      b. Displacement-controlled anchors: The position of the plug in the anchor shell shall be checked with the manufacturer-supplied installation tool or other appropriate device. The position of the plug shall conform to the manufacturer's specifications.
   3. Allowable loads
      a. Anchors not installed in underside of beam/slab:
         1. When tested in accordance with AC01, Section 5.6: Values listed in ICC-ES report
         2. When not tested in accordance with AC01, Section 5.6: 80% of values listed in ICC-ES report
      b. Anchors installed in underside of beam/slab:
         1. When tested in accordance with AC01, Section 5.6: Values for anchor without special inspection or in cracked concrete in ICC-ES report
         2. When not tested in accordance with AC01, Section 5.6: 80% of values for anchor without special inspection or in cracked concrete in ICC-ES report

C. Epoxy-type (adhesive) Anchors

1. Allowable loads: values from ICC-ES report when compliant with AC58.

D. Anchors must receive special inspection per CBC Section 1704.15.

3.5 TESTING AND INSPECTION OF POST-INSTALLED ANCHORS

A. General

1. Post-installed anchors shall be tested in accordance with the provisions of 2001 California Building Code Section 1923A.3.5, by an authority having jurisdiction accepted testing facility, unless approval of an alternative individual is obtained in advance from the authority having jurisdiction.
2. If any anchor fails testing, test all anchors of the same type, not previously tested until twenty (20) consecutive anchors pass, then resume the initial test frequency. If the anchors are used for the support and bracing of non-structural components (pipe, duct or conduit), the twenty (20) shall be only those anchors installed by the same trade.
3. Test equipment (including torque wrenches) is to be calibrated by an approved testing laboratory in accordance with standard recognized procedures.
4. Regardless of which test method is chosen, test values and all appropriate criteria shall be shown on the contract documents.
5. Anchor diameter refers to the thread size for the wedge and sleeve categories, and to the anchor outside diameter for the sleeve category.
6. Apply proof test loads to wedge and sleeve anchors without removing the nut if possible. If not, remove nut and install a threaded coupler to the same tightness as the original nut using a torque wrench to apply the test load.
7. For sleeve/shell internally threaded categories, verify that the anchor is not prevented from withdrawing by a baseplate or other fixtures. If restraint is found, loosen and shim or remove fixture(s) prior to testing.
8. Reaction loads from test fixtures may be applied close to the anchor being tested, provided the anchor is not restrained from withdrawing by the fixture(s).
9. Alternate torque test procedures and test values for shell type anchors may be submitted to the enforcement agency for review and approval on a case-by-case basis when test procedures are submitted and approved by the enforcement agency.
10. Required test loads may be determined by either of the following methods:
    a. Twice the allowable tension load from Part 3.4.
    b. Tension or torque test values from the table and procedures.

Test Values (Hardrock or Lightweight Concrete)							
Anchor	Wedge		Sleeve		Shell		Screw
Diameter (in)	Load (lbs)	Torque (ft. lbs)	Load (lbs)	Torque (ft. lbs)	Load (lbs)	Torque (ft. lbs)	Torque (ft. lbs)
1/4	800	10	400	4	1000	-	-
5/16	-	-	400	5	1400	-	-
3/8	1100	25	700	10	1800	-	10
1/2	2000	50	900	20	2700	-	10
5/8	2300	80	1100	45	3700	-	10
3/4	3700	150	1400	90	5400	-	20
1	5800	250	-	-	-	-	-

11. If the manufacturer's recommended installation torque is less than the test torque noted in the table, the manufacturer's recommended installation torque should be used in lieu of the tabulated values.

B. Expansion-type Anchors

1. The test load may be applied by any method that will effectively measure the tension in the anchor, such as direct pull with a hydraulic jack, calibrated spring-loaded devices, or a calibrated torque wrench. Displacement-controlled anchors such as drop-ins shall not be tested using a torque wrench.
2. Anchors tested with a hydraulic jack should exhibit no discernable movement during the tension test, e.g., as evidenced by loosening of the washer under the nut.
3. Anchors tested with a calibrated torque wrench must attain the specified torque within 1/2 turn of the nut.
4. Exceptions: Undercut anchors that are so designed to allow visual confirmation of full set, need not be tension or torque tested. If the manufacturer's installation torque is less than the specified test torque, use the manufacturer's specified installation torque for testing the anchor.
5. Apply proof test loads to wedge and sleeve anchors without removing the nut if possible. If not, remove nut and install a threaded coupler to the same tightness as the original nut using a torque wrench to apply the test load.
6. For sleeve/shell internally threaded categories, verify that the anchor is not prevented from withdrawing by a baseplate or other fixtures. If restraint is found, loosen and shim or remove fixture(s) prior to testing.
7. Reaction loads from test fixtures may be applied close to the anchor being tested, provided the anchor is not restrained from withdrawing by the fixture(s).
8. Shell type anchors should be tested as follows:
    a. Visually inspect 25% for full expansion as evidenced by the location of the expansion plug in the anchor body. Plug location of a fully expanded anchor should be as recommended by the manufacturer, or, in the absence of such recommendation, as determined on the job site following the manufacturer's installation instructions. At least 5% of the anchors shall be proof loaded as indicated in the table

above, but not less than three anchors per day for each different person or crew installing anchors, or;

b. Test installed anchors per current edition of the CBC Section 1913A.7.

C. Epoxy-type (adhesive) Anchors

1. Epoxy-type (adhesive) anchors shall be tension tested per current edition of the CBC Section 1913A.7. The tension test load shall equal twice the allowable load for the specific location of the anchor to be tested (i.e., accounting for edge distance) or 80% of the yield strength of the bolt ($0.8A_bF_y$), whichever is less. The test procedures for expansion-type anchors in the attached table shall also be used for epoxy-type (adhesive) anchors. Torque testing of epoxy-type (adhesive) anchors is not permitted.
2. Where epoxy-type (adhesive) anchors are used as shear dowels across cold joints in slabs on grade and the slab is not part of the structural system, testing of those dowels is not required.
3. Anchors shall exhibit no discernible movement during the tension test.

D. Screw-type Anchors

E. The following criteria apply for the acceptance of installed anchors:

1. Hydraulic ram method: The anchor should have no observable movement at the applicable test load. For wedge and sleeve type anchors, a practical way to determine observable movement is that the washer under the nut becomes loose.
2. Torque wrench method: The applicable test torque must be reached within the following limits:
   a. Wedge or Sleeve type: One-half (1/2) turn of the nut.
   b. One-quarter (1/4) turn of the nut for the 3/8 in. sleeve anchor only.

3.6 PAINTING

A. Touchup:

1. Clean field welds and abraded areas of shop paint.
2. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting.
3. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).
4. Comply with the following requirements
   a. Architectural painting specifications
   b. SSPC-PA 1 requirements for touching up field-painted surfaces.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780.

END OF SECTION

DOCUMENT 260548

VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SECTION INCLUDES

Anchoring and vibration isolation equipment for electrical equipment:

A. Isolation pads
B. Spring isolators
C. Restrained spring isolators
D. Channel support systems
E. Restraint cables
F. Hanger rod stiffeners
G. Anchorage bushings and washers

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A Published specifications standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.
B American Society for Testing and Materials (ASTM)
  1 ASTM A36/A36M: Standard Specification for Carbon Structural Steel
  2 ASTM A325: Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 KSI Minimum Tensile Strength
  3 ASTM A563: Standard Specification for Carbon and Alloy Steel Nuts
  4 ASTM B633: Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
  5 ASTM E488: Standard Test Methods for Strength of Anchors in Concrete Elements

6 ASTM F594: Standard Specification for Stainless Steel Nuts

C American Welding Society (AWS)
1 AWS D1.1: Structural Welding Code - Steel

D California Building Safety Codes (CBSC)
1 California Building Code (CBC)
2 California Electrical Code (CEC)

E General Services Administration
1 FF-S-325
2 W-C-582: Conduit, Raceway, Metal and Fittings: Surface
3 WW-H-171: Hanger and Support, Pipe

F ICC Evaluation Service (ICC-ES)
1 ESR-1917

G National Electrical Contractors Association
1 NECA 1: Standard Practice of Good Workmanship in Electrical Construction

H Underwriters' Laboratories

1.4 QUALITY ASSURANCE

A. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency meeting requirements of Part 1.6, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

D. Comply with latest editions of the California Building Code and California Electric Code

1.5 SUBMITTALS

A. Submit under provisions of Section 013000 or 013300.

B. Submittals shall include the following:
1. Table of contents
2. A complete set of detailed manufacturer's specifications describing and illustrating all standard and special components and materials
3. Part numbers
4. Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5. Maintenance instructions and intervals
6. A complete set of drawings for any special items

7. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
8. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.
    a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an agency meeting requirements of Part 1.6.
    b. Annotate to indicate application of each product submitted and compliance with requirements.
9. Restrained-Isolation Devices: Include ratings for horizontal, vertical, and combined loads.

C. Electronic submittals shall be searchable

D. Delegated-Design Submittal: For vibration isolation and seismic-restraint details indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified licensed structural engineer responsible for their preparation.
1. Design Calculations:
    a. Calculate static and dynamic loading due to equipment weight and operation, seismic forces required to select vibration isolators and seismic restraints.
    b. Coordinate design calculations with wind-load calculations required for equipment mounted outdoors. Comply with requirements in other electrical Sections for equipment mounted outdoors.
2. Indicate materials and dimensions and identify hardware, including attachment and anchorage devices.
3. Field-fabricated supports.
4. Seismic-Restraint Details:
    a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
    b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacing. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.
    c. Preapproval and Evaluation Documentation: By an agency meeting requirements of Part 1.6, showing maximum ratings of restraint items and the basis for approval (tests or calculations).

E. Welding certificates.

F. Field quality-control test reports.

G. The submittal shall be substantially complete for all items and equipment furnished under this section.

H. Individual drawings and data sheets submitted at random intervals will not be accepted for review.

I. Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit manuals at close out.
B The manuals shall, at minimum, include the following:
  1 Manufacturer (including contact information)
  2 Model number
  3 Load ratings
  4 Material type(s)
  5 Environmental ratings
  6 Maintenance requirements
  7 Installation instructions
  8 Repair instructions (where applicable)
C Provide manuals in one of the following formats
  1 Three hardcopies
  2 PDF

1.7 PERFORMANCE REQUIREMENTS

Seismic-Restraint Loading:
A. Site Class as Defined in the CBC: Refer to structural plans
B. Assigned Seismic Use Group or Building Category as Defined in the CBC: Refer to structural plans
  1. Component Importance Factor: Refer to structural plans
  2. Component Response Modification Factor: Refer to structural plans
  3. Component Amplification Factor: Refer to structural plans
C. Mapped Spectral Acceleration for Short Period (0.2 Second): S_S Refer to structural plans
D. Site Coefficient for Short Period: F_a Refer to structural plans
E. Maximum Spectral Response Acceleration for Short Period: S_{MS} Refer to structural plans
F. Design Spectral Response Acceleration for Short Period: S_{DS} Refer to structural plans
G. Mapped Spectral Acceleration for 1 Second Period: S_1 Refer to structural plans
H. Site Coefficient for 1 Second Period: F_v Refer to structural plans
I. Maximum Spectral Response Acceleration for 1 Second Period: S_{M1} Refer to structural plans
J. Design Spectral Response Acceleration for 1 Second Period: S_{D1} Refer to structural plans

1.8 QUALIFICATIONS OF TESTING AGENCY

The testing agency shall meet the following requirements:
A. Federal OSHA criteria for accreditation of testing laboratories, Standard Number 1910.7 (Definition and Requirements for a nationally recognized testing laboratory). Membership in the National Electrical Testing Association constitutes proof of meeting such criteria.
B. Acceptable to authorities having jurisdiction.

PART 2 – PRODUCTS

2.1 VIBRATION ISOLATORS

A. Pads:
   1. Arrange in single or multiple layers of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.
   2. Resilient Material: Oil and water resistant, waffle embossed neoprene.

B. Spring Isolators: Freestanding, laterally stable, open-spring isolators.
   1. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
   2. Minimum Additional Travel: 50 percent of the required deflection at rated load.
   3. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
   4. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
   5. Baseplates: Factory drilled for bolting to structure and bonded to 1/4-inch- (6-mm-) thick, rubber isolator pad attached to baseplate underside. Baseplates shall limit floor load to 500 psig (3447 kPa).
   6. Top Plate and Adjustment Bolt: Threaded top plate with adjustment bolt and cap screw to fasten and level equipment.

C. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic or limit-stop restraint.
   1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to weight being removed; factory-drilled baseplate bonded to 1/4-inch- (6-mm-) thick, neoprene or rubber isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
   2. Restraint: Seismic or limit-stop as required for equipment and authorities having jurisdiction.
   3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
   4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
   5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
   6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.2 SEISMIC-RESTRAINT DEVICES

A. General Requirements for Restraint Components: Rated strengths, features, and application requirements shall be as defined in reports by an agency meeting requirements of Part 1.6.

B. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four (verify with structural engineer) times the maximum seismic forces to which they will be subjected.
C. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.
D. Restraint Cables: ASTM A 492 stainless-steel cables with end connections made of steel assemblies with thimbles, brackets, swivels, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.
E. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections or reinforcing steel angle clamped to hanger rod. Do not weld stiffeners to rods.
F. Bushings for Floor-Mounted Equipment Anchor: Neoprene bushings designed for rigid equipment mountings and matched to type and size of anchors and studs.
G. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings and matched to type and size of attachment devices.
H. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.
I. Mounting, Anchoring, and Attachment Components: Refer to Section 260529.
J. Steel parts shall be hot dipped galvanized after fabrication for dry areas or stainless steel for damp or wet locations.

PART 3 – EXECUTION

3.1 APPLICATIONS

A. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by an agency meeting requirements of Part 1.6.
B. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.
C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

3.2 SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Equipment and Hanger Restraints:
1. Install restrained isolators on electrical equipment.

2. Install resilient, bolt-isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch (3.2 mm).
3. Install seismic-restraint devices using methods approved by an agency meeting requirements of Part 1.6 providing required submittals for component.

B. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

C. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

D. Drilled-in Anchors:
1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.3 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where they terminate with connection to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

3.4 FIELD QUALITY CONTROL

Tests and Inspections:

A. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.

B. Test at least 10% of each type and size of installed anchors and fasteners selected by Architect.

C. Test to 90 percent of rated proof load of device.
D. Measure isolator restraint clearance.
E. Measure isolator deflection.
F. Verify snubber minimum clearances.
G. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.
H. Remove and replace malfunctioning units and retest as specified above.
I. Prepare test and inspection reports.

3.5 ADJUSTING

A. Adjust isolators after isolated equipment is at operating weight.
B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
C. Adjust active height of spring isolators.
D. Adjust restraints to permit free movement of equipment within normal mode of operation.

3.6 ELECTRICAL VIBRATION-CONTROL AND SEISMIC-RESTRAINT DEVICE SCHEDULE

A. Provide the owner with a schedule of all major supported or suspended electrical equipment. Include the following.
    1. Equipment Location
    2. Pads:
        a. Material
        b. Thickness
        c. Durometer
        d. Number of Pads
    3. Isolator Type
    4. Component Importance Factor
    5. Component Response Modification Factor
    6. Component Amplification Factor
B. Provide the owner with cut sheets for all other support equipment.

END OF SECTION

DOCUMENT 260800

COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A Testing in conformity with equipment applicable to this project, applicable codes and authorities having jurisdiction
B Test equipment requirements listed in this section shall apply to testing required by all other sections in Division 26, Division 27, and Division 28.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A Published specifications standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.
B California Electrical Code
C International Electrical Testing Association (NETA)
  1 NETA ATS: for Acceptance Testing Specifications for Electrical Power Equipment and Systems
D Institute of Electrical and Electronic Engineers
  1 IEEE 81: Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System Part 1: Normal Measurements
  2 IEEE 82: Standard Test Procedure for Impulse Voltage Tests on Insulated Conductors
  3 IEEE 95: Standard Test Procedure for Impulse Voltage Tests on Insulated Conductors
  4 IEEE 112: Standard Test Procedure for Polyphase Induction Motors and Generators
  5 IEEE 114: Standard Test Procedure for Single-Phase Induction Motors

6 IEEE 115: IEEE Guide for Test Procedures for Synchronous Machines Part I—Acceptance and Performance Testing Part II—Test Procedures and Parameter Determination for Dynamic Analysis
7 IEEE 141: Recommended Practice for Electric Power Distribution for Industrial Plants
8 IEEE 142: Recommended Practice for Grounding of Industrial and Commercial Power Systems
9 IEEE 241: Recommended Practice for Electric Power Systems in Commercial Buildings
10 IEEE 242: Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems (IEEE Buff Book)
11 IEEE 252: Standard Test Procedure for Polyphase Induction Motors Having Liquid in the Magnetic Gap
12 IEEE 259: Standard Test Procedure for Evaluation of Systems of Insulation for Dry-Type Specialty and General-Purpose Transformers
13 IEEE 389: Recommended Practice for Testing Electronics Transformers and Inductors
14 IEEE 393: Test Procedures for Magnetic Cores
15 IEEE 399: Recommended Practice for Industrial and Commercial Power Systems Analysis (Brown Book)
16 IEEE 400: Guide for Field Testing and Evaluation of the Insulation of Shielded Power Cable Systems Rated 5 kV and Above
17 IEEE 442: Guide for Soil Thermal Resistivity Measurements
18 IEEE 495: Guide for Testing Faulted Circuit Indicators
19 IEEE 576: Recommended Practice for Installation, Termination, and Testing of Insulated Power Cable as Used in Industrial and Commercial Applications
20 IEEE 1188: Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated Lead-Acid (VRLA) Batteries for Stationary Applications
21 IEEE 1234: Guide for Fault Locating Techniques on Shielded Power Cable Systems
22 IEEE 1415: Guide for Induction Machinery Maintenance Testing and Failure Analysis
23 IEEE 1458: Recommended Practice for the Selection, Field Testing, and Life Expectancy of Molded Case Circuit Breakers for Industrial Applications

E National Institute of Standards and Technology (NIST)

F Underwriters' Laboratories
1 UL 1244: Electrical and Electronic Measuring and Testing Equipment
2 UL 1436: Outlet Circuit Testers and Similar Indicating Devices
3 UL 61010-2-030: Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-030: Particular requirements for testing and measuring circuits
4 UL 61010B-1: Electrical Measuring and Test Equipment – Part 1: General Requirements
5 UL 61010B-2-031: Electrical Equipment for Measurement, Control, and Laboratory Use – Part 2: Particular Requirements for Hand-Held Probe Assemblies for Electrical Measurement and Test

6 UL 61010B-2-032: Electrical Equipment for Measurement, Control, and Laboratory Use – Part 2: Particular Requirements for Hand-Held Current Clamps for Electrical Measurement and Test

1.4 QUALITY ASSURANCE

A The Contractor shall engage and pay for the services of a recognized independent testing laboratory for the purpose of performing inspections and tests as herein specified.
B The testing laboratory shall provide all material, equipment, labor and technical supervision to perform switch tests and inspections.
C It is the intent of these tests to assure that all electrical equipment, both Contractor and Owner supplied, is operational within industry and manufacturer's tolerances and is installed in accordance with design specifications.
D The tests and inspections shall determine the suitability for energizing.
E Schedule tests and give a minimum of two weeks advance notice to the Owner.

1.5 SUBMITTALS

A List of tests preformed
B Test procedures
C Test results
D The submittal shall be substantially complete for all items and equipment furnished under this section.
E Individual drawings and data sheets submitted at random intervals will not be accepted for review.

1.6 QUALIFICATIONS OF TESTING AGENCY

The testing agency shall meet federal OSHA criteria for accreditation of testing laboratories, Standard Number 1910.7 (Definition and Requirements for a nationally recognized testing laboratory). International Electrical Testing Association (NETA) accreditation constitutes proof of meeting such criteria.

1.7 TEST INSTRUMENT TRACEABILITY

A The testing laboratory shall have a calibration program which maintains all applicable test instrumentation within rated accuracy.
B The accuracy shall be traceable to the National Institute of Standards and Technology (NIST) in an unbroken chain.
C Instruments shall be calibrated in accordance with the following frequency schedule:
1 Field instruments: 6 months maximum.
2 Laboratory instruments: 12 months.
3 Leased specialty equipment: 12 months
D Dated calibration labels shall be visible on all test equipment.

