SECTION 02 41 19 – SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of work shown on the drawings and/or specified in this section.

1.02 SCOPE OF WORK

A. Work included under this section shall include but not necessarily be limited to the following:

1. Perform demolition work as necessary to accomplish the work, including the removal and proper disposal of items which are exposed and not to remain in use, including but not necessarily limited to pavement, walks, plantings, foundations, slabs, structural items, walls, roofing, flashings, doors, frames, windows, curtain wall, glazing, finishes, ceilings, flooring, framing, trim, specialties, equipment, casework, plumbing, mechanical and electrical items, etc.
2. Include items exposed such as sewer, water and electrical lines which may require capping per city or utility company requirements.
3. Properly dispose of demolished material and such other obstacles required for a complete and proper installation of new work and the disposition of materials incidental to this work.
4. Erection of barricades, etc., to protect existing building areas.
5. Protection of existing utilities.
6. Repair to building areas, utilities damaged during demolition.
7. Demolition in specific building locations to the extent described on the drawings and/or required to construct the work shown.
8. Remove protection when work is complete.
9. Rubbish and debris shall be promptly removed from building as to minimize dust within the building.
10. Coordinate with Owner Operations. Portions of the school building will be in operation during the construction phase.

B. Existing surfaces and finishes which are marred or defaced as a result of demolition work shall be patched and matched as required.

C. Demolition shall include the removal of debris materials associated with demolition procedures. Debris shall be properly deposed of into project dumpsters and subsequently taken to a legal dump site.

1.03 JOB CONDITIONS

A. Visit the site and be informed as to the character and type of work to be removed. Owner assumes no responsibility for the condition of existing construction to be removed or demolished. Later claims for additional payment for conditions reasonably foreseeable shall not be allowed.

1.04 PROTECTION

A. Provide and maintain, during demolition operations, barricades and temporary environmental protection to separate the working area from other areas.

B. Remove protections and temporary enclosures when work is complete.

C. Properly protect existing building, walks, paving, grass, trees, shrubs, etc. Properly restore/replace damaged items meeting Owner approval.

D. Where demolition operations create conditions which may result in water and/or weather leaks, provide necessary temporary enclosures which create a weathertight barrier and protect existing structures and facilities from damage due to infiltration of water and/or weather.

E. Verify routing of existing Fire Alarm, Electrical, Security, Phone, Mechanical, Plumbing, and other systems prior to cutting roof, walls, floor, etc. Maintain these systems in full operating condition during course of the work. Pay repair costs to systems and finishes damaged during the execution of the Work.

1.05 DEMOLITION

A. Exact extent of demolition as shown on drawings and to be completed shall be verified at the site. Determine the nature and extent of demolition that will be necessary by comparing the drawings with existing site conditions. Operations shall be done in a careful and orderly manner to avoid hazards to persons and property, and interference with the use of adjacent areas, and interruption of free passage to and from such areas.

B. Where concrete or masonry is to be cut, a straight cut line shall be obtained by using a carborundum masonry saw.

C. Work shall be demolished in small sections. Provide bracing and shoring necessary to maintain existing building integrity.

D. Do not remove more of existing construction than is necessary. Do not mar, damage, or deface construction which is to remain.

E. Verify routing of existing Fire Alarm, Electrical, Security, Phone, Mechanical, Plumbing, and other systems prior to cutting roof, walls, floor, etc. Maintain these systems in full operating condition during course of the work. Pay repair costs to systems and finishes damaged during the execution of the Work.

F. Access routes to and from the site shall be kept clean of debris resulting from the Work.

1.06 SALVAGEABLE ITEMS

A. Verify with the Owner the items to be salvaged and turned over to the Owner.

END OF SECTION 02 41 19

SECTION 03 30 00 – CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of the work shown on the drawings and/or specified in this section.

1.02 QUALITY ASSURANCE

A. Qualifications of Concrete Contractor

1. Installation shall be by a company continuously and regularly employed in the installation of Concrete Cast In Place work for a period of at least 5 consecutive years; and which can show evidence of these materials being satisfactorily installed on at least 6 projects of similar size, scope and type within such a period. At least 3 of the projects shall have been in successful use for 3 years or longer.

B. Interior Floor Slab Moisture Content Requirements, Testing, and Moisture Sealer

1. Schedule work as necessary to install slab with enough time prior to finish flooring, to allow for complete drying of concrete, minimum of 180 days, as per the recommendations of the concrete contractor and the finish floor manufacturer.

2. Provide appropriate scheduling, curing, & drying time, and other related conditions to insure moisture content as acceptable by the finish floor manufacturer. (The proper installation of the vapor retarder, the low water cement ratio specified, installation 180 days prior, protection from weather & rain, and moist curing can contribute significantly to accomplishing a timely drying date.) Repair and prepare concrete surfaces to meet the finish floor moisture content requirements. Moisture content shall not exceed 5 pounds, or 3 pounds if finish floor manufacturer recommends 3 pounds, per 1000 sq. ft. for a 24 hour period, as per calcium chloride test ASTM F1869-98, measured 45 days prior to scheduled Substantial Completion. Testing shall take place in the building envelope conditioned to the temperature and humidity levels as recommended by the finish floor manufacturer. Testing density is required to equal 3 tests in the first 1,000 square feet, with one additional test per each additional 1,000 square feet of concrete slab surface. Provide Architect with written test reports including pertinent data, locations as per a key plan, temperature, humidity, time & date, and moisture readings.

C. Pre-Installation-Concrete Meeting

1. Meeting with Architect and Contractor; Contractor shall submit procedures to provide quality installation of the work, and protection of work after placement, including: curing, testing, protection of fresh concrete from rain and water infiltration, flatness, minimize curling of slabs, minimize high spots at construction joints, provision (location, construction, and timing) of control joints, cold or hot weather placement & protection, special concrete finishes, meeting interior slab moisture requirements, installation of Moisture Sealer, coordination with finish flooring substrate prerequisites, other coordination, and other requirements of this section.

1.03 REFERENCE STANDARDS

A. Work shall conform to the following except as superseded by this Section, American Concrete Institute (ACI) and ASTM Publications:

1. ACI 117 - Specifications for Tolerances for Concrete Construction.
2. ACI 301 - Specifications of Structural Concrete for Buildings.
3. ACI 302.1R-15 – Guide to Concrete Floor and Slab Construction.
4. ACI 305 - Hot Weather Concreting.
5. ACI 306 - Cold Weather Concreting.
6. ACI 308 - Recommended Practice for Curing Concrete.
7. ACI 309 - Standard Practice for Consolidation of Concrete.
8. ACI 347 - Recommended Practice for Concrete Formwork. (Includes tolerances.)
9. ASTM C 494 - Standard Specification for Chemical Admixtures.
10. ASTM C 260 - Standard Specification for Air-entraining Admixtures.
11. ASTM C 94/C 94M - Ready-Mixed Concrete.

1.04 COORDINATION

A. Coordinate Concrete Flatwork with Requirements of Finish Floors

1. Coordinate the installation and components of concrete flatwork with the scheduled finish floor selections, such that concrete flatwork, including but not limited to mix design, admixtures, flatness, levelness, curing compounds, evaporative retarder, curing covers, surface treatments, moisture, moisture sealers, alkalinity, hardeners, sealers, fillers, underlayments, fiber reinforcing, joint design, joint location, joint fillers, elevation, recesses, inserts, and finishing are compatible with the final concrete finish and final finish flooring.

1.05 SUBMITTALS

A. Concrete supplier's test reports indicating mix design specification compliance.

B. Mix design components.

C. Shop drawings indicating floor slab control joints.

D. Proposed cold and hot weather placement & protection procedures.

E. Product literature for Moisture Sealer.

F. Product literature for products listed below.

1.06 FIELD-CONSTRUCTED MOCK-UP(S)

A. Prior to installation of vapor barrier, assemble mock-up(s) to comply with the following requirements.

1. Assemble mock-up(s) of vapor barrier at typical edge, penetrations, thickened slabs, column piers, and standard lap joint conditions. Mock-ups may be part of the actual construction.
2. Protect the mock-up(s) from damage. The approved mock-up(s) conditions shall

be used to review the quality of the installation of the vapor barrier throughout the project.

3. Approved mock-up(s) does not constitute approval to deviate from specifications.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store cementitious materials in a dry, weather tight location. Maintain accurate records of shipment and use.

B. Store aggregates to permit free drainage and to avoid contamination with deleterious matter or other aggregates. When stockpiled on ground, discard bottom 6 inches of pile.

C. Handle aggregates to avoid segregation.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cementitious Materials: Portland cement meeting requirements of ASTM Specification C 150-81 Type I.

B. Cementitious Materials: Fly Ash: ASTM C 618, Type C. Limit Fly Ash content to a maximum of 20% total cement content.

C. Cementitious Materials: Ground Granulated Blast-Furnace Slag (GGBS): ASTM C 989, Grade 100 or Grade 120. Limit GGBS content to a maximum of 50% total cement content. Due to color variations between GGBS concrete and non-GGBS concrete, if GGBS concrete is used, it shall be used at all locations of exposed concrete.

D. Fine aggregate: Sand, clean and sound grains, free of injurious amounts of dust and other deleterious matter and conform to ASTM C 33.

E. Coarse aggregate: Clean, sound un-coated crushed stone or gravel (do not use gravel at vehicular pavements, walks, retaining wall, exterior stairs or curbs, unless material is approved by Illinois Department of Transportation, IDOT, for use in highway construction in portland cement concrete surfaces) free from injurious amounts of soft, thin or laminated pieces or other deleterious matter and conform to ASTM C 33. Aggregate shall pass a 3/4" ring except that used for footings which may be one inch (1").

F. Water: Clean, fresh, potable, and free from injurious amounts of mineral or organic matter.

G. Admixtures

1. Contractor shall submit for review any proposed admixtures to improve workability of the mix without having detrimental effect on the strength, durability, permeability, curing, finishing, sealing, adhesion of final finish flooring, or other desirable attributes of the concrete.

2. The Contractor shall submit the name of the admixtures proposed and admixture manufacturer's certification that the selected admixtures meet the requirements herein. Admixture manufacturer's product literature shall specify when in the batching/mixing operation the admixture must be added, how the mixing shall be accomplished, and dosage rate range. Where multiple admixtures for a single design mix are proposed, Contractor shall submit a letter or notation from their concrete supplier certifying that such joint use of multiple admixtures are compatible with the design mix, such that the desirable effects of each admixture

will be realized. Where the multiple admixtures which are proposed are not of the same brand, Contractor shall specifically address that issue within such letter or notation.

3. Liquid admixtures shall be considered part of the total water. Admixtures which result in more than 0.1 percent of soluble chloride ions by weight of cement are prohibited.

4. When admixtures are used with a mix containing cementitious materials other than Portland cement, such as fly ash or slag, Contractor shall verify with the admixture manufacturer whether the amount of the admixture shall be based on the amount of Portland cement only or the total amount of cementitious materials.

5. Where concrete contains a Water Reducing, High Range Admixture or an Accelerating Admixture, the admixture manufacturer's representative shall attend the pre-installation-concrete meeting, observe project start-up of concrete placements, and offer recommendations.

6. Admixtures:

   a. Air-entraining Admixture: Comply with ASTM C 260. Air entraining is required as per Design of Concrete Mixes, listed above.

   b. Accelerating Admixture: Accelerating admixture complying with ASTM C 494, Type C. Non-chloride admixture.

   c. Water Reducing Admixture: Water reducing admixture complying with ASTM C 494, Type A.

   d. Water Reducing and Retarding Admixture: Water reducing and retarding admixture complying with ASTM C 494, Type D.

   e. Water Reducing, High Range Admixture: Water reducing, high range admixture (superplasticizer) complying with ASTM C 494, Type F or G, ASTM C 1017, Type 1 or 2.

   f. Other: as complying with applicable ASTM requirements and approved by the Architect.

H. Cure and Seal for interior slabs: Water based, non-yellowing, 20% solids, single coat or two coat application as specified herein. Confirm compatibility with finish flooring manufacturer for acceptable methods; if cure and seal is not acceptable provide 7 day moisture cured method in accordance with ACI-308 and as required by the finish flooring manufacturer:

   1. BASF Master Builders, MasterKure CC 200WB

   2. WR Meadows, VOCOMP 20

   3. Tamms-Euclid, Luster Seal WB 150

I. Curing Cover for exterior slabs: Meet or exceed ASTM C171- 03, ASTM C171-97a, and AASHTO M171-00, single-use (not reusable), water retaining, waterproof, UV protective curing cover:

   1. Sika Corporation, UltraCure NCF

   2. Mctech Group, UltraCure NCF

3. PNA Construction Technologies, HydraCure S16.

J. Interior Expansion Joint Filler, wood/cellulose fiber, thickness ½" unless as called out otherwise:

1. Knight-Celotex, "Flexcell"

2. W.R. Meadows, Inc., "Fibre Expansion Joint"

3. Right Pointe, "Right Joint Expansion Joint"

K. Exterior Expansion Joint Fillers: Conform to applicable articles of the "Standard Specifications for Road and Bridge Construction, State of Illinois, Division of Transportation", current adopted edition.

L. Vapor Barrier: Provide vapor retarder/barrier over prepared granular base material directly below slabs on grade. Vapor retarder/barrier membrane must have the following qualities:

1. Permeance: ASTM E 96; no greater than 0.01 Perms, as tested in accordance with mandatory conditioning test per ASTM E 1745 Section 7.1 (7.1.1-7.1.5)

2. Strength: ASTM E 1745; exceeds Class A for tensile strength and puncture resistance.

3. Thickness: ACI 302.1R-96; Not less than 15 mils

4. Materials: polyethylene or polyolefin, manufactured for use as under slab vapor retarder/barrier; ordinary or generic polyethylene are not acceptable. No use of recycled or post consumer resins.

5. Use only materials that are resistant to decay when tested in accordance with ASTM E 154 – Sections 8, 11, 12 and 13.

6. Provided in continuous sheets of not less than 10 foot wide.

7. Sealing Materials: Provided with vapor retarder/barrier manufacturer's recommended seam tape, mastics, and edge seal products.

8. Provided with vapor retarder/barrier manufacturer's recommended prefabricated penetration boots, collars, etc.

9. Provided with vapor retarder/barrier manufacturer's installation instructions.

10. Products: Subject to compliance with requirements, provide from one of the following approved manufacturers:

a. Stego Industries, Inc., Stego-Wrap, 15 mil.

b. WR Meadows, Perminator, 15 mil.

M. Underlayment Compound: Free-flowing, self-leveling, cement-based compound, for interior applications as applicable, leveling from 1 inch thick to feathered edges. Must be compatible with finish flooring products and adhesives. Gypsum containing products are not permitted. Install with primer as per manufacturer's recommendations. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109M. Flexural Strength: Not less than 1000 psi at 28 days when tested according to ASTM C 78.

1. Subject to compliance with requirements and recommendations of manufacturer for thickness required and substrate condition, provide one of the following:

a. Conspec Mfg. Co. Spec Topping ESL

b. Euclid-Tamms, Super Flo-Top

c. Ardex, K-15

d. Mapei, Ultraplan Easy

2. If required for exterior applications manufacturer must provide their product as applicable for exterior and moist environments.

N. Waterstops: Manufactured flexible waterstops shall be PVC, dumb-bell style, minimum 9" wide, with pre-fabricated corners.

1. Manufacturer's

a. Greenstreak

b. Vinylex Corporation,

c. Tamms

O. Self-Expanding Strip Waterstops: Manufactured rectangular or trapezoidal strip, active sodium bentonite or other similar hydrophylic material for adhesive bonding to concrete with manufacturer's adhesives.

1. Products: Subject to compliance with requirements, provide manufacturers proper shape for each condition:

a. CETCO, Waterstop RX

b. Concrete Sealants Inc., Conseal CS-231

c. Greenstreak, Hydrotite

d. Mirafi Moisture Protection, Mirastop

P. Perimeter Insulation: 2 inches thick, extruded polystyrene board insulation (XPS), Type IV, 1.6 pcf minimum density, 25 psi minimum compressive strength, square edge rigid cellular polystyrene with closed-cells and integral high density skin, for below grade installation. Comply with ASTM C 578, ASTM E 84 maximum flame-spread of 10 and smoke-developed indexes of 175; 5 year aged R-values of 10.8 at 40 degrees F and 10.0 at 75 degrees F:

1. Dow Chemical Company - "Styrofoam XPS"

2. Owens Corning - "Foamular 250 XPS"

3. DiversiFoam Products Co. - "CertiFoam 25"

2.02 DESIGN OF CONCRETE MIXES

A. The Contractor shall have prepared, the design mixes of the Portland cement (including other cementitious materials), aggregates, and water for each class of concrete to be used. Each mix shall be based upon a mix with the approved materials and admixtures, and the concrete supplier's testing laboratory results meeting the requirements herein. (Tested design mixes do not need to contain hot or cold weather conditioning admixtures such as accelerators.)

1. Design Mixes in accordance with ACI 211.1-81 to provide normal weight concrete with properties as indicated on drawings and schedule, but shall at a minimum meet the requirements set herein.

a. Provide two design mixes; one for flatwork, one for concrete other than flatwork. Design mix for interior and exterior flatwork shall produce 4,500 lb. per sq. in. compressive strength at the end of 28 days, and water/cement (water/cementitious materials) ratio is not to exceed 0.45. Design mix for other than flatwork shall produce 3,500 lb. per sq. in. compressive strength at the end of 28 days, and water-cement ratio shall not exceed 0.55.

b. Provide slump of 3 inches plus or minus 1 inch for flatwork and 4 inches plus or minus 1 inch for other concrete work.

c. Concrete exposed to the exterior, excluding building foundations; add an air entraining agent in accordance with air entraining manufacturer's recommendation; Air content; 6 percent plus or minus 1 percent.

d. Concrete exposed to the exterior, excluding building foundations; use GGBS cementitious materials in accordance with GGBS manufacturer's recommendation.

2.03 FORM-FACING MATERIALS

A. Formed Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Rust-free metal.

2. Exterior-grade undamaged, unpatched plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

a. Medium-density overlay, Class 1, or better, mill-release agent treated and edge sealed.

b. Structural 1, B-B, or better, mill oiled and edge sealed.

c. B-B (Concrete Form), Class 1, or better, mill oiled and edge sealed.

3. Architecturally Exposed Concrete: Medium-density overlay, class 1 or better, mill-release agent treated and edge sealed

B. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.

C. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

D. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of the exposed concrete surface.

2. Furnish ties that, when removed, will leave holes not larger than 1 inch (25 mm) in diameter in concrete surface.

3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

4. Furnish stainless steel ties where drawings indicate to be exposed.

PART 3 - EXECUTION

3.01 GENERAL

A. Install products as per the manufacturer's written recommendations, except as superseded herein.

3.02 FORMS

A. Construct forms true to lines, shapes and dimensions as shown. Erect plumb, straight and sufficiently tight to prevent leakage. Brace and shore to adequately and safely support construction loads and prevent displacement. The design and engineering of the formwork and shores as well as its construction and removal shall be the responsibility of the Contractor and shall conform to "Recommended Practice for Concrete Formwork", ACI 347 and Section 6.2 of ACI 318.

1. Accurately form structural forms as per ACI 347-78. Brace, tie and shore as required to prevent movement in any direction during the placement of concrete.

2. Side forms may be omitted at footings where soil conditions will permit excavation to accurate size without cave-in.

B. Coat contact surfaces of forms with non-staining, rust preventative form-release agent, according to manufacturer's written instructions, before placing reinforcement. Rust stained steel formwork is not acceptable.

C. Forms for exposed concrete:

1. Drill forms to suit ties used and to prevent leakage of concrete mortar around tie holes.

2. Do not use metal cover plates for patching holes or defects in forms.

3. Provide sharp, clean corners at intersecting planes, without visible edges or offsets. Back joints with extra studs or girts to maintain true, square intersection.

4. Use extra studs, walers and bracing to prevent bowing of forms between studs and to avoid bowed appearance of concrete. Do not use narrow strips of form material that will produce bow.

5. Assemble forms so they may be readily removed without damage to exposed concrete surfaces.

3.03 PREPARATION FOR PLACING CONCRETE

A. Clean earth surface upon which concrete footings are to be placed and interiors of forms free from frost, ice, mud, water and other foreign matter.

B. Moisten wood forms, except in freezing weather, so joints will tighten to prevent cement grout seepage. The Contractor shall inspect reinforcement for secure fastening and accurate position.

C. Level floor areas on grade to true planes with gravel as a bed for concrete, prior to applying mesh.

D. Prior to the placing of concrete, the Contractor shall notify the Architect in due time to allow for the Architect's review of the work.

3.04 DELIVERING CONCRETE

A. Batch, mix and deliver concrete in accordance with the requirements set forth in ASTM C 94; subject to provisions specified herein relative to materials, strength, proportioning, consistency and delivery timing.

B. The rate of delivery of the mixed concrete shall be such that the interval between placing of successive batches shall not exceed 30 minutes. The elapsed time between the introduction of mixing water to the cement and aggregate and completion of discharge shall not exceed 90 minutes.

C. Delivery tickets shall record the mix design and the batch time. Keep legible copies of these available for examination by the Architect.

3.05 ENTRANCE PLATFORM FOUNDATIONS

A. Provide solid concrete foundation/frost protection wall around entire perimeter of entrance platforms, stoops, landings, etc. Depth of wall minimum of 4 feet below grade. Tie platform to foundation with minimum #5 bars 12” o.c.

3.06 INSTALLATION OF EMBEDDED ITEMS

A. General: Set anchorage devices, including but not limited to anchorage devices for precast concrete panel or slabs, curtainwall, elevator, masonry, mechanical/electrical equipment, and other items required for other work connected to or supported by cast-in-place concrete, using templates, setting drawings, and instructions from suppliers of items to be embedded.

1. Install reglets to receive flashings and other membrane materials at locations indicated, in accordance with manufacturer's recommendations.

2. Edge Forms and Screeds: Set edge forms and intermediate screeds as necessary to achieve final elevations indicated for finished slab surfaces.

3. Install anchor rods and dowels, accurately located, to required elevations.

4. Install dovetail masonry anchor slots per manufacturer’s requirements to receive specified masonry ties.

B. Waterstops: Install waterstops according to manufacturer's written instructions.

1. PVC Waterstops: Install in construction joints as indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of Work. Field-fabricate, weld and seal joints in waterstops watertight according to manufacturer's written instructions.

2. Self-Expanding Strip Waterstops: Install in construction joints and at other locations as indicated, according to manufacturer's written instructions, bonding with manufacturers adhesives, or mechanically fastening if conditions require, firmly pressing into place. Install in longest lengths practicable. Allow for expansion without damage or blow-out of concrete.

3.07 INSTALLATION OF VAPOR BARRIER

A. Following leveling and tamping of granular base for slabs on grade, place vapor retarder/barrier sheeting with longest dimension parallel with direction of pour.

B. Install as per ASTM E-1643, unless exceeded herein. Comply with manufacturer’s recommendations, except as herein exceeded.

C. Protect from damage, place vapor retarder/barrier just ahead of concrete placement, not to

exceed extent of day's pour.

D. Lap joints 6-12" and seal with vapor retarder/barrier manufacturer's appropriate tape. At foundation perimeter walls and vertical wall interruptions, provide manufacturer recommended double sided seal tape 1" below the installed slab elevation. Install vapor retarder/barrier up the perimeter walls and vertical wall interruptions so that the edges are showing 1" above the installed slab elevation. After installation of floor slab, trim flush with slab. Extend vapor retarder/barrier 6" out from construction joints for access for seam taping. Install manufacturer's recommended pipe boots fully sealed, or similar manufacturers approved sealing methods at pipe penetrations. Installation shall be water tight and vapor tight. Use extreme care to ensure that the integrity of the vapor retarder/barrier is not violated.

E. Notify Architect by email and provide the opportunity for observation of the fully installed, taped and sealed vapor retarder/barrier by the Architect no less than 24 hours prior to installation of the concrete slab.

3.08 PERIMETER INSULATION:

A. Install perimeter insulation around the entire perimeter of the foundation wall. Apply insulation complying with manufacturer's recommendations. Butt boards closely together. Apply board insulation to clean surfaces. On vertical surfaces, use appropriate spot adhesive to secure in place.

B. Insulation shall extend vertically to top of footing, or 4'-0" where footing is lower than 4'-0", except where shown to exceed this. Where shown on horizontal surfaces, level fill below slab so that boards are well seated.

3.09 CONCRETE SLAB FINISH FLOORING SUBSTRATE REQUIREMENTS

A. Concrete slab flatness, fiber exposure, final finish, recess or elevation, admixtures, curing methods/materials, sealers, sealants, alkalinity, and moisture content shall meet the requirements of finish flooring in this project. Contractor shall verify the requirements with the finish floor suppliers prior to installation of this concrete work.

3.10 PLACING CONCRETE

A. Place concrete immediately after mixing. Tamp, spade or vibrate to force out air pockets and work concrete into corners of forms and around reinforcement to ensure a dense homogeneous mass.

1. Pouring shall be continuous from working joint to working joint.

3.11 JOBSITE ADDITION OF WATER TO CONCRETE

A. Water shall not be permitted to be added at the jobsite unless all of the following are met:

1. Design mix was batched to allow for added water, clearly states so on the batch ticket delivered to the site, and clearly states how many gallons per cubic yard may be added on site without exceeding the water/cement ratio.

2. Batched water plus site added water shall not exceed the specified water/cement ratio.

3. The slump, properly tested as per ASTM C143, is less than the specified requirement.

4. The time from leaving the plant does not exceed 90 minutes.

5. Water may be added only to a full batch (full truckload).

6. Maximum amount of water permitted shall be 2 gallons of water per cubic yard of concrete.

7. Truck drum shall make 35 revolutions after water added.

8. The slump as originally tested and the amount of water added shall be recorded on copies of the batch ticket, and shall be signed by the Contractor.