1.8 FINAL SETTINGS

A The test report shall include the following: summary of project, description of equipment tested, description of test, list of test equipment used in calibration and calibration date, test results, conclusions and recommendations, and appendix, including appropriate test forms.
B The test report shall be bound and its contents certified.
C Submit three copies of the completed report to the architect, or engineer if no architect is involved, no later than fifteen (15) days after completion of test, unless otherwise directed.

1.9 FAILURE TO TEST

A Any system material or workmanship which is found defective on the basis of acceptance tests shall be reported directly to the architect or engineer if no architect is involved.
B Contractor shall replace the defective material or equipment and have test repeated until test proves satisfactory without additional cost to the Owner.

PART 2 – PRODUCTS: [NOT USED]

PART 3 – EXECUTION

3.1 GROUND RESISTANCE TEST

A Building ground electrode resistance testing shall be accomplished with a ground resistance, direct-reading, single test meter utilizing the Fall-of-Potential method and two (2) referenced electrodes. Perform test prior to interconnection to other grounding system. Orient the concrete-encased ground electrode to be tested and the two referenced electrodes in straight line spaces fifty (50) feet apart. Drive the two (2) reference electrodes ten (10) feet deep.
B Test results shall be in writing, and shall show temperature, humidity and condition of the soil at the time of the tests. In the case where the ground resistance exceeds 25 ohms, add an additional ground rod and retest. Add additional ground rods when necessary in order to bring the ground resistance below 25 Ohms. All testing shall be done prior to concrete pour and in the presence of the inspector of record. Provide test results for engineer review.

3.2 MISCELLANEOUS TESTING

A Functional and operational testing to the fire alarm, security system, telephone system, paging/intercom system, and all electrical components upon completion of electrical work.
B Perform an insulation resistance test on all switchboard busses, bus ducts; feeder conductors, including neutrals, using a megohmeter. Minimum value for each conductor shall be 20 megohms.

3.3 ELECTRICAL DISTRIBUTION EQUIPMENT OPERATIONAL CHECK

A Electrical distribution equipment operational check includes main switchboards, distribution boards, panelboards, panels, switchgear, etc.

B Verify proper operating condition of all equipment mechanically and electrically including, but not limited to verifying operation of each circuit breaker trip device with a rating of 100A or more using an accurately metered timed instrument (by passing 300% rated current through each pole).

C If any equipment is found defective during operational check, it shall be replaced by the Contractor without cost to the Owner. The tests shall be repeated by the Contractor without cost to the owner until satisfactory results are obtained.

END OF SECTION

DOCUMENT 262200

LOW VOLTAGE (0-600V) TRANSFORMERS

PART 1 – GENERAL

1.1 SECTION INCLUDES

This section includes minimum requirement for low voltage transformers.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A Transformers 750kVA and smaller shall be listed by Underwriters Laboratories.
B Institute of Electrical and Electronics Engineers (IEEE)
  1 IEEE 259: Standard Test Procedure for Evaluation of Systems of Insulation for Dry-Type Specialty and General-Purpose Transformers
  2 IEEE 295: Electronics Power Transformers
  3 IEEE 389: Recommended Practice for Testing Electronics Transformers and Inductors
  4 IEEE 393: Test Procedures for Magnetic Cores
  5 IEEE C57.12.01: Standard General Requirements for Dry-Type Distribution and Power Transformers Including Those with Solid Cast and/or Resin Encapsulated Windings
  6 IEEE C57.12.28: Pad Mounted Equipment Enclosure Integrity
  7 IEEE C57.12.34: Three Phase, Pad Mounted, Distribution Transformers
  8 IEEE C57.12.60: Standard Test Procedure for Thermal Evaluation of Insulation Systems for Dry-Type Power and Distribution Transformers, Including Open-Wound, Solid-Cast, and Resin-Encapsulated Transformers
  9 IEEE C57.12.91: Standard Test Code for Dry-type Distribution and Power Transformers
  10 IEEE C57.98: Guide for Transformer Impulse Tests
C National Electrical Manufacturers' Association

1 Transformers shall be manufactured and tested in accordance with NEMA ST20.
2 Transformers losses shall conform to NEMA TP1 requirements.
3 Transformer losses shall be tested in accord with NEMA TP2 procedures.
4 Transformers shall be labeled in accord with NEMA TP3 requirements.

D California Electric Code
1 CEC: California Electrical Code

E ANSI C57.110 and ANSI C57.12.22 requirements for pad mounted, compartmental type, self cooled, three phase distribution transformers and applicable provisions of other ANSI standards C57 Series.

F Underwriters' Laboratories
1 UL 50: Enclosures for Electrical Equipment, Non-environmental Considerations
2 UL 50E: Enclosures for Electrical Equipment, Environmental Considerations
3 UL 467: Grounding and Bonding Equipment
4 UL 486E: Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors
5 UL 506: Specialty Transformers
6 UL 1332: Organic Coatings for Steel Enclosures for Outdoor Use Electrical Equipment
7 UL 1446 Systems of Insulating Materials – General
8 UL 1561: Dry-type General Purpose and Power Transformers
9 UL 2763: Energy Efficient Harmonic Cancellation Transformers
10 UL 5085-1: Low Voltage Transformers – Part 1: General Requirements
11 UL 5085-2: Low Voltage Transformers – Part 2: General Purpose Transformers
12 UL 5085-3: Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers

1.4 QUALITY ASSURANCE

A Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.

B Supply equipment and accessories new, free from defects.

C Supply equipment and accessories in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.

D Items of a given type shall be the products of the same manufacturer.

E Ship equipment in its original packages to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.

F Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.

G Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

1.5 SUBMITTALS

A Submit under provisions of Section 013000 or 013300.
B Submittals shall include the following:
1 Table of contents
2 A complete set of detailed manufacturer's specifications describing and illustrating all standard and special components and materials
3 Part numbers
4 Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5 Maintenance instructions and intervals
6 A complete set of drawings for any special items
7 Wiring diagrams
8 Drawings shall include designations, dimensions, operating controls, instruments, riser diagrams, routing diagrams etc.
C Electronic submittals shall be searchable
D Shop drawings required: drawings and descriptions containing information of weight, dimensions, rated kVA, sound level, impedance, voltage regulation and efficiency. Provide manufacturer's literature describing the product.
E Test report of transformer furnished as hereinafter specified.
F The submittal shall be substantially complete for all items and equipment furnished under this section.
G Individual drawings and data sheets submitted at random intervals will not be accepted for review.
H Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.
B The manuals shall, at minimum, include the following:
1 Manufacturer (including contact information)
2 Model number
3 Manufacturer's data sheets – When data sheets include more than one model the model(s) used shall be noted
4 Manufacturer's user and maintenance manual(s), including trouble-shooting guidelines
5 Configuration settings
6 Wiring diagrams
7 Voltage ratings
8 Current ratings
9 Calibrated range
10 List of capabilities
11 Environmental ratings
12 NEMA enclosure type
13 Maintenance requirements
14 Installation instructions
15 Repair instructions
C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

PART 2 – PRODUCTS

2.1 DISTRIBUTION TRANSFORMERS

A General
1 Except as otherwise indicated, provide manufacturer's standard materials and components as indicated by published product information, designed and constructed as recommended by manufacturer and as required for complete installation.
2 Temperature
a 150°C rise
b Self-cooled type
c The maximum temperature of the top of the enclosure shall not exceed 50°C rise above a 40°C ambient.
3 Impedance shall be manufacturer's standard.
4 All insulating materials used shall be in accordance with NEMA ST20 or NEMA TR27 standards and be rated for 220°C UL component recognized insulation system.
5 The core of the transformer shall be visibly grounded to the enclosure by means of a flexible grounding conductor sized in accordance with applicable NEMA, IEEE and ANSI standards.
6 Primary voltage, secondary voltage, and kVA capacity shall be as shown on the single line or three-line diagram(s).
7 All windings shall be copper.

B Manufacturer:
1 Square D
2 General Electric
3 Eaton
4 Approved equal

C Enclosure
1 Dead front
2 Transformers 25 kVA and larger shall be in a heavy gauge, sheet steel, ventilated enclosure
3 Provide wire fabric rodent guard over ventilated openings and designed to prevent accidental access to live parts in accordance with UL, NEMA, and California Electric Code standards for ventilated enclosures.
4 Mounting
a Transformers 15 kVA through 75 kVA shall be designed so they can be either floor or wall mounted.
b Transformers above 75 kVA shall be floor mounted.
5 Corrosion resistant coating
a The completed enclosure shall be degreased and cleaned.
b After the cleaning process is finished, the enclosure shall be phosphatized.
c After the phosphatizing, the enclosure shall receive an electrostatic deposition of polyester powder coating followed by baking to produce a hard, durable finish.

1 The minimum thickness of the paint film shall be 2.0 mils.
2 For the exterior of transformer tank, interior and exterior of primary and secondary cable compartments the minimum total dry film thickness shall be 3.5 mils.
3 Paint film shall be uniform in color and free from blisters, sags, flaking and peeling

d Finish shall conform to UL 50 and UL 50E.

e Color shall be ANSI 61 Gray.

f Coat underside surfaces of equipment outdoors or in damp locations with a corrosion resistant coating.

D Sound: Sound levels shall be guaranteed by the manufacturer not to exceed the following.

1	15-50 kVA	45 dB
2	51-150 kVA	50 dB
3	151-300 kVA	55 dB
4	301-500 kVA	60 dB
5	501-700 kVA	62 dB
6	701-1000 kVA	64 dB
7	1000-1500 kVA	65 dB
8	1501-2000 kVA	66 dB

E Efficiency: Transformers shall be low loss type with minimum efficiencies per DOE 2016.

F

Singe Phase		Three Phase	
kVA	Efficiency	kVA	Efficiency
15	97.7%	15	97.0%
25	98.0%	30	97.5%
37.5	98.2%	45	97.7%
50	98.3%	75	98.0%
75	98.5%	112.5	98.2%
100	98.6%	150	98.3%
167	98.7%	225	98.5%
250	98.8%	300	98.6%
333	98.9%	500	98.7%
700	98.9%	750	98.8%

G The transformer(s) shall supply phase shift of 0° or 30°.

H Transformers shall be supplied with quality, full width electrostatic shields resulting in a maximum effective coupling capacitance between primary and secondary of 33 picofarads. With transformers connected under normal, loaded operating conditions, the attenuation of line noise and transients shall equal or exceed the following limits.

1 Common Mode: 0 to 1.5kHZ - 120dB; 1.5kHZ to 10kHZ - 90dB; 10kHZ to 100kHZ - 65dB; 100kHZ to 1MHZ - 40dB
2 Transverse Mode: 1.5kHZ to 10kHZ - 52dB; 10kHZ to 100kHZ - 30dB; 100kHZ to 1MHZ – 30dB

I Taps: distribution transformers shall come equipped with the following taps.

1 2.5% FCAN
2 5.0% FCAN
3 2.5% FCBN
4 5.0% FCBN

5 7.5% FCBN
6 10.0% FCBN

J All transformers listed below shall be K-13 rated unless explicitly noted as having a different K rating on the plans.
1 All school transformers
2 Any transformer feeding a load where the load from harmonic producing devices is at least 50% of the transformer's capacity.

2.2 CONSTRUCTION

A Transformer coils shall be of copper windings, continuous wound construction, and shall be impregnated with non-hygroscopic, thermosetting varnish.

B All cores shall be constructed with low hysteresis and eddy current losses. Magnetic flux densities are to be kept well below the saturation point to prevent core overheating. Cores for transformers greater than 500kVA shall be clamped utilizing insulated bolts through the core laminations to ensure proper pressure throughout the length of the core. The completed core and coil shall be bolted to the base of the enclosure but isolated by means of rubber vibration-absorbing mounts. There shall be no metal-to-metal contact between the core and coil and the enclosure except for a flexible safety ground strap. Sound isolation systems requiring the complete removal of all fastening devices will not be acceptable.

C The core of the transformer shall be visibly grounded to the enclosure by means of a flexible grounding conductor sized in accordance with applicable UL and CEC standards.

D The transformer enclosures shall be ventilated and be fabricated of heavy gauge, sheet steel construction. The entire enclosure shall be finished utilizing a continuous process consisting of degreasing, cleaning and phosphatizing, followed by electrostatic deposition of polymer polyester powder coating and baking cycle to provide uniform coating of all edges and surfaces. The coating shall be UL recognized for outdoor use. The coating color shall be ANSI 49.

PART 3 – EXECUTION

3.1 ANCHORING

A Install transformers as indicated, complying with manufacturers written instructions, applicable requirements of CEC, NEMA, ANSI, and IEEE standards, and in accordance with recognized industry practices to ensure that products fulfill requirements.

B Floor and roof mounted transformers shall be mounted on steel plates cemented to neoprene pads with a bolt hole through both. Refer to details. Conduit entering transformers shall be isolated from case with oversize hole, ground wire, and rubber grommet.

C Anchor transformer to concrete pad with 3/4" minimum diameter anchor bolts. Bolts and washers shall be galvanized. Strength of materials used to secure the transformer shall be sufficient to resist shear and uplift produced by force equal to one half of the equipment mass applied horizontally at center of gravity.

3.2 GROUNDING

Provide equipment grounding connections, sufficiently tight, to assure permanent and effective ground, for transformers as indicated.

3.3 TESTING

Upon completion of installation of transformers, energize primary circuit at rated voltage and frequency from normal power source and test transformers, including, but not limited to, audible sound levels, to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at the site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with re-testing.

END OF SECTION

DOCUMENT 262413

SWITCHBOARDS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A Main Switchboards
B Distribution Boards

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A Published specifications standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.
B California Electrical Code
C California Building Code
D Institute of Electrical and Electronic Engineers (IEEE)
  1 IEEE 81: Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
  2 IEEE 100: The Authoritative Dictionary of IEEE Standards Terms
  3 IEEE 1584: Guide for Performing Arc Flash Hazard Calculations
  4 IEEE 1584a: Guide for Performing Arc-Flash Hazard Calculations--Amendment 1
  5 IEEE 1584b: Guide for Performing Arc-Flash Hazard Calculations--Amendment 2: Changes to Clause 4
  6 IEEE C2: National Electrical Safety Code
  7 IEEE C12.16: Solid-State Electricity Meters
  8 IEEE C37.13: Standard for Low-Voltage AC Power Circuit Breakers Used in Enclosures
  9 IEEE C37.20.1: Standard for Metal-Enclosed Low-Voltage Power Circuit-Breaker Switchboard

10 IEEE C37.90.1: Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus
11 IEEE C57.12.28: Standard for Pad-Mounted Equipment - Enclosure Integrity
12 IEEE C57.13: Standard Requirements for Instrument Transformers

E National Electrical Manufacturers' Association
1 NEMA 12.10: Physical Aspects of Watt-hour Meters - Safety Standards
2 NEMA 250: Enclosures for Electrical Equipment (1000 Volts Maximum)
3 NEMA AB 1: Molded Case Circuit Breakers
4 NEMA PB 2: Deadfront Distribution Switchboards
5 NEMA PB 2.1: General Instructions for Proper Handling, Installation, Operation and Maintenance of Deadfront Distribution Switchboards Rated 600 V or Less
6 NEMA SG 3: Low Voltage Power Circuit Breakers
7 NEMA ST 20: Standard for Dry-Type Transformers for General Applications

F National Electrical Testing Association (NETA)
1 NETA ATS: Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems

G National Fire Protection Association (NFPA)
1 NFPA 70E: Standard for Electrical Safety in the Workplace

H Underwriters' Laboratories (UL)
1 UL 50: Enclosures for Electrical Equipment, Non-environmental Considerations
2 UL 50E: Enclosures for Electrical Equipment, Environmental Considerations
3 UL 414: Meter Sockets
4 UL 467: Grounding and Bonding Equipment
5 UL 486A: Wire Connectors
6 UL 486B: Wire Connectors
7 UL 486E: Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors
8 UL 489: Molded Case Circuit Breakers, Molded Case Switches, and Circuit Breaker Enclosures
9 UL 891: Switchboards
10 UL 1053: Ground-fault Sensing and Relaying Equipment
11 UL 1059: Terminal Blocks
12 UL 2735: Electric Utility Meters
13 UL 60947-1: Low-Voltage Switchboard and Controlgear – Part 1: General Rules
14 UL 60947-7-1: Low-voltage switchboard and controlgear – Part 7-1: Ancillary equipment - Terminal blocks for copper conductors
15 UL 60947-7-2: Low-Voltage Switchboard and Controlgear - Part 7-2: Ancillary Equipment - Protective Conductor Terminal Blocks for Copper Conductors

1.4 QUALITY ASSURANCE

A Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.
B Supply equipment and accessories new, free from defects.
C Supply equipment and accessories in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.
D Items of a given type shall be the products of the same manufacturer.
E Ship equipment in its original packages to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.
F Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.
G Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

1.5 SUBMITTALS

A Submit under provisions of Section 013000 or 013300.
B Submittals shall include the following:
1 Table of contents
2 A complete set of detailed manufacturer’s specifications describing and illustrating all standard and special components and materials
3 Part numbers
4 Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5 Maintenance instructions and intervals
6 Calibration procedures and intervals
C Submit shop drawings that include:
1 Complete fabrication details
2 Elevations and sections of enclosure(s)
3 Dimensions of enclosure(s)
4 Space available for conduits
5 Voltage, ampacity, short circuit, and enclosure ratings
6 Short circuit withstand ability of bus and lowest rated device,
7 Circuit schedule showing circuit number, device description, circuit breaker frame ampere rating and trip or fuse clip ampere rating
8 Termination lug size
9 Feeder identification
10 Single line diagram
11 Include both elementary diagram and terminal to terminal wiring diagrams.
D Electronic submittals shall be searchable
E The submittal shall be substantially complete for all items and equipment furnished under this section.
F Individual drawings and data sheets submitted at random intervals will not be accepted for review.

G Substitutions: Items of same function and performance shall be in conformance with Division 1. The Contractor shall provide a comparison of the proposed substitute with the specified equipment for review by the Engineer.
H Submit field test and operations check report for circuit breakers under provisions of Section 260500.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.
B The manuals shall, at minimum, include the following:
1 Manufacturer (including contact information)
2 Model number
3 Manufacturer's data sheets – When data sheets include more than one model the model(s) used shall be noted
4 Manufacturer's user and maintenance manual(s), including trouble-shooting guidelines
5 Configuration settings
6 Wiring diagrams
7 Voltage ratings
8 Current ratings
9 List of capabilities
10 Environmental ratings
11 NEMA enclosure type
12 Maintenance requirements
13 Installation instructions
14 Repair instructions
C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A Square D Company QED series
B Approved equal
C Switchboards serving critical infrastructure (hospitals, utilities, public safety, etc.) shall be seismically certified by OSHPD.

2.2 RATINGS

A Voltage and ampacity shall be as shown on plans with maximums of $600V_{AC}/250V_{DC}$ and 5000A.
B Continuous main current ratings as indicated on associated drawings.

C All switchboard bus current ratings shall be determined by heat-rise tests conducted in accordance with UL 891. Tests shall be conducted for all bus ratings.
D Provide UL Listed short circuit current ratings (SCCR) as indicated on the associated drawings not to exceed the lowest interrupting capacity rating of any circuit breaker.
E Boards shall be fully rated.
F Switchboards and distribution boards serving critical infrastructure (hospitals, utilities, public safety, etc.) shall be seismically certified by OSHPD.

2.3 INTERIOR

A Buses shall be copper.
B Buses shall be braced to withstand the rms symmetrical short-circuit current ratings as shown in the drawings.
C Each section shall include phase, neutral, and ground buses.
D Each section shall include horizontal through buses.
E Each section shall include vertical buses for connection to circuit breakers/branch circuits.
F Each section of a bus shall be firmly bolted to the adjacent section using bolt, Belleville spring washer, and nut.
G Buses shall maintain full rating the entire length of the board. Do not taper the buses.
H Circuit breakers shall be plug-on type and bolt to the board frame.
I Where any circuit breaker is capable of 1200A trip setting, all circuit breakers 100A and larger shall include zone selective interlocking capability.
J The main circuit breaker shall have a barrier separating it from the rest of the board.