3.12 COLD & HOT WEATHER PROCEDURES

A. ACI cold & hot procedures are minimum requirements. Contractor must protect concrete from freezing, from frost below concrete slabs or footings, from excessive or fast evaporation or drying and provide for proper curing in all types of weather.

B. Cold weather concreting: Do not mix or place concrete when the temperature is expected to fall below 40 deg. F. during the 24 hour period after placing concrete or below 30 deg. F. during the succeeding 6 days unless proper provision has been made for heating and protecting the concrete. In such cases provide heated concrete in accordance with ASTM C-94 and follow procedures outlined in ACI 306 or the "Manual of Concrete Practice".

C. Hot weather concreting: During hot weather and periods of low humidity, take adequate precautions to reduce the detrimental effects of these conditions on concrete. When applicable, apply an evaporation retarder which is fully compatible with other materials, methods, and final finish flooring. The approved practice for hot weather concreting are those approved by ACI 305. Conduct hot weather concreting in accordance with these practices as outlined.

3.13 FINISHING CONCRETE

A. Exposed concrete wall areas, interior and exterior: Wet grind to a smooth finish, and to the approval of the Architect.

B. Concrete paving, walks, stoops, ramps, and curbs shall receive a broom finish.

C. Interior floor slabs: One course concrete, steel troweled to a smooth finish, without the use of drier. Screed concrete floor slabs with an approved vibrating screed or other approved methods to ensure a dense concrete.

D. Interior floor slabs shall be level, and flat within a tolerance of 3/16" in 10 feet, or 1/8” in 10 feet where required by the finish floor manufacturer. Make corrections required to meet flatness levels before installation of flooring materials.

E. Slope floors to pitch ¼ inch at a 1 foot radius from the edge of floor drains, except where shown with a larger slope or radius on the drawings.

3.14 CONCRETE JOINT CONSTRUCTION

A. Construction Joints: Locate and install construction joints as indicated on drawings. If construction joints are not indicated, locate in manner which will not impair strength and will have least impact on appearance.

1. Keyways: Provide keyways not less than 1-1/2 inches deep.

2. Reinforcement: Continue reinforcement across and perpendicular to construction joints, unless details specifically indicate otherwise.

B. Expansion Joints: Construct expansion joints where indicated. Install expansion joint filler to full depth of concrete.

C. Control Joints: Construct control joints in slabs poured on grade to form panels of sizes indicated on drawings, but not more than 10 feet apart in either direction. Panels shall be nearly square and the length shall not exceed 1.5 times the width. L-shaped panels are not acceptable. Provide control joints at column centerlines. Provide additional control joints as necessary to comply with these guidelines. Provide control joints at elevated slabs. In addition, control joints at elevated slabs shall be centered on beam lines and as required to meet the above spacing requirements.

1. Interior: Form control joints by means of saw cuts one-fourth the depth of the slab, performed as soon as possible after slab finishing without dislodging aggregate.

2. Exterior: Form control joints by means of neatly tooling one-fourth the depth of the slab, performed as soon as possible after slab finishing without dislodging aggregate. Sawcut exterior control joints are not acceptable.

3.15 CURING CONCRETE

A. Protect concrete from damage due to premature drying or exposure to rain.

1. At interior concrete flatwork, apply one coat of cure and seal per manufacturer requirements.

a. Locations which are to have exposed concrete floors without finish flooring, and areas indicated to have Sealed Concrete Floors, shall have two coats total. After initial coat, areas are to be thoroughly cleaned and prepared for the application of one additional coat of cure and seal. The additional coat of cure and seal should be applied after the end of the 28 day concrete cure time.

b. Where floors are ground down, reapply cure and seal.

2. At exterior concrete flatwork, cure by placing curing cover over finish surface within two (2) hours after final troweling and leave in place for 7 days.

a. Follow curing cover manufacturer's requirements, if necessary keep concrete thoroughly wet for a period of seven (7) days when subjected to excessive heat, sun, wind or other elements producing a drying effect.

B. Make provisions necessary to maintain temperature of concrete at a minimum of 50 deg. F. for at least five (5) days after placement.

3.16 QUALITY CONTROL DURING CONSTRUCTION

A. Contractor shall fully prepare substrate, vapor retarder, reinforcing, formwork, etc, prior to concrete placement. Contractor shall notify Architect by email no less than 24 hours prior to installation of concrete, and provide the Architect the opportunity for observation of the full preparation (including reinforcing, vapor barrier, etc.) prior to the concrete placement. Should the Architect determine that the preparation is improper, incomplete, or otherwise fails to meet the requirements of the specifications, he shall notify Contractor, in writing or by email, stating observed shortcomings. Contractor shall take immediate steps to remedy the stated deficiencies and send a second 24 hour notice by email to Architect, certifying that preparation is now proper & complete & those deficiencies remedied, and again provide the Architect the opportunity for observation of the full preparation prior to the concrete placement.

B. Should the Contractor fail to give the Architect proper notice prior to installation of any

concrete work that concrete work shall be subject to additional testing, including core samples, and other testing methods. Contractor shall properly fill test holes and reimburse the Owner for the additional testing expenses, even if the concrete tests indicate general compliance with the specifications.

C. Contractor shall take precautions as necessary to prevent curling of flatwork including but not limited to use of curing sheets, misting, and other ACI approved procedures.

D. Contractor shall take precautions as necessary to provide a consistent appearance in the exposed concrete including but not limited to the use of consistent materials, installation, finishing, jointing, curing, patching, sealing, and other procedures, as well as avoiding "checker board" flatwork installation.

3.17 TESTING CONCRETE

A. The Owner will engage one or more Materials & Geotech Testing agencies to conduct tests for concrete. Refer to Section 01 41 00 - Materials & Geotech Testing for additional requirements.

3.18 ALLOWABLE TOLERANCES OF CONSTRUCTION:

A. Provide at a minimum concrete tolerances to meet ACI 347 and ACI 117, except as superseded herein:

1. Provide at a minimum the following formed concrete tolerances, except as superseded herein: Provide Class A tolerances for concrete surfaces exposed to view. Provide Class C tolerances for other concrete surfaces.

2. Maximum Variation from Plumb: In lines and surfaces of columns, walls, piers, etc.:

a. 1/4 inch in 10 feet.

b. 3/8 inch in any story or 20 feet maximum.

c. 1/2 inch in 40 feet.

3. Maximum variation from level or grades for exposed foundation wall tops, sills, horizontal grooves, and other conspicuous lines.

a. 1/4 inch in any bay or 20 feet maximum.

b. 1/2 inch in 40 feet.

4. Maximum variation of linear building line from an established position in plans and related portions of columns, walls and partitions.

a. 1/2 inch in any bay or 20 feet maximum.

b. 3/4 inch in 40 feet.

c. Maximum variation in cross sectional dimensions of thickness of walls: Not less than 1/4 inch smaller or more than 1/2 inch larger.

3.19 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas: Repair and patch defective areas with cement mortar after removing forms.

B. Mix dry-pack mortar, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and

placing.

1. Cut out honeycombs, rock pockets, void over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.

2. For surfaces exposed to view, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match surround color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface deflects include but are not limited to honeycomb, cracks, spalls, color or texture irregularities, air bubbles, rock pockets, fins, other projections on the surface, stains, and discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.

1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.

1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycombs, rock pockets, and other objectionable conditions.

2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days. Pay particular attention to slab construction joints, these high areas shall be ground down to minimize the thickness of any filling compound.

3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing. Finish repaired areas to blend into adjacent concrete. Proprietary cementitious underlayment compounds may be used when installed as per manufacturer's written recommendations. Substrates shall be cleaned & primed as required and underlayment compound installed as per manufacturer's recommendations. No gypsum underlayment fillers may be used as underlayment compounds.

4. Repair defective areas, except random cracks and single holes under 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent

concrete.

E. Repair isolated random cracks and single holes less than 1 inch in diameter with pressure injected repair epoxy in accordance with the repair epoxy manufacturer's recommendations.

F. Perform structural repairs with prior approval of Architect for method and procedure.

G. Repair methods not specified above may be used, subject to acceptance of Architect.

END OF SECTION 03 30 00

SECTION 04 10 00 – MORTAR AND GROUT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of the work shown on the drawings and/or specified in this section.

1.02 SUBMITTALS

A. Mortar and Grout

1. Product data.
2. Mortar mix designs. Must clearly state Portland cement, lime, proportional mix, of proper type.
3. Grout mix design.
4. Mortar test reports, ASTM C270 (Lab mixed) & ASTM C780 (Field mixed).
5. Integral Water Repellant (IWR) Admixture, which is the same as the water repellent admixture products used in provided masonry products.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Mortar Mix: Prepackaged or silo mix, must clearly state Portland cement lime mortar mix. Masonry cement or mortar cement mortars are not acceptable.

B. Masonry: Type N Portland cement lime mortar, complying with ASTM C270, Table 1 (Proportional design), with average compressive strength of 750 psi (800 psi max.).

C. Grout Mix (for masonry & hollow metal frames): Comply with ASTM C476. Aggregate ASTM C404. Grout shall comply with proportion requirements of ASTM C476. 1 part Portland cement 1/10 part hydrated lime 3 parts sand 2 parts coarse aggregate (for coarse grout only, omit for fine grout). Fine or coarse grout mix as per ACI 530.1. Slump for masonry shall be 8-11 inches. Slump for hollow metal frames shall be 4 inches. Gypsum grout components are not allowed. Mortar is not an acceptable substitution for grout.

D. Components for field mixed mortar and grout:

1. Cement: Portland cement meeting the requirements of ASTM Specification C 150-81 Type I.
2. Lime: Hydrated lime meeting standard specifications ASTM C 207 for hydrated lime, Type S.
3. Sand: Well graded, clean, sharp mason sand meeting ASTM C 144-527.
4. Water: Clean, fresh and free from salt, dirt and sewage and potable.
5. Aggregate for Mortar: ASTM C 144.
6. Aggregate for Grout: ASTM C 404.

E. Water Repellent Admixture: Provide water repellent admixture in mortar, which is the

same as the water repellent admixture products used in provided masonry products to assure bonding of mortar to masonry products. Use at masonry which has integral water repellent.

F. Provide mortar, products and accessories compatible with specified masonry products for a complete and proper installation and to assure bonding of mortar to masonry products.

G. Other Admixtures: The use of calcium chloride or other agents for lowering freezing temperature, or for accelerating, or any other admixtures not listed herein, are not allowed.

PART 3 - EXECUTION

3.01 MIXING

A. Mix mortar in such quantities that it will be used within a reasonable time. Re-tempering of mortar is not allowed.

3.02 TESTING MORTAR

A. The Owner will engage one or more Materials & Geotech Testing agencies to conduct tests for mortar. Refer to Section 01 41 00 - Materials & Geotech Testing for additional requirements.

END OF SECTION 04 10 00

SECTION 04 20 00 – UNIT MASONRY

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of the work shown on the drawings and/or specified in this section.

1.02 SUBMITTALS

A. Product data for each of the following.

1. CMU
2. Split Faced CMU
3. Burnished Block
4. Smooth Face masonry
5. Texture Face masonry
6. Rough Face masonry
7. Diffuser CMU (including Burnished if applicable)
8. Slotted Acoustical CMU
9. Face Brick including IRA
10. Water Repellent Admixture
11. Masonry Cleaning Products
12. Built-in members, flashings, reinforcing, and accessories

B. Samples for each of the following.

1. Split Faced CMU
2. Burnished Block
3. Smooth Face masonry
4. Texture Face masonry
5. Rough Face masonry
6. Diffuser CMU (including Burnished if applicable)
7. Slotted Acoustical CMU
8. Face Brick with cost per thousand as described in the allowance below, for each masonry type and size. Final selection of face brick shall not be approved without written allowance costs.

C. Control joint layout plans and details.

D. Final Itemized Cost Accounting for adjustment of masonry allowance

1.03 QUALITY ASSURANCE

A. Pre-Installation Masonry Meeting: Meeting with Architect and Contractor; Contractor shall review procedures to provide quality installation of the work, including: mockup sketch and installation, material selections, accessories, detailing, protection of masonry

materials and walls from weather, control joints, cold weather construction and protection, special masonry materials or units or finishes, special or unusual details or conditions, and other requirements of this section.

B. Materials:

1. Do not change source or brands of masonry materials during the Work.

2. Obtain masonry units from one manufacturer, cured (if applicable) by one process and of uniform texture and color, for each type required for each continuous area and visually related areas.

3. Fire-Resistive ratings: Provide materials and construction identical to those of assemblies with fire-resistive ratings determined per ASTM E 119 by a testing and inspection agency, by equivalent concrete masonry thickness, or other means, as acceptable to authorities having jurisdiction.

4. Regulatory Requirements: Comply with the applicable requirements of governing authorities and codes.

5. Unit Masonry Standard: Comply with TMS602/ACI530.1/ASCE6 current edition "Specifications for Masonry Structures," except as otherwise specified.

6. Coordination: Review installation procedures and coordinate with other Work that must be integrated with masonry.

1.04 FIELD-CONSTRUCTED MOCK-UP

A. Prior to installation of masonry, erect mock-up to comply with the following requirements, using preliminary masonry unit selections:

1. Submit a shop drawing sketch of the proposed mock-up panel, prior to mock-up panel construction, showing front and rear elevations.

2. Build Mock-Up approximately 8 feet long by 6 feet high, with a 1 foot 4 inch corner return, full wall thickness, including face and backup wythes as well as masonry accessories. Mockup shall be constructed upon a stable concrete foundation.

3. Include each and every masonry type used on the building, both interior and exterior.

4. Install full range of color, texture, etc. of masonry units in the mock up.

5. Wall construction shall include typical wall vocabulary including flashing and drip edge, drainage mesh, insulation, weep holes, reinforcing, brick and CMU control joints, etc. Leave base of wall flashing partially exposed for viewing flashing installation.

6. Include masonry details such as: special banding, bonding, mortar joint profiles, etc. Foreshorten typical wall construction as required to fully include top of wall cornice, wall banding, etc.

7. Window opening: 16” x 16” opening including jamb, sill, head with lintel, jamb closure wood blocking, weep holes, flashing, and drip edge. Leave flashed lintel partially exposed for viewing flashing and end dam installation. Leave window sill flashing partially exposed for viewing flashing, flashing support, and end dam installation.

8. Protect the mock-up wall cavity from the elements, with a typical top of masonry wall with wood blocking, flashing, and cap installation at the top of the mock-up

wall. Leave one end of the top of wall partially exposed for viewing flashing, flashing support, and blocking installation.

9. Construct the mock-up 21 days prior to the date selections are to be finalized. Approved mockup does not constitute approval to deviate from specifications.

10. Retain and maintain mock-up during construction in undisturbed condition until directed to remove the mock-up. When directed, demolish and remove mock-up from project site.

1.05 MASONRY WARRANTY

A. The Contractor accepts the responsibility of providing proper workmanship, including completely filling head and bed joints with mortar, proper installing of flashings, and the assumption that leaks through the walls, cracks in the mortar, and improper bonding to masonry units will be due to the Contractor's improper workmanship. Contractor further warrantees that the walls will not leak, cracks will not occur in the mortar, and the mortar will be properly bonded to masonry units, and flashing will be properly installed. Contractor agrees to cut out mortar joints to 3/4" depth in areas with either leaks, cracks, or poorly bonding, to point them with mortar, and to replace improperly installed flashings, until such conditions have been stopped. This warranty covers a period of 2 years from the date of Substantial Completion.

1.06 PROJECT CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602, and as indicated herein.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

C. Masonry Protections:

1. During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

a. Where one wythe of multi wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

2. Do not apply uniform floor or roof loads or concentrated loads for at least 7 days after constructing masonry walls or columns which support these loads.

3. Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Remove immediately any grout, mortar, and soil that comes in contact with such masonry.

4. Protect base of walls from rain-splashed mud and mortar splatter.

5. Protect sills, ledges, and projections from grout and mortar droppings.

6. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes from grout and mortar droppings.

PART 2 - PRODUCTS

2.01 MASONRY UNITS

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work; if units are installed exposed they will be subject to rejection and replacement.

B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction, and as specified within.

2.02 CONCRETE MASONRY

A. Concrete block: Standard medium weight concrete block, ASTM C-90, Grade N, Type I, for concrete masonry units.

1. Interior partitions and exterior back-up medium weight except as otherwise called for on drawings of Haydite, Arcalite, or Solite Plus Limestone. Metallic admixtures not allowed.

2. Maximum weight of thoroughly cured 8" x 16" medium weight block: 34 lbs. Density, 105-125 lbs. per cu. ft. Blocks shall be of true height so courses and joints line up and be uniform. Interior exposed block shall have a fine to dense uniform surface texture free from superficial defects, to be supplied from one manufacturer.

3. Minimum net area compressive strength of concrete masonry units shall be 3,000 psi or net area compressive strength of masonry, f'm shall be 1775 by the prism strength test method.

4. The block, other than those which are autoclave cured, shall be a minimum of 90 days old. Furnish a certification that blocks furnished for this project are a minimum of 90 days when delivered.

5. 5. Fire Rating:

a. 4" and 6" concrete block: Certified classification C-1 (1-hour rating).

b. 8" and 12" concrete block: Certified classification C-2 (2-hour rating).

6. Earlier delivery may be approved when the manufacturer utilizes special curing, or drying processes, or both, which insure the delivery of cured units with a moisture content of less than 30% of total absorption.

7. Special shapes: At interior block, exposed outside vertical corners shall be bull nosed except door and window jambs, unless shown otherwise. Provide bull nosed units for window sills, unless shown otherwise. Bull nose units shall be manufactured, not field fabricated. Lintel & bond beam block with "U" shape for use at block lintels and bond beams as called for by the Drawings. Special “control joint” slotted sash units to be provided at masonry control joints. Use solid concrete brick of load bearing grade, where required to adjust steel bearing elevation.

B. Burnished Block: Burnished block to be factory ground face at exposed surfaces, cast-in integral color, with factory applied clear sealer. Block shall have integral waterproofing, equal to W.R. Grace Dry-Block, with a compatible mortar waterproofing product available from the same waterproofing manufacturer. Approved manufacturers, subject to the requirements herein:

1. Northfield Block Co./Trendstone; Ground Faced Masonry; Provide

manufacturer's full color options for selection.

2. Provide 4", 8", 12" and bond beam units as indicated and required to complete the Work.

3. Special shapes: At interior block, exposed outside vertical corners shall be factory manufactured bull nose units, except at door and window jambs. Provide special 135° corner units at angled outside corners. Provide special units with multiple ground surfaces as required or indicated to maintain uniform, consistent finish throughout area.

4. Special finishes: At exterior and interior block, seal walls with one coat of Trencoat low VOC 20% solids acrylic sealer (or comparable product, products must be approved by masonry unit manufacturer) clear acrylic sealer. Apply sealer per manufacturer's recommendations. Seal units after properly removing mortar drippings, smears, etc., and proper approved cleaning methods have been accomplished. Protect adjacent dissimilar surfaces, including but not limited to wood, glass, aluminum, prefinished metal, etc.

C. Split Faced CMU: Standard medium weight split faced concrete block, ASTM C-90, Grade N, Type I, for concrete masonry units. Cast-in integral color, with integral waterproofing, equal to W.R. Grace Dry-Block, with a compatible mortar waterproofing product available from the same waterproofing manufacturer. Approved manufacturer, subject to the requirements herein:

1. Trenwyth Industries, Split Face Concrete Masonry Units; Provide manufacturer's full color options for selection.

2. Sizes: 8" x 16" x 8"w. Provide factory finished special shapes for corner units (edge returns to have factory texture matching face), door jambs (smooth returns), and as shown or otherwise necessary to accomplish the work.

3. Maximum weight of thoroughly cured 8" x 16" medium weight block: 34 lbs. Density, 105-125 lbs. per cu. ft. Blocks shall be of true height so courses and joints line up and be uniform.

4. Minimum net area compressive strength of concrete masonry units shall be 3,000 psi or net area compressive strength of masonry, f'm shall be 1775 by the prism strength test method.

5. The block, other than those which are autoclave cured, shall be a minimum of 90 days old. Furnish a certification that blocks furnished for this project are a minimum of 90 days when delivered.

6. Earlier delivery may be approved when the manufacturer utilizes special curing, or drying processes, or both, which insure the delivery of cured units with a moisture content of less than 30% of total absorption.

D. Smooth Face Masonry, Texture Face Masonry, and Rough Face Masonry: Units shall have a fine grain textured appearance similar to natural Indiana Limestone, with no surface crazing or pin holes. Units shall meet the requirements of the Cast Stone Institute, except where listed here otherwise. Units shall have a minimum compressive strength of 5000 PSI and a maximum moisture absorption ASTM C1195 of 6%. Units shall have cast-in integral color or natural aggregate color as selected. Block shall have integral waterproofing, equal to W.R. Grace Dry-Block, with a compatible mortar waterproofing product available from the same waterproofing manufacturer. Units shall be delivered to the job site packaged in a manner to minimize damage to the faces in shipment. The face of masonry units shall be of uniform color, exposure and texture. Surfaces are to be

factory coated with a clear, unpigmented sealer.

1. Trenwyth Industries, Cordova Stone

   a. Smooth; Ground face.

   b. Texture; Texture face

   c. Rough; Chisel face.

2. Sizes: 4" x 24" x 4"w, 8" x 24" x 4"w, and as indicated or required. Provide factory finished special shapes for corner units (edge returns to have factory texture matching face), jambs (smooth returns as indicated), sills, and copings as shown or otherwise necessary to accomplish the work.

E. Diffuser CMU and Burnished diffuser CMU to be 8" and 12" “Diffuser Blox” without acoustical slots and filler by RPG Diffuser Systems, Inc. Provide necessary components to provide a complete and proper installation. Diffuser CMU to be laid in stack bond and reinforced with vertical and horizontal reinforcing bars grouted in solid as indicated and per manufacturer’s requirements. Units at Auditorium and Stage areas to have cast-in integral color matching adjacent burnished CMU units. After installation, seal burnished units after properly removing mortar drippings, smears, etc., and proper approved cleaning methods have been performed. Seal interior walls with one coat of TK Sealer, “Bright Seal” (or comparable product, products must be approved by masonry unit manufacturer) clear acrylic sealer. Apply sealers per manufacturer’s recommendations. Protect adjacent dissimilar surfaces, including but not limited to glass, aluminum, prefinished metal, etc.

F. Slotted Acoustical buCMU: Slotted Acoustical CMU in walls as indicated to be 8" “Soundblox”, Type RSC, by Proudfoot Company, Inc. Provide incombustible fibrous filler in each cavity. Provide right and left hand half slot face units at ends to allow running bond to be maintained with straight vertical end slot patterns. Provide RSC-RF units at vertical reinforced locations.

2.03 FACE BRICK

A. General: Provide shapes indicated and as follows:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.

2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

3. Provide special shapes as detailed or required, including corner brick (other than 90 degree corners) angle units, solid units, etc. Use solid brick at recessed or projected courses, and at corbelling.

4. Initial Rate of Absorption (IRA): Provide test data of Initial Rate of Absorption to verify less than 30g / 30sq. in. per minute when tested per ASTM C 67.

5. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."

B. Face brick to be the same color, manufactured by the same manufacturer, and produced on the same run to assure color match. Face brick to be in sizes and textures as selected.

Specifier Note: Must be edited and allowances updated for each project

1. Face brick Type 'A' shall be furnished where indicated or required. Face brick

shall meet A.S.T.M. C-216, Grade SW, Type FBX, velour finish.

a. Utility size (3-5/8" x 3-5/8" x 11-5/8")

1. Typical U.O.N.

2. Material cost allowance of $1,500 per thousand F.O.B. jobsite.

b. Closure size (3-5/8" x 3-5/8" x 7-5/8")

1. Material cost allowance of $1,200 per thousand F.O.B. jobsite.

c. Modular size (2-1/4" x 3-5/8" x 7-5/8")

1. Material cost allowance of $900 per thousand F.O.B. jobsite.

2. Face Brick Type 'B' shall be furnished where indicated or required. Face brick shall meet A.S.T.M. C-216, Grade SW, Type FBX, vertically struck wire cut finish.

a. Utility size (3-5/8" x 3-5/8" x 11-5/8")

1. Typical U.O.N.

2. Material cost allowance of $1,600 per thousand F.O.B. jobsite.

b. Closure size (3-5/8" x 3-5/8" x 7-5/8")

1. Material cost allowance of $1,300 per thousand F.O.B. jobsite.

c. Modular size (2-1/4" x 3-5/8" x 7-5/8")

1. Material cost allowance of $950 per thousand F.O.B. jobsite.

3. Face Brick Type 'C' shall be furnished where indicated or required. Face brick shall meet A.S.T.M. C-216, Grade SW, Type FBX, smooth finish.

a. Utility size (3-5/8" x 3-5/8" x 11-5/8")

1. Typical U.O.N.

2. Material cost allowance of $1,600 per thousand F.O.B. jobsite.

b. Closure size (3-5/8" x 3-5/8" x 7-5/8")

1. Material cost allowance of $1,300 per thousand F.O.B. jobsite.

c. Modular size (2-1/4" x 3-5/8" x 7-5/8")

1. Material cost allowance of $950 per thousand F.O.B. jobsite.

C. Allowance: Provide material cost allowance noted above for each masonry type, F.O.B. jobsite, unloaded in a location as directed by Contractor.

1. Submit substantiating paperwork for review prior to final approval of the brick selections.

2. Final Itemized Cost Accounting will be reviewed for adjustment of masonry allowance.

2.04 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: Billet steel deformed bars complying with ASTM A 615/A 615M, Grade 60.

B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.