2.4 ENCLOSURES

A General
1 All enclosures shall be galvanized steel constructed in accordance with UL 50 requirements and be UL 50 listed.
2 Each section shall be of uniform depth and height.
3 Each section shall bolt firmly to adjacent section(s).
4 All components shall be front accessible.
5 Rodent guards and steel mesh screens shall be provided and installed so that all openings are sealed.
6 Each section shall be separated from adjacent sections with barriers.
7 The through bus shall be separated from the branch circuit breakers with barriers.

B Type 1 Boxes
1 Boxes shall have removable blank end walls and interior mounting studs. Interior support bracket shall be provided for ease of interior installation.

2 Type 1 trim fronts shall be galvanized steel and meet strength and rigidity requirements per UL 50 standards.

C Type 3R Boxes
1 All enclosures for switchboards installed outside or in wet locations shall be NEMA 3R rated.
2 End walls shall be welded and sealed.
3 All doors shall be gasketed.

D Doors
1 The enclosure shall be dead-front with door opened to access circuit breakers.
2 A clear plastic directory card holder shall be mounted on the inside of door.

E Locks
1 All doors shall include locks.
2 Locks shall be cylindrical tumbler type with larger enclosures requiring sliding vault locks with 3-point latching.
3 All lock assemblies shall be keyed alike.
4 Two (2) keys shall be provided with each lock.

2.5 ARC FLASH ENERGY REDUCTION

All fixed trip circuit breakers 1200A or greater and adjustable trip circuits breakers with a maximum rating 1200A or greater shall be equipped with one of the following methods to reduce arc flash energy.

A Zone selective interlocking
B Differential relaying
C Arc flash detection and mitigation system in panel/board with the 1200A circuit breaker, refer to Section 260930

2.6 ENCLOSURE FINISH

A The completed enclosure shall be degreased and cleaned.
B After the cleaning process is finished, the enclosure shall be phosphatized.
C After the phosphatizing, the enclosure shall receive an electrostatic deposition of polyester powder coating followed by baking to produce a hard durable finish.
1 The minimum thickness of the paint film shall be 2.0 mils.
2 For the exterior of transformer tank, interior and exterior of primary and secondary cable compartments the minimum total dry film thickness shall be 3.5 mils.
3 Paint film shall be uniform in color and free from blisters, sags, flaking and peeling
D Finish shall conform to UL 50 and UL 50E.
E Color shall be ANSI 61 Gray.
F Coat underside surfaces of equipment outdoors or in damp locations with a corrosion resistant coating.

2.7 NAMEPLATES

Provide and install nameplates per Section 260500.

PART 3 – EXECUTION

3.1 INSTALLTION

A Install all equipment per manufacturer’s instructions.
B Secure switchboard to mounting pad
  1 Top of concrete pad shall be 6” above surround finished floor or finished grade.
  2 Pad shall extend a minimum of 5” below grade with 3” deep, 6” wide footings around entire perimeter of pad.
  3 Secure with a minimum of one 1/2" diameter, stainless Hilti Kwik-Bolt TZ (or approved equal) anchor bolts with 3” embedment at each corner.
  4 Strength of materials used to secure the switchboard shall be sufficient to resist shear and uplift produced by force equal to one half of the equipment mass applied horizontally at center of gravity.
C Mount switchboard with center of top circuit breaker handle no higher than 78" above finished floor.
D Front align all switchboard sections and any adjacent switchgear or distribution board sections.
E Submit three copies of the certified list for permanent record to be referenced to in the event of failure of any motor either within or beyond expiration of the warranty period.

3.2 FIELD TESTS

A Test all equipment per manufacturer’s instructions.
B Test the operation of each interlock, circuit breaker, signal, etc. to verify that all components perform their functions.
C Test system for correct execution of control logic. Adjust wiring connections in panel to correct errors.
D Operate each breaker and verify that all phases of each load are disconnected.

3.3 WIRING

A All wiring between components of the switchboard shall be factory installed.
B Terminal blocks shall be provided complete with marking strips, covers, and pressure connectors. They shall be track mount type. Compression terminals will not be allowed. 25% spare terminals shall be provided. Terminals shall be labeled to agree with the identification indicated on the supplier's submittal drawings.
C Contractor shall make all connections for a fully functional system.
  1 Minimum wire size shall be as shown on Single Line Diagram.
  2 If wire sizes are not shown, size wires per CEC.
D Contractor shall make all communications connections per manufacturers’ instructions.

E All wires shall be contained within conduits.

3.4 GROUNDING

A. Ground equipment per manufacturer's instructions, Section 260500, and applicable codes.
B. Minimize resistance from device to ground.
C. Resistance from device to ground shall not exceed 25 ohms.

3.5 NEW UTILITY METERS

Provide and install a 6-pair, 22AWG cable from any new utility company meter to the telephone MPOE for remote monitoring of meter. Coordinate with the utility company and the telephone company.

3.6 LOAD BALANCING

If the contractor changes circuiting from the panel schedule on the approved plans, the contractor shall be responsible to ensure that the loads on any two phases differ by no more than 5%.

3.7 IDENTIFICATION

A Provide nameplate identifying panel on exterior of panel per requirements in Section 260500.
B Provide type written panel schedule on interior of door.

3.8 OVER CURRENT PROTECTION DEVICE COORDINATION STUDY

A Contractor shall provide a coordination study to determine trip settings of circuit breakers and/or appropriate fuse types.
B Fault, circuit overload, etc shall only trip closest circuit breaker or melt closest fuse. No other circuits shall be affected.
C Contractor may elect to have the engineer of record provide such services at the contractor's expense.

END OF SECTION

DOCUMENT 262416

PANELBOARDS

PART 1 – GENERAL

1.1 SECTION INCLUDES

Lighting and Appliance Panelboards

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A Published specifications standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.
B California Electrical Code
C California Building Code
D Institute of Electrical and Electronic Engineers (IEEE)
  1 IEEE 81: Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
  2 IEEE 100: The Authoritative Dictionary of IEEE Standards Terms
  3 IEEE C2 National Electrical Safety Code
  4 IEEE C12.16: Solid-State Electricity Meters
  5 IEEE C37.13: Standard for Low-Voltage AC Power Circuit Breakers Used in Enclosures
  6 IEEE C37.20.1: Standard for Metal-Enclosed Low-Voltage Power Circuit-Breaker Switchgear
  7 IEEE C37.90.1: Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus
  8 IEEE C57.12.28: Standard for Pad-Mounted Equipment - Enclosure Integrity
  9 IEEE C57.13: Standard Requirements for Instrument Transformers
E National Electrical Manufacturers' Association

1 NEMA 250: Enclosures for Electrical Equipment (1000 Volts Maximum)
2 NEMA PB 2: Deadfront Distribution Switchboards
3 NEMA PB 2.1: General Instructions for Proper Handling, Installation, Operation and Maintenance of Deadfront Distribution Switchboards Rated 600 V or Less
4 NEMA ST 20: Standard for Dry-Type Transformers for General Applications
5 NEMA 12.10: Physical Aspects of Watthour Meters - Safety Standards

F National Electrical Testing Association (NETA)
1 NETA ATS: Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems

G Underwriters' Laboratories (UL)
1 UL 50: Enclosures for Electrical Equipment, Non-environmental Considerations
2 UL 50E: Enclosures for Electrical Equipment, Environmental Considerations
3 UL 467: Grounding and Bonding Equipment
4 UL 486A: Wire Connectors
5 UL 486B: Wire Connectors
6 UL 486E: Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors
7 UL 489: Molded Case Circuit Breakers, Molded Case Switches, and Circuit Breaker Enclosures
8 UL 891: Switchboards
9 UL 1053: Ground-fault Sensing and Relaying Equipment
10 UL 1059: Terminal Blocks
11 UL 1558: Standard for Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear
12 UL 2735: Electric Utility Meters
13 UL 60947-1: Low-Voltage Switchgear and Controlgear – Part 1: General Rules
14 UL 60947-7-1: Low-voltage switchgear and controlgear – Part 7-1: Ancillary equipment - Terminal blocks for copper conductors
15 UL 60947-7-2: Low-Voltage Switchgear and Controlgear - Part 7-2: Ancillary Equipment - Protective Conductor Terminal Blocks for Copper Conductors

1.4 QUALITY ASSURANCE

A Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.
B Supply equipment and accessories new, free from defects.
C Supply equipment and accessories in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.
D Items of a given type shall be the products of the same manufacturer.

E Ship equipment in its original packages to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.

F Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.

G Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

1.5 SUBMITTALS

A Submit under provisions of Section 013000 or 013300.

B Submittals shall include the following:

1 Table of contents

2 A complete set of detailed manufacturer’s specifications describing and illustrating all standard and special components and materials

3 Part numbers

4 Evidence of compliance with the applicable standards listed under Article 1.3 of this section

5 Maintenance instructions and intervals

6 Calibration procedures and intervals

C Submit shop drawings that include:

1 Complete fabrication details

2 Elevations and sections of enclosure(s)

3 Dimensions of enclosure(s)

4 Space available for conduits

5 Voltage, ampacity, short circuit, and enclosure ratings

6 Short circuit withstand ability of bus and lowest rated device,

7 Circuit schedule showing circuit number, device description, circuit breaker frame ampere rating and trip or fuse clip ampere rating

8 Termination lug size

9 Feeder identification

10 Single line diagram

11 Include both elementary diagram and terminal to terminal wiring diagrams.

D Electronic submittals shall be searchable

E The submittal shall be substantially complete for all items and equipment furnished under this section.

F Individual drawings and data sheets submitted at random intervals will not be accepted for review.

G Substitutions: Items of same function and performance shall be in conformance with Division 1. The Contractor shall provide a comparison of the proposed substitute with the specified equipment for review by the Engineer.

H Submit field test and operations check report for circuit breakers under provisions of Section 260500.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.

B The manuals shall, at minimum, include the following:
1 Manufacturer (including contact information)
2 Model number
3 Manufacturer's data sheets – When data sheets include more than one model the model(s) used shall be noted
4 Manufacturer's user and maintenance manual(s), including trouble-shooting guidelines
5 Configuration settings
6 Wiring diagrams
7 Voltage ratings
8 Current ratings
9 List of capabilities
10 Environmental ratings
11 NEMA enclosure type
12 Maintenance requirements
13 Installation instructions
14 Repair instructions

C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A Square D Company
1 I-LINE
2 NQ
3 NF

B Equals
1 General Electric
2 Eaton/Cutler-Hammer
3 Approved equal

2.2 TYPE NQ PANELBOARD

A Interior
1 Shall be type NQ panelboard or approved equal rated for $240V_{AC}/48V_{DC}$ maximum. Continuous main current ratings, as indicated on associated schedules, not to exceed 600 amperes maximum.
2 Minimum short circuit current rating: 22000AIC as indicated in rms symmetrical amperes at $240V_{AC}$.
3 Provide one (1) continuous bus bar per phase. Each bus bar shall have sequentially phased branch circuit connectors suitable for plug-on or bolt-on branch circuit breakers. The bussing shall be fully rated. Panelboard bus current ratings shall be determined by heat-rise tests conducted in

accordance with UL 67. Bussing rated 100-400 amperes shall be copper. Bussing shall be copper as standard construction.

4 Interior trim shall be of dead-front construction to shield user from energized parts. Dead-front trim shall have pre-formed twistouts covering unused mounting space.

B Main Circuit Breaker

1 Main circuit breakers shall have an over-center, trip-free, toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have a permanent trip unit with thermal and magnetic trip elements in each pole. Each thermal element shall be true rms sensing and be factory calibrated to operate in a 40°C ambient environment. Thermal elements shall be ambient compensating above 40°C.

2 Two- and three-pole circuit breakers shall have common tripping of all poles. Circuit breakers frame sizes above 100 amperes shall have a single magnetic trip adjustment located on the front of the circuit breaker which allows the user to simultaneously select the desired trip level of all poles. Circuit breakers shall have a push-to-trip button for maintenance and testing purposes.

3 Breaker handle and faceplate shall indicate rated ampacity. Standard construction circuit breakers shall be UL Listed for reverse connection without restrictive line or load markings.

4 Lugs shall be UL Listed to accept solid or stranded copper and aluminum conductors 90°C rated wire, sized according to the 75°C temperature rating per CEC Table 310-16.

C Enclosures

1 Type 1 Boxes

a Boxes shall be galvanized steel constructed in accordance with UL 50 requirements.

b Boxes shall have removable end walls with knockouts located on one end. Boxes shall have welded interior mounting studs. Interior mounting brackets are not required.

c Box width shall be 20 in wide.

2 Type 1 Fronts

a Front shall meet strength and rigidity requirements per UL 50 standards.

b Front shall have cylindrical tumbler type lock with catch and spring-loaded stainless steel door pull. All lock assemblies shall be keyed alike. Two (2) keys shall be provided with each lock. A clear plastic directory card holder shall be mounted on the inside of door.

c All electrical busses shall be copper.

3 Type 3R, 5, and 12

a Enclosures shall be constructed in accordance with UL 50 requirements

b All doors shall be gasketed and equipped with a tumbler type vault lock. All lock assemblies shall be keyed alike. One (1) key shall

be provided with each lock. A clear plastic directory card holder shall be mounted on the inside of door.

c Maximum enclosure dimensions shall not exceed 20 in wide and 6.5 in deep.

2.3 TYPE NF PANELBOARD

A Interior

1 Shall be type NF panelboard for 480Y/277V_{AC} maximum. Continuous main current ratings, as indicated on associated schedules, not to exceed 600 amperes maximum.

2 Minimum Short Circuit Rating: 14000 as indicated rms symmetrical amperes at 480Y/277V_{AC}.

3 Provide one (1) continuous bus bar per phase. Each bus bar shall have sequentially phased branch circuit connectors limited to bolt-on branch circuit breakers. The bussing shall be fully rated. Panelboard bus current ratings shall be determined by heat-rise tests conducted in accordance with UL 67. Bussing rated 100-400 amperes shall be copper. Bussing rated for 600 amperes shall be copper as standard construction.

4 Interior trim shall be of dead-front construction to shield user from energized parts. Dead-front trim shall have pre-formed twistouts covering unused mounting space.

B Main Circuit Breaker

1 Main circuit breakers shall have an over-center, trip-free, toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have a permanent trip unit with thermal and magnetic trip elements in each pole. Each thermal element shall be true rms sensing and be factory calibrated to operate in a 40°C ambient environment. Thermal elements shall be ambient compensating above 40°C.

2 Two- and three-pole circuit breakers shall have common tripping of all poles. Circuit breakers frame sizes above 100 amperes shall have a single magnetic trip adjustment located on the front of the breaker which allows the user to simultaneously select the desired trip level of all poles. Circuit breakers shall have a push-to-trip button for maintenance and testing purposes.

3 Circuit breaker handle and faceplate shall indicate rated ampacity. Standard construction circuit breakers shall be UL Listed for reverse connection without restrictive line or load markings.

4 Lugs shall be UL Listed to accept solid or stranded copper and aluminum conductors. Lugs shall be suitable for 90°C rated wire, sized according to the 75°C temperature rating per CEC Table 310-16.

C Enclosures

1 Type 1 Boxes

a Boxes shall be galvanized steel constructed in accordance with UL 50 requirements.

b Boxes shall have removable end walls with knockouts located on one end. Boxes shall have welded interior mounting studs. Interior mounting brackets are not required.

2 Type 1 Fronts
- a Front shall meet strength and rigidity requirements per UL 50 standards.
- b Front shall have flat latch type lock with catch and spring loaded stainless steel door pull. All lock assemblies shall be keyed alike. One (1) key shall be provided with each lock. A clear plastic directory card holder shall be mounted on the inside of door.

3 Type 3R, 5, and 12
- a Enclosures shall be constructed in accordance with UL 50 requirements
- b All doors shall be gasketed and equipped with a tumbler type vault lock and two (2) additional trunk type latches. All lock assemblies shall be keyed alike. One (1) key shall be provided with each lock. A clear plastic directory card holder shall be mounted on the inside of door.
- c Maximum enclosure dimensions shall not exceed 21 inches wide and 8 inches deep.

2.4 ENCLOSURE FINISH

A The completed enclosure shall be degreased and cleaned.

B After the cleaning process is finished, the enclosure shall be phosphatized.

C After the phosphatizing, the enclosure shall receive an electrostatic deposition of polyester powder coating followed by baking to produce a hard durable finish.
- 1 The minimum thickness of the paint film shall be 2.0 mils.
- 2 For the exterior of transformer tank, interior and exterior of primary and secondary cable compartments the minimum total dry film thickness shall be 3.5 mils.
- 3 Paint film shall be uniform in color and free from blisters, sags, flaking and peeling

D Finish shall conform to UL 50 and UL 50E.

E Color shall be ANSI 61 Gray.

F Coat underside surfaces of equipment outdoors or in damp locations with a corrosion resistant coating.

2.5 NAMEPLATES

Provide and install nameplates per Section 260500.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install all equipment per manufacturers' instructions.
B. Test all equipment per manufacturer's instructions.
C. Mount panelboards with center of top circuit breaker handle no higher than 78" above finished floor. Install flush mounted panelboards as indicated on architectural interior elevation drawings. Provide all necessary blocking, channels and other hardware for securing panelboards to wall, column or other parts of building structure.
D. Submit three copies of the certified list for permanent record to be referenced to in the event of failure of any motor either within or beyond expiration of the warranty period.

3.2 GROUNDING

A. Ground equipment per manufacturer's instructions, Section 260500, and applicable codes.
B. Minimize resistance from device to ground.
C. Resistance from device to ground shall not exceed 25 ohms.

3.3 LOAD BALANCING

If the contractor changes circuiting from the panel schedule on the approved plans, the contractor shall be responsible to ensure that the loads on any two phases differ by no more than 5%.

3.4 IDENTIFICATION

A Provide nameplate identifying panel on exterior of panel per requirements in Section 260500.
B Provide type written panel schedule on interior of door.

END OF SECTION

DOCUMENT 262700

LOW VOLTAGE (0-600V) DISTRIBUTION EQUIPMENT

PART 1 – GENERAL

1.1 SECTION INCLUDES

Materials, equipment fabrication, installation and tests in conformity with applicable codes and authorities having jurisdiction, for the following:

A Wiring devices
B Terminal cabinets
C Power distribution terminal blocks

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS

Published specification standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.

A California Building Code
B California Electrical Code
C Underwriters' Laboratories
  1 UL 20: General Use Snap Switches
  2 UL 50: Enclosures for Electrical Equipment, Non-environmental Considerations
  3 UL 50E: Enclosures for Electrical Equipment, Environmental Considerations
  4 UL 111: Multi-Outlet Assemblies
  5 UL 231: Power Outlets
  6 UL 486A: Wire Connectors
  7 UL 486B: Wire Connectors
  8 UL 486E: Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors
  9 UL 498: Attachment Plugs and Receptacles

10 UL 514A: Metallic Outlet Boxes
11 UL 514C: Nonmetallic Outlet Boxes, Flush-device Boxes, and Covers
12 UL 514D: Cover Plates for Flush-mounted Wiring Devices
13 UL 917: Clock Operated Switches
14 UL 943: Ground Fault Circuit Interrupters
15 UL 1681: Wiring Devices Configurations
16 UL 1773: Standard for Termination Boxes
17 UL 1953: Power Distribution Terminal Blocks
18 UL 2255: Standard for Receptacle Closures
19 UL 2682: Switch Rated Plugs and Receptacles

1.4 QUALITY ASSURANCE

A Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.
B Supply equipment and accessories new, free from defects.
C Equipment and accessories in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.
D Items of a given type shall be the products of the same manufacturer.
E Deliver, store and protect products under provisions of Section 016200.
F Ship equipment in its original packages, to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.
G Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.
H Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

1.5 SUBMITTALS

A Submit under provisions of Section 013000 or 013300.
B Submittals shall include the following:
1 Table of contents
2 A complete set of detailed manufacturer’s specifications describing and illustrating all standard and special components and materials
3 Part numbers
4 Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5 Maintenance instructions and intervals
6 Calibration procedures and intervals
7 A complete set of drawings for any special items
8 A single line block diagram showing exactly the manner in which the contractor proposes to layout the system.
9 Wiring diagrams
10 Illustrations and scale drawing of the racks, equipment layouts etc.
11 Drawings shall include designations, dimensions, operating controls, instruments, riser diagrams, routing diagrams etc.
12 The contractor shall also submit a copy of his valid state contractor's license and show proof that he is a distributor of the submitted equipment.