1. Interior Walls: Class 1 Mill galvanized, carbon steel (ASTM A641).
2. Exterior Walls: Class B-2 Hot-dip galvanized, carbon steel (ASTM A153).
3. Wire Size for Side Rods: 9 gauge.
4. Wire Size for Veneer Ties: 9 gauge.
5. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
6. Masonry Veneer Horizontal Joint Reinforcement at Wood or Metal Stud Walls: 9 gauge wire.
7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

C. Horizontal Joint Reinforcement: Welded-wire units prefabricated with prefabricated corner and tee units. Width of reinforcing shall be not less than two inches (2") less than total width of wall. Provide prefabricated corners and/or tees at intersecting masonry walls.

1. For multi-wythe masonry, provide type as follows: Ladder Design with cross rods spaced not more than 16 inches o.c. and number of side rods as follows: Number of side rods for multi-wythe concrete masonry: One side rod for each face shell of hollow masonry units more than 4 inches in nominal width plus one side rod for each wythe of masonry 4 inches or less in nominal width. Provide drip at cross rod between wythes.
2. For single-wythe masonry, provide type as follows with single pair of side rods: Truss Design with continuous diagonal cross rods spaced not more than 16" o.c.
3. For multi-wythe masonry, where construction of the concrete block precedes the installation of the exterior veneer, or alignment or horizontal masonry joints do not align between wythes, provide: Ladder Design with cross rods spaced not more than 16 inches o.c., with side rods & accessories as follows: Two side rods at the interior concrete block masonry. One rod at 4" thick exterior masonry wythe, or two ladder type rods at exterior 6" or thicker masonry veneer. 3/16" diameter wire U anchor fabricated to secure a similar wire bent tie. Provide an interlock system (Holmann & Barnard, Inc. “Seismiclip” or comparable), such that the exterior masonry wire reinforcing is tied back to the interior reinforcing.
4. Manufacturers:
   a. Holmann & Barnard, Inc.
   b. Heckmann Building Products, Inc.

2.05 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8" cover on outside face. Outer ends of wires are bent

90 degrees and extend 2 inches parallel to face of veneer.

C. Masonry anchors at poured in place concrete wall back up with ¾"minimum joint depth shall be hot dipped galvanized 3/16" dia. triangular wire tie of the proper length for embed depth required with dovetail clip (corresponding cast in 12 ga. galv. metal dovetail slot by installing contractor from same manufacturer, verify and coordinate exact requirements), and premolded horizontal wire reinforcing seismic clip. Items to be hot dipped galvanized. Provides for continuous horizontal wall reinforcement to be secured to ties.

1. Hohmann & Barnard, Inc.; #315-BT S.I.S.

2. Heckman Building Products, Inc.; comparable to (1)

D. Interior masonry wall anchors at poured in place concrete wall back up with ¾" minimum joint depth shall be mill galvanized 3/16" dia. triangular wire tie of the proper length for embed depth required with channel clip, premolded horizontal wire reinforcing seismic clip, and surface mounted mill galvanized 12 ga. metal channel slot receiver strips. Provides for continuous horizontal wall reinforcement to be secured to ties.

1. Hohmann & Barnard, Inc.; #363-BT S.I.S. and #362-C channel

2. Heckman Building Products Inc.; comparable to (1)

E. Intersecting Masonry Wall Anchors: Wire Mesh Wall Tie: 1/2" sq. x 16 gauge hot dipped galvanized wire, 16" long panel x 2" width less than wall. Use as tie between intersecting masonry walls.

1. Hohmann & Barnard; MWT

2. Heckman Building Products; No. 269

F. Masonry wall anchors at embedded steel columns and beams shall be mill galvanized, hot dipped galvanized at exterior walls, 3/16" dia. triangular wire ties of the proper length for embed depth required with proper end clip or strap (corresponding surface anchored 12 ga. channel slot or wire tie receiver strips from same manufacturer as ties, provided by structural steel manufacturer, verify and coordinate exact requirements). Provides for continuous horizontal wall reinforcement to be secured to ties.

1. Hohmann & Barnard, Inc.; #315-BT S.I.S.

2. Heckman Building Products, Inc.; comparable to (1)

G. Masonry veneer wall anchors at concrete or masonry back up, and embedded steel columns, with 3/8" joint depth, shall be 3/16" dia. wire tie of the proper length for embed depth required with surface mounted 12 ga. metal anchorage strap. Items to be hot dipped galvanized. Provides for continuous horizontal wall reinforcement to be secured to ties.

1. Hohmann & Barnard, Inc.; #345-BL S.I.S.

2. Heckman Building Products Inc.; comparable to (1)

H. Masonry veneer wall anchors at wood or metal frame wall construction shall be 3/16" dia. triangular wire tie of the proper length for embed depth required with channel clip, pre-molded horizontal wire reinforcing seismic clip, and surface mounted 12 ga. metal channel slot receiver strips of required type for the specified rigid cavity wall insulation thickness. Items to be hot dipped galvanized. Provides for continuous horizontal 9 gauge wire wall reinforcement to be secured to ties.

1. Hohmann & Barnard, Inc.; #363-BT S.I.S. and #362-CX channel

2. Heckman Building Products Inc.; comparable to (1)

I. Anchor Bolts: Headed or L-shaped steel bolts complying with ASTM A 307, Grade A (ASTM A 325M, Property Class 4.6); with comparable hex nuts and, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

2.06 EMBEDDED FLASHING MATERIALS

A. Flexible Flashing: Use the following unless otherwise indicated, for damp course and through wall flashing:

1. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040" (40 mil.).

a. Products: Subject to compliance with requirements, provide one of the following available products:

1. Grace Construction Products, W. R. Grace & Co. - Conn.; Perm-A-Barrier Wall Flashing.

2. IPCO; Self Adhesive Rubberized Asphalt Flashing.

3. W.R. Meadows, Inc., Air-Shield Thru-Wall Flashing

b. Associated Flashing Accessories:

1. Mastic: Mastic compatible with flashing materials, supplied by flashing manufacturer.

2. Termination bar: Stainless steel, type 304, Size: 1/8" thick x 1" wide with holes pre-drilled 6" or 8" o.c.

3. Primer: Primer compatible with flashing materials, supplied by flashing manufacturer.

4. Drip Edge Flashing: Shall be stainless steel, type 304, 26 gauge, 1 5/8" min. depth with 2B finish, shall be installed in accordance with manufacturer's recommendation. Provide preformed corners where available from manufacturer. Approved manufacturers subject to requirements as listed:

a. Hohmann & Barnard, Inc.

b. Sandell Manufacturing.

c. IPCO.

5. Flashing Support within wall cavity: IPCO stainless steel (type 304 minimum 28ga) cavity bridge, type F, L, Z, as applicable.

6. Preformed Door Jamb End Dam: IPCO stainless steel (type 304 minimum 28ga) with diagonal end dam. Use at unsupported end dam conditions.

2.07 MISCELLANEOUS MASONRY ACCESSORIES

A. Control joint shear key to be premolded joint filler for use with CMU sash block.

1. Hohmann & Barnard; RS Series

2. Heckman Building Products, Inc.; comparable to (1)

3. Dur-O-Wall; DA 2000 Series

B. Expansion Joint Filler, Non-metallic (for use at exterior wythe of exterior masonry walls at Expansion Joint): Pre-molded filler strips complying with ASTM D 1056, Type 2, (closed cell), Class A (cellular rubber and rubber-like materials with resistance to petroleum base oils), Grade 1 (compression-deflection range of 2 to 5 psi), compressible up to 35 percent, of width indicated, formulated from the following material:

1. Neoprene.

2. Urethane.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Weep Hole Rope: Sash cord, cotton, 3/8" diameter, 12" minimum length.

E. Cavity Drainage Mesh: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity; 1" thick by approximately 10 inches high, polyethylene, polyester, or nylon mesh, 90% open weave, with a top surface in a trapezoidal (dovetail) configuration designed to allow moisture to flow downward in the cavity to masonry flashing and weeps. Drainage system shall be continuous at base of wall and above flashed installations where the cavity extends at least 24" above. Match clear cavity width to drainage mesh thickness. Clear cavity width should be no more than 1/4" wider than the drainage mesh thickness. Make adjustments to the clear cavity width, by installing an additional 12” high piece of rigid cavity wall insulation, thickness as required, in back of the drainage mesh, such that there remains no more than 1/4" of clear cavity space. Approved manufacturers, subject to compliance with these requirements:

1. Mortar Net USA, Ltd.; Mortar Net.

2. Hohmann & Barnard, Inc.; Mortar Trap.

3. CavClear; Mortar Drop Stop.

2.08 MASONRY CLEANERS

A. Proprietary Masonry Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Diedrich Technologies, Inc.

b. ProSoCo, Inc.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors

and textures.

C. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

D. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond with vertical joint in each course centered on units in courses above and below.

1. Match existing bond unless noted otherwise

3.02 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2" or minus 1/4".

2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2".

3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4" in a story height or 1/2" total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4" in 10 feet, or 1/2" maximum.

2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8" in 10 feet, 1/4" in 20 feet, or 1/2" maximum.

3. For vertical lines and surfaces do not vary from plumb by more than 1/4" in 10 feet, 3/8" in 20 feet, or 1/2" maximum.

4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8" in 10 feet, 1/4" in 20 feet, or 1/2" maximum.

5. For lines and surfaces do not vary from straight by more than 1/4" in 10 feet, 3/8" in 20 feet, or 1/2" maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8", with a maximum thickness limited to 1/2".

2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8" or minus 1/4".

3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8".

3.03 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond pattern for exposed masonry as indicated in paragraph 3.01. Do not use units with

less than nominal 4” horizontal face dimensions at corners or jambs.

1. Lay concealed masonry with all units in a wythe bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners.

C. Discard units with cracked faces, chipped edges, or corners or other defects that affect appearance or performance.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

1. Install steel lintels, bearing plates, etc. plumb and level.

E. Fill cores in hollow CMU’s with grout 24 inches each way under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

F. Chases. Ascertain from each trade subcontractor where chases or openings for pipes, wires, ducts, etc., are to go and do not wait for such information to be given. Construct such chases as shown or required.

G. Build in anchors, bolts, flashings, wall plugs, nailing strips, frames, etc., as may be required. Place these materials according to directions of those manufacturers who furnish them, except as exceeded herein.

H. Provide openings as shown or required for windows, doors, as well as mechanical, electrical, plumbing, and other items.”

I. Grout hollow metal frames in masonry or concrete partitions, filling with concrete grout vertical frame members, except for the bottom 8". Do not grout hollow metal frames at gypsum walls. Grout shall comply with ASTM C 476, mixed to provide a 4" maximum slump, and hand troweled into place. Do not use grout mixed to a thin/pumpable consistency, or with an accelerant, or with antifreeze, or with a chloride, or a gypsum grout, any of which may cause premature rusting of frames.

J. Rake and caulk exposed sill and coping head joints; rake joints 1/2" deep, install backer rod and sealant.

3.04 CONTROL JOINTS

A. Exterior wall control joints shall be provided where indicated on the drawings.

B. Interior wall control joints shall be provided at the following applications:

1. At non-vertically reinforced wall runs where the length (L) to height (H) ratio (L/H) exceeds 2. Where practicable, place required joint near corners, near intersecting walls and at edges of large openings.

2. At changes in wall height or thickness including at pilasters.

3. At locations where structural columns are fully encased within masonry.

3.05 MORTAR BEDDING AND JOINTING

A. Lay hollow brick and CMU’s as follows:

1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.

2. With webs fully bedded in mortar in courses of piers, columns, and pilasters.

3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.

4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated. Joints 16" above ceilings, and that will not be exposed shall be struck flush.

3.06 CAVITY WALLS

A. Bond wythes of cavity walls together using the following methods:

1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. of wall area spaced not to exceed 24 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 16 inches o.c. vertically.

2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.

a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes or adjustable two-piece tab-type reinforcement if veneer is installed later.

b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties.

c. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties to allow for differential movement regardless of whether bed joints align.

B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

C. Installing Cavity-Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown. Tape joints and around penetrations with manufacturer's approved tape.

3.07 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8" on exterior side of walls, 1/2" elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches o.c.

2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.

3. Provide reinforcement not more than 8 inches above and below wall openings

and extending 12 inches beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

3.08 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:

1. Provide an open space not less than 1/2" wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.

2. Anchor masonry with anchors embedded in masonry joints and attached to structure.

3. Space anchors as indicated, but not more than 16 inches o.c. vertically and 24 inches o.c. horizontally.

3.09 ANCHORING MASONRY VENEERS

A. Anchor masonry veneers to concrete, and masonry backup with seismic masonry-veneer anchors to comply with the following requirements:

1. Fasten screw-attached and seismic anchors to concrete and masonry backup with metal fasteners of type recommended by manufacturer. Use two fasteners unless anchor design only uses one fastener.

2. Embed tie sections connector sections and continuous wire in masonry joints. Provide not less than indicated air space between back of masonry veneer and face of concrete, or masonry backup.

3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.

4. Space anchors as indicated, but not more than 16 inches o.c. vertically and 24 inches o.c. horizontally with not less than 1 anchor for each 2.67 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.

3.10 ANCHORING MASONRY VENEERS TO STUD FRAMING

A. Anchor masonry veneers to wood or metal stud framing backup with seismic masonry-veneer anchors to comply with the following requirements:

1. Place seismic anchor channels on face of rigid cavity wall insulation, fasten by screw-attached method with metal spacer clips through rigid insulation and wall sheathing to wall framing with metal fasteners of type recommended by manufacturer.

2. Insert wire tie section into channel, embed tie section connector sections and continuous horizontal reinforcement wire (set in tie section seismic clip) in masonry joints. Provide not less than indicated air space between back of masonry veneer and face of sheathing backup. Allow for rigid wall insulation clearance and installation requirements.

3. Locate anchor sections to allow maximum vertical differential movement of ties

up and down.

4. Space anchors as indicated, but not more than 16 inches o.c. vertically and 24 inches o.c. horizontally with not less than 1 anchor for each 2.67 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.

3.11 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

2. At lintels and shelf angles, extend flashing a minimum of 6 inches above drainage mat. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.

3. Install stainless steel metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2" back from outside face of wall and adhere flexible flashing to top of stainless steel metal drip edge.

4. Install stainless steel metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2" back from outside face of wall and adhere flexible flashing to top of stainless steel metal flashing termination.

C. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:

1. Use specified weep rope products to form weep holes.

2. Provide rope and weeps in head joints in first course at base of wall as well as every location immediately above flashing. Provide at the bottom of head joints, spaced as follows: minimum of 16" o.c. at masonry units which are equal to or less than 8" long; 24" o.c. at masonry units which are 12" long; 16" o.c. at masonry units which are 16” long; 24" o.c. at masonry units which are 24" long.

3. Lay rope on flashing and properly extend rope into cavity and run horizontally behind veneer masonry, below cavity drainage mat.

D. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

3.12 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/ TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

2. Limit height of vertical grout pours to not more than 60 inches.

3.13 PROTECTION OF WORK AND MATERIAL

A. Refer to Project Conditions paragraph 1.06 for further requirements.

B. Keep wall surfaces and projections free of droppings and mortar smears.

C. Corners of entrances and jambs and external corners that could be damaged shall be protected by wood and boxing.

D. Cover masonry units stored on the site, and keep dry until after placed in the wall. Cover tops of walls, projections, openings, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress. Extend cover a minimum of 24 inches down both sides and secure cover in place against high winds, rain, snow, and ice. Concrete masonry shall be thoroughly cured and dry before placement. Keep stored masonry away from contact with the ground.

E. Do not perform work when the temperature might drop below freezing before initial set without proper protection and procedures as herein described.

3.14 COLD WEATHER CONSTRUCTION/PROTECTION

A. Cold Weather Construction: Perform the following construction procedures while masonry work is progressing. Temperature ranges indicated below apply to air temperatures existing at time of installation. In heating mortar and grout materials, maintain mixing temperature selected within 10° F. Do not heat water for mortar and grout to above 160° F.

1. 40° F to 32° F.:

Mortar: Heat sand or mixing water to produce mortar temperature between 40° F. and 120° F.

Grout: Follow normal masonry procedures.

2. 32° F. to 25° F.:

Mortar: Heat mixing water and sand to produce mortar temperatures between 40° F. and 120° F.; maintain temperature of mortar until used above freezing.

Grout: Heat grout materials to 90° F. to produce in-place grout temperature of 70° F.

3. 25° F. to 20° F.:

Mortar: Heat mixing water and sand to produce mortar temperatures between 40° F. and 120° F.; maintain temperature of mortar until used above freezing.

Grout: Heat grout materials between 70° F. and 120° F to produce in-place grout temperature of 70° F.

4. Provide enclosure and auxiliary heat to maintain an air temperature of at least 40° F.

5. 20○ F. and below:

Mortar: Heat mixing water and sand to produce mortar temperatures between 40° F. and 120° F.

Grout: Heat grout materials to 90° F. to produce in-place grout temperature of 70° F.

Masonry Units: Heat masonry units so that they are above 40° F. at time of laying.

Provide enclosure and auxiliary heat to maintain an air temperature of at least 40° F. for 24 hours after laying units.

B. Cold Weather Protection: These requirements apply after masonry is placed and are based on anticipated minimum daily temperature for grouted masonry and anticipated mean daily temperature for ungrouted masonry. Protect completed masonry in the following manner.

1. 40° F. to 25° F.:

Completely cover masonry with weather-resistive membrane for at least 24 hours.

2. 25° F. to 20° F.:

Completely cover masonry with weather-resistive insulating blankets or similar protection for at least 24 hours, 48 hours for grouted masonry.

3. 20° F. and below:

Except as otherwise indicated, maintain masonry temperature above 32° F. for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps or other methods proven to be satisfactory. For grouted masonry maintain heated enclosure to 40° F. for 48 hours.

3.15 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

B. Inspections: Level 1 special inspections according to the "International Building Code" where the height (H) of masonry or length of masonry (L) to thickness (T) of masonry ratio (H/T or L/T) exceeds 18.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.

2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.

3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

E. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.

F. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140

for compressive strength.

G. During progress of work, mortar tests shall be made by an approved testing laboratory in accordance with "Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry", A.S.T.M. C 780. Include the cost of tests in contract price.

1. Perform one series of mortar tests for each 10,000 square feet of gross building area.

H. If the test results indicate that the mortar does not meet specified requirements, Architect shall have the right to request additional tests to be made on portions of the building affected at the Contractor's expense. Should the results of the additional testing fail to meet specified requirements, it is the Contractor's responsibility to remove and replace such faulty masonry work as determined by the Architect.

3.16 REPAIRING, POINTING, AND CLEANING

A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.

2. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.

3. Clean masonry with a proprietary commercial cleaner applied according to manufacturer's written instructions only if above methods do not achieve approved results.

4. Protect surfaces from contact with cleaner.

5. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

END OF SECTION 04 20 00

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of work shown on the drawings and/or specified in this section.

1.02 REFERENCE

A. Framing Standard: American Forest & Paper Association's WCD 1, "Details for Conventional Wood Frame Construction".

1.03 SUBMITTALS

A. Product Data

B. Wood Treatment Data:

1. Rot-Resistant Treatment: Submit Certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained and conformance with applicable standards.

2. Fire-Retardant Treatment: Submit Certification by treating plant that treatment material complies with specified standard and other requirements.

a. Include certified classification from manufacturer's testing agency, either Underwriters Laboratories, Inc. or other testing and inspecting agency acceptable to authorities having jurisdiction, including meeting or exceeding the requirements of the specified rated assembly testing agency.

C. Certification: Modification of Engineered Wood Product (LVL) components.

1.04 PRODUCT HANDLING

A. Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar material.

1.05 PROJECT CONDITIONS

A. Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of nailers and similar supports to allow attachment of other work.

PART 2 - PRODUCTS

2.01 LUMBER

A. Rough lumber for plates, blocking, nailers, etc., without large knots or splits shall be a minimum of No. 2 & better Doug-Fir Larch, Southern Yellow Pine, or SPFs (Spruce-Pine-Fir South) with fiber stress (fb) = 1,100 psi minimum. Provide continuous and intermediate lengths as required.

1. Utility, standard, stud and No. 3 grade of any lumber species are not permitted.

2. Rough lumber in contact with concrete or earth, to be pressure treated for rot resistance as specified herein.

2.02 PLYWOOD

A. Plywood floor decking to be 3/4" nominal thickness, T & G edge, Group 1 species.

1. 23/32 PERF CAT APA Rated STURD-I-FLOOR 16” oc Exposure 1.

B. Plywood wall sheathing to be 5/8” nominal thickness, square edge, Group 1 species.

1. 19/32 PERF CAT APA Rated Sheathing 24/16 Exposure 1.

C. Plywood roof sheathing to be 5/8” nominal thickness, square edge, Group 1 species.

1. 19/32 PERF CAT APA Rated Sheathing 40/20 Exposure 1.

D. Plywood as indicated for roofing nailer assemblies, blocking, etc. to be 3/4” thickness, square edge, Group 1 species.

1. 3/4 PERF CAT APA C-C Exposure 1.

E. Plywood as indicated for use at stainless steel countertops and sills to be 3/4” nominal thickness, square edge, Group 1 species.

1. 23/32 PERF CAT APA C-C Plugged Exterior.

F. Miscellaneous plywood indicated within walls and/or roof areas to match the specified plywood wall or roof sheathing for the application condition.

G. Interior wall sheathing, to receive surface applied FRP panels, to be 1/2” nominal thickness sanded plywood panels, square edge, Group 1 species.

1. 15/32 PERF CAT APA A-D Exposure 1.

H. Plywood as indicated for use as an interior exposed mounting board for low voltage equipment such as FACP, TTB, etc. to be at a minimum 5/8” nominal thickness, square edge, Group 1 species.

1. 19/32 PERF CAT APA A-D Exposure 1

I. Miscellaneous plywood for temporary use such as enclosures and protection boards to be at a minimum 5/8” thickness, square edge, Group 1 species.

1. 19/32 PERF CAT APA C-C Exposure 1.

2. 19/32 PERF CAT APA C-C Plugged Exterior; provide if subject to prolonged exposure to weather affecting the weather tightness of the installation.

2.03 TREATED WOOD PRODUCTS

A. Meet requirements specified in 2.01 for Lumber and 2.02 Plywood.

B. Rot Resistant Treated: Rough lumber indicated to be treated, in contact with concrete, gravel, earth, and where indicated, exposed to all weather cycles, to be pressure treated for rot resistance, AWPA Category UC4a for exterior items with ground contact, Kiln dried after treatment to a maximum moisture content of 19 percent. Products containing arsenic, chromium, or inorganic boron are not acceptable. Warped material is not acceptable.

1. Exterior construction, exposed to elements

C. Rot Resistant Treated: Rough lumber indicated to be treated, above grade, protected from weather, to be pressure treated for rot resistance, AWPA Category UC2 for interior items without ground contact, Kiln dried after treatment to a maximum moisture content of 19 percent. Products containing arsenic, chromium, or inorganic boron are not acceptable. Warped material is not acceptable.

1. Interior construction, concealed

D. Fire Retardant Treated (FRT): Rough lumber indicated to be fire-retardant-treated (FRT), to be pressure impregnated with fire-retardant chemicals, AWPA Category UCFA for

interior items without ground contact and protected from exterior exposure; identify lumber with appropriate classification marking of Underwriters Laboratories, Inc. or other testing and inspecting agency acceptable to authorities having jurisdiction. Maximum moisture content of 19 percent. Warped material is not acceptable.

1. Interior construction, concealed

E. Fire Retardant Treated (FRT) Plywood Roof Sheathing: Plywood roof sheathing indicated to be fire-retardant-treated, to be 5/8" nominal thickness, square edge, Group 1 species, fire-retardant-treated (FRT) plywood pressure impregnated with fire-retardant chemicals in accordance with AWPA C27, Category UCFA for interior items without ground contact and protected from exterior exposure.

1. FRT plywood sheathing must meet the performance category requirements and load capacities of the specified plywood roof sheathing.

2. Flame spread rating of 25 or less in accordance with ASTM E 84, Class I.

3. Identify with appropriate classification marking of Underwriters Laboratories, Inc. or other testing and inspecting agency acceptable to authorities having jurisdiction.

2.04 FLEXIBLE WALL FLASHING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Grace Construction Products, Perm-A-Barrier Wall Flashing

2. W.R. Meadows, Inc., Air-Shield Thru-Wall Flashing

B. Flexible wall flashing to be 40 mil. self-adhesive membrane, rubberized asphalt, self-healing, integrally bonded to cross-laminated, high-density polyethylene film. Membrane shall be interleaved with disposable coated release paper until installed.

C. Primer for Flexible Membrane Wall Flashing:

1. Grace Construction Products, Perm-A- Barrier WB Primer

2. W.R. Meadows, Inc., MEL-Prime W/B

2.05 ENGINEERED WOOD PRODUCTS - LAMINATED VENEER LUMBER (LVL)

A. Laminated Veneer Lumber of series called for on the drawings, shall be structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559.

B. Subject to compliance with requirements, provide products by one of the following.

1. Trusjoist MacMillan

2. Alpine Engineered Products, Inc.

3. Gang-Nail Systems, Inc.

C. Include extended ends and accessories for the complete and proper installation.

D. Minimum modulus of elasticity shall be 2,000,000 psi.

2.06 MISCELLANEOUS MATERI METAL FRAMING ANCHORS

A. Manufacturers: Subject to compliance with requirements, provide products by:

1. Simpson Strong-Tie Co., Inc.

B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

1. Provide proper number and size fasteners to comply with required loads.

C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A653M; Structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.