C Electronic submittals shall be searchable
D The submittal shall be substantially complete for all items and equipment furnished under this section.
E Individual drawings and data sheets submitted at random intervals will not be accepted for review.
F Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.
B The manuals shall, at minimum, include the following:
1 Manufacturer (including contact information)
2 Model number
3 Manufacturer's data sheets – When data sheets include more than one model the model(s) used shall be noted
4 Manufacturer's user and maintenance manual(s), including trouble-shooting guidelines
5 Configuration settings
6 Wiring diagrams
7 Voltage ratings
8 Current ratings
9 List of capabilities
10 Environmental ratings
11 NEMA enclosure type
12 Maintenance requirements
13 Installation instructions
14 Repair instructions
C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

PART 2 – PRODUCTS

2.1 WIRING DEVICES

A Wall (Local) Switches
1 Totally enclosed
2 AC rated
3 20A rated
4 Silent type, unless noted otherwise on the plans
5 Manufacturers
a Hubbell Premise Wiring
b Leviton
6 Specification Grade
B Receptacles
1 Duplex receptacles shall be 20A, 125V_{AC} rated, 3-wire, grounded
2 Receptacle shall include a LED that indicates it has power.

3 Receptacles shall be tamperproof.
4 Manufacturers
a Hubbell Premise Wiring
b Leviton
5 Specification Grade
6 Exterior receptacle plates shall have steel, weatherproof, vandal-resistant while-in-use cover with key lockable/locking cover with keys to match owner standards.
7 All automatically switched receptacles shall be marked per 2022 CEC 406.3(E).

C Other special purpose receptacles shown on Drawings shall be of same quality.

D GFI receptacles shall self test every 3 seconds and indicate if the GFI protection has passed or failed the test.

E Wall Plates:
1 Commercial: Satin finish stainless steel
2 Educational and medical: Satin finish stainless steel
3 Medical: Satin finish stainless steel
4 Residential:
a Material: Nylon
b Color: Match wall color

F Switch and receptacle colors shall be as noted below unless otherwise specified.
1 Job type dependant:
a Educational and medical: Gray
b Commercial: White
c Residential: Match wall color
2 Feature type dependant (not job type dependant):
a Isolated Ground (IG) receptacle: Orange
b Equipment on emergency system: Red
c Receptacle with surge suppression: Blue
d Isolated ground receptacles with feature dependant color (other than orange) shall have orange triangle.
3 Follow the facility has a color code scheme if the facility has one. Verify with owner.

2.2 TERMINAL CABINETS

A Construction
1 Fabricated from code gauge steel, size as indicated on drawings, with flush latch and concealed hinges and mounting screws.
2 Enclosure for flush mounted cabinets shall be designed for flush mounting.
3 Enclosure for surface mounted cabinets shall be designed for surface mounting.

B Where size is not indicated, the minimum size shall be 24 inches wide x 30 inches high x 4 inches deep.

C Cabinet shall be Square D “Mono-Flat Fronts”, or approved equal.

D Terminal cabinets shall include a backboard at inside back of cabinet.
1 The backboard shall be 3/4" inch thick plywood
2 Paint backboard with 3 coats of fire retardant paint.

E Provide and install one terminal point for each wire within the terminal cabinet.

F NEMA type:
1 Interior, non-corrosive, non-hazardous (classified) locations: NEMA 1
2 Exterior locations with vents: NEMA 3R
3 Cooled enclosures: NEMA 4
4 Enclosures containing electronics in dusty areas or outdoors: NEMA 4
5 Enclosures in hazardous (classified) locations: NEMA 4 or 4X (corrosive locations) listed for hazardous classification
6 Enclosure in corrosive locations: NEMA 4X
7 All seams on NEMA 3R, 4, and 4X enclosures shall be continuously welded with welds ground smooth.

G Coating
1 The completed enclosure shall be degreased and cleaned.
2 After the cleaning process is finished, the enclosure shall be phosphatized.
3 After the phosphatizing, the enclosure shall receive an electrostatic deposition of polyester powder coating followed by baking to produce a hard durable finish.
a The minimum thickness of the paint film shall be 2.0 mils.
b For the exterior of transformer tank, interior and exterior of primary and secondary cable compartments the minimum total dry film thickness shall be 3.5 mils.
c Paint film shall be uniform in color and free from blisters, sags, flaking and peeling
4 Finish shall conform to UL 50 and UL 50E.
5 Color shall be ANSI 61 Gray.
6 Coat underside surfaces of equipment outdoors or in damp locations with a corrosion resistant coating.

2.3 POWER DISTRIBUTION TERMINAL BLOCKS

A Power distribution terminal blocks (PDTB) shall be finger-safe, NEMA 1 type.
B Conducting material shall be copper.
C Current rating and short circuit rating of PDTBs shall be no lower than upstream overcurrent protective device.
D Terminals
1 Each terminal shall be screw type and be designed for wire size connecting to it.
2 PDTB shall have one terminal for each wire connected to it on both load and line sides.
E Load wire sizes and OCPD shall comply with CEC 240.21(B) and 240.92(B) as well as all other applicable codes.
F PDTBs shall have provisions for panel or DIN rail mounting.
G PDTBs shall be mounted within enclosure unless otherwise noted.

2.4 NAMEPLATES

Provide and install nameplates per Section 260500.

PART 3 – EXECUTION

3.1 GENERAL

A Electric system layouts indicated on the Drawings are generally diagrammatic, but shall be followed as closely as actual construction and work of other trades will permit. Govern exact routing of cable and wiring and the locations of outlets by the structure and equipment served. Dimensions shall be taken from Architectural Drawings.

B Consult all other Drawings. Verify scales and report any dimensional discrepancies or other conflicts to architect, or engineer if no architect is involved, before submitting bid.

C Home runs to panelboards are indicated as starting from the outlet nearest the panel and continuing in the general direction of that panel. Continue such circuits to the panel as though the routes were completely indicated. Terminate homeruns of signal, alarm, and communications system in a similar manner.

D Avoid cutting and boring holes through structure or structural members wherever possible. Obtain prior approval of Architect and conform to structural requirements when cutting or boring the structure is necessary or permitted.

E Furnish and install necessary hardware, hangers, blocking, brackets, bracing, runners, required for equipment specified under this section.

F Provide necessary backing required to insure rigid mounting of outlet boxes.

G Outlet boxes shall be plumb.

H Back of wall plates shall be flush with wall finish. Gaps between wall plates and wall or wall plates not parallel to wall are not acceptable.

3.2 CONNECTIONS TO EQUIPMENT

A General:

1 Furnish and install required power supply conduit and wiring to equipment. See below for other wiring required.

2 Install rough-in work for equipment from approved shop drawings to suit the specific requirements of the equipment.

3 Furnish and install magnetic motor starters that are shown on the Drawings or specified under other divisions to be furnished under this division of work. Verify equipment nameplate ratings prior to installation and furnish adequately rated starters for the loads.

4 Furnish and install manual thermal protection for motors not integrally equipped with thermal protection.

5 Furnish and install 120V power to each control panel and time switch requiring a source of power to operate.

B Heating, ventilating, and air conditioning equipment:

1 Coordinate with mechanical contractor for sizes, locations and details of motors, heating units, and control requirements.

2 Provide required power supply conduit and wiring to equipment.

3 Provide a suitable means of disconnect switch immediately ahead of and adjacent to each motor and appliance unless the motor or appliance is located adjacent and within sight of the service panelboard, circuit breaker or switch at a distance allowed by codes. Verify equipment nameplate

current ratings prior to installation. Provide a disconnect means at each magnetic motor starter.

4 Provide magnetic motor starters required under this division of work.

5 Provide manual thermal protection for motors not integrally equipped with thermal protection.

6 Line and low voltage temperature control and interlock wiring, conduit, and required connections are a part of other divisions unless specifically shown or noted on the Drawings as to be furnished under this section.

7 Provide 120V power supply to control panels, time switch furnished and installed under other divisions of work.

8 Furnish and install 120V power to each duct detector scheduled for operation of fire dampers or shut down of mechanical equipment. Coordinate the exact quantity and locations with the mechanical drawings.

C Plumbing and other contractor-furnished and Owner-furnished equipment:

1 Required power and control conduit, wiring and connections are included under this section of the work. Control sensing and alarm devices will be furnished under the respective section of the contract supplying the equipment unless noted otherwise. These devices will be located in pipes, ducts, vessels, tanks, etc., and will be mounted in a place by the Contractor furnishing the devices. Other devices shall be mounted under this section of the work.

2 Control panels for packaged equipment will be furnished under the respective section of the contract supplying the equipment unless otherwise noted. Installation and connection of the control panels are under this section of the work.

3.3 IDENTIFICATION

Refer to Section 260500.

END OF SECTION

DOCUMENT 262800

LOW VOLTAGE (0-600V) CIRCUIT PROTECTIVE DEVICES

PART 1 – GENERAL

1.1 SECTION INCLUDES

Materials, equipment fabrication, installation and tests in conformity with applicable codes and authorities having jurisdiction, for overcurrent protective devices

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

Published specification standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.

A California Building Code
B California Electrical Code
C Institute of Electrical and Electronic Engineers
  1 IEEE 1015: Recommended Practice for Applying Low-Voltage Circuit Breakers Used in Industrial and Commercial Power Systems
  2 IEEE 1458: Recommended Practice for the Selection, Field Testing, and Life Expectancy of Molded Case Circuit Breakers for Industrial Applications
D Underwriters' Laboratories
  1 UL 50: Enclosures for Electrical Equipment, Non-environmental Considerations
  2 UL 50E: Enclosures for Electrical Equipment, Environmental Considerations
  3 UL 98: Enclosed and Dead-front Switches
  4 UL 244A: Solid-state Controls for Appliances
  5 UL 363: Knife Switches
  6 UL 489: Molded-case Circuit Breakers, Molded-case Switches, and Circuit Breaker Enclosures

7 UL 1066: Standard for Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures
8 UL 2367: Standard for Solid State Overcurrent Protectors
9 UL 60947-7-3: Low-Voltage Switchgear and Controlgear - Part 7-3: Ancillary Equipment - Safety Requirements for Fuse Terminal Blocks

1.4 QUALITY ASSURANCE

A Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.
B Supply equipment and accessories new, free from defects.
C Equipment and accessories in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.
D Items of a given type shall be the products of the same manufacturer.
E Deliver, store and protect products under provisions of Section 016200.
F Ship equipment in its original packages, to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.
G Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.
H Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

1.5 SUBMITTALS

A Submit under provisions of Section 013000 or 013300.
B Submittals shall include the following:
1 Table of contents
2 A complete set of detailed manufacturer’s specifications describing and illustrating all standard and special components and materials
3 Part numbers
4 Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5 Maintenance instructions and intervals
6 A complete set of drawings for any special items
7 Wiring diagrams
C Electronic submittals shall be searchable
D The submittal shall be substantially complete for all items and equipment furnished under this section.
E Individual drawings and data sheets submitted at random intervals will not be accepted for review.
F Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.
B The manuals shall, at minimum, include the following:
1 Manufacturer (including contact information)

2 Model number
3 Manufacturer's data sheets – When data sheets include more than one model the model(s) used shall be noted
4 Manufacturer's programming, user, and maintenance manual(s), including trouble-shooting guidelines
5 Configuration settings
6 Wiring diagrams
7 Voltage ratings
8 Current ratings
9 Calibrated range
10 List of capabilities
11 Environmental ratings
12 NEMA enclosure type
13 Maintenance requirements
14 Installation instructions
15 Repair instructions

C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

PART 2 – PRODUCTS

2.1 CIRCUIT BREAKERS

A Circuit breakers shall be constructed in accordance with the following standards:
1 UL 489 or UL 1066
2 Federal Specification W-C-375B/GEN
3 NEMA AB1
4 CSA 22.2, No. 5-M91
5 IEC 157-1
6 BS 4752

B Construction
1 Circuit breakers shall be constructed using glass reinforced polyester insulating material providing superior dielectric strength.
2 Current-carrying components shall be completely isolated from the handle and the accessory mounting area.
3 Breaker contact material shall be a non-weldable silver alloy.
4 Breakers shall have arc-extinguishing chutes.
5 Circuit breakers shall have an over-center, trip-free, toggle operating mechanism which will provide quick-make, quick-break contact action.
6 Multiple pole breakers shall have a common trip element and a single operating handle.
7 Circuit breakers for branch circuits shall be molded case
8 Circuit breakers shall have bolt-on/plug-on type bus connectors.

C Trip type
1 Circuit breakers having a frame size of 150 amperes or less shall have thermal magnetic non-interchangeable, trip-free sealed trip units.

2 Circuit breakers with a frame size of 175 amperes to 1200 amperes shall have interchangeable thermal and adjustable magnetic trip elements.

D There shall be two forms of visible trip indication.
1 The breaker handle shall reside in a position between ON and OFF.
2 In addition, there shall be a red trip indicator appearing in the clear window of the circuit breaker housing.

E Circuit breakers shall be UL Listed with amperage ratings, interrupting ratings, and number of poles as indicated on the panelboard schedules.

F Circuit breakers faceplates shall be marked with the following
1 Rated ampacity
2 UL and IEC certification standards
3 Applicable voltage systems and corresponding AIR ratings

G Lugs shall be UL Listed to accept solid or stranded copper and aluminum conductors. Lugs shall be suitable for 90°C rated wire, sized according to the 75°C temperature rating per CEC Table 310-16.

H Branch circuit breakers rated 30 amperes and below shall be UL Listed to accept 60°C rated wire.

I The interrupting capacity of all main and feeder branch circuit breakers shall be a minimum of 42,000A_{RMS} symmetrical amperes.

J All circuit breakers feeding HVAC units, motors, or circuit breakers supplying loads other than convenience receptacles or lights shall have lockout devices.

K Standard circuit breakers up to 250A at 600V_{AC} shall be UL Listed with HACR ratings.

L All circuit breakers feeding 120V, 15A and 20A branch circuits in dwellings shall be AFCI.

M Circuit breakers with shunt-trip or low voltage release shall be switch duty rated.

N All fixed trip circuit breakers 1200A or greater and adjustable trip circuits breakers with a maximum rating 1200A or greater shall be equipped with one of the following methods to reduce arc flash energy.
1 Zone selective interlocking
2 Differential relaying
3 Arc flash detection and mitigation system in panel/board with the 1200A circuit breaker, refer to Section 260930

2.2 SAFETY SWITCHES (DISCONNECTS)

A Switches shall be heavy duty type

B Minimum voltage rating shall be 600V.

C Minimum Size
1 Switches for disconnecting motors shall be sized for the horsepower of for motor(s).
2 All switches shall be sized per the overcurrent protective device protecting the switch.

D Construction
1 NEMA 1 for indoors
2 NEMA 3R or NEMA 4 for outdoors
3 Handle shall be lockable in the off/disconnected/open position.

E The switch shall include a barrier between the fuse section and the switch section with separate doors for each section. The entire fuse section shall be de-energized when the switch is in the off position.

F Switch shall be equivalent to Square D H-rated series.

G Finish: The entire enclosure shall be finished as follows.

1 Degreasing

2 Cleaning

3 Phosphatizing

4 Electrostatic deposition of polymer polyester powder coating followed by baking to produce a hard, durable finish.

a The minimum thickness of the paint film shall be 2.0 mils.

b Paint film shall be uniform in color and free from blisters, sags, flaking and peeling

5 Finish shall conform to UL 50 and UL 50E.

6 Color shall be ANSI 61 Gray.

7 Coat underside surfaces of equipment outdoors or in damp locations with a corrosion resistant coating

PART 3 – EXECUTION

3.1 GENERAL

A Electric system layouts indicated on the Drawings are generally diagrammatic but shall be followed as closely as actual construction and work of other trades will permit. Govern exact routing of cable and wiring and the locations of outlets by the structure and equipment served. Dimensions shall be taken from Architectural Drawings.

B Consult all other Drawings. Verify scales and report any dimensional discrepancies or other conflicts to architect, or engineer if no architect is involved, before submitting bid.

C Furnish and install necessary hardware, hangers, blocking, brackets, bracing, runners, required for equipment specified under this section.

3.2 OVER CURRENT PROTECTION DEVICE COORDINATION STUDY

A Contractor shall provide a coordination study to determine trip settings of circuit breakers and/or appropriate fuse types.

B Fault, circuit overload, etc shall only trip closest circuit breaker or melt closest fuse. No other circuits shall be affected.

C Contractor may elect to have the engineer of record provide such services at the contractor’s expense.

END OF SECTION

DOCUMENT 265000

LIGHTING

PART 1 – GENERAL

1.1 SECTION INCLUDES

This section includes materials, equipment fabrication, installation and tests in conformity with applicable codes and authorities having jurisdiction, for lighting fixtures and installation.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
- 1 Section 013000: Administrative Requirements
- 2 Section 013300: Submittal Procedures
- 3 Section 014000: Quality Requirements
- 4 Section 016000: Product Requirements
- 5 Section 017000: Execution and Closeout Requirements
- 6 All other included sections under Division 1

B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A. Published specifications standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.
B. California Electrical Code
C. Illuminating Engineering Society: The Lighting Handbook
D. Underwriters' Laboratories
   1. UL 50: Enclosures for Electrical Equipment, Non-environmental Considerations
   2. UL 50E: Enclosures for Electrical Equipment, Environmental Considerations
   3. UL 924: Emergency Lighting and Power Equipment
   4. UL 1598: Luminaires
   5. UL 2575: Standard for Lithium Ion Battery Systems for Use in Electric Power Tool and Motor Operated, Heating and Lighting Appliances
   6. UL 8750: Light Emitting Diode Equipment for Use in Lighting Products

1.4 QUALITY ASSURANCE

A. Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.

B. Supply equipment and accessories new, free from defects.
C. Supply equipment and accessories in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.
D. Items of a given type shall be the products of the same manufacturer.
E. Ship equipment in its original packages to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.
F. Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.
G. Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

1.5 SUBMITTALS

A. Submit under provisions of Section 013000 or 013300.
B. Submittals shall include the following:
   1. Table of contents
   2. A complete set of detailed manufacturer's specifications describing and illustrating all standard and special components and materials
   3. Part numbers
   4. Evidence of compliance with the applicable standards listed under Article 1.3 of this section
   5. Maintenance instructions and intervals
   6. Calibration procedures and intervals
   7. A complete set of drawings for any special items
   8. Wiring diagrams
   9. Drawings shall include designations, dimensions, operating controls, instruments, riser diagrams, routing diagrams etc.
C. Electronic submittals shall be searchable
D. The submittal shall be substantially complete for all items and equipment furnished under this section.
E. Individual drawings and data sheets submitted at random intervals will not be accepted for review.
F. Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.
G. Pole mounted fixtures, including complete data on the pole material, finish, handholes, anchoring and attachment. Support method shall be submitted for interior fixtures weighing more than fifty (50) pounds.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.
B The manuals shall, at minimum, include the following:
   1 Manufacturer (including contact information)
   2 Model number
   3 Programming manual (where applicable)
   4 Wiring diagrams
   5 Trouble-shooting guidelines (where applicable)

6 Voltage ratings
7 Current ratings
8 Calibrated range (where applicable)
9 List of capabilities
10 Environmental ratings
11 NEMA enclosure type
12 Maintenance requirements
13 Installation instructions
14 Repair instructions (where applicable)

C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

PART 2 – PRODUCTS

2.1 GENERAL

A. Furnish and install all fixtures complete, including lamps, ballasts, whips, conductors, etc. and ready for service.
B. Fixture Designation: Fixtures are designated on Drawings by means of letters. See Lighting Fixture Schedule. Where only one (1) fixture designation appears in a room or area, that designation applies to all fixtures in that room or area.
C. Tandem wired units acceptable where appropriate.
D. Manufacturers and models for fixtures, ballasts, and lamps shall be as shown on the fixture schedule or approved equal.

2.2 FIXTURES

A Linear fixtures
1 Fixture housings shall be steel.
2 Housing shall be painted after fabrication with white, electro-statically deposited paint. Housing shall be completely covered with paint to prevent corrosion.
B All lenses shall be clear, prismatic, 0.125”, K12 pattern, acrylic lenses.
C Louvers shall be semi-specular aluminum.
D Open can light reflectors shall be semi-specular aluminum.
E Fixtures installed in gyms and similar rooms, locker rooms, storage rooms, and warehouses shall include stainless steel wireguards to protect fixture from damage.
F Fixtures shall direct a minimum of 75% of light within zone below 30 degrees below horizontal.

2.3 LAMPS

A. All LED fixtures shall have a color rendering index (CRI) of 0.8 and color temperature of 4000°K unless otherwise noted on plan.

2.4 EXIT SIGNS

A. All exit signs shall be connected to an unswitched source.
B. Colors
    1. Face shall be white.
    2. Letters and arrows shall be green.
C. Exit signs shall have arrows to indicate direction of exit where necessary.
D. All exit signs shall include batteries to provide 90 minutes of illumination in the event of a power outage.

2.5 FIXTURE HANGERS AND SUPPORTS

A. Provide proper supports and mounting accessories, such as hangers, stems, yokes, plaster frames, etc., as required by the type of ceiling installed.
B. Where pendant mounted fixtures with stems are specified, provide swivel canopies or ball aligners in order to hang plumb regardless of ceiling slope.
C. Entire assemblies shall comply with state earthquake resistance/ bracing guidelines.

2.6 POLES

A. The minimum pole shall be capable of supporting the weights and effective projected areas listed below in 100 MPH winds:
    1. 20 foot tall: W_{MAX}=390lbs, EPA_{Max}=15.6FT^2
    2. 25 foot tall: W_{MAX}=495lbs, EPA_{Max}=19.8FT^2
    3. 30 foot tall: W_{MAX}=550lbs, EPA_{Max}=22.0FT^2
    4. 35 foot tall: W_{MAX}=363bs, EPA_{Max}=14.5FT^2
    5. 39 foot tall: W_{MAX}=475lbs, EPA_{Max}=19.0FT^2
    6. 45 foot tall: W_{MAX}=475lbs, EPA_{Max}=19.0FT^2
    7. 50 foot tall: W_{MAX}=340lbs, EPA_{Max}=13.6FT^2
B. Anchoring
    1. Concrete base depth and anchor bolt length shall be as shown on plans.
    2. In no case shall the concrete base embedment depth be less than 20% of the pole height.
    3. Minimum anchor bolt length is 10% of the pole height.
    4. Minimum anchor bolt diameter is 1 inch.
C. Coordinate with architect for pole color.
D. Poles shall be made of ATSM A595, Grade A steel.

2.7 GROUNDING

A Fixtures shall have factory installed grounding studs.
B All fixtures shall be capable of being grounded.

2.8 LIGHTING CONTROLS

Refer to Section 265700.

PART 3 – EXECUTION

3.1 GENERAL

A. Verify ceiling type and conditions. Order fixtures designed for conditions and the type of ceiling installed.
B. Architectural reflected ceiling plans shall be used to determine exact locations of lighting fixtures.
C. Determine exact location and height of fixtures by the structural and mechanical limitations of the building. Install fixtures in such a manner as to avoid such obstructions and to give proper illumination result. Verify layouts with architect.
D. All recessed lighting fixtures shall be wired from adjacent junction boxes utilizing 6' flexible metal conduit to permit future fixture relocation. Outlet box for surface or stem mounted fixtures shall be provided with fixture stud as well as tapped and drilled canopy covers. All outlets shall finish flush with walls or ceiling except where in ceiling tiles, locate these in the center of a tile or at the intersection of four (4) tiles.
E. All building mounted fixtures shall be supported from the building structural members. Provide all necessary blocking and hardware so that fixtures installed suspended below grid type ceiling shall be supported independently of the grid system at a minimum of four (4) points per 4' long fixture.
F. Minimum mounting provisions for closed ceiling (surface) mounted fluorescent lighting fixtures in ceilings other than grid type shall be as follows:
    1. 4' long fixture body: By a pair of 3/8" machine bolts separated by a maximum distance possible and located 4 inches in from each end of fixture - total of four (4) bolts per fixture.
G. Support for fixtures installed in suspended ceilings shall conform to Section 4701 of Title 24, Part 2.
H. When installed in grid type ceiling, a slack #12 gauge galvanized tie wire permanently attached to the structure shall be provide at four (4) corners of each 4' long fixture.
I. At fire rated ceiling, provide sheet rock at top and at all sides of recessed mounted lighting fixtures.
J. Ground all fixtures.

END OF SECTION

DOCUMENT 265700

LIGHTING CONTROLS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Materials, equipment fabrication, installation and tests in conformity with equipment applicable to this project, applicable codes and authorities having jurisdiction.
B. The work to be provided under these specifications consists of furnishing and installing a complete and operable lighting control system.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

Published specifications standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.

A California Electrical Code
B Underwriters' Laboratories
  1 UL 20: General Use Snap Switches
  2 UL 50: Enclosures for Electrical Equipment, Non-environmental Considerations
  3 UL 50E: Enclosures for Electrical Equipment, Environmental Considerations
  4 UL 67: Panelboards
  5 UL 98: Enclosed and Dead-front Switches
  6 UL 467: Grounding and Bonding Equipment
  7 UL 486A: Wire Connectors
  8 UL 486B: Wire Connectors
  9 UL 489: Molded-case Circuit Breakers, Molded-case Switches, and Circuit Breaker Enclosures
  10 UL 773A: Nonindustrial Photoelectric Switches for Lighting Control
  11 UL 917: Clock Operated Switches

12 UL 60730-2-7: Automatic Electrical Controls for Household and Similar Use – Part 2: Particular Requirements for Timers and Time Switches

1.4 QUALITY ASSURANCE

A. Equipment and accessories to be the product of a manufacturer regularly engaged in its manufacture.
B. Supply equipment and accessories new, free from defects.
C. Equipment and accessories in compliance with the applicable standards listed in Article 1.1 of this section and with applicable national, state and local codes.
D. Items of a given type shall be the products of the same manufacturer.

1.5 SUBMITTALS

A Submit under provisions of Section 013000 or 013300.
B Submittals shall include the following:
1 Table of contents
2 A complete set of detailed manufacturer's specifications describing and illustrating all standard and special components and materials
3 Part numbers
4 Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5 Maintenance instructions and intervals
6 Calibration procedures and intervals
7 A complete set of drawings for any special items
8 A single line block diagram showing exactly the manner in which the contractor proposes to layout the system.
9 Wiring diagrams
10 Drawings shall include designations, dimensions, operating controls, instruments, riser diagrams, routing diagrams etc.
C Electronic submittals shall be searchable
D The submittal shall be substantially complete for all items and equipment furnished under this section.
E Individual drawings and data sheets submitted at random intervals will not be accepted for review.
F Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.
B The manuals shall, at minimum, include the following:
1 Manufacturer (including contact information)
2 Model numbers
3 Programming manuals
4 Wiring diagrams
5 Trouble-shooting guidelines
6 Voltage ratings
7 Current ratings

8 Calibrated range (where applicable)
9 List of capabilities
10 Environmental ratings
11 NEMA enclosure type
12 Maintenance requirements
13 Installation instructions
14 Repair instructions

C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

1.7 ABBREVIATIONS

A. ATC Astronomical Time Clock
B. LCP Lighting Control Panel
C. LCS Lighting Control System

PART 2 – PRODUCTS

2.1 GENERAL

A. The LCP size and quantity; and relay quantity shall be sufficient for all circuits with 25% spare circuits.
B. Enclosures shall be NEMA 1 for interior, dry locations and NEMA 3R or NEMA 4 for exterior or wet locations.
C. Energy Management Systems
1. All LCPs with 12 or more switch legs shall be capable of communications with an Energy Management System via a minimum of one of the following protocols.
a. BACnet
b. LONWorks
c. Modbus
2. Provide and install a communications gateway if LCP/LCS and EMS system do not have a common protocol.
D. All equipment shall be rated for voltage used.

2.2 BUILDING LIGHTING CONTROL SYSTEMS

A. Building lighting control systems shall be Wattstopper Digital Lighting Management system and consist of the following, except as allowed in Part B.
1. Lighting control systems shall have the following capabilities and features.
a. Networkable (TCP/IP interface)
b. Scheduling controls
c. Astronomical time clock
d. Manual switches interfaces
e. Photocell interface
2. Controllers where dimming is required:

a. System controller
    1. 100 or fewer sub-controllers and no more than three segments: Wattstopper LMSM-3E
    2. More than 100 sub-controllers or 3 segments: Wattstopper LMSM-6E
b. Switch leg relay sub-controller where dimming is required
    1. Wattstopper LMRC-210 series for 0-10V_{DC} dimming
    2. Wattstopper LMRC-220 series for line voltage dimming
c. Switch leg relay sub-controller where dimming is not required: Wattstopper LMRC-100 series
d. Provide Wattstopper LMBC-300 network bridge for each sub-controller.

3. Switches: Wattstopper LMSW-100 series
4. Dimmers: Wattstopper LMDM-101
5. Switches and dimmers in multiple stall restrooms or where noted on plans shall have locking, stainless steel covers (Legrand #WP26L or approved equal).
6. Motion sensors (All motion sensors shall be dual technology [passive infrared and ultrasonic]).
    a. Ceiling mounted: Wattstopper LMDC-100
    b. Wall mounted: Wattstopper LMDX-100

2.3 OTHER DEVICES

A. On/off Switches
    1. SPST switch for 120V or 277V
    2. DPST switch for 208V, 240V, or 480V
B. Switches for use with sport lighting shall be 3 position, maintained position switch for on-off-automatic control.
C. Astronomical time switch: Wattstopper RT-200
D. Clock input
    1. 120V
    2. Six (6) months cumulative battery back-up
    3. SPDT dry contract
    4. Enclosure shall be fiberglass, suitable for outdoor/indoor UL listed.
    5. Digital LED display.
    6. Tork model K801Z or equal.
E. Lighting Relays
    1. Electrically operated, mechanically held, specifically designed as lighting contactors
    2. 20A, 480V_{AC} rated, with 120V_{AC} controls unless otherwise specified
    3. Minimum of 4-pole
    4. Relays shall be mounted on shock absorbers within an acoustically treated enclosure to eliminate make and break noise.
    5. Install the relays in code gage cabinets 24”W x 36”H x 6”D with ¾” fire rated plywood backboards.
    6. Products: GE CR460 series, ASCO 917 series, or equivalent
    7. Contact response time shall be no more than 5 milliseconds.
F. Lighting Relay panels Wattstopper or indicated on plan.

PART 3 – EXECUTION

3.1 COMPATIBILITY

The installing contractor shall insure to the Owner that all components installed are compatible with all other components within the lighting control system.

3.2 INSTALLATION PRACTICES

A. All equipment shall be installed in a neat and workmanlike manner and to the satisfaction of an authorized representative.
B. All equipment power wiring and grounding shall conform to the Califonia Electrical Code and applicable local codes. Electronics equipment shall be grounded using a No. 6 solid copper wire.
C. Cable shall be adequately supported, and connectors specifically designed for the type cable in use shall be installed.

3.3 SYSTEM PROOF OF PERFORMANCE

A. Upon completion of the system installation, it shall be the responsibility of the contractor to perform the necessary adjustments.
B. The system shall be physically inspected by an authorized representative of the customer to assure that all equipment is installed in a neat and workmanlike manner as called for by the plans and specifications.
C. Before the contract shall be considered completed, the contractor shall conduct an operating test for approval. The system shall be demonstrated to operate in accordance with the requirements of these specifications. The test shall be performed in the presence of an authorized representative of the Owner. The contractor shall furnish all equipment and personnel required for the tests.
D. Should such a demonstration of performance show that the system does not perform as intended, the contractor shall make all necessary changes or adjustments and a second performance demonstration shall be arranged.
E. Should a second performance demonstration fail, the contractor agrees to correct the system deficiencies under the supervision of the owner’s technical staff at no cost to the owner.
F. Title 24 acceptance testing shall be performed by a technician licensed by an Acceptance Test Technician Certification Provider.

END OF SECTION

DOCUMENT 271100

COMMUNICATIONS EQUIPMENT ROOM FITTINGS

PART 1 – GENERAL

1.1 SECTION INCLUDES

This section includes material and workmanship requirements for intermediate data frames (IDFs), main data frames (MDFs), and signal and communications terminal backboards (SCTBs) including, but not limited to, cabinets, racks, patch panels, cable terminations, patch cables, and power distribution.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A. Governing Codes and Conflicts: If the requirements of the Construction Documents exceed those of the governing codes and regulations, then the requirements of the Construction Documents shall prevail. Where a conflict exists, the governing codes and ordinances shall supersede all other requirements.
B. ANSI: American National Standards Institute (ANSI)
C. CEC: California Electrical Code
D. Electronic Components Association (ECA)
  1. ECA-310-E: Cabinets, Racks, Panels, and Associated Equipment
E. Institute of Electrical and Electronic Engineers (IEEE)
  1. IEEE 802.3: IEEE Standard for Ethernet
  2. IEEE 802.3ad: Link Aggregation
  3. IEEE 802.3ae: 10 Gigabit Ethernet
  4. IEEE 802.3af: Power over Ethernet
  5. IEEE 802.3an: 10 Gigabit Ethernet on Twisted Pair Copper Cable (10G Base T)
  6. IEEE 802.3aq: 10 Gigabit Ethernet on FDDI-Grade Multimode Fiber (10G Base LRM)
  7. IEEE 802.3at: Enhanced Power over Ethernet

F. Telecommunications Industries Association (TIA)
   1. TIA-455: General Requirements for Standard Test Procedures for Optical Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices, and Other Fiber Optic Components
   2. TIA-472-0000: Generic Specification for Fiber Optic Cable
   3. TIA-472-C000: Sectional Specification for Fiber Optic Communications Cable for Indoor Use
   4. TIA-472-D000: Sectional Specification for Optical Fiber Outside Plant Communications Cables
   5. TIA-472-E000: Sectional Specification for Indoor-Outdoor Optical Fiber Cable
   6. TIA-472-F000: Sectional Specification for Optical Fiber Drop Cable
   7. TIA-492-0000: Generic Specification for Optical Fibers
   8. TIA-492-AAAD: Detailed Specification for 850-nm, Laser Optimized, 50µm Core Diameter / 125µm Cladding Diameter, Class IA Graded-Index, Multimode Optical Fibers Suitable for Manufacturing OM4 Cabled Optical Fibers
   9. TIA-492-CAAB: Detailed Specification for Class IVA, Dispersion-Unshifted, Single-Mode, Optical Fibers with Low Water Peak
   10. TIA-526: Standard Test Procedures for Fiber Optic Systems
   11. TIA-526-2: Effective Transmitter Output Power Coupled into Single-Mode Fiber Optic Cable
   12. TIA-526-14: Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
   13. TIA-526-19: Optical Signal-to-Noise Ratio Measurement Procedures for Dense Wavelength – Division Multiplexed Systems
   14. TIA-568-C: Commercial Building Telecommunications Standard
   15. TIA-568-C.0: Generic Telecommunications Cabling for Customer Premises
   16. TIA-568-C.1: Commercial Building Telecommunications Cabling Standard
   17. TIA-568-C.2: Balanced Twisted-Pair Telecommunications Cabling and Components Standards
   18. TIA-568-C.3: Optical Fiber Cabling Components Standard
   19. TIA-568-C.3-1 Addendum 1: Addition of OM4 Cabled Optical Fiber and Array Connectivity
   20. TIA-569-C: Commercial Building Standard for Telecommunications Pathways and Spaces
   21. TIA-604: Fiber Optic Connector Intermate ability Standards
   22. TIA-606-B: Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
   23. TIA-607-B: Commercial Building Grounding and Bonding Requirements for Telecommunications
   24. TIA-758-B: Customer Owned Outside Plant Telecommunications Infrastructure Standard
   25. TIA-TSB-36: Technical Systems Bulletin Additional Cable Specifications for Unshielded Twisted-Pair Cables
   26. TIA-TSB-62: Informative Test methods for Fiber-Optic Fibers, Cables, Opto-Electronic Sources and Detectors, Sensors, Connecting and Terminating Devices, and Other Fiber-Optic Components

27. TIA-TSB-63: Reference Guide for Fiber Optic Test Procedures
28. TIA-TSB-149: Generic Workmanship Guidelines for Fiber Optic Connector Interoperability
29. TIA-TSB-4979: Practical Considerations for Implementation of Encircled Flux Launch Conditions in the Field

G. Underwriters Laboratories, Inc.
1. UL 50: Enclosures for Electrical Equipment, Non-environmental Considerations
2. UL 50E: Enclosures for Electrical Equipment, Environmental Considerations
3. UL 489A: Circuit Breakers for Use in Communications Equipment
4. UL 497: Protectors for Paired-conductor Communications Circuits
5. UL 497A: Secondary Protectors for Communications Circuits
6. UL 497B: Protectors for Data Communications and Fire Alarm Circuits
7. UL 497C: Protectors for Coaxial Communications Circuits
8. UL 497D: Component Secondary Protectors for Communications Circuits Used With Specified Voltage Suppression
9. UL 497E: Protectors for Antenna Lead-In Conductors
10. UL 1449: Surge Protective Devices
11. UL 1651: Standard for Optical Fiber Cable
12. UL 1655: Standard for Community-Antenna Television Cables
13. UL 1690: Standard for Data-Processing Cable
14. UL 1778: Uninterruptible Power Systems
15. UL 1801: Power Distribution Centers for Communications Equipment
16. UL 1863: Communications Circuit Accessories
17. UL 1977: Component Connectors for Use in Data, Signal, Control, and Power Applications
18. UL 2024: Standard for Signaling, Optical Fiber and Communications Raceways and Cable Routing Assemblies
19. UL 2269: Optical Fiber/Communications/Signaling/Coaxial Cable Outlet Boxes
20. UL 2416: Audio/Video, Information, and Communication Technology Equipment Cabinet, Enclosure, and Rack Systems
21. UL 2564: Low Voltage Surge Withstand Telecommunications Overcurrent Protector Components
22. UL 2566: Low Voltage Surge Withstand Telecommunications Fuses
23. UL 2567: Low Voltage Surge Withstand Telecommunications Polymer Positive Temperature Coefficient Thermistor (PPTC)
24. UL 2569: Low Voltage Surge Withstand Telecommunications Line Feed Resistor
25. UL 2570: Low Voltage Surge Withstand Telecommunications Electronic Current Limiters
26. UL 60950-1: Information Technology Equipment Safety – Part 1: General Requirements
27. UL 60950-22: Information Technology Equipment - Safety - Part 22: Equipment to be Installed Outdoors
28. UL 62368-1: Audio/video, information and communication technology equipment - Part 1: Safety requirements

1.4 QUALITY ASSURANCE

A Contractor requirements:

1 The Contractor shall have successfully completed a minimum of 5 telecommunications projects of the same size and scope.

2 Project Manager

a The Project Manager shall have successfully completed a minimum of 5 telecommunications projects of the same size and scope.

b The contractor shall make the project manager available to the Owner/Owner's Representative before the start of this project for an interview. This person must be deemed acceptable by the Owner and/or their Representative before work can begin.

c Project Manager will be required to be available for scheduled on site project meetings at no additional cost to the Owner.

d Project Manager will be required to be available to meet on site with the Owner/Owner's representative with a minimum of 24 hours notice for non- emergency issues, and a minimum of 4 hours for emergency issues at no additional cost to the Owner.

3 The work performed under this specification shall be of good quality and performed in a workmanlike manner. In this context 'good quality' means the work shall meet industry technical standards and quality of appearance. The Owner reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.

4 The Contractor shall provide all necessary materials and labor for a complete, functional Telecommunications cabling infrastructure in accordance with all applicable standards and the Construction Documents.

B Material requirements

1 All material and equipment to be installed on this project will be new and free from defects.

2 Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.

3 New material shall meet the following requirements.

a Manufactured within one year of the installation date.

b Undamaged

c Not previously installed

d Delivered to jobsite in original packaging

e No corrosion or other degradation of material

f In factory condition

g Unmodified

4 If used material or equipment has been installed on this project the Contractor shall replace said materials and/or equipment with new products at no additional cost to the Owner.

5 Equipment and accessories shall be in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.

6 Items of a given type shall be the products of the same manufacturer.

7 Deliver, store and protect products under provisions of Section 016200.

8 Ship equipment in its original packages, to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.

9 Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.

10 Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

C Contractor shall warranty all materials, equipment, and workmanship for a minimum of one (1) year.

1 Warranty shall provide repair/replacement of all defective or improperly installed materials at no additional cost to the Owner (including all costs to repair or replace the item(s)).

2 Contractor shall provide a competent service technician and new materials to repair/replace defective items no later than 24 hours after notification.

D The work performed under this specification shall be of good quality and performed in a workmanlike manner. In this context ‘good quality’ means the work shall meet industry technical standards and quality of appearance. The Owner reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.