1. Provide stainless steel framing anchors where use with fire retardant treated (FRT) lumber.

2.07 MISCELLANEOUS MATERIALS

A. Rough hardware. Bolts, screws, nails, expansion anchors, hangers, clips, etc., necessary for connection of carpentry, framing, and lumber members shall be of proper size, configuration and strength and shall be hot dipped heavy galvanized.

1. Rough hardware for use with treated members shall be stainless steel.

2. Rough hardware for use with fire retardant treated (FRT) plywood shall be stainless steel unless FRT panel manufacturer allows hot dipped galvanized for the intended application.

3. Rough hardware for exterior gypsum wall sheathing to be hot dipped galvanized drilled fasteners of the proper type for each condition meeting sheathing manufacturers requirements.

B. Anchor Bolts: L-shaped steel bolts complying with ASTM A 307, Grade A (ASTM A 325M, Property Class 4.6); with comparable hex nuts and, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

1. Anchor bolts for use with treated members shall be stainless steel.

C. Plywood roof sheathing metal H-clips shall be prefabricated units of the proper size, configuration and strength, and shall be 20 gauge minimum hot dipped galvanized steel. Clips must be the proper type for the thickness of the panels being supported, and allow for APA recommended 1/8" gap between panels.

1. Clips for use with fire retardant treated (FRT) plywood shall be stainless steel unless FRT panel manufacturer allows hot dipped galvanized for the intended application.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

E. Sill-Sealer Gaskets: ASTM D 1056-91, high density closed-cell neoprene foam strip sill sealer with pressure sensitive adhesive on one side, 1/4 inch thick, match width of sill plate members.

1. Hohmann & Barnard, Inc., Neoprene Sill Sealer

PART 3 - EXECUTION

3.01 GENERAL

A. Do not use lumber of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate the Work with a minimum of joints or the optimum jointing arrangement.

B. Treated lumber and wood products, apply minimum 1/16” coating of bituminous paint to the contact surface of steel, galvanized steel, and aluminum to ensure separation from contact with the treated products.

C. Frame and bolt framing as detailed or as required in straight lines, securely anchored.

D. Plates and sills resting on masonry or steel shall be secured with bolts of required size and length with suitable washers and nuts spaced not more than 4'-0" o.c. or as detailed.

E. Install grounds for application of wood trim, etc., where required and of proper thickness and securely fastened.

F. Frame soffits, install furring, blocking, etc., as shown or required.

G. Fit carpentry work to other Work. Scribe and cope as required for accurate fit.

H. Set carpentry work accurately to required levels and lines with members plumb and true.

I. Securely attach carpentry work to substrates by anchoring and fastening as shown and as required by recognized standards.

J. Provide washers under bolt heads and nuts in contact with wood.

K. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

L. Do not drive threaded friction-type fasteners; turn into place. Tighten bolts and lag screws at installation and retighten as required for tight connections prior to closing in or at completion of Work.

M. Set wood framing accurately to required lines and levels. Provide framing members of sizes and on spacings shown, and frame openings as shown or, if not shown, comply with the recommendations of the NFPA (National Forest Products Association). Cut, join and tightly fit framing around other Work. Do not splice structural members between supports unless otherwise detailed.

N. Anchor and nail as shown or, if not shown, to comply with the Recommended Nailing Schedule and other recommendations of NFPA.

O. Grounds, Nailers and Blocking:

1. Provide wherever shown and where required for screeding or attachment of other Work. Form to shapes and cut as required for true line and level of Work to be attached or screeded.

2. Provide solid wood blocking built into gypsum board partitions and walls where shelving, cabinets, toilet partitions, accessories and similar are secured.

3. Coordinate location with other Work. Refer to Shop Drawings of such Work, if any.

4. Attach to substrates securely with anchor bolts or other attachment devices as shown and as required to support applied loading.

5. Countersink bolts and nuts flush with surfaces, unless otherwise indicated.

6. Build into masonry as Work progresses, cutting to fit masonry unit size involved.

7. Anchor to formwork before concrete placement.

P. Temporary closers shall be of substantial construction with appropriate security measures provided as required.

3.02 TREATED LUMBER

A. Install rot resistant treated lumber where indicated and required including necessary incidentals, components, etc.

1. Rough hardware for use with treated members shall be stainless steel.

B. Install fire retardant treated (FRT) lumber where indicated and required including necessary incidentals, components, etc. meeting the requirements of the specified assembly testing agency, and the authority having jurisdiction to provide at a minimum the required fire rated assembly.

1. Rough hardware for use with treated members shall be stainless steel.

3.03 STRUCTURAL FRAMING

A. Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Sill plates to be continuous, in longest lengths possible. At exterior walls set on concrete foundations with continuous sill-sealer neoprene gaskets of width matching sill plate, and securely anchor to foundation wall with cast-in anchor bolts as indicated. At existing concrete foundation walls and at interior wall locations securely anchor to concrete with drilled epoxy expansion anchors. Sill-sealer gaskets are not required at interior walls.

C. Stud System Erection. Attach sill plates at floor with suitable fasteners located 2" from each end and spaced 16" o.c. engaging floor joists. Position studs vertically, engaging floor and ceiling plates and spaced 16" o.c. Studs shall run full height from sill plates at floor to height as indicated. Place studs in direct contact with door frame jambs, abutting partitions and partition corners.

D. Anchor studs for shelf-walls, counter, vanity, and those adjacent to door frames, partition intersections, and corners to ceiling and floor sill plates with mechanical fasteners. Securely anchor studs to jamb and head anchor clips of door frames by screw attachment.

E. Framing components shall be cut squarely for attachment to perpendicular members, or as required for an angular fit against abutting members. Members shall be held positively in place until properly fastened.

F. Construct corners using minimum 3 studs, double stud at wall opening, door and windows jambs.

G. Erect studs 1 piece full length; splicing of studs not permitted.

H. Provide necessary stud bracing, etc. as detailed and/or required to support design and anticipated loads.

I. Install intermediate studs above and below openings to match wall stud spacing.

J. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.

K. Provide substantial intermediate wood blocking properly anchored to studs for secure attachment of wall mounted items including but not limited to door stops, toilet accessories, wall mounted equipment, casework, etc.

L. Install Engineered Wood Products per manufacturers requirements. Modifications to these products require review and approval by the manufacturer.

3.04 GENERAL DECKING AND SHEATHING INSTALLATION

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate and supports by fastening as indicated, complying with the more stringent of the following:

1. NES NER-272 for power-driven fasteners

2. IBC 2015 Table 2304.10 Fastening Schedule

3.05 FLOOR DECKING

A. Plywood floor decking to be installed continuous over two or more spans, strength axis perpendicular to supports. Ends shall be centered over supports. Secure to supports with continuous bead of adhesive, and with mechanical fasteners spaced at a minimum of 6" o.c. at panel edges and 12" o.c. at intermediate supports. Top layer of decking to be adhered over base layer decking with joints staggered from base layer and secured in the same manner.

1. Wood framing, secure with non-corrosive ring or screw shank 8d nails.

2. Metal framing, secure with non-corrosive hardened screw shank or self-tapping fasteners of the proper size and type. Pneumatically-driven steel pins are not acceptable.

3.06 WALL SHEATHING

A. Plywood wall sheathing to be installed continuous over two or more spans, strength axis perpendicular to supports, with ends staggered between panels and centered over supports. Secure to supports with continuous bead of adhesive, and with mechanical fasteners spaced at a minimum of 6" o.c. at panel edges and 12" o.c. at intermediate supports.

1. Wood framing, secure with non-corrosive deformed shank 8d nails.

2. Metal framing, secure with non-corrosive hardened screw shank or self-tapping fasteners of the proper size and type. Pneumatically-driven steel pins are not acceptable.

3.07 FLEXIBLE WALL FLASHING

A. Install membrane flashing, and auxiliary materials according to manufacturer's written instructions to form a seal with adjacent construction and maintain a weathertight barrier.

B. Apply primer to substrates to receive membrane flashing at required rate and allow to dry. Limit priming to areas that will be covered in same day. Re-prime areas exposed for more than 24 hours.

1. Prime glass-fiber-surfaced gypsum sheathing and/or roof underlayment board not covered with an air membrane material with number of prime coats needed to achieve required bond, with adequate drying time between coats.

C. Fill gaps in perimeter framed wall opening surfaces and miscellaneous sheathing penetrations with foam insulation sealant prior to flashing installation.

D. Connect and seal membrane flashing continuously to roofing membrane air barrier.

E. Repair punctures, voids, and deficient lapped seams in membrane per manufacturers requirements. Slit and flatten fish-mouths and blisters. Patch with membrane extending 6 inches beyond repaired areas.

3.08 ROOF SHEATHING

A. Plywood roof sheathing to be installed continuous over two or more spans, strength axis perpendicular to supports, with ends centered over supports. Space nails no less than 6" o.c. at panel edges and 12" o.c. at intermediate supports using non-corrosive deformed shank 8d nails.

1. Provide proper metal H-clips between adjacent panels and at any unavoidable unsupported edges. Clip spacing at a minimum to be one per span of supporting framing member and as required by the loads.

2. Roof sheathing to be covered and protected from moisture with the specified roofing felts as appropriate sized areas are completed and in a manner to avoid interference between tradesmen.

B. Fire retardant treated (FRT) plywood roof sheathing panels to be kept dry and protected from moisture, wetting, and condensation during shipping, storage, and installation. Install sheathing continuous over two or more spans, strength axis perpendicular to supports, with ends centered over supports. Space nails no less than 6" o.c. at panel edges and 12" o.c. at intermediate supports using stainless steel deformed shank 8d nails.

1. Install FRT panels meeting the requirements of the specified assembly testing agency, and the authority having jurisdiction to provide at a minimum the required fire rated assembly.

2. Provide proper metal H-clips between adjacent panels and at any unavoidable unsupported edges. Clip spacing at a minimum to be one per span of supporting framing member and as required by the loads.

3. FRT roof sheathing to be covered and protected from moisture with the specified roofing felts as appropriate sized areas are completed and in a manner to avoid interference between tradesmen.

3.09 ROOF NAILERS AND EDGE ASSEMBLIES

A. Roofing nailers and blocking, to be installed as indicated and called for in specified roofing sections.

1. Install grounds for application of wood roofing nailers and blocking, etc., where required and of proper thickness and securely fastened.

2. Fabricate roof edge assemblies with nailers, plywood, blocking, etc. as indicated to provide a secure, stable substrate properly anchored to wall construction to meet applicable codes and standards, and meet roofing system requirements.

a. At curved wall locations provide additional layers of specified plywood cut to indicated radius in lieu of multiple 2x nailers. Bottom exterior and interior edges of assembly to be 2x3 nailers cut to meet indicated radius from 2x10 specified material in longest lengths possible to minimize joints.

END OF SECTION 06 10 00

SECTION 06 20 00 – FINISH CARPENTRY

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of work shown on the drawings and/or specified in this section.

1.02 SUBMITTALS

A. Shop Drawings

1. Countertops
2. Wood Trim indicating component profiles, locations, and fastening methods.

B. Product Data

C. Samples

1. Plastic Laminate and PVC edge banding for color selection
2. Solid Surface for color selection
3. Wood Trim
   a. Solid wood for transparent finish, set of 3 samples, minimum one foot long, for each required configuration, showing extremes in color and grain.
   b. Solid wood for opaque finish, 1 sample, minimum one foot long, for each required configuration.

D. Solid Surface Warranty

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer producing products in an ISO 9001, ISO 14001, and OHSAS 18001 certified facility.

B. Fabricator/Installer: A firm which has successfully produced work similar to the quality specified and in the quantity shown for a period of not less than 5 years.

C. Reference Standards: Comply with the applicable provisions for grading and workmanship of the "Architectural Woodwork Quality Standards", Current Version, published by the Architectural Woodwork Institute (AWI) (herein referred to as Standards), except as otherwise specified.

1.04 DELIVERY, STORAGE AND HANDLING

A. Protect woodwork during transit, delivery, storage and handling to prevent damage, soiling and deterioration.

B. Store plastic laminate and solid surface materials protected from exposure to harmful weather conditions, at temperature and humidity conditions recommended by manufacturer. Store sheet materials flat on pallets or similar rack-type storage to preclude damage.

C. Store woodwork materials and completed woodwork only in a dry, ventilated place, protected from the weather.

D. Protect woodwork from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

E. Do not deliver woodwork until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, woodwork must be stored in other than installation areas, store only in areas which meet the requirements specified for installation areas.

1.05 JOB CONDITIONS

A. Environmental Requirements: Do not start Work until room or space is at normal use temperature and humidity and wood has tempered to the room or space.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before on Shop Drawings.

1.06 COORDINATION

A. Coordinate and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that architectural woodwork can be supported and installed as indicated.

1.07 SOLID SURFACE MATERIAL WARRANTY

A. Manufacturer's 10 year commercial limited warranty against defects in solid surface sheet materials.

PART 2 - PRODUCTS

2.01 PLASTIC LAMINATE TOPS

A. Continuous, 3/4" min. thickness with 1 1/4" edge thickness, 3/4" x 4" backsplash where indicated. Exposed end corners to have 2" radius corners.

B. Description:

1. Self edge plastic laminate edge for countertop and top of backsplash.

C. Material:

1. Horizontal surfaces; .048" high pressure plastic laminate (HPL) horizontal grade, unless otherwise noted.

2. Countertops, associated backsplash/top edge, transaction counter work surfaces; .048" high pressure high wear (HW) grade plastic laminate. Exceed NEMA LD-3 2005 for wear resistance.

3. Edges of countertops, and transaction counter work surfaces; As described in B. above.

4. Vertical surfaces; .030" high pressure plastic laminate (HPL) vertical grade.

5. Substrate for plastic laminate tops, panels, shelves, etc., to be 3/4" min. thickness water resistant M-2 industrial grade 45# density particle board substrate. All boards to be balanced.

D. Plastic laminate (HPL): Colors to be as selected by Architect from manufacturer's full line of non-metallic, non-solid depth colors regardless of quantity. Matte or similar finish.

1. Formica Corp.
2. Wilsonart, LLC
3. Panolam Surface Systems, Nevamar/Pionite

E. PVC edge banding: Colors to be as selected by Architect from manufacturer's full line of non-metallic colors regardless of quantity, matching HPL finish.

1. Richelieu
2. Dollken
3. HPL Manufacturer

2.02 SOLID SURFACE COUNTERTOPS

A. Solid surface material countertop and backsplash shall be ½" thick with eased profile edges:

1. Dupont, Corian
2. Formica Corp, Solid Surfacing
3. Wilsonart LLC, Solid Surfacing
4. LG, Hi-Macs
5. Meganite, Solid Surfacing

B. Color as selected by Architect from Corian color Group 4 and 5 or manufacturer's equivalent color group.

2.03 INTERIOR WOOD

A. Finished wood trim, base, mouldings, handrails, frames, etc., to be premium grade, solid, clear select, smooth sanded for transparent finish. Consecutive members shall match one to the other in color and grain.

1. AWI Premium Grade 1, Red Oak, plain sawn.

B. Finished wood trim, base, mouldings, handrails, frames, etc., to be premium grade, solid, clear select, smooth sanded for painted finish.

1. AWI Premium Grade 1, Yellow Poplar, plain sawn

2.04 EXTERIOR WOOD TRIM

A. Exterior wood trim, fascias, soffits, etc., shall be smooth sanded Western Red Cedar, clear select, sizes indicated, maximum moisture content of 15% (MC15).

PART 3 - EXECUTION

3.01 FINISH CARPENTRY

A. Finish carpentry work shall be neatly and substantially constructed in a workmanlike manner according to details. Joints shall be neatly made, coping interior angle joints wherever possible and mitering exterior corners.

B. Woodwork, trim, etc. to be as detailed. Trim to be backed out to permit tight fit against wall. Items shall be applied in a neat and workmanlike manner by experienced mechanics and left free from hammer marks or other defects.

1. Install in single, unjointed lengths for openings and for runs less than maximum length of lumber available. For longer runs, use only one piece less than maximum length available in any straight run. Stagger joints in adjacent members.

2. Distribute defects allowed in the quality grade specified to the best overall advantage, when installing job assembled woodwork items.

3. Cope moldings at returns and miter at corners.

4. Attach woodwork securely in place with uniform joints providing for thermal and building movements.

5. Blind nail where possible. Use fine finishing nails where exposed. Set exposed nail heads.

6. Screw to wall studs behind finish at each crossing. Countersink and plug with matching wood plugs glued and set flush

7. Hand dressed, cleaned free of tool marks with nails set and holes filled and sand papered smooth. Fastening to be concealed.

C. Solid surface materials to be installed in strict accord with manufacturer's requirements. Solid surfacing material to be fused together to provide a uniform, watertight, monolithic appearance.

END OF SECTION 06 20 00

SECTION 07 21 00 - INSULATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of the work shown on the drawings and/or specified.

1.02 SUBMITTALS

A. Product Data for each insulation type, fasteners, adhesives, tapes, sealants, and accessories.

B. Insulation approval from roofing system manufacturer.

C. Nailable rigid roof insulation approval from metal roofing manufacturer.

D. Nailable vented rigid roof insulation approval from shingle roofing manufacturer.

E. Tapered insulation layout.

F. Foamed in place insulation installer qualifications.

1.03 QUALITY ASSURANCE

A. Foamed in place insulation installer qualifications: Installer must be an experienced dealer/applicator who has been trained and licensed by the product manufacturer and which has not less than three years direct experience in the installation of the specified products.

B. Roofing system manufacturer: Roofing system mechanical fastener pull out tests on all components including but not limited to roof system edge securement, nailers, blocking, underlayment board, insulation, etc. to be performed by the roofing system manufacturer, and meet the requirements of the specified full system warranty.

1. Submit test results under the applicable roofing system section.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturers written instructions for handling, storing, and protecting during installation.

B. Protect plastic foam insulation as follows:

1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.

2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.

3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.01 UNIFORM THICKNESS ROOF INSULATION

A. Manufacturers:

1. Roofing system manufacturer's recommended base layer, protection (recovery) board, and vapor barrier underlayment board.

2. Vapor Barrier Underlayment Board, for use with roof decks at single ply roofing applications.

   a. As approved by single ply roofing system manufacturer for use with their vapor barrier and subject to compliance with requirements.

      1. Georgia-Pacific Gypsum LLC, DensDeck Prime

      2. National Gypsum Company, DEXcell FA Glass Mat Roof Board

      3. CertainTeed Corp., GlasRoc Roof Board

      4. USG Corporation, Securock

   b. At metal roof deck, vapor barrier underlayment board may be omitted when manufacturers vapor barrier is approved to be directly adhered to the metal roof deck and the subsequent insulation layers are secured using adhered methods without mechanical fasteners. Mechanical fastener penetrations through the vapor barrier are not acceptable.

   c. Refer to section 07543 – TPO Membrane Roofing for roof vapor barrier in this application.

B. Insulation Types:

1. Base Layers: closed cell polyisocyanurate foam board with glass fiber reinforced facers each side, square edges, ASTM C 1289 Type II Class 1 Grade 3, 25 psi minimum compressive strength, ASTM D 1621.

2. Protection Board for Single-Ply Roofing Systems: high density closed cell polyisocyanurate foam board with glass fiber reinforced facers each side, square edges, ASTM C 1289 Type II Class 4 Grade 2, 100 psi minimum compressive strength, ASTM D 1621.

3. Protection Board for Built-up and Modified Bitumen Roofing Systems: high density, asphalt coated face, cellulosic wood fiber roof insulation board, square edges, ASTM C 208 Type II Grade 2, 20 psi minimum compressive strength.

4. Vapor Barrier Underlayment Board: non-combustible, moisture and mold resistant per ASTM D 3273 score of 10. Water resistant per ASTM C 1177. Surface burning characteristics; flame spread maximum 5, smoke developed 0 per ASTM E 84. UL Class A roof board with non-asphaltic heavy duty fiberglass facers. 900 psi minimum compressive strength per ASTM C 473.

C. Thicknesses for Single-Ply Roofing Systems

1. Base Layers: Initial layer of 2-1/2 inch thickness, with additional layer of 2-1/2 inch thickness for 5 inches total base layer thickness to achieve total minimum LTTR-R Value of 28.8.

2. Polyisocyanurate Protection Board: 1/2 inch, minimum LTTR-R Value of 2.5.

3. Overall thickness: 5-1/2 inches total to achieve minimum LTTR-R Value of 31.1. Meet the requirements of ASTM C 1289.

4. Vapor Barrier Underlayment Board: 5/8" minimum thickness, minimum R Value of 0.6.

D. Thicknesses for Built-up and Modified Bitumen Roofing Systems

1. Base Layer: Initial layer of 2-1/2 inch thickness, with additional layer of 2-1/2 inch thickness for 5 inches total base layer thickness to achieve total minimum LTTR-R Value of 28.8.

2. Wood Fiber Protection Board: 1/2 inch, minimum R Value of 1.3.

3. Overall thickness: 5-1/2 inches total to achieve minimum LTTR-R Value of 30.1. Meet the requirements of ASTM C 1289.

4. Vapor Barrier Underlayment Board: 5/8" minimum thickness, minimum R Value of 0.6.

E. Low Rise Foam Adhesive: Provide manufacturer's low rise foam adhesive at fully adhered single ply roofing systems to adhere roofing insulation to substrate and subsequent insulation layers.

1. Provide low temperature low rise foam adhesive for installations occurring in temperatures below 40 degrees F or as required by roofing system manufacturer.

F. Materials must meet the specified roofing system manufacturer's requirements for the required year full system warranty.

G. U.L approved to achieve a Class "A" roof and FM approved for installation in compliance with a minimum FM I-60 (FM I-90) rating requirements.

2.02 TAPERED ROOF INSULATION

A. Tapered roof insulation: closed cell polyisocyanurate foam board with glass fiber reinforced facers each side, square edges, ASTM C 1289 Type II Class 1 Grade 3, 25 psi minimum compressive strength, factory formed tapered insulation, ASTM D 1621.

1. Tapered roof insulation slope shall be a minimum 1/4 inch per foot slope.

2. Tapered roof insulation shall be installed with joints broken.

3. Tapered insulation shall be installed over base layer insulation. There shall be no reduction in thickness of base layer insulation when taper insulation is utilized, except at roof drain sumps.

B. Tapered insulation used as crickets shall be 1/2 inch slope minimum.

C. Materials must meet the roofing system manufacturer's requirements for the required year full system warranty.

D. U.L approved to achieve a Class "A" roof and installed in compliance with a minimum FM I-60 rating requirements.

PART 3 - EXECUTION

3.01 GENERAL

A. Install insulation per manufacture's recommendations, butting joints tightly and filling voids. Provide support at any unsupported edges. Tape joints to provide a continuous barrier.

1. Seal joints between rigid insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.

3.02 ROOF INSULATION - GENERAL

A. Installation and materials shall conform to requirements for a UL Class A roof installation and in compliance with a minimum FM I-60 rating requirements.

B. Installation and materials shall conform to requirements of the roofing system manufacturer for the required full system warranty.

C. Firmly butt each insulation board each insulation board to surrounding boards. Do not jam or deform boards. Maximum gap shall not exceed roofing system manufacturer's requirements. Any gaps shall be filled with roof insulation. Insulation shall be neatly cut to fit around roof penetrations and projections.

D. Maximum elevation variation between adjacent boards shall not exceed the roofing system manufacturer's requirements. Cut and fit insulation boards 1/4 inch from vertical surface. Filler pieces shall have a minimum dimension of 18 inches.

E. Joints in insulation shall be over deck flange with a minimum of 1-1/2 inch bearing surface. Do not cantilever insulation edges over deck flutes. Lay insulation in 48 inch wide courses.

F. At roof drains, construct 4 foot square by 1 inch deep sumps, and as indicated, centered on roof drains. Provide a one foot continuous wedge strip around the perimeter of the sump.

G. Install uniform thickness roof installation in a minimum of three layers, breaking joints in each direction. Tapered insulation shall be installed directly over top base insulation layer. Protection board shall be installed over top of exposed base layer and/or tapered insulation.

1. Install taper board to provide required drainage. Install tight to roof penetrations, projections, and edges.

3.03 FULLY ADHERED TPO MEMBRANE ROOFING SYSTEM INSULATION INSTALLATION (Cool Roof)

A. Secure the 5/8" vapor barrier underlayment board to the roof deck meeting the roofing system manufacturer's requirements.

1. At metal roof deck, vapor barrier underlayment board may be omitted when manufacturer's vapor barrier is approved to be directly applied to the metal roof deck and the subsequent insulation layers are secured using adhered methods without mechanical fasteners. If this criteria cannot be met, adhere vapor barrier over vapor barrier underlayment board, directly over metal deck and mechanically fasten with approved non-corrosive fasteners. Fastening pattern shall be per manufacturer's requirements, and provide a minimum pullout strength of 300 pounds per fastener.

a. At 1-1/2" metal roof deck the fasteners are to be installed in the upper ribs.

b. At acoustical metal roof deck, 2" and 2-1/2" metal roof deck fasteners must not penetrate the exposed flat plane of the deck and must be concealed from view within the ribs.

2. At wood roof deck, install directly over deck and mechanically fasten with approved non-corrosive fasteners. Fastening pattern shall be per manufacturer's requirements and provide a minimum pullout strength of 300 pounds per fastener.

3. At precast insulated roof deck, first install one ply of red rosin paper and one layer of Type II fiberglass base sheet nailed to roof deck with approved non-corrosive fasteners and provide a minimum pullout strength of 50 pounds per fastener. Underlayment board shall be mechanically fastened using non-corrosive barbed type NTB or Tube-Lok fasteners. Fastening pattern and embed depth shall be per manufacturer's requirements and provide a minimum pullout strength of 300 pounds per fastener. Fasteners shall not penetrate though the roof deck. Any penetrations or deformation of the deck shall be repaired to match including painting

B. Install the roofing system manufacturer's vapor barrier with approved adhesives or utilize a self-adhering system with proper primers. Mechanical fastener penetrations through the vapor barrier are not acceptable. Properly lap and seal joints. Seal pipe, conduit, etc. penetrations vapor tight.

1. Refer to section 07543 – TPO Membrane Roofing for roof vapor barrier in this application.

C. Utilizing the roofing manufacturer's low-rise foam insulation adhesives throughout, adhere roof insulation initial base layer, followed by additional layer(s) specified, followed by any tapered insulation where applicable, then cap assembly with the specified protection board. Layers to be adhered as mechanical fastening of roof insulation through the vapor barrier is not acceptable.

D. Over protection board, install fully adhered TPO roof membrane.

END OF SECTION 07 21 00

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of the work shown on the drawings and/or specified under this section.

B. Be responsible for the condition of the building and site, and provide necessary provisions to protect the building, adjacent work and contents, and site. Replace/restore items and surfaces damaged in carrying out the work.

C. It is the intent of this specification to assure weathertight and watertight conditions, during and after completion of the Work. The Contractor performing the work is expected to advise the Architect of any unusual or unforeseen conditions arising during the project.

1.02 SCOPE OF WORK

A. Demolition

B. Thermoplastic Polyolefin (TPO) Single-Ply Roof System

1. Furnish and install a TPO Single-Ply Roofing System, Class "A" rated, including incidental and accessory items, including, but not limited to the following:

a. Vapor Barrier

b. Insulation

c. Fasteners

d. Adhesives

e. Roofing Membrane

f. Flashings and Metal Edge

g. Expansion Joint

h. Accessories

i. Slip Sheet

j. Wood Nailers

k. Warranty

1.03 SUBMITTALS

A. Shop Drawings: Roof Plan with details to indicate roof edge, flashing, penetrations, and miscellaneous items.

B. Product Data:

1. Roofing membrane, flashing, adhesive, accessories.

2. Vapor Barrier

3. Protective Membrane

4. Expansion Joint

5. Walkway Pads

6. Slip Sheet

7. Fasteners

C. Roofing contractor qualifications.

D. Roof system manufacturers approval to proceed with installation.

E. Roof system manufacturers periodic inspection and mechanical fastener pull out test results as they occur.

F. Written warranty.

1.04 QUALITY ASSURANCE

A. Roofing Contractor must have a minimum of ten (10) years experience installing TPO Single-Ply Roofing Systems specified. Roofing Contractor must be roofing system manufacturers' current approved premium installers in good standing with corporate office located within 50-mile radius of Rockford Public Schools. Owner reserves the right to reject any contractor with past history with the District of: failure to perform the work meeting specifications; excessive call backs for leaks; ongoing issues not corrected; etc.

B. Pre-Roofing Conference: A pre-roofing conference shall be held at the project site in advance of the time scheduled for roofing work. The purpose of this conference is to review requirements for the work and conditions which could possibly interfere with successful performance of the work. This conference shall review deck surfaces, roof insulation, roofing, flashing, and any other item related to the roof system. A record of all decisions and agreements made at this meeting, as well as a list of attendees, shall be submitted to the Architect in writing for record.

C. Roofing system manufacturer: Roofing system mechanical fastener pull out tests on components including but not limited to roof system edge securement, nailers, blocking, underlayment board, insulation, etc. to be performed by the roofing system manufacturer, and meet the requirements of the specified full system warranty.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.

1. Materials shall be delivered to the site in an undamaged and dry condition.

2. Material received which is not dry or is otherwise damaged shall be rejected.

B. Storage under polyethylene or similar non-breathing film stock shall not be permitted, and materials are never to be in contact with the ground.

1. Proper storage on or off the site shall be the responsibility of the contractor.

C. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.06 WARRANTY

A. The Contractor shall furnish to the Owner, the Manufacturer's Full System No Dollar Limit Warranty of watertightness. This warranty shall be fully paid for by the Roofing Contractor.

1. Warranty Period: 30 years from date of Substantial Completion.

2. Warranty shall provide at a minimum, manufacturer's wind speed coverage of maximum 100 mph, 3-second peak gusts, measured at 10 meters (33ft) above ground level.

B. This Warranty shall cover both labor and materials necessary to effect watertightness, including that required to repair conditions caused by structural movement or standing water on the roof membrane, without limit as to amount required to effect repairs.

PART 2 - PART 2 - PRODUCTS

2.01 ROOFING MEMBRANE

A. Thermoplastic polyolefin (TPO) sheet, internally fabric reinforced, meet or exceed ASTM D6878 Requirements, with an initial solar reflectance index (SRI) of not less than 99 and three year aged SRI of not less than 85.

1. Thickness: 80 mils

2. Exposed Face Color: Gray

3. System Type: Fully Adhered

B. Subject to compliance with requirements, provide products by one of the following:

1. Firestone Building Products, Ultraply Platinum.

2. Carlisle Corp., Sure-Weld EXTRA.

3. Johns-Manville, TPO ST8RA-S.

C. Provide necessary flashing and accessories as required or recommended by roofing system manufacturer. Flashing shall be 80 mil uncured TPO.

D. Provide materials, incidentals, and installation procedures required for the manufacturer’s specified full system warranty.

2.02 VAPOR BARRIER

A. Vapor Barrier to be roofing system manufacturers self-adhering, polypropylene reinforced rubberized asphalt air and vapor barrier membrane system, meet or exceed ASTM D1970, E96 and E2178 requirements.

1. Firestone Building Products, V- Force

2. Carlisle Corp., VapAir Seal 725TR

3. Johns-Manville, JM Vapor Barrier SA

2.03 ACCESSORIES

A. Provide manufacturers accessories as necessary and required to provide a full systems approach, including but not limited to:

1. Pre-molded accessories such as inside corners, outside corners, curb wrap corners, pipe flashing, pipe seals, sealant pockets, etc.

2. Adhesives, sealants, pre-molded and field fabricated flashings, fasteners, and other related components manufactured or recommended by the selected roofing system manufacturer.

2.04 WALKWAY PADS

A. Manufacturers factory formed, non-porous, heavy duty, slip resistant, surface textured TPO walkway pads, heat weldable, 5/32” min. thickness; standard sizes 24” x 24” or 30” x 30” as indicated.

1. Manufacturers roll type system meeting specified criteria is acceptable.

2.05 NAILERS

A. Wood nailers and nailer assemblies shall be installed where required and indicated. Height of nailers and assemblies shall be matched to that of the insulation being used and as indicated.

B. Nailers and nailer assemblies are as specified in Section 061050 – Miscellaneous Rough Carpentry.

PART 3 - EXECUTION

3.01 GENERAL REROOF

A. roofing, flashings, metal fascia, metal coping, etc. and rigid insulation down to existing roof deck.

1. Remove an area no larger than can be re-roofed in one day.

B. Repair existing roof deck and nailers deteriorated or damaged during tear off.

C. Remove existing soil stack leads and replace with new 4# leads.

D. Remove existing roof drain leads and provide new 4' x 4' - 4# leads at each drain.

E. Remove existing dome strainers, clamping rings, lugs, and clamping devices at roof heads and clean prior to installation of new roofing system. After new roof system is installed clean and rod roof drain lines serving reroof area for proper operation from roof to point of discharge onto grade or into storm sewer to provide a complete and proper functioning system to insure positive drainage. Provide new metal dome strainers, clamping rings, lugs, etc. at existing roof drain locations to provide a complete and proper functioning system to insure positive drainage. Provide necessary components and incidentals to provide a complete and proper weathertight installation.

F. Curb flashing at existing exhaust fans, mechanical units, etc. shall be removed to allow proper flashing installation and then replaced on curbs in proper operating condition and in a manner insuring weather tight installation as recommended by manufacturer.

1. Raise mechanical items, roof hatches, etc. and extend curbs as required to provide 8" minimum height above roof surface to top of exposed flashing

membrane. Disconnect and extend services by licensed tradesman as required to provide a complete and proper operating condition.

2. Secure flashing and install new metal counterflashing prior to re-installation of unit.

3. Perimeter nailers must be added to match elevation of new roof insulation.

G. Remove abandoned mechanical items, roof curbs, piping, conduit, etc. Infill roof deck openings as required to provide a stable, secure, load bearing structural roof deck surface to receive the new roof system as indicated on the Drawings.

1. At mechanical items to be removed with associated roof curb to remain abandoned in place:

a. After removal of existing mechanical equipment, conduit, piping, ductwork, etc. by licensed tradesman, repair any damage to the existing roof curb to provide a stable, sound weathertight condition.

b. Extend top of curb as required by the new top of roof surface elevation to provide 8” minimum exposed height of vertical roof flashing after cap is set in place.

c. Cap top of curb with weathertight, insulated, one piece galvanized metal cap.

H. Immediately remove debris from roof surface. Demolished roof system may not be stored on the roof surface.

3.02 INSPECTION

A. Examine surfaces for inadequate anchorage, foreign material, moisture, unevenness, or other conditions which could prevent the best quality and longevity of roofing, flashing, and accessory components. Notify the architect of deficiencies.

1. Verify installation conditions as satisfactory to receive work.

2. Verify that work of other trades penetrating roof deck or requiring workers and equipment to transverse roof deck has been approved by roofing system manufacturer, and contractor.

3. Check projections, curbs, and deck for inadequate anchorage, foreign material, moisture, or unevenness that would prevent quality and execution of new roofing system. Determine it is free from defects, nails, and other irregularities. Decks to be dry prior to staring roof work.

4. Do not install new roofing until unsatisfactory conditions are corrected.

5. Beginning work constitutes acceptance of conditions by the contractor and roofing system manufacturer, and shall imply approval of deck surfaces and site conditions; and no claim in this respect will be considered valid in case of failure of the roofing components within the warranty period.

3.03 FIELD QUALITY CONTROL

A. Contractor to make arrangement for the roofing system manufacturer to perform the required fastener pull out tests, provide initial inspection and periodic inspections of the roofing system as appropriate and as required for warranty inspections, including whenever called upon by the Architect for the duration of the installation.

1. Upon completion of the installation, final inspection shall be made by the roofing system manufacturer to ascertain that the roofing system has been installed according to the manufacturer's published specifications and details, and meets the specified full system warranty requirements. The written warranty is to be issued upon final approval of the installation.

B. Contractor to accompany the manufacturer's technical inspector and assist with equipment and workmen if necessary to provide access to the roof.

1. Correct defects noted during the inspections.

3.04 PREPARATION

A. Ensure that surfaces are clean and dry before starting and during performance of work.

B. Verify that work of other contractors and subcontractors which penetrates the roof deck or requires men and equipment to traverse the roof deck has been completed.

C. Provide written confirmation that the roof system manufacturer’s fastener pull out test results and initial inspection has indicated the work can proceed meeting the requirements of the specified full system warranty.

3.05 GENERAL

A. Install Roof System following current manufacturer's written instructions, recommendations, and details. Provide materials, incidentals, and installation procedures required for the manufacturer’s specified full system warranty.

1. Install roofing system only in dry weather.

2. Comply with manufacturer's climatic restrictions.

3. Roofing membrane to be installed over manufacturer's slip sheet if required.

B. Material shall be one-piece roof membrane adhered to roof insulation with roofing manufacturers low VOC bonding adhesive, formed by heat welding meeting manufacturer's requirements for the specified full system warranty. At a minimum seams shall be made by lapping the membrane a minimum of two inches (2") over itself or over flashing, making a continuous seam two inches (2") wide allowing for a minimum 1½” wide continuous weld. This seam shall then be checked for continuity and integrity, and as required for the specified full system warranty sealed with 8” wide membrane joint covers, and sealant. Seams are to be welded and sealed the same day.

1. Follow manufacturer’s requirements for seam lap direction relative to slope, which varies depending on degree of slope.

2. Provide manufacturers additional membrane securement at areas exceeding 2” slope in 12” horizontal.

C. Once work is started on a roof or section, it shall continue without undue delay until that section is completed before starting another. The installation of flashings shall follow application of the roofing without delay.

D. Nailers and nailer assemblies shall be firmly anchored to the structure, perimeter walls, etc. with non- corrosive fasteners to resist a force of 200 pounds per lineal foot in any direction. Masonry walls to have embedded anchor bolts as indicated.

2" vent spaces shall be left between lengths of nailers and assemblies.

1. Anchors in double row conditions to have each row staggered equally from the other.

2. Provide a minimum of 5 anchors (per row) for each 8' length of nailer and assembly, shorter sections provide a minimum of 3 anchors (per row).

E. Install insulation as called for in Section 07200 - Insulation. Insulation to be installed over roofing system manufacturers vapor barrier using adhered methods without mechanical fasteners.

1. Mechanical fastener penetrations through the vapor barrier are not acceptable.

F. Flashing shall be installed at vertical surfaces, roof interruptions and penetrations as detailed, and in accordance with roofing membrane manufacturer's current published details consistent with job conditions. Where details appear to be in conflict with those published, then the details shall govern and control. Flashings and terminations shall be securely fastened in place to the roof deck with suitable fasteners to provide holding force of not less than two hundred (200) pounds per lineal foot in any direction for the expected life of the roof.

1. Fasteners shall be installed at intervals not to exceed eight inches (8"), except where otherwise specified or recommended by the manufacturer.

G. Water cut-offs shall be made by extending the membrane beyond the insulation and setting the end of the membrane in 4" of roofing system manufacturer’s approved roofing cement overlapped to existing membrane. Temporary water cut-offs shall be removed prior to proceeding with the next work period by cutting off that portion of the membrane that has been in contact with the roofing cement.

H. Expansion joint concealed components to be installed in maximum lengths possible, properly tape and seal tubing and vapor retarder joints. Install roofing system flashing cover over tubing as required to provide a sealed, weathertight condition meeting manufacturer’s requirements.

I. Walkway pads to be installed in accordance with manufacturer’s recommendations for an adhered installation to the roofing membrane.

3.06 PROTECTION

A. Roof Traffic: After work on roof is started, no traffic will be permitted on the roof other than that necessary for the roofing application and inspection. Materials shall not be piled on the roof to the extent that the original structural design live and dead loads are exceeded. Roofing materials shall not be transported over unfinished or finished roofing unless adequate protection is provided. Any damage to previously installed roofs shall be repaired at no expense to Owner.

B. Protection against damage: Surfaces shall be protected as necessary to prevent damage resulting from the application of roofing, or transporting of materials. If surfaces are damaged in any way they shall be repaired, restored, or replaced by the contractor, at no cost to the Owner, in a manner acceptable to the Architect and Owner.

PART 4 - ADJUST AND CLEAN

A. Adjustment and Repair: Any roofing damaged or misapplication shall be repaired or replaced as required at no expense to Owner.

B. Remove debris from the roofing areas and job site. Legally dispose of debris.

C. Remove tools, equipment, and construction aids.

D. Prevent storage of materials and equipment on the completed roof. Any damage to previously installed roofs shall be repaired at no expense to Owner.

END 07 54 24

SECTION 07 71 00 – PREFABRICATED ROOF SPECIALTIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of the work shown on the drawings and/or specified under this section.

1.02 SCOPE OF WORK

A. Work under this section shall include, but not necessarily be limited to the following:

1. Metal fascia, copings, counterflashing, gutters, downspouts, curb mounted expansion joints.
2. Pipe supports, pipe boots, roof curbs.
3. Roof hatches.
4. Walkway pads.
5. Roof curb metal caps.

1.03 SUBMITTALS

A. Product data

B. Shop drawings

C. Samples of finish color on metal.

D. Letter from NRCA stating that manufacturer and/or shop fabricator is a NRCA Authorized Fabricator of ANSI/SPRI ES-1 components and systems.

E. Prior to fabrication, submit certification that edge securement components meet requirements of ANSI/SPRI ES-1, and Roofing System Manufacturer's requirements for the specified full system warranty.

F. Warranty

1.04 QUALITY ASSURANCE

A. Materials, components and installation procedures shall be in accordance with Roofing System Manufacturer's requirements for the specified full system warranty.

B. Edge securement components shall meet requirements of ANSI/SPRI ES-1, and Roofing System Manufacturer's requirements for the specified full system warranty.

C. Manufacturer and/or shop fabricator shall be a NRCA Authorized Fabricator of ANSI/SPRI ES-1 components and systems meeting Roofing System Manufacturer's requirements for the specified full system warranty.

D. Installing contractor must have proven experience record on projects of similar scope, and requirements including but not limited to water tightness, aesthetics, adherence to design intent, coordination of components, provide and maintain manufacturers warranties, etc.

1.05 PROJECT CONDITIONS

A. Coordinate Work with adjacent Work, including installation of roofing system to prevent

roofing terminations being left unprotected.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.

1. Materials shall be delivered to the site in an undamaged and dry condition.

2. Material received which is not dry or is otherwise damaged shall be rejected.

1.07 WARRANTY

A. Prefinished Metal: Furnish a written 20 year non-prorated manufacturer's warranty on finish and material for pre-finished metal items.

1. Metal Roof Edge and Copings: Products as specified and required by Roofing System Manufacturer to provide the specified full system warranty.

B. Roof Hatch: Provide manufacturer's standard written warranty. Materials shall be free of defects in material and workmanship for a period of five years. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

C.

PART 2 - PRODUCTS

2.01 METAL COPING AND FASCIA SYSTEM

A. Two piece pre-manufactured system:

1. Edge securement components meet requirements of ANSI/SPRI ES-1.

2. Materials and components as required by Roofing System Manufacturer to provide the specified full system warranty.

B. Coping:

1. Material: 24-gauge galvanized steel; Sizes and shapes as indicated on drawings.

2. Concealed cleat attachment on the outside, exposed fasteners with neoprene gaskets on the inside

3. Finish: Kynar 500. Color as selected by Architect from manufacturer's full range of non-metallic colors.

4. Provide pre-manufactured accessories, concealed splice plates, corner assemblies, miters, etc.

5. Provide manufacturers factory curved sections at curved wall areas conforming to indicated radius. Lengths to be as long as possible to minimize joints. Short flat segments are not acceptable.

6. Manufacturers:

a. Petersen Aluminum Corp.: PAC-TITE

b. OMG Roofing Products: Permasnap

c. Metal ERA: Perma-Tite

d. Manville: Presto Lock

e. Roofing System Manufacturers comparable products as required by the specified full system warranty. Above products may be used only if approved in writing by the Roofing System Manufacturer.

7. If approved in writing by the Roofing System Manufacturer as meeting the specified full system warranty requirements, Contractor may use shop-fabricated sheet metal for certain specific components in lieu of specified pre-manufactured system components only due to reasons generated by the Roofing System Manufacturer. In addition to the specified full system warranty requirements, the Contractor certifies in writing prior to fabrication the following:

a. Shop-fabricated components meet minimum thickness required by NRCA recommended details which comply with ANSI/SPRI ES-1 requirements or the specified thicknesses, whichever is more.

b. Shop-fabricated components were installed in strict accordance with NRCA recommended details which comply with ANSI/SPRI ES-1 requirements.

c. Shop-fabricated components are watertight and weathertight.

8. Field-fabricated metal components are not acceptable.

C. Fascia:

1. Material: 24-gauge prefinished galvanized steel; Sizes and shapes as indicated on drawings.

2. Factory-made, 2-piece with water dam and snap-on cover, designed for specified roofing system.

3. Finish: Kynar 500. Color as selected by Architect from manufacturer's full range of non-metallic colors.

4. Provide pre-manufactured accessories, concealed splice plates, corner assemblies, miters, scuppers, etc.

5. Manufacturers:

a. Petersen Aluminum Corp.: PAC-LOC 2000

b. OMG Roofing Products: Econosnap

c. Metal ERA: Perma-Tite System 200

d. Manville: Comparable to above

e. Roofing System Manufacturers comparable products as required by the specified full system warranty

6. If approved in writing by the Roofing System Manufacturer as meeting the specified full system warranty requirements, Contractor may use shop-fabricated sheet metal for certain specific components in lieu of specified pre-manufactured system components only due to reasons generated by the Roofing System Manufacturer. In addition to the specified full system warranty requirements, the Contractor certifies in writing prior to fabrication the following:

a. Shop-fabricated components meet minimum thickness required by NRCA recommended details which comply with ANSI/SPRI ES-1 requirements or the specified thicknesses, whichever is more.

b. Shop-fabricated components were installed in strict accordance with NRCA recommended details which comply with ANSI/SPRI ES-1 requirements.

c. Shop-fabricated components are watertight and weathertight.

7. Field-fabricated metal components are not acceptable.

2.02 MISCELLANIOUS PREFINISHED METAL ITEMS

A. Shop fabricated metal counterflashing, gutters, scuppers, downspouts, valley flashings, mechanical equipment flashings, roof edge flashings, fascias and copings on projects without a full system warranty.

1. Edge securement components meet requirements of ANSI/SPRI ES-1.

2. Contractor shall certify in writing the following:

a. Shop-fabricated components meet minimum thickness required by NRCA recommended details which comply with ANSI/SPRI ES-1 requirements or the specified thicknesses, whichever is more.

b. Shop-fabricated components were installed in strict accordance with NRCA recommended details which comply with ANSI/SPRI ES-1 requirements.

c. Shop-fabricated components are watertight and weathertight.

3. Field-fabricated metal components are not acceptable.

B. 24-gauge prefinished galvanized steel by:

1. Petersen Aluminum Corp.: Pac-Clad

2. Firestone: Una-Clad

C. Shop fabricated, shapes and sizes as indicated.

D. Finish: Kynar 500, color as selected by Architect from manufacturer's full range of non-metallic colors.

1. Valley flashings and mechanical equipment flashings to match shingles and may be different color from other items.

2.03 PIPE SUPPORTS

A. Conduit, gas piping, HVAC piping, etc to be supported above roof surface with prefabricated pipe supports. Non-metallic support base with height adjustable galvanized metal bracket type at single conduit and piping, and adjustable channel strut guide type at multiple adjacent conduit and piping runs. Provide roller guide type accessory at gas lines.

1. Portable Pipe Hangers Inc.

2. Cooper Industries, B-Line

3. Miro Industries, Inc.

4. OMG Roofing Products.

5. Roofing System Manufacturers comparable products as required by the specified full system warranty.

2.04 PIPE BOOTS

A. Prefabricated EPDM pipe boot cover

1. Portals Plus, Inc.

2. OMG Roofing Products.

3. Roofing System Manufacturers comparable products as required by the specified full system warranty.

B. Provide proper single boot or multiple boot cap system as required by the conditions.

2.05 ROOF EXPANSION JOINT COVER – CURB MOUNTED

A. Materials must be approved by the roofing system manufacturer to provide specified warranty requirements.

B. Prefabricated insulated roof expansion joint cover with neoprene bellows of the proper width and 2” x 0.032” aluminum flanges, mounting type indicated, factory insulated core with integrally attached vapor retarder.

1. Manville, Expand-O-Flash.

2. Balco, Inc., Roof Bellows Expansion Joint.

3. Roofing System Manufacturers comparable products as required by the specified full system warranty.

C. Provide in maximum lengths possible, factory fabricated corners, properly seal lap joints and install per manufacturer’s requirements and as required to provide a weathertight condition.

2.06 WALKWAY PADS

A. Walkway Pads: Provide manufacturer standard walkway pads around perimeter of roof mounted equipment requiring access or service including roof hatches, stairs, ladders, mechanical exhaust fans, air handling units, condensing units, etc. Individual walkway pads shall be nominal 30” by 30”.

2.07 ROOF HATCH

A. Roof hatch shall be 2'-6" x 3'-0" single-leaf type, thermally broken, preassembled aluminum unit.

1. Bilco, Type GS-50

B. Performance:

1. Cover and curb shall be thermally broken to prevent heat transfer between interior and exterior surfaces.

2. Cover shall be reinforced to support a minimum live load of 40 psf with a maximum deflection of 1/150th of the span and 20 psf wind uplift.

3. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing, and shall not be affected by temperature.

4. Entire hatch shall be weather tight with fully welded corner joints on cover and curb.

C. Cover: 11 gauge minimum aluminum with a 5” beaded flange with formed reinforcing members. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation. Cover shall have a heavy extruded EPDM rubber gasket bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.

D. Insulation: 3” minimum rigid polyisocyanurate with an LTTR-value of 18.0, fully covered and protected by an 18 gauge minimum aluminum liner.

E. Curb: 11 gauge minimum aluminum. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation. Curb shall have an integral 11 gauge aluminum capflashing fully welded at the corners. Curb to have 5” minimum mounting flange with height to allow for 12” minimum clearance from final roof surface to bottom of capflashing flange. Top of curb to be level, curb to be tapered as required.

1. Insulation: 3” minimum rigid polyisocyanurate with an LTTR-value of 18.0.

F. Lifting mechanisms: Compression spring operators enclosed in telescopic tubes.

G. Hardware

1. Heavy stainless steel pintle hinges.

2. Cover shall be equipped with a spring latch with interior and exterior turn handles

3. Hatch shall be equipped with interior padlock hasps.

4. Latch strike shall be a stamped component bolted to the curb assembly.

5. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a vinyl grip handle to permit easy release for closing.

6. Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be zinc plated and chromate sealed.

7. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.

H. Finishes: Mill finish aluminum.

I. Ladder safety post for attachment to roof access ladder with safety yellow finish.

1. Bilco, LadderUP Safety Post, Model LU-1.

2. Babcock-Davis, BSP

2.08 EQUIPMENT CURBS/RAILS

A. Prefabricated, load bearing equipment curbs/rails, double wall 18 gauge minimum galvanized steel with continuous welded and mitered corner seams and internal wood blocking with rigid insulation fill. Provide with integral base mounting plate and counterflashing.

1. The Pate Company
2. RPS Accessories
3. Hranec Sheet Metal Inc.

2.09 ROOF CURB METAL CAPS

A. Existing abandoned roof curbs to remain without use are to be capped with a weathertight, insulated, one piece galvanized metal cap as indicated.