E The Contractor shall provide all necessary materials and labor for a complete, functional Telecommunications cabling infrastructure in accordance with all applicable standards and the Construction Documents.

1.5 SUBMITTALS

A Submit under provisions of Section 013000 or 013300.

B Submittals shall include the following:

1 Table of contents

2 A complete set of detailed manufacturer’s specifications describing and illustrating all standard and special components and materials

3 Part numbers

4 Evidence of compliance with the applicable standards listed under Article 1.3 of this section

5 Maintenance instructions and intervals

6 A complete set of drawings for any special items

7 A single line block diagram showing exactly the manner in which the contractor proposes to layout the system.

8 Wiring diagrams

9 Illustrations and scale drawing of the racks, equipment layouts etc.

10 Drawings shall include designations, dimensions, operating controls, instruments, riser diagrams, routing diagrams etc.

C Electronic submittals shall be searchable

D The submittal shall be substantially complete for all items and equipment furnished under this section.

E Individual drawings and data sheets submitted at random intervals will not be accepted for review.

F Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.
B The manuals shall, at minimum, include the following:
1 Table of contents
2 Manufacturer (including contact information)
3 Model number
4 Programming manual (where applicable)
5 Wiring diagrams
6 Trouble-shooting guidelines (where applicable)
7 Voltage ratings
8 Current ratings
9 Calibrated range (where applicable)
10 List of capabilities
11 Environmental ratings
12 NEMA enclosure type
13 Maintenance instructions and intervals
14 Calibration procedures and intervals
15 Installation instructions
16 Repair instructions (where applicable)
17 As-built drawings
C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

1.7 DEFINITIONS

A. Intermediate distribution frame (IDF): An intermediate distribution of horizontal cabling to other cabling (e.g. horizontal, backbone, or equipment).
B. Main Distribution Frame (MDF): A main distribution for, 1st level backbone cables, entrance cables, and equipment cables. The Main Distribution-frame is often co-located in the building Entrance Facility (EF) and/or Equipment Room (ER) and consisting of riser cable terminals, utility service cables terminals, PBS terminals, and other equipment.

PART 2 – PRODUCTS

2.1 GENERAL

A. All IDF, MDF, et cetera shall be enclosed unless open racks are called out on the plans.
B. Top of wall mounted IDFs shall be 18” below ceiling.
C. Provide all necessary mounting hardware.
D. All material shall be UL listed for its application.

2.2 ENCLOSURES AND RACKS

A. Manufacturers
   1. APC
   2. Black Box
   3. Chatsworth Products, Inc.
   4. Cooper B-Line
   5. Hoffman Enclosures
   6. Hubbell Premise Wiring
   7. Southwest Data Products

B. Main Distribution Frames
   1. Four posts: Front and rear pairs of 3” deep C-shaped equipment mounting channels, 19” wide
   2. Minimum of 42 rack units
   3. 2000 pound static load capacity
   4. Provisions for anchoring to floor
   5. Zone 4 Seismic rated
   6. Provide and install a minimum of 6 shelves with the following requirements
      a. 4 points of attachment
      b. 200 pound capacity
      c. Vented
   7. Mount a backboard on wall behind cabinet or rack
      a. 48” wide by 96” high by 3/4” deep plywood
      b. Mounting: 3/8”x2” long wood or self-tapping screw every 12” along wall stud
      c. Paint with 3 coats of fire resistant paint.
   8. Fiber optic cable storage ring: Black Box FOSR24
   9. MDFs shall be floor mounted unless otherwise noted.

C. Intermediate Distribution Frames
   1. Four posts
   2. Minimum of 24 rack units
   3. 300 pound static load capacity
   4. Provisions for wall mounting
   5. Provide and install a minimum of 3 shelves with the following requirements
      a. 4 points of attachment
      b. 60 pound capacity
      c. Vented
   6. 18” DIN rail
   7. Mount a backboard inside rear of cabinet (enclosed IDF) or on wall behind rack (open IDF)
      a. 3/4” plywood
      b. Mounting: 3/8”x2” long wood or self-tapping screw every 12” along wall stud
      c. Paint with 3 coats of fire resistant paint.
   8. Fiber optic cable storage ring: Black Box FOSR12
   9. IDFs shall be wall mounted unless otherwise noted.

D. Cabinets

1. General
    a. Material: Steel
    b. 18” DIN rail
    c. Wall mounted cabinets shall be composed of three sections:
        1) Rear panel mounted to wall
        2) Main section shall be hinged on rear panel and include lock to secure in closed position to rear panel.
        3) Front door shall be hinged on main section and lockable in the closed position.
    d. Hinges shall be reversible to allow swing open from the right or left.
    e. The front door shall have rounded edges and corners.
    f. Floor mounted cabinets shall have locking front and rear doors.
2. Enclosed rack/cabinet in cooled room
    a. Top mounted ventilation fan(s)
        1) Minimum flow rate of 450 CFM for MDF cabinet
        2) Minimum flow rate of 225 CFM for IDF cabinet
    b. MDF cabinets shall include 250 CFM enclosure blower.
    c. Ventilation openings in sides or front
    d. MDF cabinets shall have locking, mesh front and rear doors.
    e. IDF cabinets shall have a locking front door with smoked poly-methyl-methacrylate window.
    f. Install temperature switch in cabinet to turn the fan on at 100°F and off at 90°F.
3. Coating
    a. The completed rack or cabinet shall be degreased and cleaned.
    b. After the cleaning process is finished, the rack or cabinet shall be phosphatized.
    c. After the phosphatizing, the rack or cabinet shall receive an electrostatic deposition of polyester powder coating followed by baking to produce a hard durable finish.
        1) The minimum thickness of the paint film shall be 2.0 mils.
        2) Paint film shall be uniform in color and free from blisters, sags, flaking and peeling
    d. Finish shall conform to UL 50 and UL 50E.
    e. Color shall be black for interior locations and ANSI 61 gray for exterior locations.
    f. Coat underside surfaces of equipment outdoors or in damp locations with a corrosion resistant coating.

E. Each rack unit space shall be identified on the racks/posts.

F. The contractor shall calculate space requirements prior to ordering equipment. If the specified enclosure or rack is not large enough, the contractor shall order the size required for the equipment to be installed.

2.3 COPPER PATCH PANELS

A. 48 Port, Category 6a patch panel: Panduit #CPP48WBLY

B. Data ports
    1. RJ45 design

2. Terminate 26AWG to 22 AWG, stranded or solid, Cat-6A cables without punch-down tool
3. Suppress alien cross-talk
4. Maintain 10GB/S performance in 48 port, 1RU patch panels
5. T568B wiring scheme
6. Meet or exceed Cat-6A requirements of TIA-568-C.2 and IEEE 802.3an.
7. Compatible with IEEE 802.3at POE+
8. Snap in, snap out modular design
9. Conductor retention and strain relief
10. Gold plated contacts
11. Manufacturer and models
    a. Black: Panduit #CJ6X88TGBL
    b. Blue: Panduit #CJ6X88TGBU
    c. Green: Panduit #CJ6X88TGGR
    d. Purple: Panduit #CJ6X88TGVL
    e. Red: Panduit #CJ6X88TGRD
    f. White: Panduit #CJ6X88TGIW
    g. Yellow: Panduit #CJ6X88TGYL
12. Ports in patch panels shall be grouped by use (data, VOIP, clock/public address, etc.)

C. Patch cords
1. RJ45 design
2. Four twisted, unshielded, 23 AWG, solid pairs (23 AWG UTP)
3. Suppress alien cross-talk
4. Maintain 10GB/S performance
5. T568B wiring scheme
6. Meet or exceed Cat-6A requirements of TIA-568-C.2 and IEEE 802.3an.
7. SRL, Attenuation and NEXT results shall use Sweep Frequency test per TIA-568-C.
8. Compatible with IEEE 802.3at POE+
9. Snagless latch on plugs
10. Length shall be 12 inches
11. Manufacturer and models
    a. Black: Panduit #UTP6A1BL
    b. Blue: Panduit #UTP6A1BU
    c. Green: Panduit #UTP6A1GR
    d. Purple: Panduit #UTP6A1VL
    e. Red: Panduit #UTP6A1RD
    f. White: Panduit #UTP6A1IW
    g. Yellow: Panduit #UTP6A1YL

D. Colors for RJ45 ports and patch cables shall be:
1. Clocks: Green
2. Data: Blue
3. Energy management system: Purple
4. Power distribution units: Black
5. Servers: White
6. Speakers: Green
7. Surveillance: Red
8. Uninterruptable power supplies: Black

9. Wireless access points: Yellow

E. Quantity: provide and install sufficient patch panels and patch cords to accommodate all devices with:
   1. 48 spare ports for MDFs
   2. 24 spare ports for IDFs

F. Port identification: Panduit #C061X030FJJ

2.4 FIBER OPTIC PATCH PANELS

A. Patch panel: Panduit #CFAPPBL1

B. Fiber adapter panels (FAP)
   1. Multi-mode
      a. OM4
      b. 12 Duplex LC adapters per FAP
      c. Zirconia ceramic, split sleeve ferrules
      d. Color: Blue
      e. Manufacturer: Panduit
   2. Single-mode
      a. OS2
      b. 12 Duplex LC adapters per FAP
      c. Zirconia ceramic, split sleeve ferrules
      d. Color: Green
      e. Manufacturer: Panduit

C. Install blank adapter panel in each unused space in the patch panel: Panduit #FAPB

D. Fiber optic patch cords
   1. Cords shall have duplex LC connectors on one end and SFP connectors on other end.
   2. Length shall be 8 inches for patch panel adjacent to switch. Add 1.75 inches to length for each rack unit separating patch panel from switch.
   3. Multi-mode patch cords shall be OM4. Single-mode patch cords shall be OS2.
   4. Cord and connector colors shall match adapter colors.

E. Quantity: provide and install sufficient devices to accommodate all backbone cable strands with:
   1. 36 spare terminals for MDFs
   2. 12 spare terminals for IDFs

F. Port identification: Panduit #C061X030FJJ

2.5 TELCO SPLICE BLOCKS

A. Where called out on plans provide and install a 50 pair, Type 66 Telco Splice Block; Black Box JP620 or equivalent.

B. Quantity: provide and install sufficient splice blocks to accommodate 150% of phone lines terminating at MDF.

C. All terminals shall be screw type.

2.6 POWER SUPPLIES

A. IDF Uninterruptable Power Supply
   1. UPS shall be APC rack mountable Smart-UPS or Symmetra series.
   2. Refer to plans for size of UPS. If size is not shown on plans, size of UPS shall be 900VA per 48 port LAN switch.
   3. Provide and install APC AP9631 Network Management Card with Environmental Monitoring and APC AP9335TH temperature and humidity sensor.
   4. Provide and install Cat-6A patch cord from UPS to LAN switch.

B. All UPS feeding data equipment shall have battery packs allowing for 30 minutes of runtime at full load during power outage.

C. Power Distribution Units
   1. PDUs shall be rack mounted, switched outlet type with sequenced start-up.
   2. PDU(s) shall have a minimum of 8 5-15R and/or 5-20R per 2kVA of UPS capacity. Coordinate receptacle types with equipment being fed by PDU(s).
   3. Quantity of PDUs shall allow usage of full capacity of UPS.
   4. PDUs shall be capable of cycling power to each receptacle via network.
   5. Coordinate input type(s) of PDU(s) with output type(s) of UPS.
   6. Provide and install Cat-6A patch cord from each PDU to LAN switch.

D. All UPSs and PDUs shall include the following features.
   1. Minimum of one RJ-45 Ethernet port
   2. SMNPv3, SSL, SSH
   3. Password protection
   4. User defined alarms with email alerting
   5. Load display

E. Provide and install APC InfraStruxure Manager software and license for each UPS and PDU.

2.7 GROUNDING AND BONDING

A Grounding Busbar
   1 Grounding Busbars shall be 4” high by 12” wide by 0.25” thick solid copper bar.
   2 The busbar shall be 4” high and 12” long and shall have 18 attachment points (two rows of 9 each) for two-hole grounding lugs.
   3 The hole pattern for attaching grounding lugs shall meet the requirements of TIA-607-B and shall accept 30 lugs with 5/8” hole centers and 6 lugs with 1” hole centers.
   4 The busbar shall include wall-mount stand-off brackets, assembly screws and insulators.
   5 The busbar shall be UL Listed as grounding and bonding equipment.
   6 Grounding Busbar shall be Chatsworth Products, Inc. 40153-012, or approved equal.

B Vertical Rack Busbar
   1 Vertical, rack-mounted busbar shall be constructed of 1/4” thick by 5/8” wide, hard-drawn copper bar.
   2 Busbar shall be designed to mount into the channel of the rack without interfering with mounting of equipment on the rack.

3 Bar shall have eight 6-32 tapped ground mounting holes on 1” intervals and four 0.281” holes for the attachment of two-hole grounding lugs.
4 Busbars shall run entire height of rack.
5 Busbars shall be Chatsworth Products, Inc. 40161-036 and/or 40161-072

C Antioxidant Joint Compound
1 Aluminum to copper: Chatsworth Products, Inc. 40166-xxx
2 Copper to copper: Chatsworth Products, Inc. 40168-xxx

2.8 SURGE SUPPRESSION

A. Provide and install a 10 GB/S data-line surge suppressor for each data and VOIP cable entering a building: Phoenix Contact #DT-LAN-CAT.6+
B. Provide and install a telephone line surge suppressor for each analog telephone line entering a building: Black Box #SP365A-R2 or equivalent

PART 3 – EXECUTION

3.1 INSTALLATION

A Cabinets, racks, and enclosures
1 Mount all cabinets and racks to walls or floors according to the Typical Electrical Details.
2 Rack mount screws not used for installing patch panels and other hardware shall be bagged and left with the rack upon completion of the installation.

B Cable trays
1 Cable trays must be securely attached to walls, backboards, and racks/cabinets to comply with all Zone 4 seismic requirements.
2 Cable trays shall be installed so that there is a minimum of 8” of unobstructed clearance above rack.
3 Cable trays shall be installed so that there is a minimum of 12” of clearance from all florescent lighting, electrical conduits/circuits, and fire alarm conduits/devices.

C Rack mounted equipment
1 Securely fasten all rack mounted equipment to each rack rail with a minimum of two screws per rail and according to manufacturers’ recommendations.
2 Patch panels shall be mounted to front pair of rack rails.
3 PDUs shall be mounted to rear pair of rack rails.
4 All other equipment shall be mounted to both pairs of rack rails.
5 Alternate patch panels and switches so that each port in the patch panel is adjacent to the corresponding port in the switch.

D Cable management
1 Install vertical cable management raceways on each post of freestanding racks.
2 Install fiber optic storage ring on backboard behind each IDF/MDF or in rear of IDF cabinet. Loop each fiber optic cable round ring 3 times. Install ID tag on loop of each cable.

E Grounding and Bonding
1 Each MDF and IDF shall be equipped with a grounding busbar.
2 Each grounding busbar shall be connected to the building electrical grounding facility per plans.
3 All metallic equipment, including but not limited to, each rack, metallic backboard, cable sheath, metallic strength member, splice case, cable tray shall be grounded to its respective grounding busbar using a minimum #6 AWG stranded copper bonding conductor with a green insulation and compression connectors.
4 Wall mounted grounding busbars
a Attach busbars to the wall with appropriate hardware according to the manufacturer's installation instructions and Typical Electrical Details.
b Conductor connections to the grounding busbar shall be made with two-hole bolt-on compression lugs sized to fit the busbar and the conductors.
c Each lug shall be attached with stainless steel hardware after preparing the bond according to manufacturer recommendations and treating the bonding surface on the busbar with antioxidant to help prevent corrosion at the bond.
d The wall-mounted busbar shall be bonded to ground as part of the overall Telecommunications Bonding and Grounding System.
5 Rack-Mount Busbars and Ground Bars
a Each rack and cabinet shall be equipped with a vertical grounding busbar.
b Attach rack-mount busbars and ground bars to racks according to the manufacturer's installation instructions.
c Bond the rack-mount grounding busbar to the rack, cabinet, and room's grounding busbar with appropriately sized hardware and conductor.
6 Equipment Ground Jumper Kit
a Bond equipment to a vertical rack-mount grounding busbar using ground jumper according to the manufacturer's recommendations.
b Clean the surface and use antioxidant between the compression lugs on the jumper and the rack-mount grounding busbar to help prevent corrosion at the bond.
F Program UPSs, PDUs, and software to set alarms for current overload, temperature out of limits, and humidity out of limits and send email notification of alarm conditions.

3.2 LABELING

A. The contractor shall follow the Owner's labeling scheme.
B. Each IDF and MDF shall be labeled.
C. Each IDF, MDF, patch panel, port, switch, and cable shall have a unique identification.
D. Label each port on the patch panel and faceplate with its identification.

E. Label each cable at its beginning and end points no further than 6” behind termination on a section of cable that is easily accessible. Cable labels shall include the ids of both terminations and cable id.
F. Label the plug end of each power cord with id of equipment it feeds.
G. Each faceplate shall be machine labeled. The labeling shall be placed on the faceplate so that the individual jack can be clearly identified by its associated label.
H. All labels shall be machine printed. Handwritten labels are not acceptable.
I. All labeling information shall be recorded on the as-built drawings and all test documents.

3.3 SYSTEM CLOSEOUT AND AS-BUILT DOCUMENTATION

A Upon completion of the installation, the telecommunications contractor shall provide three (3) full documentation sets to the Owner’s Representative/Engineer for approval. One (1) to be a hardcopy and two (2) to be electronic copies. Documentation shall include the items detailed in the sub-sections below.
B Documentation shall be submitted within ten (10) working days of the completion of each testing phase. This is inclusive of all test results and draft as-built drawings. Draft drawings may include annotations done by hand. Machine generated (final) copies of all drawings shall be submitted within 30 calendar days of the completion of each testing phase. At the request of the Owner’s Representative/Engineer, the telecommunications contractor shall provide copies of the original test results.
C The Owner’s Representative/Engineer will request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the telecommunications contractor, additional testing can be requested to the extent determined necessary by the Engineer, including a 100% re-test. This re-test shall be at no additional cost to the Owner.
D Test Results documentation shall be provided in two media, as listed above, one (1) hardcopy and one (1) on disk within three weeks after the completion of the project. The documentation shall be clearly marked on the outside front cover with the words “Project Test Documentation”, the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, a bi-annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.
E Printouts generated for each cable by the wire test instrument shall be submitted as part of the documentation package.

F When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.

G The As-Built drawings are to include cable routes, outlet locations and the approved labeling identifiers. Their sequential number as defined elsewhere in this document shall identify outlet locations. Numbering, icons, and drawing conventions used shall be consistent throughout all documentation provided. The Owner will provide floor plans in paper and electronic (DWG, AutoCAD 2008) formats on which as-built construction information can be added. These documents will be modified accordingly by the telecommunications contractor to denote as-built information as defined above and returned to the Owner.

H Contractor will provide one laminated 11”x17” drawing at each IDF and MDF that includes the building layout for that IDF or MDF, along with the outlet locations and all of the approved labeling.