B. Cap to be shop fabricated, 14 gauge minimum galvanized steel with continuous 3" minimum perimeter flange with drip edge, overlapping exterior edges of roof curb on all four sides, with maximum vertical gap of ¼". Any seams and joints to be fully welded and sealed. Cap to be fully insulated with 5" total thickness polyisocyanurate rigid board insulation, consisting of two layers fully adhered together and to underside of cap, and abutting inside faces of roof curb. Caps with either dimension exceeding 48" to have horizontal surface cross broken for strength, with peak on exterior side. In addition, caps with either dimension exceeding 60" to be reinforced with concealed 3 x 3 x 14 gauge galvanized steel bent angles spanning the short dimension at 24" centers, tack welded to underside of cap. Follow current SMACNA recommendations.

1. Steel to be commercial quality hot-dipped zinc coated steel that complies with ASTM A653, Coating Designation A60 (Galvanealed).
2. Touch-up any seams, welds, and exposed edges with galvanized paint.
3. Rigid insulation to be closed cell polyisocyanurate foam board, foil faced, square edges, maximum flame spread 25 and smoke developed indexes of 450. ASTM C 1289 Type I Class 1 Grade 3, 25 psi minimum compressive strength, ASTM D 1621. Minimum LTTR-R Value of 28.8.

PART 3 - EXECUTION

3.01 INSTALLATION - GENERAL

A. Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive roof accessory units, and with roof insulation, roofing and flashing; as required to ensure that each element of the work performs properly, and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.

1. Except as otherwise indicated install roof accessory items in accordance with construction details of "NRCA Roofing and Waterproofing Manual".
2. Follow NRCA recommended details which comply with ANSI/SPRI ES-1 requirements for edge securement items.

B. Where metal surfaces of units are to be installed in contact with non-compatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.

C. Flange Seals: Except as otherwise indicated, set flanges of accessory units in a thick bed of approved roofing sealant to form a seal.

D. Operational Units: Test operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

3.02 INSTALLATION – PRE-MANUFACTURED COPING AND FASCIA

A. Install two-piece pre-manufactured coping and fascia system components per manufacturer's requirements.

B. Provide necessary components, accessories, trim, etc. to provide a complete and proper finished weathertight condition.

C. Provide manufacturers concealed interlocking splice plates at section joints, properly sealed to provide a weathertight condition and allow for expansion. Lapped joints or exposed cover plates are not acceptable.

3.03 INSTALLATION – SHOP FABRICATED METAL

A. Counterflashing to be set on continuous bead of caulk and secured to wall construction with neoprene gasketted non-corrosive fasteners of the proper type for the supporting substrate at 12" centers. Provide one piece and two piece as indicated. Top edge at one piece to be caulked continuous.

1. Sections to be lapped 4" and fully sealed.

B. Gutters to be in maximum available lengths and installed with prefinished metal straps of same material as gutters, including expansion joints, etc. following SMACNA recommendations. Gutters to be properly pitched to downspouts and shall have joints properly lapped and caulked to provide a watertight condition. Do not install joints within 5'-0" of exterior passage doors. Metal straps to be non-exposed from grade.

C. Downspouts to be secure to masonry with prefinished metal rod type anchors at 4'-0" o.c. min. matching downspout finish. Provide concrete splashblocks at discharge end of each downspout, at roof locations set on roofing manufacturers specified walkway pads, full coverage and a minimum of 6" larger than the splashblock in all directions.

D. Fascias and copings where approved to be shop fabricated, shall be applied to wood backing as detailed and in accordance with manufacturer's recommendations with continuous 22 ga. minimum galvanized metal cleats.

1. Provide concealed 12" closure at section joints of same material, caulked in to provide a weathertight condition and allow for expansion. Provide 3/8" joint between sections centered on closure.

E. Provide necessary components, accessories, trim, etc. to provide a complete and proper finished weathertight condition.

F. Rake ends to be drain lapped 3" minimum.

G. Miscellaneous metal wall flashings to be installed in longest sections possible to minimize joints. Securely fasten concealed to solid substrate backup with non-corrosive flat head fasteners. Joints to be lapped 3" minimum with vertical/horizontal surfaces set together on beads of sealant to ensure watertight condition.

H. Concealed non-corrosive fasteners to be utilized wherever possible. Exposed fasteners to be non-corrosive, Kynar 500 finish matching adjacent metal.

I. Exposed edges and cut edges of prefinished metal to be properly treated, and finished, matching faces to provide a finished, corrosion free appearance.

3.04 INSTALLATION – MISCELLANEOUS ROOF COMPONENTS

A. Install miscellaneous roof components per manufacturer's recommendations to provide complete and proper weathertight installation.

B. Skylight roof curbs to be securely anchored to roof structure and properly sealed and flashed to provide a complete and proper finished weathertight condition for the items indicated, meeting manufacturer's requirements.

C. Install walkway pads in accordance with manufacturer's recommendations.

D. Roof hatch to be securely anchored to roof structure and associated structural supports. Properly sealed and flashed to provide a complete and proper finished weathertight condition meeting manufacturer's requirements. Install units level, plumb, and in proper alignment with adjacent work.

1. Test units for proper function and adjust until proper operation is achieved.

2. Repair finishes damaged during installation.

3. Restore finishes so no evidence remains of corrective work.

E. Equipment curbs and rails to be securely anchored to roof structure and associated structural supports. Properly sealed and flashed to provide a complete and proper finished weathertight condition for the roof supported equipment, meeting manufacturer's requirements.

3.05 INSTALLATION - ROOF CURB METAL CAPS

A. Existing abandoned roof curbs to remain: After removal of existing mechanical equipment, conduit, piping, ductwork, etc. by licensed tradesman, repair any damage to the existing roof curb to provide a stable, sound weathertight condition. Extend top of curb as required by the new top of roof surface elevation to provide 8" minimum exposed height of vertical roof flashing after cap is set in place.

B. Set cap on existing roof curb with a continuous bead of silicone sealant along top surface of curb. Secure cap at 8" centers through the perimeter cap flange with non-corrosive neoprene gasketted fasteners of the proper type for existing material to be anchored to.

C. Caulk bottom drip edge of perimeter cap flange to the roof curb with silicone sealant. Include incidentals, etc. as needed to provide a complete and proper, secure, weathertight installation.

3.06 CLEANING AND PROTECTION

A. Remove protective film where applicable. Clean exposed surfaces in accordance with manufacturer's instructions.

B. Touch up damaged coatings and exposed metal edges with manufacturers Kynar touch up paint.

END OF SECTION 07 71 00

SECTION 07 84 13 - THROUGH-PENETRATION FIRESTOP STYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of the work shown on the drawings and/or specified.

1.02 SUBMITTALS

A. Product Data

1.03 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed firestop systems similar in material, design, and extent to that indicated for this Project and familiar with the requirements and restrictions/limitations of the Firestop Contactors International Associations (FCIA) manual of practice and factory mutual research approved.

B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements provide products by one of the following:

1. Grace Construction Products
2. Hilti, Inc.
3. Johns Manville
4. 3M Fire Protection Products
5. Tremco, Inc. Tremco Fire Protection Systems Group
6. USG Corporation

2.02 PENETRATION FIRESTOPPING

A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

B. Penetrations in Fire-Resistance-Rated Walls: Ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01- inch wg.

1. F-Rating: Not less than the fire-resistance rating of construction penetrated.

C. Penetrations in Horizontal Assemblies: Ratings determined per ASTM E 814 or UL 1479 based on a positive pressure differential of 0.01-inch wg.

1. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
2. T-Rating: A least 1 hour, but not less than the fire-resistance rating of the constructions penetrated except for floor penetrations within the cavity of a wall.

D. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

E. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.

2.03 SYSTEM FIRE SAFING

A. Manufacturers, subject to system manufacturer's approval:

1. Certainteed: Thermafiber
2. Johns Manville: MinWool Safing
3. Owens Corning: Safing Insulation/MW
4. Industrial Insulation Group, LLC; MinWool Safing

B. Description: Unfaced mineral wool fire rated safing, thicknesses as required for the system. Greenguard Indoor Air Quality Certified.

C. Ratings: Non-combustible, ASTM E136; Three hour fire resistance rating, ASTM E119, UL 263, NFPA 251; Flame spread rating 5 and smoke developed rating 0, ASTM E84, UL 723.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Examine substrates and conditions for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

C. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

D. Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

E. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.

F. Install fill materials for firestopping by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.

2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.02 FIRE SAFING

A. Install fire safing per manufacturer's requirements to obtain required Fire Rating, Flame Spread and Smoke Developed ratings. Fill gaps fully and seal with systems fire caulk.

3.03 IDENTIFICATION

A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:

1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."

2. Contractor's name, address, and phone number.

3. Date of installation.

4. Through-penetration firestop system manufacturer's name.

5. Installer's name.

3.04 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

END OF SECTION 07 84 13

SECTION 07 92 00 – JOINT SEALANTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of the work shown on the drawings and/or specified in this section.

1.02 PERFORMANCE REQUIREMENTS

A. Provide and install elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

B. Provide and install joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.03 SUBMITTALS

A. Product Data indicating specific location(s) where submitted material(s) is to be installed.

B. Color Samples consisting of strips of cured sealants showing the full range of colors available for each product exposed to view and indicating specific location(s) where submitted material(s) is to be installed.

C. Warranty

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.05 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.

2. When joint substrates are wet.

B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.06 WARRANTY

A. Installer's Warranty: Submit written warranty, signed by Installer agreeing to repair or replace work that does not comply with performance and other requirements specified herein within Two (2) years from Substantial Completion date.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Perimeter caulking, exterior, at louvers, window and door frames, masonry control joints, and other joints between wood and masonry, metal and masonry, metal and wood, metal flashings, metal copings, metal fascias, conduit, piping, and other dissimilar materials shall be silicone building sealant by:

1. Dow Corning, 790 Building Sealant
2. GE, SCS2000 SilPruf
3. Pecora, 864NST
4. Tremco, Spectrem 1

B. Perimeter caulking, interior, at louvers, window and door frames, and other joints between wood and masonry, metal and masonry, metal and wood, conduit, piping, and other dissimilar materials shall be paintable white acrylic siliconized building sealant:

1. Pecora, AC-20 + Silicone
2. GE, SCS7000 Paintable
3. Tremco, Tremflex 834

C. Perimeter caulking, interior, along hard surface finish flooring or floor slabs, at metal door and sidelight frames, steel columns, other metal and wood terminations/joints, etc. shall be colored acrylic siliconized building sealant:

1. Pecora, AC-20 + Silicone
2. GE, SCS7000
3. Tremco, Tremflex 834

D. Sealing of interior concrete floor slab control joints, construction joints, expansion joints (including perimeter expansion joints at walls), cracks, penetrations through the floor slab, and cast in floor devices to be polyurethane building sealant:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. BASF/MasterSeal: NP 2 and SL 2.
   b. Pecora: Dynatrol II and Dynatrol II SG or NR-200
2. Sealant shall be flush with concrete floor slab. Provide gun grade or pourable as appropriate for the application.

E. Sealing of exterior concrete slab control joints, expansion joints, penetrations through concrete slab, and cast in items to be high performance, traffic exposure, exterior urethane building sealant:

1. BASF/MasterSeal
2. Pecora
3. Tremco
4. Sealant shall be flush with concrete slab. Provide gun grade or pourable as appropriate for the application.

F. Colors as selected by Architect.

2.02 JOINT SEALANT BACKING

A. Provide sealant backings of material and type which are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Backer Rod: ASTM C 1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

1. Type C: Closed-cell material with a surface skin, unless open cell is indicated or recommended by sealant manufacturer.

2. Type O: Open-cell material.

3. Type B: Bicellular material with a surface skin.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.03 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the following requirements:

1. Remove foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose

particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:

a. Concrete.

b. Masonry.

c. GFRC

d. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.

4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

a. Metal.

b. Glass.

c. Porcelain enamel.

d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION

A. General: Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.

2. Do not stretch, twist, puncture, or tear sealant backings.

3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.

E. Install sealants by proven techniques to comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.

2. Completely fill recesses provided for each joint configuration.

3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealants from surfaces adjacent to joint.

2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

G. Use masking tape to protect adjacent surfaces of recessed tooled joints.

3.04 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.05 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

END OF SECTION 07 92 00

SECTION 07 95 00 – EXPANSION CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of work shown on the drawings and/or specified.

1.02 SUBMITTALS

A. Product Data

B. Shop Drawings

1. Indicate joint device profiles, dimensions, locations in the Work, affected adjacent construction, anchorage devices, available colors and finish, and locations of splices.

2. Provide details showing intersection between floor areas, floor-to-wall, wall-to-ceiling, corner conditions, transitions between systems, terminations, etc.

C. Installation Instructions

1. Manufacturer's installation instructions.

D. Color Samples

1. Manufacturer standard color and finish options for selection.

E. Assembly Samples

1. Two assembly samples 6 x 6 in. in size illustrating profile, dimension, color, and finish selected.

PART 2 - PRODUCTS

2.01 EXPANSION JOINTS AT NEW/EXISTING CONSTRUCTION

A. Interior floor expansion joint at doors shall be surface mounted extruded aluminum saddle type expansion joint cover. Unit shall be pedestrian rated and meet ADA requirements.

1. MM Systems Corp., HSC-C Series / Slab to Slab

2. Architectural Art, comparable to 1 above.

3. Balco, Inc., comparable to 1 above.

B. Interior floor expansion joint at walls shall be surface mounted extruded aluminum saddle type expansion joint cover.

1. MM Systems Corp., HSC-C Series / Slab to Wall

2. Architectural Art, comparable to 1 above.

3. Balco, Inc., comparable to 1 above.

C. Interior masonry wall expansion joint shall be flexible cellular polyurethane backer with preformed silicone sealing strip.

1. MM Systems Corp., ESS Series

2. Architectural Art, comparable to 1 above.

3. Balco, Inc., comparable to 1 above.

D. Fire rated interior gypsum board wall expansion joint shall be surface applied expansion joint system.

1. MM Systems Corp., FSWL-100 Fire Rated
2. Architectural Art, comparable to 1 above.
3. Balco, Inc., comparable to 1 above.

E. Interior gypsum board ceiling/soffit expansion joint shall be concealed securement, flush expansion joint with flexible cover.

1. MM Systems Corp., VSWL-500
2. Architectural Art, comparable to 1 above.
3. Balco, Inc., comparable to 1 above.

F. Exterior masonry wall expansion joint shall be flexible cellular polyurethane backer with preformed silicone bellows seal.

1. MM Systems Corp., SIF Series
2. Architectural Art, comparable to 1 above.
3. Balco, Inc., comparable to 1 above.

G. Sizes as required by joint widths and application.

2.02 METAL EXPANSION JOINTS

A. Interior floor expansion joint shall be classic curved expansion joint cover with recessed flange to accept floor finish. Unit shall be pedestrian rated and meet ADA requirements.

1. MM Systems Corp., Model HFXR
2. Architectural Art, comparable to 1 above.
3. Balco, Inc., comparable to 1 above.

B. Interior wall expansion joint shall be surface applied expansion joint system.

1. MM Systems Corp., Model FXK and FXL
2. Architectural Art, comparable to 1 above.
3. Balco, Inc., comparable to 1 above.

C. Interior ceiling expansion joint shall be expansion joint with accordion flexible filler. Color as selected by Architect.

1. MM Systems Corp., Model CX (ACT ceiling) and KX (Gypsum board)
2. Architectural Art, comparable to 1 above.
3. Balco, Inc., comparable to 1 above.

D. Exterior wall expansion joint shall be silicone expansion joint system. Provide extruded aluminum cover plate, width to be 2” greater than the maximum joint opening width. Anchor cover plate to one side of joint only.

1. MM Systems Corp., Model HFXR
2. Architectural Art, comparable to 1 above.
3. Balco, Inc., comparable to 1 above.

E. Sizes as required by joint widths and application.

2.03 MISCELLANEOUS REQUIREMENTS

A. Materials:

1. Extruded Aluminum: 6063-T5

2. Threaded Fasteners: Manufacturers standard non-corrosive

3. Silicone Seal and integral Foam Backer: Colored silicone surface seal factory applied to secondary micro-cell self-expanding foam with impregnated acrylic polymer, watertight, UV stable, flame resistant, chemical resistant meeting ASTM 283, ASTM 518, DIN 18542

4. Elastomeric Seals: ASTM E 1783; preformed elastomeric membranes or extrusions to be installed in metal frames.

5. Compression Seals: ASTM E 1612; preformed elastomeric extrusions having an internal baffle system and designed to function under compression.

6. Fire Barriers: Manufacturers standard to meet performance criteria for required fire-resistance rating.

7. Protective Coatings: Isolate dissimilar materials with manufacturers standard protective coatings for the proper application.

B. Finish

1. Exposed Extruded Sections on Floors: Mill finish.

2. Exposed Extruded Sections on Walls and Ceilings: Clear anodized.

3. Resilient Fillers/Silicone Seals/Elastomeric Seals: Color as selected by Architect from manufacturers full range of non-custom colors.

C. Back paint components in contact with cementitious materials to prevent electrolysis with manufacturers protective coatings.

D. Galvanize concealed ferrous metal anchors and fastening devices.

E. Shop assemble components and package with anchors and fittings.

F. Provide joint components in single lengths wherever practical. Minimize site splicing.

G. At fire rated locations, provide comparable unit or add standard components that meets required fire rating.

PART 3 - EXECUTION

3.01 PREPARATION

A. Provide anchoring devices for installation and embedment. Modify as required to provide secure installation into each substrate.

B. Provide templates or rough-in measurements.

3.02 INSTALLATION

A. Install components and accessories in accord with manufacturer's instructions. Provide necessary sealants, fasteners, etc. required for each system.

B. Align work plumb and level, flush with adjacent surfaces.

C. Rigidly anchor and/or adhere to substrate to prevent movement or misalignment.

D. Provide items and components necessary for continuous transition between roof, wall,

floor, and ceiling (soffit) joint covers and as required to provide a uniform finished appearance, and a complete and proper weathertight installation.

3.03 PROTECTION

A. Protect finished installation.

B. Provide removable strippable coating reinforced cloth tape to protect finish joint surface.

END OF SECTION 07 95 00

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

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. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Louvers installed in hollow metal doors.
4. Light frames and glazing installed in hollow metal doors.

B. Related Sections:

1. Division 01 Section "General Conditions".
2. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
3. Division 08 Section “Flush Wood Doors”.
4. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
5. Division 08 Section "Door Hardware".
6. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.

10. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
11. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
12. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
13. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
14. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
15. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
16. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of anchorages, joints, field splices, and connections.
6. Details of accessories.
7. Details of moldings, removable stops, and glazing.
8. Details of conduit and preparations for power, signal, and control systems.

D. Samples for Verification:

1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.

B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40” above sill) or UL 10C.

1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
3. Smoke Control Door Assemblies: Comply with NFPA 105.

    a. Smoke "S" Label: Doors to bear “S” label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.

E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data integration and data reliability of their Work into the coordinated BIM applications.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:

1. CECO Door Products (C).
2. Curries Company (CU).
3. Pioneer Industries (PI).

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 HOLLOW METAL DOORS

A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.

B. Exterior Doors (Energy Efficient): Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model, ANSI/SDI A250.4 for physical performance level, and HMMA 867 for door construction.

1. Design: Flush panel.
2. Core Construction: Foamed in place polyurethane and steel stiffened laminated core with no stiffener face welds, in compliance with HMMA 867 “Laminated Core”.

a. Provide 22 gauge steel stiffeners at 6 inches on-center internally welded at 5" on-center to integral core assembly, foamed in place polyurethane core chemically bonded to all interior surfaces. No stiffener face welding is permitted.
b. Thermal properties to rate at a fully operable minimum U-Factor 0.37 and R-Value 2.7, including insulated door, thermal-break frame and threshold.
c. Kerf Type Frames: Thermal properties to rate at a fully operable minimum U-Factor 0.38 and R-Value 2.6, including insulated door, kerf type frame, and threshold.

3. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053 inch - 1.3-mm) thick steel, Model 2.
4. Vertical Edges: Vertical edges to be mechanically interlocked with hairline seam. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".
7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

C. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.

a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.

2. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.
3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

D. Manufacturers Basis of Design:

1. Curries Company (CU) - Polystyrene Core - 707 Series.
2. Curries Company (CU) - Energy Efficient - 777 Trio-E Series.

2.4 HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16" positive thermal break and integral vinyl weatherstripping.

C. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Frames: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.
3. Manufacturers Basis of Design:

a. Curries Company (CU) – Thermal Break TQ Series.

D. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Manufacturers Basis of Design:

a. CECO Door Products (C) - BU DU Series.
b. CECO Door Products (C) - SU Series.
c. Curries Company (CU) - M Series.

E. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

F. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
3. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.6 LOUVERS

A. Metal Louvers: Unless otherwise indicated provide louvers to meet the following requirements.

1. Blade Type: Vision proof inverted V or inverted Y.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.

1. Manufacturers: Subject to compliance with requirements, provide louvers to meet rating indicated.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

2.7 LIGHT OPENINGS AND GLAZING

A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.

C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.

D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

2.8 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.9 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Doors:

1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".

D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

    a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.

3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
9. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Two anchors per jamb up to 60 inches high.
        2) Three anchors per jamb from 60 to 90 inches high.
        3) Four anchors per jamb from 90 to 120 inches high.
        4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

1) Three anchors per jamb up to 60 inches high.
2) Four anchors per jamb from 60 to 90 inches high.
3) Five anchors per jamb from 90 to 96 inches high.
4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.

10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
11. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.

E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.10 STEEL FINISHES

A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

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 the Work.

B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.

1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

3.5 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

END OF SECTION 081113

SECTION 08 71 00 – FINISH HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Sliding doors.
3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Hollow Metal Doors and Frames”.
2. Division 08 Section “Flush Wood Doors”.
3. Division 08 Section “Aluminum-Framed Entrances and Storefronts”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.

5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

a. Type, style, function, size, label, hand, and finish of each door hardware item.
b. Manufacturer of each item.
c. Fastenings and other pertinent information.
d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
e. Explanation of abbreviations, symbols, and codes contained in schedule.
f. Mounting locations for door hardware.
g. Door and frame sizes and materials.
h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

D. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:
1. Five years for exit hardware.
2. Twenty five years for manual overhead door closer bodies.

1.8 MAINTENANCE SERVICE

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.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in

writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:

   a. Two Hinges: For doors with heights up to 60 inches.
   b. Three Hinges: For doors with heights 61 to 90 inches.
   c. Four Hinges: For doors with heights 91 to 120 inches.
   d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

   a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
   b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

   a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
   b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

   a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Manufacturers:

   a. Hager Companies (HA).
   b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).
   c. Stanley Hardware (ST).

B. Pin and Barrel Continuous Hinges: ANSI/BHMA A156.26 Grade 1-600 certified pin and barrel continuous hinges with minimum 14 gauge Type 304 stainless steel hinge leaves, concealed stainless pin, and twin self-lubricated nylon bearings at each knuckle separation. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

a. Markar Products; ASSA ABLOY Architectural Door Accessories (MR).
b. Pemko (PE).

2.3 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.
3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

5. Manufacturers:

a. Door Controls International (DC).
b. Rockwood (RO).
c. Trimco (TC).

B. Coordinators: ANSI/BHMA A156.3 certified door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.

1. Manufacturers:

a. Door Controls International (DC).
b. Rockwood (RO).
c. Trimco (TC).

C. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.

5. Manufacturers:

a. Hiawatha, Inc. (HI).
b. Rockwood (RO).
c. Trimco (TC).

2.4 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

C. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

1. Threaded mortise cylinders with rings and cams to suit hardware application.
2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
4. Tubular deadlocks and other auxiliary locks.
5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
6. Keyway: Match Facility Standard.

D. Keying System: Each type of lock and cylinders to be factory keyed.

1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. Existing System: Field verify and key cylinders to match Owner's existing system.

E. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

F. Construction Keying: Provide construction master keyed cylinders.

G. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

2.5 KEY CONTROL

A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:

    a. Lund Equipment (LU).
    b. MMF Industries (MM).
    c. Telkee (TK).

2.6 MECHANICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed.

1. Locks shall meet or exceed the requirements of ANSI/BHMA A156.2 Series 4000, Grade 1 with all standard trims, as follows:

    a. Cycle Test: ANSI/BHMA A156.2 Grade 1 requirements with no lever sag.
    b. Abusive Locked Lever Torque: Exceed 3,100 in-lb with no entry; lock to maintain egress functionality in compliance with BHMA certification requirements.
    c. Offset Lever Pull: Exceed 1,600 lbs with no entry (8 times ANSI/BHMA A156.2 requirements).
    d. Latch Retraction with Preload: Exceed 100 lb preload while maintaining ANSI/BHMA requirements for operation in warped doors (2 times ANSI/BHMA A156.2 requirements).

2. Vertical Impact: Exceed 100 vertical impacts (20 times ANSI/BHMA A156.2 requirements).

3. Furnish with solid cast levers, standard 2 3/4” backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.

4. Locks are to be non-handed and fully field reversible.

5. Manufacturers:

    a. Sargent Manufacturing (SA) - 10X Line.
    b. No Substitution.

B. Knurling: Where required by local code provide knurling or abrasive coating to all levers on doors leading to hazardous areas such as mechanical rooms, boiler and furnace rooms, janitor closets, and as otherwise required or specified.

2.7 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.

2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.8 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.

3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

5. Flush End Caps: Provide flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.

6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

   a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
   b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.

9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.

10. Rail Sizing: Provide exit device rails factory sized for proper door width application.

11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1. Manufacturers:

a. Sargent Manufacturing (SA) - 80 Series.
b. No Substitution.

C. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish.