END OF SECTION

DOCUMENT 271300

COMMUNICATIONS BACKBONE CABLING

PART 1 – GENERAL

1.1 SECTION INCLUDES

This section includes material and workmanship requirements for data and telephone backbone cabling.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A. Governing Codes and Conflicts: If the requirements of the Construction Documents exceed those of the governing codes and regulations, then the requirements of the Construction Documents shall prevail. Where a conflict exists, the governing codes and ordinances shall supersede all other requirements.
B. ANSI: American National Standards Institute (ANSI)
C. CEC: California Electrical Code
D. Institute of Electrical and Electronic Engineers (IEEE)
  1. IEEE 802.3: IEEE Standard for Ethernet
  2. IEEE 802.3ad: Link Aggregation
  3. IEEE 802.3ae: 10 Gigabit Ethernet
  4. IEEE 802.3aq: 10 Gigabit Ethernet on FDDI-Grade Multimode Fiber (10G Base LRM)
E. Insulated Cable Engineers Association (ICEA)
  1. ICEA S-87-640: Fiber Optic Outside Plant Communications Cable
  2. ICEA S-104-696: Indoor-Outdoor Optical Fiber Cable
  3. ICEA S-110-717: Optical Fiber Drop Cable
F. Telecommunications Industries Association (TIA)
  1. TIA-440: Fiber Optic Terminology

2. TIA-455: General Requirements for Standard Test Procedures for Optical Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices, and Other Fiber Optic Components
3. TIA-472-0000: Generic Specification for Fiber Optic Cable
4. TIA-472-C000: Sectional Specification for Fiber Optic Communications Cable for Indoor Use
5. TIA-472-D000: Sectional Specification for Optical Fiber Outside Plant Communications Cables
6. TIA-472-E000: Sectional Specification for Indoor-Outdoor Optical Fiber Cable
7. TIA-472-F000: Sectional Specification for Optical Fiber Drop Cable
8. TIA-492-0000: Generic Specification for Optical Fibers
9. TIA-492-AAAD: Detailed Specification for 850-nm, Laser Optimized, 50µm Core Diameter / 125µm Cladding Diameter, Class IA Graded-Index, Multimode Optical Fibers Suitable for Manufacturing OM4 Cabled Optical Fibers
10. TIA-492-CAAB: Detailed Specification for Class IVA, Dispersion-Unshifted, Single-Mode, Optical Fibers with Low Water Peak
11. TIA-509: Fiber Optic Terminal Devices
12. TIA-526: Standard Test Procedures for Fiber Optic Systems
13. TIA-526-2: Effective Transmitter Output Power Coupled into Single-Mode Fiber Optic Cable
14. TIA-526-3: Fiber Optic Terminal Equipment Receiver Sensitivity and Maximum Receiver Input
15. TIA-526-7: Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
16. TIA-526-11: Measurement of Single-Reflection Power Penalty for Fiber Optic Terminal Equipment
17. TIA-526-14: Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
18. TIA-568-C.0: Generic Telecommunications Cabling for Customer Premises
19. TIA-568-C.1: Commercial Building Telecommunications Cabling Standard
20. TIA-568-C.3: Optical Fiber Cabling Component Standard
21. TIA-569-C: Commercial Building Standard for Telecommunications Pathways and Spaces
22. TIA-604: Fiber Optic Connector Intermateability Standards
23. TIA-604-1: Fiber Optic Connector Intermateability Standard
24. TIA-604-6: Fiber Optic Connector Intermateability Standard – Type LC
25. TIA-606-B: Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
26. TIA-758-B: Customer-Owned Outside Plant Telecommunications Cabling Standard
27. TIA-758-1: Addendum No. 1 to TIA-758, Customer-Owned Outside Plant Telecommunications Cabling Standard
28. TIA-TSB-62: Informative Test methods for Fiber-Optic Fibers, Cables, Opto-Electronic Sources and Detectors, Sensors, Connecting and Terminating Devices, and Other Fiber-Optic Components

29. TIA-TSB-63: Reference Guide for Fiber Optic Test Procedures
30. TIA-TSB-149: Generic Workmanship Guidelines for Fiber Optic Connector Interoperability

G. Underwriters Laboratories, Inc.
1. UL 444: Communications Cables
2. UL 1651: Standard for Optical Fiber Cable
3. UL 1666: Standard for Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts
4. UL 1690: Standard for Data-Processing Cable
5. UL 1863: Communications Circuit Accessories
6. UL 1977: Component Connectors for Use in Data, Signal, Control, and Power Applications
7. UL 2024: Standard for Signaling, Optical Fiber and Communications Raceways and Cable Routing Assemblies
8. UL 2269: Optical Fiber/Communications/Signaling/Coaxial Cable Outlet Boxes
9. UL 62368-1: Audio/video, information and communication technology equipment - Part 1: Safety requirements

1.4 QUALITY ASSURANCE

A Contractor requirements:
1 The Contractor shall have successfully completed a minimum of 5 telecommunications projects of the same size and scope.
2 Project Manager
a The Project Manager shall have successfully completed a minimum of 5 telecommunications projects of the same size and scope.
b The contractor shall make the project manager available to the Owner/Owner's Representative before the start of this project for an interview. This person must be deemed acceptable by the Owner and/or their Representative before work can begin.
c Project Manager will be required to be available for scheduled on site project meetings at no additional cost to the Owner.
d Project Manager will be required to be available to meet on site with the Owner/Owner's representative with a minimum of 24 hours notice for non- emergency issues, and a minimum of 4 hours for emergency issues at no additional cost to the Owner.

B Material requirements
1 All material and equipment to be installed on this project will be new and free from defects.
2 New material shall meet the following requirements.
a Manufactured within one year of the installation date.
b Undamaged
c Not previously installed
d Delivered to jobsite in original packaging
e No corrosion or other degradation of material
f In factory condition
g Unmodified

3 If used material or equipment has been installed on this project the Contractor shall replace said materials and/or equipment with new products at no additional cost to the Owner.
4 Equipment and accessories shall be in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.
5 Items of a given type shall be the products of the same manufacturer.
6 Deliver, store and protect products under provisions of Section 016200.
7 Ship equipment in its original packages, to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.
8 Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.
9 Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

C Contractor shall warranty all materials, equipment, and workmanship for a minimum of one (1) year.
1 Warranty shall provide repair/replacement of all defective or improperly installed materials at no additional cost to the Owner (including all costs to repair or replace the item(s)).
2 Contractor shall provide a competent service technician and new materials to repair/replace defective items no later than 24 hours after notification.

1.5 SUBMITTALS

A Submit under provisions of Section 013000. Provide detailed description of items supplied, including specifications, performance characteristics, materials, wiring diagrams and schedules.
B Submit evidence of compliance with the applicable standards listed under Article 1.3 of this section.
C Manufacturer's Instructions: Submit manufacturer's installation instructions, testing instructions and field test procedures for engine starting.
D The following shop drawings including product data sheets and wiring diagrams per requirements in the General Conditions shall be submitted: A complete list of materials with model and part numbers and reference to the specification paragraph number.
E Submit a complete set of detailed manufacturer’s specifications describing and illustrating all standard and special components and materials.
1 A complete set of drawings for special items.
2 A single line block diagram showing exactly the manner in which the contractor proposes to layout the system.
3 Illustrations and scale drawing of the racks, equipment layouts etc.
4 Drawings shall include designations, dimensions, operating controls, instruments, riser diagrams, routing diagrams etc.
5 The contractor shall also submit a copy of his valid state contractor's license and show proof that he is a distributor of the submitted equipment.

F An operating and service manual shall be submitted at the completion of the installation and shall include all data sheets, spare parts list, trouble shooting guides, complete "as-built" and one line diagrams, circuit diagrams and wiring destination schedules necessary for the proper operation and servicing of the system.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.
B The manuals shall, at minimum, include the following:
1 Manufacturer (including contact information)
2 Model number
3 Programming manual (where applicable)
4 Wiring diagrams
5 Trouble-shooting guidelines (where applicable)
6 Voltage ratings
7 Current ratings
8 Calibrated range (where applicable)
9 List of capabilities
10 Environmental ratings
11 NEMA enclosure type
12 Maintenance requirements
13 Installation instructions
14 Repair instructions (where applicable)
C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

PART 2 – PRODUCTS

2.1 GENERAL

All material shall be UL listed for its application.

2.2 DATA BACKBONE CABLING

A General
1 The Contractor shall provide, install, terminate, dress, and test continuous fiber optic, backbone cable from ‘IDF’ to ‘MDF’ utilizing the hardware listed (or approved equivalent) in full compliance with all applicable standards, local and national codes, manufacturers recommendations, and otherwise noted within these specifications. Contractor shall determine cable “link” quantities as shown on the Electrical Construction Documents.
2 Routing shall be via conduit in accordance with electrical drawings, or attached addenda if applicable. The contractor is responsible for determination of actual segment lengths.

3 Provide all termination accessories, dressing accessories, enclosures, and testing for a complete fiber optic distribution system. Refer to Specification Section 271100.
4 Operating temperature range: -40°F to 167°F
5 Maximum load
a Installation: 600 pounds
b Sustained: 180 pounds
6 Cable shall be rated for installation environment, i.e. plenum, riser, outdoor, underground, etc.
7 Cables, fibers, and all other components shall meet the requirements of standards listed in Section 1.3.
8 Fibers shall be laser optimized glass.
9 Factory testing shall be in accordance with TIA 455 series of standards.
10 Cables shall be loose tube with water blocking system.

B Multimode Fibers
1 Multimode fibers shall be listed to OM4 (TIA-492-AAAD) standards.
2 They shall be compatible with 1000Base-SX, 10GBase-SR, and 10GBase-LRM transceivers.

C Single-mode Fibers
1 Single-mode fibers shall be listed to OS2 (TIA-492-CAAB) standards.
2 They shall be compatible with 1000Base-LX10 and 10GBase-LR transceivers.

D Backbone cables shall be 12 strand Berk-Tek or equal.

E Identification
1 Interior: Panduit #S100X225YAJ self-laminating, polyester label
2 Exterior: Panduit #MT350W17-Q stainless steel tag with rounded edges & corners

PART 3 – EXECUTION

3.1 INSTALLATION

A Cable shall be installed in accordance with manufacturer’s recommendations and best industry practices.

B Contractor shall use Velcro strip to bundle cables together. Tie Wraps will not be allowed for supporting, bundling, and/or dressing of any cables.

C Contractor shall provide a three foot service loop for all cables. The service loop will be coiled and secured using Velcro in the accessible ceiling at the conduit stub to the work area outlet box.

D A 1/8” diameter, nylon pull cord shall be co-installed with all cable installed in any conduit.

E Cable raceways shall not be filled greater than the TIA-569-C maximum fill for the particular raceway type or 40%.

F Cables shall be installed in continuous lengths from origin to destination. Splices are not permitted.

G Do not exceed the manufacturer’s minimum bend radius and maximum pulling tension for cables.

H Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the contractor prior to final acceptance at no cost to the Owner.

I Cables shall be dressed and terminated in accordance with the recommendations made in the TIA-568-C standards, manufacturer's recommendations, and best industry practices.

J The cable jacket shall be maintained to within 1/2 inch of the termination point.

K Vertical runs of cable shall be supported to messenger strand, cable ladder, or other method to provide proper support for the weight of the cable every 3 feet.

L Large bundles of cables and/or heavy cables shall be attached using metal clamps and/or metal banding to support the cables.

M All cables shall be neatly bundled and dressed continuously from the entrance point of the data room or cabinet to their respective panels. Each panel shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame. Cables in all other rooms shall be concealed.

N Inside Buildings: Cable and conductors shall be routed in conduit, or surface mounted raceway, run overhead and parallel to the structure.

1 Conduit shall be rigid steel, IMC, or EMT as described elsewhere in these specifications.

2 Plastic conduit shall not be used above grade.

3 Cable may be used behind accessible T-bar ceilings without conduit. Mount cable at the roof joist (or bottom of floor above) on 1” wide ‘J-hooks’ or ‘bridle-rings’ at every 5’-0” or less. Support each cable within 1’-0” of its termination point. Run cable parallel and perpendicular to the building structure and provide mechanical support for vertical runs by using Unistrut channel securely fastened in place.

4 Cable and conductors shall not be attached to the support wire of the T-bar ceiling or laid across the ceiling boards.

O Between buildings: Cable and conductors shall be routed in conduit run underground.

1 Conduit shall be rigid steel, IMC, or plastic as described elsewhere in these specifications.

2 The use of EMT is not acceptable.

P On The Roof: Conduit shown on the drawings as being on the roof of the building or covered walkway shall be installed on 4” by 4” pressure treated wood blocking (sleepers) attached to the structure every 8’-0” or less.

1 Conduit shall be rigid steel or IMC as described elsewhere in these specifications.

2 The use of EMT or plastic conduit is not acceptable.

Q Make all underground runs continuous without splices or taps. Use underground boxes for *pulling purposes only*.

R Only use pulling grip approved by the cable manufacturer.

S Clean conduit with mandrel prior to pulling.

T Make all connections and splices in a clean environment.

U Follow cable manufacturer’s and device manufacturer’s instructions for connections to devices.

3.2 LABELING

A. The contractor shall follow the Owner's labeling scheme.
B. Label each cable at its beginning and end points no further than 6" behind termination on a section of cable that is easily accessible. Cable labels shall include the ids of both terminations and cable id.
C. All labels shall be machine printed or embossed. Handwritten labels are not acceptable.
D. All labeling information shall be recorded on the as-built drawings and all test documents.
E. Label all cable beginning and terminating points.
F. Labels for site cables and cables in multiple buildings shall feature the following.
    1. Identify origin (MDF or IDF and building), termination (IDF or port identifier), and next pull box.
    2. Cables in pull boxes shall have a label at entry into pull box and exit from pull box. Labels shall be stainless steel tags with embossed characters.

3.3 TESTING

A. General
    1. All cables (including each fiber) and termination hardware shall be tested.
    2. Testing must comply with TIA standards for testing (refer to Section 1.3), plans, specifications, and manufacturer recommendations.
    3. Contractor shall notify the Owner or Owner's Representative 72 hours before commencement of testing.
    4. Upon receipt of the test documentation, the Customer reserves the right to have the contractor perform a 20% witnessed "spot testing" of the cabling system to validate test results provided in the test document, at no additional cost. If a significant amount of cables are marginal and/or fail during the "spot test" Contractor will retest the entire cable plant at no additional cost.
B. Equipment
    1. All equipment must be properly calibrated and traceable to NIST.
    2. Equipment shall have been recalibrated within the previous 6 month prior to testing.
    3. Power meter and light source must be set to same wavelength.
    4. Light source shall be equipped with an optical time domain reflectometer (OTDR).
    5. Light source tolerances are:
        a. 850+30nm
        b. 1300+20nm
        c. 1310+10nm
        d. 1550+20nm
C. Fiber Optic Testing Procedures
    1. All cables, equipment, etc. must be cleaned prior to test.
    2. Test that the light loss does not exceed acceptable limits and the cable system is within the maximum attenuation specifications.
    3. Test procedures shall comply with TIA-526-14, Method B: Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant and TIA-568-C series of standards.
    4. Fibers and connectors shall be tested as a complete system.

5. For basic testing the contractor shall use the following equipment: a power meter, an optical source, two (2) test jumpers (of same connector type and fiber core size), and an interconnection sleeve. An OTDR, fault finder, or visual tracer shall be required to determine the exact location of any faults.
6. To comply with TIA-526-14, the light source or OTDR shall operate within the range of 850nm±30nm for multimode fiber and 1310nm±10nm for single-mode fiber.
7. Before testing, make sure all connectors, jumper and sleeves have been properly cleaned.
8. Connect a test jumper from the meter to the optical source, set the meter and source to the same wavelength, turn them on, and record the power reading in decibels (dB). This reading is the 'Reference Reading'.
9. Wavelength settings tested shall be 850nm and 1310nm.
10. Connect a second jumper to the first test jumper, joining them with an interconnection sleeve. Turn the meter and source on, and record the power level shown on the meter. The second reading is the 'Check Reading'.
11. Compare the 'Check Reading' with the initial 'Reference Reading' to make sure the second jumper did not increase attenuation by more than 0.75dB. To do this, subtract the initial Reference Reading from the Check Reading. There should be no more than 0.75dB of loss between the first and second reading. Note that 0.75dB is the TIA-568C threshold, but the contractor may also use the manufacturer-specified Guaranteed Maximum Mated Pair Loss for the specific connector you are using.
12. If the reading is satisfactory, proceed to the end-to-end attenuation test. If not, clean all connectors except the source connection point, and repeat the Check Reading procedure.
13. Leave both jumpers attached to the optical source and power meter, but disconnect them at the interconnection sleeve. Take the meter and its jumper to one end of the cable being tested, and take the source to the other end. Record the reading; this is the official 'Attenuation Test Reading'. Subtract the Reference Reading (recorded earlier) from the test reading you have just taken, to determine the End-to-End Attenuation. Document this reading.
14. The cumulative signal loss, through connectors, jumpers, couplers, and fiber cable, shall be less than 2.0 dB.
15. Attenuation shall be measured and documented in both directions and at both applicable wavelengths (mention in Step 2a). Note that an OTDR must be used to measure attenuation of any fibers that are to be left unterminated. A visual tracer shall be used to confirm continuity.
16. Test results evaluation shall be based on the values set forth in TIA-568-C.1.
17. All installed cables must meet or exceed the defined standards for performance. The Contractor shall take all steps necessary to repair or replace any optic not meeting the standard.
18. The Contractor shall provide an electronic printout for each strand tested with the Power Meter and the OTDR.

3.4 SYSTEM CLOSEOUT AND AS-BUILT DOCUMENTATION

A Upon completion of the installation, the telecommunications contractor shall provide three (3) full documentation sets to the Owner's Representative/Engineer for approval. One (1) to be a hardcopy and two (2) to be electronic copies. Documentation shall include the items detailed in the sub-sections below.

B Documentation shall be submitted within ten (10) working days of the completion of each testing phase. This is inclusive of all test results and draft as-built drawings. Draft drawings may include annotations done by hand. Machine generated (final) copies of all drawings shall be submitted within 30 calendar days of the completion of each testing phase. At the request of the Owner's Representative/Engineer, the telecommunications contractor shall provide copies of the original test results.

C The Owner's Representative/Engineer will request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the telecommunications contractor, additional testing can be requested to the extent determined necessary by the Engineer, including a 100% re-test. This re-test shall be at no additional cost to the Owner.

D Test Results documentation shall be provided in two media, as listed above, one (1) hardcopy and one (1) on disk within three weeks after the completion of the project. The documentation shall be clearly marked on the outside front cover with the words "Project Test Documentation", the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, an bi-annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.

E Printouts generated for each cable by the wire test instrument shall be submitted as part of the documentation package.

F When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.

G The As-Built drawings are to include cable routes, outlet locations and the approved labeling identifiers. Their sequential number as defined elsewhere in this document shall identify outlet locations. Numbering, icons, and drawing conventions used shall be consistent throughout all documentation provided. The Owner will provide floor plans in paper and electronic (DWG, AutoCAD 2008) formats on which as-built construction information can be added. These documents will be modified accordingly by the telecommunications contractor to denote as-built information as defined above and returned to the Owner.

H Contractor will provide one laminated 11”x17” drawing at each IDF and MDF that includes the building layout for that IDF or MDF, along with the outlet locations and all of the approved labeling.

END OF SECTION

DOCUMENT 271500

COMMUNICATIONS HORIZONTAL CABLING

PART 1 – GENERAL

1.1 SECTION INCLUDES

This section includes material and workmanship requirements for data, telephone (analog and VOIP), IP clocks, and IP speakers horizontal cabling.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
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E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

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B. ANSI: American National Standards Institute (ANSI)
C. CEC: California Electrical Code
D. Institute of Electrical and Electronic Engineers (IEEE)
  1. IEEE 802.3: IEEE Standard for Ethernet
  2. IEEE 802.3ad: Link Aggregation
  3. IEEE 802.3ae: 10 Gigabit Ethernet
  4. IEEE 802.3af: Power over Ethernet
  5. IEEE 802.3an: 10 Gigabit Ethernet on Twisted Pair Copper Cable (10G Base T)
  6. IEEE 802.3aq: 10 Gigabit Ethernet on FDDI-Grade Multimode Fiber (10G Base LRM)
  7. IEEE 802.3at: Enhanced Power over Ethernet
E. Insulated Cable Engineers Association (ICEA)
  1. ICEA S-84-608: Telecommunications Cables, Filled Polyolefin Insulated, Copper Conductor

2. ICEA S-86-634: Buried Distribution and Service Wire, Filled Polyolefin Insulated, Copper Conductor
3. ICEA S-102-700: ICEA Standard for Category 6 Individually Unshielded, Twisted Pair Indoor Cables (With or Without an Overall Shield) for Use in Communications Wiring Systems Technical Requirements
4. ICEA S-103-701: Riser Cables Technical Requirements

F. Telecommunications Industries Association (TIA)
1. TIA-568-C: Commercial Building Telecommunications Standard
2. TIA-568-C.0: Generic Telecommunications Cabling for Customer Premises
3. TIA-568-C.1: Commercial Building Telecommunications Cabling Standard
4. TIA-568-C.2: Balanced Twisted-Pair Telecommunications Cabling and Components Standards
5. TIA-569-C: Commercial Building Standard for Telecommunications Pathways and Spaces
6. TIA-606-B: Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
7. TIA-607-B: Commercial Building Grounding and Bonding Requirements for Telecommunications
8. TIA-758-B: Customer Owned Outside Plant Telecommunications Infrastructure Standard
9. TIA-1152: Requirements for Field Test Instruments and Measurements for Balanced Twisted Pair Cabling
10. TIA-1183: Measurement Methods and Test Fixtures for Balun-less Measurement of Balanced Components and Systems
11. TIA-TSB-36: Technical Systems Bulletin Additional Cable Specifications for Unshielded Twisted-Pair Cables
12. TIA-TSB-62: Informative Test methods for Fiber-Optic Fibers, Cables, Opto-Electronic Sources and Detectors, Sensors, Connecting and Terminating Devices, and Other Fiber-Optic Components
13. TIA-TSB-63: Reference Guide for Fiber Optic Test Procedures
14. TIA-TSB-67: TIA Telecommunications Systems Bulletin, Additional Transmission Specifications for Unshielded Twisted-Pair Connecting Hardware
15. TIA-TSB-149: Generic Workmanship Guidelines for Fiber Optic Connector Interoperability
16. TIA-TSB-155: Guidelines for the Assessment and Mitigation of Installed Category 6 Cabling to Support 10GBase-T
17. TIA-TSB-184: Guidelines for Supporting Power Delivery Over Balanced Twisted-Pair Cabling
18. TIA-TSB-1197: Mode Conversion Parameters for Balanced Twisted Pair Cabling

G. Underwriters Laboratories, Inc.
1. UL 444: Communications Cables
2. UL 1651: Standard for Optical Fiber Cable
3. UL 1655: Standard for Community-Antenna Television Cables
4. UL 1666: Standard for Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts
5. UL 1690: Standard for Data-Processing Cable

6. UL 1863: Communications Circuit Accessories
7. UL 1977: Component Connectors for Use in Data, Signal, Control, and Power Applications
8. UL 2024: Standard for Signaling, Optical Fiber and Communications Raceways and Cable Routing Assemblies
9. UL 2269: Optical Fiber/Communications/Signaling/Coaxial Cable Outlet Boxes
10. UL 62368-1: Audio/video, information and communication technology equipment - Part 1: Safety requirements

1.4 QUALITY ASSURANCE

A Contractor requirements:
- 1 The Contractor shall have successfully completed a minimum of 5 telecommunications projects of the same size and scope.
- 2 Project Manager
  - a The Project Manager shall have successfully completed a minimum of 5 telecommunications projects of the same size and scope.
  - b The contractor shall make the project manager available to the Owner/Owner's Representative before the start of this project for an interview. This person must be deemed acceptable by the Owner and/or their Representative before work can begin.
  - c Project Manager will be required to be available for scheduled on site project meetings at no additional cost to the Owner.
  - d Project Manager will be required to be available to meet on site with the Owner/Owner's representative with a minimum of 24 hours notice for non- emergency issues, and a minimum of 4 hours for emergency issues at no additional cost to the Owner.
- 3 The work performed under this specification shall be of good quality and performed in a workmanlike manner. In this context 'good quality' means the work shall meet industry technical standards and quality of appearance. The Owner reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.
- 4 The Contractor shall provide all necessary materials and labor for a complete, functional Telecommunications cabling infrastructure in accordance with all applicable standards and the Construction Documents.

B Material requirements
- 1 All material and equipment to be installed on this project will be new and free from defects.
- 2 Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.
- 3 New material shall meet the following requirements.
  - a Manufactured within one year of the installation date.
  - b Undamaged
  - c Not previously installed
  - d Delivered to jobsite in original packaging
  - e No corrosion or other degradation of material

f In factory condition
g Unmodified

4 If used material or equipment has been installed on this project the Contractor shall replace said materials and/or equipment with new products at no additional cost to the Owner.
5 Equipment and accessories shall be in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.
6 Items of a given type shall be the products of the same manufacturer.
7 Deliver, store and protect products under provisions of Section 016200.
8 Ship equipment in its original packages, to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.
9 Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.
10 Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

C Contractor shall warranty all materials, equipment, and workmanship for a minimum of one (1) year.
1 Warranty shall provide repair/replacement of all defective or improperly installed materials at no additional cost to the Owner (including all costs to repair or replace the item(s)).
2 Contractor shall provide a competent service technician and new materials to repair/replace defective items no later than 24 hours after notification.

D The work performed under this specification shall be of good quality and performed in a workmanlike manner. In this context ‘good quality’ means the work shall meet industry technical standards and quality of appearance. The Owner reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.

E The Contractor shall provide all necessary materials and labor for a complete, functional Telecommunications cabling infrastructure in accordance with all applicable standards and the Construction Documents.

1.5 SUBMITTALS

A Submit under provisions of Section 013000 or 013300.
B Submittals shall include the following:
1 Table of contents
2 A complete set of detailed manufacturer’s specifications describing and illustrating all standard and special components and materials
3 Part numbers
4 Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5 Maintenance instructions and intervals
6 A complete set of drawings for any special items
7 A single line block diagram showing exactly the manner in which the contractor proposes to layout the system.

8 Wiring diagrams
9 Drawings shall include designations, dimensions, operating controls, instruments, riser diagrams, routing diagrams etc.

C Electronic submittals shall be searchable

D The submittal shall be substantially complete for all items and equipment furnished under this section.

E Individual drawings and data sheets submitted at random intervals will not be accepted for review.

F Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.

B The manuals shall, at minimum, include the following:
1 Manufacturer (including contact information)
2 Model number
3 Programming manual (where applicable)
4 Wiring diagrams
5 Trouble-shooting guidelines (where applicable)
6 Voltage ratings
7 Current ratings
8 Calibrated range (where applicable)
9 List of capabilities
10 Environmental ratings
11 NEMA enclosure type
12 Maintenance requirements
13 Installation instructions
14 Repair instructions (where applicable)

C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

PART 2 – PRODUCTS

2.1 GENERAL

A. All material shall be UL listed for its application.

B. Cables shall be rated for its intended use, i.e. plenum, riser, wet location, etc.

C. Cables, conductors, and all other components shall meet the requirements of standards listed in Section 1.3.

2.2 DATA AND VOIP HORIZONTAL CABLING

A. Contractor shall provide, install, and test a Cat-6A cable link from each Data/VOIP Outlet directly to the IDF utilizing the hardware listed below (or approved equivalent) in full compliance with all applicable standards, local and

national codes, manufacturers' recommendations, and otherwise noted within these specifications.

B. Specifications:
   1. Four twisted, unshielded, 23 AWG, solid copper pairs (23 AWG UTP)
   2. Suppress cross-talk
   3. Maintain 10GB/S performance
   4. Meet or exceed Cat-6A requirements of TIA-568-C.2 and IEEE 802.3an.
   5. SRL, Attenuation and NEXT results shall use Sweep Frequency test per TIA-568-C.
   6. Have UL verification to Cat-6A specifications.
   7. Compatible with IEEE 802.3at POE+
   8. Colors for cables shall be:
      a. Clocks: Green
      b. Data: Blue
      c. Energy management system: Purple
      d. Power distribution units: Black
      e. Servers: White
      f. Speakers: Green
      g. Surveillance: Red
      h. Uninterruptable power supplies: Black
      i. Wireless access points: Yellow
   9. Berk-Tek LANmark-10G2 or approved equal

C. Cables shall be rated for its intended use, i.e. plenum, riser, wet location, etc.

D. Cables, conductors, and all other components shall meet the requirements of standards listed in Section 1.3.

E. Provide all termination accessories, dressing accessories, enclosures, and testing for a complete fiber optic distribution system. Refer to Specification Section 271100.

F. Identification
   1. Interior: Panduit S100X225YAJ self-laminating, polyester label
   2. Exterior: Panduit MT350W17-Q stainless steel tag with rounded edges & corners

G. Contractor shall determine cable "link" quantities as shown on the Construction Documents.

2.3 ANALOG TELEPHONE HORIZONTAL CABLING

A The Contractor shall provide, install, terminate, dress and test Category 5e cable "link" from Telephone Outlet to SCTB utilizing the hardware listed below (or approved equivalent) in full compliance with all applicable standards, local and national codes, manufacturers' recommendations, and otherwise noted within these specifications.

B Specifications:
   1 Type: Category 5e, 24 AWG, 4-pair, plenum rated, UTP: Berk-Tek LANmark-350 or equal
   2 Color: Cable shall be gray in color.
   3 The cable shall exceed all applicable performance standards required by TIA-568-C compliance
   4 Have UL verification to Cat-5e specifications.

5 SRL, Attenuation and NEXT results shall use Sweep Frequency test per TIA-568-C.

C Identification
1 Interior: Panduit S100X225YAJ self-laminating, polyester label
2 Exterior: Panduit MT350W17-Q stainless steel tag with rounded edges & corners

D Contractor shall determine cable “link” quantities as shown on the Electrical Construction Documents.

2.4 OUTLET HARDWARE

A Data and VOIP Ports:
1 Category 6a, RJ45 port: Black Box C6AJA70-##, Panduit CJ6X88TG##, or approved equivalent
2 Colors for cables shall be:
a Clocks: Green
b Data: Blue
c Energy management system: Purple
d Power distribution units: Black
e Servers: White
f Speakers: Green
g Surveillance: Red
h Uninterruptable power supplies: Black
i Wireless access points: Yellow
3 Terminate 26AWG to 22 AWG, stranded or solid, Cat-6A cables without punch-down tool
4 Suppress cross-talk
5 Maintain 10GB/S performance in 48 port, 1RU patch panels
6 T568B wiring scheme
7 Meet or exceed Cat-6A requirements of TIA-568-C.2 and IEEE 802.3an.
8 Compatible with IEEE 802.3at POE+
9 Snap in, snap out modular design
10 Conductor retention and strain relief
11 Gold plated contacts

B Analog Telephone Ports:
1 Category 5e, RJ45 port: Black Box FM923C, Panduit CJ5E88TGIG, or equivalent
2 Color: Port shall be gray in color.
3 Terminate 26AWG to 22 AWG, stranded or solid, Cat-5e cables without punch-down tool
4 T568B wiring scheme
5 Meet or exceed Cat-5e requirements of TIA-568-C.2 and IEEE 802.3.
6 Compatible with IEEE 802.3at POE+
7 Snap in, snap out modular design
8 Conductor retention and strain relief
9 Gold plated contacts

C Wallplates:
1 Commercial, educational, industrial, and institutional
a Material: Satin finish stainless steel

b For data or telephone – one module space: Black Box WP370 or equivalent
c For data and telephone – two module spaces: Black Box WP371, Panduit CFPL2SY, or equivalent
d For data and telephone – two module spaces: Black Box WP373, Panduit CFPL4SY, or equivalent

2 Residential:
a Material: Nylon
b Color: Wallplate color shall closely match wall color.
c For data or telephone – one module space: Panduit NK1FNWH or equivalent
d For data and telephone – two module spaces: Panduit NK2FNWH or equivalent
e Wallplate Specifications: The wallplate housing shall be a one-piece, single-gang flush mount style that fits standard NEMA openings, on four-square boxes with reducer. It should provide 1-port field-configurable with a variety of simplex snap-in ports/connectors. It must be made of high-impact, self-extinguishing plastic rated UL 94V-0, and be UL Listed, CSA certified, and compliant with FCC Part 68 and TIA-568-C specifications. Wallplate screws must match wallplate color.

3 Provide an install a blank module for each unused opening in the wallplates, Panduit CMBIG-X or equivalent.
4 Labels: Panduit C125X030YPT self-adhesive, polyester label

D Back box: 4 inch square box with one gang plaster

2.5 MISCELLANEOUS MATERIALS

A Conduits: Refer to Section 260500.
B Supports: Refer to Section 260529.
C J-Hooks shall be steel with closure and two bolt holes. Finished part shall be hot dipped galvanized.

2.6 IDENTIFICATION

A Interior: Panduit #S100X225YAJ self-laminating, polyester label
B Exterior: Panduit #MT350W17-Q stainless steel tag with rounded edges & corners

PART 3 – EXECUTION

3.1 INSTALLATION

A Cables
1 Cable shall be installed in accordance with manufacturer's recommendations and best industry practices.
2 Contractor shall use Velcro strip to bundle cables together. Tie Wraps will not be allowed for supporting, bundling, and/or dressing of any cables.

3 Contractor shall provide a three foot service loop for all cables. The service loop will be coiled and secured using Velcro in the accessible ceiling at the conduit stub to the work area outlet box.

4 A 1/8” diameter, nylon pull cord shall be co-installed with all cable installed in any conduit.

5 Cable raceways shall not be filled greater than the TIA-569-C maximum fill for the particular raceway type or 40%.

6 Cables shall be installed in continuous lengths from origin to destination. Splices are not permitted.

7 Do not exceed the manufacturer’s minimum bend radius and maximum pulling tension for cables.

8 Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the contractor prior to final acceptance at no cost to the Owner.

9 Cables shall be dressed and terminated in accordance with the recommendations made in the TIA-568-C standards, manufacturer's recommendations, and best industry practices.

10 The cable jacket shall be maintained to within 1/2 inch of the termination point.

11 Vertical runs of cable shall be supported to messenger strand, cable ladder, or other method to provide proper support for the weight of the cable every 3 feet.

12 Large bundles of cables and/or heavy cables shall be attached using metal clamps and/or metal banding to support the cables.

13 All cables shall be neatly bundled and dressed continuously from the entrance point of the data room or cabinet to their respective panels. Each panel shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame. Cables in all other rooms shall be concealed.

14 Inside Buildings: Cable and conductors shall be routed in conduit, or surface mounted raceway, run overhead and parallel to the structure.

- a Conduit shall be rigid steel, IMC, or EMT as described elsewhere in these specifications.
- b Plastic conduit shall not be used above grade.
- c Cable may be used behind accessible T-bar ceilings without conduit. Mount cable at the roof joist (or bottom of floor above) on 1” wide ‘J-hooks’ or ‘bridle-rings’ at every 5’-0” or less. Support each cable within 1’-0” of its termination point. Run cable parallel and perpendicular to the building structure and provide mechanical support for vertical runs by using Unistrut channel securely fastened in place.
- d Cable and conductors shall not be attached to the support wire of the T-bar ceiling or laid across the ceiling boards.

15 Between buildings: Cable and conductors shall be routed in conduit run underground.

- a Conduit shall be rigid steel, IMC, or plastic as described elsewhere in these specifications.
- b The use of EMT is not acceptable.

16 On the roof: Conduit shown on the drawings as being on the roof of the building or covered walkway shall be installed on 4” by 4” pressure treated wood blocking (sleepers) attached to the structure every 8’-0” or less.
   a Conduit shall be rigid steel or IMC as described elsewhere in these specifications.
   b The use of EMT or plastic conduit is not acceptable.
17 Make all underground runs continuous without splices or taps. Use underground boxes for *pulling purposes only*.
18 Only use pulling grip approved by the cable manufacturer.
19 Clean conduit with mandrel prior to pulling.
20 Make all connections and splices in a clean environment.
21 Follow cable manufacturer’s and device manufacturer’s instructions for connections to devices.
22 Maximum combined cable length (patch cords and installed cable) from switch to end user equipment shall be 328 feet.
23 Stranded conductors shall be “tinned” with solder before terminations are made.
24 Make all terminations in cabinets and at terminal backboards on terminal blocks and/or Patch Panels as specified above.

B Outlets Installation
1 No more than 12” of cable shall be stored in an outlet box, modular furniture raceway, or insulated walls.
2 Data jacks, unless otherwise noted in drawings, shall be located in the top position(s) of each faceplate. Data jacks in horizontally oriented faceplates shall occupy the left-most position(s).
3 Voice jacks, unless otherwise noted in drawings, shall occupy the next position(s) below the data on the faceplate. Voice jacks in horizontally oriented faceplates shall occupy the position right of the data jack.
4 All faceplates installed shall be level.

3.2 LABELING

A. The contractor shall follow the Owner’s labeling scheme.
B. Label each cable at its beginning and end points no further than 6” behind termination on a section of cable that is easily accessible. Cable labels shall include the ids of both terminations and cable id.
C. All labels shall be machine printed or embossed. Handwritten labels are not acceptable.
D. All labeling information shall be recorded on the as-built drawings and all test documents.
E. Label all cable beginning and terminating points.
F. Labels for site cables and cables in multiple buildings shall feature the following.
   1. Identify origin (MDF or IDF and building), termination (IDF or port identifier), and next pull box.
   2. Cables in pull boxes shall have a label at entry into pull box and exit from pull box. Labels shall be stainless steel tags with embossed characters.

3.3 TESTING

A. General
   1. All cables (including each fiber) and termination hardware shall be tested.
   2. Testing must comply with TIA standards for testing (refer to Section 1.3), plans, specifications, and manufacturer recommendations.
   3. Contractor shall notify the Owner or Owner's Representative 72 hours before commencement of testing.
   4. Upon receipt of the test documentation, the Customer reserves the right to have the contractor perform a 20% witnessed "spot testing" of the cabling system to validate test results provided in the test document, at no additional cost. If a significant amount of cables are marginal and/or fail during the "spot test" Contractor will retest the entire cable plant at no additional cost.

B. Equipment
   1. All equipment must be properly calibrated and traceable to NIST.
   2. Equipment shall have been recalibrated within the previous 6 month prior to testing.

C. Data Copper Cables:
   1. Each pair in each cable shall be tested in accordance with TIA-568-C series and TIA-TSB-67 for:
      a. Opens
      b. Shorts
      c. Grounds
      d. Continuity
      e. Polarity
      f. DC resistance
      g. DC resistance unbalance
      h. Impulse noise
      i. Signal attenuation
      j. NEXT
      k. PS-NEXT
      l. ELFEXT
      m. PS-ELFEXT
      n. Return loss
      o. Propagation delay
      p. Delay skew
   2. Each installed cable link shall be tested for installed length using a TDR type device. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number.
   3. Conductors and connectors shall be tested as a complete system.
   4. Testing of all horizontal cable, outlet ports, patch cords, and riser cable pairs shall include end-to-end tests using a Wavetech Lanteck 100 or Fluke Network's DXT CableAnalyzer Series scanner.
   5. Test cables to check that they meet all IEEE and TIA Cat-6a and 10GB/S performance specifications (refer to Section 1.3).
   6. All installed cables must meet or exceed the defined standards for performance. The Contractor shall take all steps necessary to repair or replace any optic not meeting the standard.
   7. Test results shall be automatically evaluated by the equipment, using the most up-to-date criteria from the TIA standards.

8. The test equipment shall provide a printed document for each test that is also available in a downloadable file using an application from the test equipment manufacturer. The printed test results shall include a print out of all tests performed, and the individual test results for each cable.

3.4 SYSTEM CLOSEOUT AND AS-BUILT DOCUMENTATION

A Upon completion of the installation, the telecommunications contractor shall provide three (3) full documentation sets to the Owner's Representative/Engineer for approval. One (1) to be a hardcopy and two (2) to be electronic copies. Documentation shall include the items detailed in the sub-sections below.

B Documentation shall be submitted within ten (10) working days of the completion of each testing phase. This is inclusive of all test results and draft as-built drawings. Draft drawings may include annotations done by hand. Machine generated (final) copies of all drawings shall be submitted within 30 calendar days of the completion of each testing phase. At the request of the Owner's Representative/Engineer, the telecommunications contractor shall provide copies of the original test results.

C The Owner's Representative/Engineer will request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the telecommunications contractor, additional testing can be requested to the extent determined necessary by the Engineer, including a 100% re-test. This re-test shall be at no additional cost to the Owner.

D Test Results documentation shall be provided in two media, as listed above, one (1) hardcopy and one (1) on disk within three weeks after the completion of the project. The documentation shall be clearly marked on the outside front cover with the words "Project Test Documentation", the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, an bi-annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.

E Printouts generated for each cable by the wire test instrument shall be submitted as part of the documentation package.

F When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.

G The As-Built drawings are to include cable routes, outlet locations and the approved labeling identifiers. Their sequential number as defined elsewhere in this document shall identify outlet locations. Numbering, icons, and drawing conventions used shall be consistent throughout all documentation provided. The Owner will provide floor plans in paper and electronic (DWG, AutoCAD 2008)

formats on which as-built construction information can be added. These documents will be modified accordingly by the telecommunications contractor to denote as-built information as defined above and returned to the Owner.

H Contractor will provide one laminated 11”x17” drawing at each IDF and MDF that includes the building layout for that IDF or MDF, along with the outlet locations and all of the approved labeling.

END OF SECTION