1. Provide keyed removable feature where specified in the Hardware Sets.

2. Provide stabilizers and mounting brackets as required.

3. Provide electrical quick connection wiring options as specified in the hardware sets.

4. Manufacturers:

a. Same as exit device manufacturer.

2.9 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use.

Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.

4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Large Body Cast Iron): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.

1. Manufacturers:

a. Corbin Russwin Hardware (RU) - DC8000 Series.
b. Norton Rixson (NO) - 9500 Series.
c. Sargent Manufacturing (SA) - 281 Series.

2.10 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.

4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:

a. Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

6. Manufacturers:

   a. Hiawatha, Inc. (HI).
   b. Rockwood (RO).
   c. Trimco (TC).

2.11 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

   1. Manufacturers:

      a. Hiawatha, Inc. (HI).
      b. Rockwood (RO).
      c. Trimco (TC).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

   1. Manufacturers:

      a. Norton Rixson (RF).
      b. Sargent Manufacturing (SA).

2.12 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

1. National Guard Products (NG).
2. Pemko (PE).

2.13 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.14 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with

corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.

2. The supplier is responsible for handing and sizing all products.

3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer's Abbreviations:

1. MK - McKinney
2. MR - Markar
3. RO - Rockwood
4. SA - SARGENT
5. RF - Rixson
6. PE - Pemko
7. OT - Other
8. SU - Securitron

Hardware sets contain a prefix that identify the school as follows:

EH = East High School
F = Flinn
L = Lincoln
W = Washington

Hardware Sets

Set: S1.00

3	Hinge (heavy weight)	T4A3786 5" x 4-1/2"	US26D	MK
1	Rim Exit Device, Storeroom	12 19 43 76 8804 ETL	US32D	SA
1	Surface Closer	281 P9	EN	SA
1	Kick Plate	K1050 8" high 4BE CSK	US32D	RO
1	Wall Stop	403	US26D	RO
1	H & J Smoke Seal	S88D		PE
2	Sweep	18061CNB		PE

END OF SECTION 08 71 00

SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of work shown on the drawings and/or specified.

1.02 SUBMITTALS

A. Product data.

B. Glazing schedule indicating glazing types and locations

C. Samples of colored and/or tinted glazing units, 12" x 12".

1.03 PERFORMANCE

A. Insulated Glass

1. Conform to ASTM E 774-88. Visible, permanent IGCC Certification Label for CBA rating level.

2. Dual perimeter seals, silicone and polyisobutylene.

3. Manufacturer’s continuous warm edge type spacer with desiccant. Manufacturer listed and dated.

B. Glazing Requirements: Conform to Consumer Products Safety Commission Part 1201 - Safety Standard For Architectural Glazing Materials.

C. Fire-Rated Glazing and Tempered Glass shall be furnished with an etched label showing conformance with specified requirements and IBC code requirements.

1.04 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to

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. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Fire-Rated Glazing, General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 252 for door assemblies and NFPA 257 for window assemblies.

1. Laminated Ceramic Glazing: Laminated glass made from 2 plies of clear, ceramic flat glass; 5/16-inch total nominal thickness; complying with testing requirements in 16 CFR 1201 for Category II materials.

2. Manufacturer Size Limitations: Contractor shall coordinate requested glazing sizes with manufacturer production size limitations. Where necessary, Glazing installed in adjacent lites shall be furnished by a single manufacturer in order to produce a consistent appearance.

3. Products: Subject to compliance with requirements provide one of the following:

a. Nippon Electric Glass Co., Ltd. (distributed by Technical Glass Products); FireLite Plus.

b. Schott North America, Inc.; Laminated Pyran Platinum.

c. Vetrotech Saint-Gobain; SGG Keralite FR-L.

4. At door lites, provide manufacturer’s Standard grade fire rated glazing. At locations other than door lites, provide manufacturer’s Premium grade fire-rated glazing.

B. Interior Tempered Glass: At interior doors and frames and as indicated, clear 1/4" thick shall be:

1. Guardian

2. PPG

3. Pilkington

4. Trulite

C. Exterior Tempered Glass: At exterior doors and as indicated, tinted to match insulated units with hard coat low emissivity coating on the #2 surface, 1/4" thick, shall be:

1. Guardian

2. PPG

3. Pilkington

4. Trulite

D. Insulated Glass for aluminum windows, exterior aluminum doors and frames, 1” thick insulated glass. Shading Coeff. 0.37; Solar Heat Gain Coeff. 0.32; LSG 1.31.

1. Provide tempered insulated units as follows:

a. Exterior lite 1/4" tempered PPG Solarbronze tinted.

b. Airspace.

c. nterior lite 1/4" tempered PPG Solarban 60 clear with high performance soft coat low emissivity coating on the #3 surface.

2. Provide units fabricated by one of the following for all applications:

a. Oldcastle

b. Trulite

c. Traco

d. EFCO

E. Obscure Glass

1. 1/4" tempered, acid etched in pattern and transparency as selected by Architect.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Glass shall be new. Each light shall bear manufacturer's label or be delivered in labeled boxes. Labels must remain on until the glass has been set reviewed, and approved by the Architect. When glass is not cut to size by manufacturer and is furnished unlabeled from local stock, the Contractor shall submit an affidavit stating the quality, type, thickness and manufacturer of glass furnished.

B. Do not set glass until rabbets are prime painted and dry. Glass shall be supported with spring clips or setting blocks. Glazing shall be set in sealants or gaskets. Sealants or gaskets shall engage both sides of glazing.

1. Where glazing sealant is used, back putty and neatly strike flush with stops.

2. Where dry gasketing is used, gaskets shall not extend above the stops.

C. Sizes for glass shall be taken from the actual frames and sash. This work contemplates glass set in place and the Contractor shall assume responsibility in regard to correct sizes. Sizes, if shown on drawings, are approximate, and shall be used for estimate only.

D. Glass shall be set by skilled workmen in the best possible manner and in such a way that there will be an equal bearing the entire width of each panel. Glass shall be accurately sized to fit the frame and edges shall be smooth, no sharp or ragged edges being left. Contractor shall be held responsible for broken glass due to improper setting. Glazing beads or stops shall be properly reset without marring or injuring the finish.

E. At interior dual glazed locations provide proper spacers, gaskets, tape, etc. to provide a complete and proper sound isolation installation. Properly clean units prior to installation of glazing.

F. Wall mirrors shall be installed to minimize distortion.

G. Security film to be installed on the interior side of exterior units and on the secure side of interior units. Security film shall be installed per manufacturer’s requirements with perimeter adhesive attachment type system. New and existing glass must be properly cleaned and prepared prior to installation. Protect as recommended by the manufacturer for the initial 30 days after installation.

3.02 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. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing 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. Glass provided by the Contractor that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism before Substantial Completion shall be replaced by the Contractor without additional cost to Owner.

END OF SECTION 08 80 00

SECTION 09 29 00 – GYPSUM BOARD SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of the work shown on the drawings and/or specified under this section.

B. Provide Level 1 gypsum board level of finish to unexposed gypsum board. At fire rated and/or smoke partitions provide additional requirements meeting codes.

C. Provide Level 4 gypsum board level of finish to exposed gypsum board to receive paint finish unless otherwise noted.

1.02 SUBMITTALS

A. Product Data

1.03 QUALITY ASSURANCE

A. Gypsum Association standards and recommendations

1. GA-214 - Recommended Levels of Gypsum Board Finish.
2. GA-216 - Application and Finishing of Gypsum Panel Products.
3. GA-290 - Area Separation Walls.
4. GA-600 - Fire Resistance Design Manual.
5. GA-801 – Handling and Storage of Gypsum Panel Products.

1.04 DESIGN REQUIREMENTS

A. Metal Framing: Provide non-load bearing steel stud partitions with deflections conforming to L/240 at 5 psf (239 Pa) typical for gypsum board walls.

B. Fire-Resistive Rating: Where indicated on Drawings, provide materials and construction that are identical to those assemblies whose fire resistance rating has been determined per ASTM E119 by a testing and inspecting organization acceptable to authorities having jurisdiction.

1. Meet or exceed fire resistance requirements outlined under provisions of the GA-600 Fire Resistance Design Manual for wall and ceiling assemblies.
2. Meet or exceed Class A flame/fuel/smoke requirements of ASTM E84 surface burning characteristics for finish materials.

PART 2 - PRODUCTS

2.01 FRAMING MATERIALS

A. Steel studs, framing, runners, furring, and associated system components: ASTM C645, 30 mil (20ga) galvanized, sizes indicated. Subject to compliance with requirements, provide products by one of the following.

1. Gypsum Board Manufacturer Products
2. ClarkDietrich

3. United States Steel

4. Marinoware

B. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes due to deflection of structure above. Allow for 1” of movement.

1. Fire Rated Locations: Provide Fire Trak Deflection Trak and Fire Stop System by FireTrak Corp. or comparable fire rated system by metal stud manufacturer.

2. Non-fire Rated Locations: Provide metal stud manufacturer’s slip-type head joint system.

2.02 METAL SUSPENSION SYSTEM

A. Manufacturers:

1. Chicago Metallic Corp./Rockfon, Fire Front 650 System

2. USG Interiors, Ceiling Suspension Division, Rigid X

3. Armstrong, Drywall Furring System 8900 Series

B. Provide proper system and components to support additional loading of multiple layers of gypsum board, light fixtures, etc.

C. Provide necessary components for a complete and proper installation.

D. Exterior installations to be galvanized.

2.03 GYPSUM BOARD

A. Gypsum Board: ASTM D3273, 5/8” thick, Type X, Mold Resistant with a score of 10 as rated according to ASTM D 3273 and/or 0 as rated according to ASTM G21.

1. U.S Gypsum; Sheetrock Firecode Core, Mold Tough Board

2. National Gypsum Co.; Gold Bond XP Fire-Shield, Mold Resistant Board

3. Georgia-Pacific; ToughRock Fireguard X Mold-Guard Gypsum Board

4. Continental Building Products; Mold Defense Type X

5. CertainTeed Corp.; M2Tech Type X

2.04 ABUSE RESISTANT GYPSUM BOARD

A. Abuse Resistant Gypsum Board: ASTM D3273 and C1629 – Level 1, 5/8” thick, Type X, Abuse and Mold Resistant with a score of 10 as rated according to ASTM D 3273 and/or 0 as rated according to ASTM G21.

1. U.S Gypsum; Sheetrock Firecode Core, Mold Tough AR Board

2. National Gypsum Co.; Gold Bond Hi-Abuse XP Fire-Shield, Mold Resistant Board

3. Georgia-Pacific; ToughRock Fireguard X Mold-Guard Abuse-Resistant Gypsum Board

4. Continental Building Products; Protecta AR 100 Type X with Mold Defense

5. CertainTeed Corp.; AirRenew Extreme Abuse Type X

2.05 EXTERIOR GYPSUM BOARD

A.

B. Exterior Gypsum Soffit Board for Protected Horizontal Applications: ASTM C1396 with manufacturer standard edges, 5/8" thick. Firecode C or X core, ASTM E84 flame spread 20 max. and smoke developed 0.

C.

1. U.S Gypsum; Sheetrock Exterior Gypsum Ceiling Board
2. National Gypsum Co.; Gold Bond Exterior Soffit Board
3. Georgia-Pacific; ToughRock Fireguard C Soffit Board
4. Continental Building Products; Firecheck Soffitboard
5. CertainTeed Corp.; Exterior Soffit Type X Board

2.06 TRIM

A. Metal Trim and Finishing Accessories: Manufacturers standard zinc galvanized metal edge trim, corner bead, etc. for use at intended application.

B. Edge Trim: PVC conforming to ASTM C1047 and D3678 for interior exposure. Include manufacturer's proper intersection and corner trim for continuous monolithic appearance. Mud set type trim with perforated concealed flanges. Provide proper comparable unit rated for exterior exposure at exterior gypsum board soffits.

1. Corner Bead, at outside corners
2. J Bead, at exposed board edges not abutting dissimilar materials
3. L Bead at board edges abutting dissimilar materials; tear away type
4. L Bead with gasket at board edges abutting exterior window and door frames, plenum walls, and at exterior soffits; tear away type
5. L Bead at board edges abutting dissimilar materials with ¼" caulk channel if narrow reveal (uncaulked) or caulk channel is needed; tear away type
6. Archway Bead at curved surfaces; tear away type
7. Subject to compliance with requirements, provide products by one of the following:
   a. Trim-Tex, Inc.
   b. Plastic Components, Inc.

C. Control Joint Trim: ¼" joint, PVC conforming to ASTM C1047 and D3678 for interior exposure. Include manufacturer's proper intersection and corner trim for continuous monolithic appearance. Mud set type trim with perforated concealed flanges. Provide proper comparable unit rated for exterior exposure at exterior gypsum board soffits. Subject to compliance with requirements, provide products by one of the following:

1. Trim-Tex, Inc., #093V Expansion Joint
2. Plastic Components, Inc., #2027-16

D. Reveal Trim: 2" x 2", PVC conforming to ASTM C1047 and D3678 for interior exposure. Include manufacturer's proper intersection and corner trim for continuous monolithic appearance. Mud set type trim with perforated concealed flanges. Provide proper comparable unit rated for exterior exposure at exterior gypsum board soffits. Subject to compliance with requirements, provide products by one of the following:

1. Trim-Tex, Inc., #AS5510 at wall intersection and #AS5110 in field
2. Plastic Components, Inc., #202 Z Mold Trim at wall intersection and #225 Drywall Reveal in field.

2.07 COMPONENTS

A. Joint compound, tapes, etc.: Gypsum board manufacturer's premium products matching the specified board type and characteristics. Must maintain indicated mold resistance, fire resistance, and abuse resistance. Do not mix manufacturers, provide same manufacturer as board to maintain the integrity of their system.

1. Screws: Type "S" as recommended by gypsum board manufacturer.

2.08 CONTINUOUS SOFFIT VENT

A. Manufacturers:

1. Air Vent, Inc; SV202
2. Guardian Building Products; 105 Continuous Soffit Vent
3. Tamlyn; CUV8 Continuous Soffit Vent

B. Products specified above are intended to be installed against a vertical surface. Provide similar model if vent is to be installed in field of soffit.

C. Extruded aluminum, 2 inch ventilated width providing nine (9) square inches net free area per lineal foot.

D. Provide concealed continuous aluminum insect screen sealed to each section.

E. Provide maximum lengths available.

F. Factory applied baked enamel finish, color as selected by Architect.

PART 3 - EXECUTION

3.01 METAL STUD FRAMING INSTALLATION

A. Stud System Erection. Attach metal runners at floor with suitable fasteners located 2" from each end and spaced 16" o.c. Position studs vertically, engaging floor and ceiling runners and spaced 16" o.c. Metal studs shall run full height from floor to height as indicated. When necessary, splice studs with 8" nested lap and one positive attachment per stud flange. Place studs in direct contact with door frame jambs, abutting partitions and partition corners.

B. Anchor studs for shelf-walls, counter, vanity, and those adjacent to door frames, partition intersections, and corners to ceiling and floor runner flanges with USG Metal Lock Fastener tool. Securely anchor studs to jamb and head anchor clips of door frames by bolt or screw attachment. Over metal door frames, place horizontally a cut-to-length section of runner with a web flange bend at each end, and secure with one positive attachment per flange.

C. Framing components shall be cut squarely for attachment to perpendicular members, or as required for an angular fit against abutting members. Members shall be held positively in place until properly fastened.

D. Construct corners using minimum 3 studs, double stud at wall opening, door and windows jambs.

E. Erect studs 1 piece full length; splicing of studs not permitted.

F. Attachment of similar materials shall be done by mechanical fasteners. Dissimilar materials may be attached with screws, bolts or properly designed clips. Wire tying of framing components in structural applications shall not be permitted.

G. Provide necessary stud bracing, etc. as detailed and/or required to support design and anticipated loads.

H. Install intermediate studs above and below openings to match wall stud spacing.

I. Provide deflection allowance in stud top track, directly below horizontal building framing for non-load bearing framing. Deflection top track to be installed per manufacturer's requirements to allow for vertical deflection, and fire rating at walls indicated to be fire rated. Provide additional gypsum board layers, etc. required by manufacturer of system.

J. At locations where the stud top track is not supported on a continuous support, provide misc. items including metal framing, blocking, angles, etc. to properly brace and support the wall.

K. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.

L. Provide substantial intermediate wood blocking properly anchored to metal studs for secure attachment of wall mounted items, toilet accessories, etc.

3.02 GYPSUM BOARD INSTALLATION

A. The suspension system for the suspended gypsum board panels, ceilings and soffits shall consist of necessary components as required and shall be installed as per manufacturer's requirements and/or as detailed to support loads at 1/360 max. deflection. Provide control joints as indicated and required, installed per manufacturer's requirements. Properly glue and screw gypsum board panels to ceiling suspension system.

B. Suspension system and components to be supported from steel bar joists including but not necessarily limited to framing and hanging wire shall be supported from the top chord of the steel joists unless otherwise specifically indicated.

C. Gypsum board erection (on studs). Apply gypsum panels vertically. Position edges over studs for vertical application; ends over studs for horizontal application.

D. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together.

E. Stagger joints on opposite sides of partition and on laminated sections. Space screws 12" o.c. in field of panels and 8" o.c. staggered along vertical abutting edges.

F. Gypsum board shall be applied to surfaces where called for the drawings. Joints shall be taped, spackled and neatly sanded to form a smooth even sound surface so as to show no evidence of joints after surfaces have been painted. Provide corner beads at exterior corners and trim at exposed edges of gypsum board surfaces and where gypsum board abuts

dissimilar materials, taped flush. Provide indicated level of finish meeting Gypsum Association standards.

G. Cement board to be provided as the backer board for areas to receive ceramic tile wall finish. Install per manufacturer's requirements.

H. Exterior gypsum board shall be provided in exterior locations. Install per manufacturer's requirements.

I. Trim, beads, control joints, reveals, etc. to be taped in flush to provide a uniform monolithic appearance. Installation with mechanical fasteners and adhesives to meet manufacturers requirements.

J. Work and materials to be per gypsum board manufacturer's requirements to provide and maintain the fire rating, mold resistance, and abuse resistance of their system.

K. Install continuous soffit vent as required to maintain proper ventilation of soffit systems.

3.03 PATCHING

A. After other trades and contractors have finished their work, damaged areas shall be patched. The Contractor shall accomplish patching and repainting without cost to the Owner.

1. Touch-up, repair or replace damaged products before Substantial Completion.

3.04 PROTECTION

A. Protect adjacent finish surfaces from damage due to operations.

B. Protect installed products until Substantial Completion.

END OF SECTION 09 29 00

SECTION 09 51 00 – ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of the work shown on the drawings and/or specified in this section.

1.02 SUBMITTALS

A. Product Data

B. Samples

1. Acoustical Tile, 6” square manufacturers sample, one (1) of each tile type

C. Attic Stock: Written verification of attic stock delivery to Owner’s representative.

1.03 STORAGE AND HANDLING

A. Deliver acoustical ceiling panels, suspension system components, and accessories to Site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.

B. Before installing acoustical ceiling panels, permit them to reach room temperature and stabilized moisture content.

C. Handle acoustical ceiling panels carefully to avoid chipping edges or damaging units in any way.

1.04 PROJECT CONDITIONS

A. Space Enclosure: Do not install interior acoustical ceilings until space is enclosed and weatherproof, wet-work (painting, gypsum board, plastering, tiling, and concrete leveling) in space is completed and dry, work above ceilings is complete, and ambient temperature and humidity conditions will be continuously maintained at values indicated for the Project when occupied for its intended use.

PART 2 - PRODUCTS

2.01 ACOUSTICAL TILE

A. Type 'A', lay-in type white tiles, ASTM E84 Class A rated incombustible mineral tile, 24" x 24" x 5/8" min. with square cut edge design, high temperature and humidity resistant. UL Classified NRC 0.70 min., with CAC 22 min.

1. Armstrong, School Zone Fine Fissured # 1713
2. CertainTeed, Performa Fine Fissured High NRC #HHF-457-HNRC
3. USG Acoustical Products Co., Radar ClimaPlus High-NRC #22111
4. Rockfon, Artic #600

B. Type 'A', lay-in type white tiles, ASTM E84 Class A rated incombustible tile, 24" x 24" with square cut edge design, high temperature and humidity resistant. UL Classified NRC 0.70 min. and CAC 40 min.

1. Armstrong, School Zone Fine Fissured #1810 (3/4” thickness)

2. CertainTeed, Performa Adagio High CAC #HCAC-1672-IOF-1

(1-1/2” thickness)

3. USG Acoustical Products Co., Radar ClimaPlus High-NRC/CAC #22521 (3/4” thickness)

4. Rockfon, Sonar dB #23100 (2” thickness)

C. Type 'B', lay-in type white tiles, ASTM E84 Class A rated, incombustible mineral tile, 24" x 24" x 5/8" min., reveal trim edges, high temperature and humidity resistant. UL Classified NRC 0.70 min., with CAC 22 min.

1. Armstrong, School Zone Fine Fissured Tegular # 1717

2. CertainTeed, Performa Fine Fissured High NRC #HHF-454-HNRC

3. USG Acoustical Products Co., Radar ClimaPlus High-NRC #22121

4. Rockfon, Artic #660

D. Type 'B', lay-in type white tiles, ASTM E84 Class A rated incombustible tile, 24" x 24" with reveal cut edge design, factory painted edges, high temperature and humidity resistant. UL Classified NRC 0.70 min. and CAC 40 min.

1. Armstrong, School Zone Fine Fissured #1717 (3/4” thickness)

2. CertainTeed, Performa Adagio High CAC #HCAC-1672B-IOF-1

(1-1/2” thickness)

3. USG Acoustical Products Co., Radar ClimaPlus High-NRC/CAC #22523 (3/4” thickness)

4. Rockfon, Sonar dB #23300 (2” thickness)

E. Type 'C', lay-in type white tiles, ASTM E84 Class A rated, incombustible fiberglass tile, 24" x 24" x 1" sq. cut edges, high temperature and humidity resistant. UL Classified NRC 0.95 min., with CAC 22 min. and AC 190 min.

1. Armstrong, Optima #3152

2. CertainTeed, Performa VOC Compliant Symphony #1342-IOF-1

3. USG Acoustical Products, Halcyon ClimaPlus #98221

4. Rockfon, Sonar #16100

F. Touch-Up Edge Paint: Tile manufacturer’s touch-up edge paint matching tile color.

2.02 METAL SUSPENSION SYSTEMS - GENERAL

A. Pre-finish exposed members white. Provide hold down clips in vestibules and as required.

B. Provide additional cross tees, adapter clips, and any necessary components for the proper installation of perimeter and multiple layer gypsum board ceilings and feature areas, and mechanical and electrical items to be secured to this system.

C. Roll-Formed, Sheet-Metal Edge Moldings and Trim: 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, formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners;

provide in longest standard single piece lengths. For penetrations of ceiling, provide edge moldings fabricated to fit penetration exactly. Provide manufacturer's factory fabricated matching trim, inside and outside corners, including matching radius for outside corner bullnose CMU and/or gypsum board wall locations.

D. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated or recommended by manufacturer.

1. Anchors in Concrete: Provide one of the following types:

a. Postinstalled Expansion Anchors: Suitable for application indicated, fabricated from corrosion resistant materials, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.

1. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.

b. Power-Actuated Fasteners: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to ten times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.

E. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641, Class 1 zinc coating, soft temper.

2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- diameter (12 gage) wire.

2.03 LAY-IN SUSPENSION SYSTEM

A. Manufacturers:

1. Chicago Metallic Corp./Rockfon, 200 System

2. USG., DX System

3. Armstrong, Prelude XL

4. CertainTeed, Classic

B. Standard 15/16" grid.

C. Provide heavy duty suspension system at precast insulated wood fiber acoustical panels.

2.04 CONCEALED SUSPENSION SYSTEM

A. Manufacturer's

1. Chicago Metallic Corp./Rockfon, 1200 System
2. Donn Corp., comparable to (1) above
3. Armstrong, Accessible Tile System
4. Certainteed, comparable to (1) above

B. Provide for full access without sightlines.

2.05 VERTICAL SUSPENSION TRIM

A. Extruded aluminum, 12” straight nominal vertical face, pre-finished white.

1. Rockfon, Infinity Standard Perimeter Trim
2. USG, Compasso Elite
3. Armstrong, Axiom Classic Trim
4. CertainTeed, Cloud Perimeter Trim

B. Provide manufacturer’s factory mitered corner trim, concealed splice plates, etc. and components required to provide a complete and proper, finished installation.

C. Provide factory curved sections meeting radius as indicated.

2.06 HORIZONTAL SUSPENSION TRIM

A. Extruded aluminum, 6” nominal horizontal face, sharp edged perimeter, pre-finished white.

1. Rockfon, Infinity Z Perimeter Trim
2. USG, Compasso Slim
3. Armstrong, Axiom Knife Edge

B. Provide manufacturer’s factory mitered corner trim, concealed splice plates, etc. and components required to provide a complete and proper, finished installation.

PART 3 - EXECUTION

3.01 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. Examine acoustical panels before installation. Acoustical panels that are cracked or damaged, wet, moisture damaged, mold damaged, etc. are not acceptable.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install materials in accordance with ASTM C 636, manufacturer's printed instructions, industry standards applicable to the Work, and requirements of authorities having jurisdiction. Exposed fasteners are not acceptable.

B. Acoustical ceiling systems and ceiling components to be supported from building structural members. Securely hang ceiling from structural system in an approved manner,

capable of supporting a minimum of 25 lbs./sq.ft. Provide additional supports at multiple layer gypsum board areas, mechanical, and electrical items as required.

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum, which are not part of supporting structural or ceiling suspension system.
2. Splay hangers only where required to miss obstructions and offset resulting horizontal force by bracing, counters playing or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Do not support ceilings directly from permanent metal forms or composite floor deck. Fasten hangers to cast-in-place hanger inserts, post-installed mechanical or epoxy adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
5. When steel or wood framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
6. Do not attach hangers to steel or wood, roof or floor decking. Attach hangers to structural members or top chord of trusses as designed for the ceiling loads.
7. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated, leveling to tolerance of 1/8 inch per 12 feet. Provide hangers not more than 8-inches from ends of each member. Provide additional hangers and locate hangers as recommended by ceiling manufacturer to support pendant lighting and other similar items.
8. 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 due to age, corrosion, or elevated temperatures. Secure wire hangers with not less than three (3) full, closely spaced turns.
9. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications and as indicated.

C. Set ceilings level with laser beam in straight lines and paralleled with rectangular walls.

D. Lay out pattern in coordination with other trades to eliminate off-centering of units in tile pattern.

E. Lay tile pattern out in order that there shall be no tile less than half.

F. Certain rooms have grilles, recessed light fixtures recessed into ceilings, access panels and other required openings. Where such occur, furring shall be framed properly to permit the installation of such fixtures, panels and openings This Contractor shall install frames, panels, etc., as furnished by the other contractors.

G. System Runners: Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

H. Ceiling Panels: Install acoustical panels with undamaged edges and fit accurately into

suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit with edges matching edge design of panel.

1. Install square-edged panels with edges fully hidden from view by flanges of suspension-system runners and moldings.

2. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces with manufacturers touch-up edge paint.

3.03 ADJUST AND CLEAN

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Clean exposed surfaces of acoustical ceilings; 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.

3.04 ATTIC STOCK

A. Provide four (4) full, unopened boxes of each tile type delivered to Owner at site at Substantial Completion. This material shall be in full tiles in unopened cartons with identifying labels.

B. Store extra stock where directed by the Owner. Provide written verification of attic stock delivery to Owner’s representative, submit to Architect.

END OF SECTION 09 51 00

SECTION 09 65 13 – RESILIENT BASE

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of the work shown on the drawings and/or specified in this section.

1.02 SUBMITTALS

A. Samples for color selection

1. Base

B. Product Data

1. Base
2. Adhesive

C. Operation and Maintenance Instructions

D. Attic Stock: Written verification and sign off of attic stock delivery to Owner's representative.

1.03 QUALITY ASSURANCE

A. Single-Source Responsibility: Obtain each type, color, and pattern of resilient flooring materials from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

B. Fire-Test-Response Characteristics: As determined by testing identical resilient flooring 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.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in original packages and containers with seals unbroken and bearing manufacturer's original labels, including manufacturer's name, product name, and directions for storing, handling, and use.

B. Store resilient flooring materials in clean, dry interior spaces protected from the weather, extreme temperature and humidity range, and freezing, with ambient temperature and humidity maintained within the range of minimum and maximum allowable by each manufacturer.

1. Store on flat surfaces.
2. Limit stacking to five (5) boxes high.

C. Move materials into spaces where they will be installed at least 48 hours prior to installation.

1.05 PROJECT CONDITIONS

A. Maintain temperatures within the range of minimum and maximum allowable by each manufacturer for at least 48 hours before, during, and for not less than 48 hours after installation. Protect materials from the direct flow of heat from hot-air registers,

radiators, or other heating fixtures and appliances. After installation period, maintain a temperature of not less than 55 deg F.

B. Close spaces to traffic during base installation and for not less than 48 hours after base installation.

1.06 RELATED SECTIONS

A. Section 07 92 00 – Joint Sealants

PART 2 - PRODUCTS

2.01 WALL BASE

A. Base: On-top type 4" x 1/8" thermoset rubber, cove type.

1. Roppe, Pinnacle
2. Johnsonite, BaseWorks
3. Burke, BurkeBase Type TS

B. Adhesive:

1. Manufacturer's contact type on non-porous surfaces.
2. Manufacturer's acrylic type on porous surfaces.

C. Manufacturer's pre-formed inside and outside corners shall be used.

D. Colors as selected by Architect.

PART 3 - EXECUTION

3.01 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Contractor shall examine substrates prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond, or impair durability or appearance of the resilient materials.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone.

D. Broom sweep and vacuum clean substrates to be covered immediately before installation. Ensure substrates are free of moisture, alkaline salts, carbonation, dust, dirt, grease and debris.

E. Apply primer to substrates if recommended by manufacturer, prior to application of adhesive. Apply primer in accordance with manufacturer's instructions.

3.02 INSTALLATION

A. The installer shall be competent in the installation of the resilient materials.

B. Install in strict accordance with the manufacturer's requirements, and as required to meet manufacturer's warranty requirements.

C. Install rubber base on each wall including casework with manufacturers approved adhesives for the existing substrate to be applied. Provide additional sealing methods as

indicated to assure a watertight installation.

3.03 CLEANING AND PROTECTION

A. Perform the following operations immediately after completing resilient materials installation:

1. Remove adhesive and other surface blemishes using clean cloth and cleaner recommended by flooring manufacturer.

2. Sweep and vacuum areas thoroughly.

3. Damp-mop surfaces to remove marks and soil.

B. Protect resilient materials against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer to ensure the resilient materials will be free of damage at Substantial Completion.

C. Immediately prior to Substantial Completion, remove protective covers and panels, thoroughly clean flooring in accordance with manufacturer's instructions.

3.04 ATTIC STOCK

A. Provide a minimum of 12 linear feet of rubber base in each color selected.

B. Store extra stock where directed by the Owner. Provide written verification of attic stock delivery to Owner’s representative, submit to Architect.

END OF SECTION 09 65 13

SECTION 09 68 13 – MODULAR TILE CARPETING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of the work shown on the drawings and/or specified under this section.

1.02 SCOPE OF WORK

A. Work shall consist of the furnishing of modular carpet in areas so designated.

1.03 SUBMITTALS

A. Product Data: Provide data on specified products, describing physical and performance characteristics, sizes, patterns, colors available, and method of installation.

B. Samples for initial selection.

C. Shop Drawing showing columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required as well as direction of carpet pile and pattern, location of edge moldings and edge bindings shall be submitted to the Architect for approval prior to installation.

D. Floor schedule using same room designations indicated on drawings.

E. Verification Samples: Submit full size samples illustrating color and installation laying pattern for each carpet material specified.

F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

G. Maintenance Data: Include maintenance procedures, recommendations for maintenance materials and equipment, and suggested schedule for cleaning.

H. Manufacturer's Product Warranty.

I. Test Reports: Floor slab moisture content level test reports from an independent agency. Testing procedures, number of test locations, and physical locations shall meet manufacturer=s requirements.

J. Attic Stock: Verification of delivery of attic stock to Owner.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications

1. Company specializing in manufacturing specified carpet with minimum 10 years documented experience.

2. Upon request, manufacturer to provide representative to assist in project start-up and to inspect installation while in process and upon completion. Representative will notify designated contact if any installation instructions are not followed.

3. Single Source Responsibility: Obtain each type of product from one source and by a single manufacturer.

B. Installer Qualifications

1. Flooring contractor must be certified by the manufacturer prior to bid.
2. Flooring contractor to be a specialty contractor normally engaged in this type of work and shall have prior experience in the installation of these types of materials.
3. Flooring contractor to provide Owner a written installation warranty that guarantees the completed installation to be free from defects in materials and workmanship for a period of one year after job completion.

1.05 DELIVERY, STORAGE, & HANDLING

A. Deliver materials to the site in manufacturer's original packaging listing manufacturer's name, product name, identification number, and related information.

B. The temperature of the interior environment, including the sub floor should be no lower than 65°F and no higher than 90°F at least 72 hours prior to, during and after the tile installation. Flooring products and installation materials should be stored between 65°F and 90°F for at least 48 hours prior to installation. Relative humidity should be no more than 65%.

C. Make stored materials available for inspection by the Owner's representative.

D. Store materials in area of installation for minimum period of 48 hours prior to installation.

1.06 PROJECT CONDITIONS

A. Sub-floor preparation is to include required work to prepare the existing floor for installation of the product as specified in this document and manufacturer's installation instructions.

B. Material used in sub-floor preparation and repair shall be recommended by the carpet manufacturer and shall be chemically and physically compatible with the carpet system being bid.

C. Maintain minimum 65 degrees F ambient temperature and 65% relative humidity for 72 hours prior to, during, and 48 hours after installation.

D. Do not install flooring until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

1.07 PRODUCT WARRANTY

A. Provide a non-prorated lifetime limited warranty which shall specifically warrant against the following:

1. Excessive Surface Wear: More than 15% loss of pile fiber weight
2. Excessive Static Electricity: More than 3.0 kV per AATCC 134
3. Resiliency Loss of the Backing: More than 10% loss of backing resiliency
4. Delamination
5. Edge Ravel
6. Zippering

a. Tuft Bind warranty in lieu of edge ravel and zippering is not acceptable.

B. Warranty to be sole source responsibility of the manufacturer. Second source warranties and warranties that involve parties other than the carpet manufacturer are unacceptable.

C. If the product fails to perform as warranted when properly installed and maintained, the affected area will be repaired or replaced at the discretion of the manufacturer.

D. Chair pads are not required, but are recommended for optimum textural performance. Absent the use of chair pads, more intensive maintenance will be required for areas in direct contact with chair caster traffic, and some degree of appearance change is to be expected.

PART 2 - PRODUCTS

2.01 MODULAR CARPET

A. Product to match existing.

B. Tarkett (Brookview Elementary School)

1. Style: 04849 Maelstrom
2. Color: To match existing

C. Patcraft (Whitehead Elementary School)

1. Style: 00450 Inspire
2. Collection: Group Think
3. Color: To match existing

D. Gerflor (Summerdale Early Childhood School)

1. Style: Mipolam Symbioz
2. Color: To Match Existing.

E. Mannington Commercial (Summerdale Early Childhood School)

1. Style: Mainboard
2. Color: To Match Existing.

F. Interface FP500 (Welsh Elementary School)

1. Collection: Fair Play
2. Style: 138800AK00
3. Color: To Match Existing.

G. Shaw Contract (Rolling Green Elementary School)

1. Style: Visible Tile (5T002)

2. Color: To Match Existing.

H. Bigelow (Maria Montessori at Marsh)

1. Style: Reckless BT353/ OB353

2. Color: To Match Existing.

2.02 MISCELLANEOUS MATERIALS AND CARPET ACCESSORIES

A. Materials recommended by manufacturer for patching, leveling, priming, etc.

B. Nonmetallic Edge Guard: Rubber of size and profile adequate for location. Color as selected by Architect.

1. Roppe

2. Mercer

3. Johnsonite

C. Miscellaneous Materials: Adhesives, tapes, thread, nails, staples and similar products of type recommended by manufacturer and installer.

D. Moisture Sealer: Apply to areas to receive carpet flooring even when the slab meets the moisture content requirements. Provide moisture sealer appropriate for moisture conditions present and approved in writing by the finish floor manufacturer(s) for the conditions present.

1. Where moisture levels are below manufacturer recommended levels, provide a moisture sealer with a minimum resistance capacity of 3 pounds, per 1000 sq. ft. for a 24 hour period, as per calcium chloride test ASTM F1869-98.

2. The required pH range is 9.0 or less as tested according to ASTM F-710-05.

PART 3 - EXECUTION

3.01 EXAMINATION / PREPARATION

A. Prepare sub-floor to comply with criteria established in manufacturer's installation instructions. Use only preparation materials that are acceptable to the manufacturer.

1. Remove deleterious substances from substrate(s) that would interfere with or be harmful to the installation.

2. Remove sub-floor ridges and bumps. Fill cracks, joints, holes, and other defects.

B. Verify that sub-floor is smooth and flat within specified tolerances and ready to receive carpet.

C. Verify that substrate surface is dust-free and free of substances that would impair bonding of product to the floor.

D. Verify that concrete surfaces are ready for installation by conducting moisture and pH testing. Results must be within limits recommended by manufacturer.

E. There will be no exceptions to the provisions stated in the manufacturer's installation instructions.

3.02 INSTALLATION – GENERAL

A. Install product in accordance with manufacturer's installation instructions. Product must have low VOC, factory applied, "dry" adhesive. A peel & stick method applied to the back at the time of manufacture is preferred.

B. Adhesive must meet the requirements of CRI's Green Label Plus program for adhesive. Provide documentation. Provide documentation showing third-party certification of VOC content.

C. Product as installed to be securely attached to the floor in compliance with Americans with Disabilities Act (ADA), Section 4.5.3.

D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings.

E. Provide fully adhered installation by trimming and fitting carpet widths into each space prior to application of adhesive. At adhesive backing installation, peel back adhesive backing sheet and lay down meeting manufacturer's requirements.

F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

G. Install borders parallel to walls.

H. Roll with appropriate roller for complete contact of product with adhesive to sub-floor.

I. Trim carpet neatly at walls and around interruptions. Completed product is to be smooth and free of bubbles, puckers, and other defects.

J. Install edge guards at exposed edges. Bind edges with cloth tape and thread where not concealable.

K. Apply vinyl cove base to walls, columns, pilasters, casework, concrete islands, and other permanent fixtures in rooms or areas where base is scheduled. Base is not required on moveable partition walls where metal base is present.

1. Install base in lengths as long as practicable, with job-formed corners.

2. Tightly bond base to backing throughout length of each piece, with continuous contact at horizontal and vertical surfaces.

3. On masonry surfaces, or other similar irregular surfaces, fill voids along top edge of wall base will base manufacturer=s recommended adhesive filler material.

3.03 PROTECTION & CLEANING

A. Remove excess adhesive and/or other from floor and wall surfaces without damage. Replace carpet which cannot be cleaned.

B. Rubbish, wrappings, debris, trimmings, etc. to be removed from site and disposed of properly.

C. Clean and vacuum surfaces using a beater brush/bar commercial vacuum.

D. After each area is installed, protect from soiling and damage by other trades.

E. In order to allow the adhesive to cure properly, hot water extraction cleaning should not be used within the first 30 days after installation, otherwise warranties are null and void.

3.04 RESTORATION

A. Damage done to paint, walls, woodwork, floors, and/or similar finishes as a result of this work, shall be corrected by the responsible contractor.

B. Required repairs shall be made by the proper trade contracted on the work of this project, who shall make the necessary repairs and shall be paid by the responsible subcontractor for the repair work.

3.05 CLEANING

A. Upon completion of the installation, remove waste materials, tools and equipment.

B. Using commercial vacuums, thoroughly vacuum the entire floor surface.

C. Remove spots or replace carpet where spots cannot be removed.

D. Remove debris, sorting pieces to be saved from scraps to be disposed of.

1. Usable pieces of carpet, roll ends of less than nine feet in length, and pieces of more than three square feet in area not more than one foot wide and necessary to complete the work, are to be left on the job site and placed in orderly manner in such area as designated by the Owner.

2. Dispose or smaller pieces as construction waste.

E. Provide protection methods and materials needed to ensure that carpeting will be without deterioration or damage at time of substantial completion.

F. In order to allow the adhesive to cure properly, hot water extraction cleaning should not be used within the first 30-45 days after installation, otherwise warranties are null and void.

3.06 ATTIC STOCK

A. Upon completion of installation, deliver a minimum of 5% of the total area of modular carpet to the Owner.

B. Package attic stock materials with protective covering with identifying labels.

C. Store attic stock materials where directed by the Owner.

END OF SECTION 09 68 13

SECTION 09 91 00 - PAINTING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, materials, equipment and incidentals required for the completion of the work shown on the drawings and/or specified.

B. The Contractor is directed to read the specification pertaining to the work and materials of other trades in order to understand the extent of various materials used and the provisions regarding their painting. Surfaces that are left unpainted or unfinished shall be finished as part of this work. Complete finished painting is required for every item whether scheduled, noted or not. Work requiring finish but not scheduled or noted shall be finished with products as specified for similar and/or adjacent work.

1. Paint new and existing exposed surfaces unless noted otherwise. If the drawings and/or Schedule of Painting does not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces.

C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1. Prefinished items include, but are not limited to, the following factory-finished components:

a. Architectural woodwork.

b. Metal lockers.

c. Elevator equipment.

d. Finished mechanical and electrical equipment.

e. Light fixtures and supports.

2. Concealed surfaces refers to surfaces, materials, assemblies, or items that cannot be accessed without moving a building element, such as within a chase, wall, or ceiling cavity; as in the following generally inaccessible spaces:

a. Furred areas.

b. Ceiling plenums.

c. Pipe spaces.

d. Duct shafts.

e. Elevator shafts.

3. Finished metal surfaces include, but are not limited to, the following:

a. Anodized aluminum.

b. Stainless steel.

c. Chromium plating.

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:

a. UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

b. Labels designating materials or assemblies as accessible.

1.02 QUALITY ASSURANCE

A. Single Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats. If single source responsibility is not possible, furnish written approval of manufacturer of finish coat indicating acceptance of proposed under coats.

B. For shop primed materials by others, verify compatibility between primer and finish coats. Notify the Architect in writing of problems anticipated with using the specified finish coat materials. Where finish coats are incompatible with primer coats or existing finishes, provide additional barrier coat or surface preparation as required by the manufacturer of the primer and finish coats.

C. Verify compatibility between primer and substrate. Notify the Architect in writing of problems anticipated with using the specified primer and finish coat materials. Where primer and finish coats are incompatible with substrates, for issues such as non-acceptable alkalinity levels, moisture levels, or poor adhesion. Provide additional barrier coat or surface preparation as required by the manufacturer of the primer and finish coats.

D. Preparatory work to be performed as indicated, and at a minimum shall be performed in strict accordance with coating manufacturer's requirements including applicable Society for Protective Coatings (SSPC) and the National Association of Corrosion Engineers International (NACE) standards.

1.03 SUBMITTALS

A. Product data: Include information regarding recommended usage, drying times, preparation and primers, surface compatibility, and application instructions which are to be followed. Material Safety Data (MSD) sheets are not acceptable as product data and if submitted, will be returned without review and comment.

B. Schedule: Submit schedule showing materials to be used, locations, and number of coats to be applied. See SCHEDULE OF PAINTING for format.

1. Products listed on the SCHEDULE OF PAINTING have been recommended by the paint system manufacturers for the intended use and establish a level of quality. If the Contractor submits and/or uses the specified products, the Contractor agrees that the specified products are proper for the intended use. If the Contractor does not agree with the use of the specified products, and recommends the use of alternative products, the Contractor shall submit written explanation and supporting data from the manufacturer for the proposed products. If accepted, proposed products shall be covered under the provisions of the warranty.

C. Color Samples: Provide manufacturer's color fans and/or samples for color selection purpose. Provide full line of standard, custom and premium colors. Provide samples on actual stock when requested by the Architect.

D. Verification Samples: Provide "Draw-Downs" of each paint color for verification purposes. Provide actual samples of each stain or varnish on actual stock. Each sample shall be marked on the backside with the manufacturer, material, and color code.

E. Adhesion Testing Reports: Provide manufacturer's recommended adhesion testing meeting ASTM D 3359 and/or ASTM D 667 as appropriate for substrate being tested. Perform in a non-conspicuous area for each substrate to receive the specified coatings. Do not proceed further until positive results are achieved. Provide additional preparatory work, primer and/or barrier coats, etc. as necessary for proper adhesion; perform additional adhesion testing to confirm proper conditions have been met.

F. Alkalinity Testing Reports: Provide manufacturer's recommended alkalinity testing of plaster, concrete, and concrete masonry surfaces scheduled to receive paint in order to confirm that surfaces do not exceed manufacturer's required alkalinity levels.

G. Moisture Testing Reports: Provide manufacturer's recommended moisture testing of concrete, concrete masonry, gypsum board, plaster, wood, finished woodwork, and other non-metallic surfaces scheduled to receive paint in order to confirm that surfaces do not exceed manufacturer's required moisture levels.

H. Warranty: Submit a written warranty, executed by the Contractor.

I. Coating Maintenance Manual: At project closeout for Owners Record Documents, provide a coatings maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

J. Attic Stock: Verification of delivery of attic stock to Owner.

1.04 DELIVERY, STORAGE AND HANDLING

A. Materials used on the job shall be stored as recommended by the manufacturer. Storage areas shall be kept neat and clean. Damage to these areas or surrounding areas shall be repaired to original condition by the Contractor. Oily rags, waste, etc., must be removed from the building every night and precautions must be taken to avoid fire or indoor contamination. Paints may not be stored, mixed or applied in rooms which have installed finished flooring without taking necessary methods for protection.

1.05 PROTECTION OF WORK

A. Contractor shall provide drop cloths for protecting the floors and finishes from damage during the execution of the work. When necessary, the Contractor shall remove temporary coverings in order to execute the work and shall replace same in a proper manner. In case the covering cannot be replaced, the Contractor shall protect the work as necessary.

B. Before painting, remove hardware, accessories, plates, lighting fixtures and other similar items or provide necessary protection of such items. Upon completion of the work, remove protections and reinstall above items. Verify proper operation of affected items and replace damaged items as directed by the Architect.

C. Contractor shall be responsible for staining of floors or other work, and must either entirely remove the stains or replace the stained materials with materials to match original condition as acceptable to the Architect.

1.06 PROJECT CONDITIONS

A. Conditions must fall within the paint manufacturers requirements, coordinate with below criteria, the more stringent shall apply.

1. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are:

a. Exterior surfaces between 50 deg F and 90 deg F.

b. Interior surfaces between 60 deg F and 90 deg F.

2. Apply solvent-thinned paints only when the temperature of exterior surfaces to be painted and surrounding air temperatures are between 45 deg F and 95 deg F.

3. Interior and exterior painting shall not be performed when satisfactory results cannot be obtained due to high humidity, excessive temperatures or other conditions affecting application and performance.

a. Do not apply in snow, rain, fog, or mist.

b. Do not apply when the relative humidity exceeds 85 percent.

c. Do not apply at temperatures less than 5 deg F above the dew point

d. Do not apply to damp or wet surfaces.

B. Do not apply paint in areas where dust is being generated or will be generated while the applied paint is drying.

C. In rooms and spaces where paint is being applied, ensure there is adequate ventilation to allow for proper paint drying, as well as to exhaust paint fumes and minimize odors.

1.07 WARRANTY

A. The Contractor accepts the responsibility of providing proper workmanship, including but not limited to proper cleaning and preparation of surfaces, proper application of product based upon manufacturer's requirements, and acceptance that specified products are proper for the intended use. Contractor agrees that if paint system fails in any manner, it will be due to improper workmanship. Should any failure occur within the specified warranty period, the Contractor agrees to remedy the affected area(s). Work shall include removal of failing paint system (if necessary or if required by the paint system manufacturer), proper cleaning and preparation of surfaces, proper application of product(s) based upon manufacturer's recommendations and requirements, and use of proper products for intended use.

1. The warranty described above shall cover a period of 2 years from the date of Substantial Completion.

2. An additional warranty shall be issued for areas that have failed and have been corrected. This additional warranty shall cover a period of 2 years from the date of acceptance of the corrected work.

B. The warranty shall not deprive the Owner of other rights or remedies the Owner may have under other provisions of the Contract Documents, and is in addition to and runs concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

1.08 ATTIC STOCK

A. Furnish extra paint materials for Owners use:

1. Deliver to project site 1 gallon of each finish paint product in each color required for painting. Mark each container with color identification and room names, numbers, or areas where paint was used, without obscuring manufacturer's label.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Paints, varnishes, enamels, lacquers, stains, paste fillers and similar materials, must be delivered in their original containers with the seals unbroken and labels intact. Materials

shall be used only as specified by the manufacturer's label on the container. Thinners and accessory materials shall be of best quality and of reputable brands.

B. Material Compatibility: Furnish block fillers, primers, finish coat materials, and related materials that are compatible with one another and with the existing painted substrates, as demonstrated by the manufacturer, based on testing or field experience.

C. Patching Material Compatibility: Furnish surface preparation products, including patching compounds, that are compatible with selected paint products.

D. Gasoline, benzene or other materials not provided for under this specification shall not be brought on the job site.

E. Colors shall be selected or approved by Architect. Colors shall be mixed as directed and sample panels shall be submitted for approval. Paint products shall be factory-tinted and not tinted on the job site.

F. The completed work of the Contractor shall match colors and surface finishes of approved samples. The Contractor shall do additional mixing and blending as necessary to achieve this result.

G. Rooms and spaces may have wall(s) painted a different color(s) than other walls in the same room. Ceilings, soffits, trim and reveals may be painted a different color(s) than the walls. Steel roof joists, bridging and related work may be painted a different color(s) than the roof deck in areas with exposed structural elements. Ductwork, conduits, piping and other mechanical/electrical items may be painted a different color(s) than surrounding items where such items are exposed.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions under which painting will be performed for compliance with paint application requirements. Comply with the specifications and manufacturer's requirements for condition of surfaces.

1. Conform with manufacturer's requirements for warranty to be furnished by the manufacturer.

B. Surface preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified herein.

C. Coordination of Work: Review other Sections in which primers are specified to ensure compatibility of the total system for various substrates.

D. Test Reports: Review alkalinity, moisture, and adhesion test results.

1. Provide required work and materials necessary to meet specification criteria, and provide for the manufacturer’s warranty.

E. Notify the Architect in writing a minimum of 14 days prior to painting, regarding anticipated problems using the specified materials over substrates previously finished with incompatible materials.

F. Do not begin to apply paint or finishes until unsatisfactory conditions have been corrected.

1. The application of paint or finishes shall be an indication of the Contractor's acceptance of the surface.

3.02 PREPARATORY WORK

A. Preparatory work to be performed as indicated, and at a minimum shall be performed in strict accordance with coating manufacturer's requirements including applicable Society for Protective Coatings (SSPC) and the National Association of Corrosion Engineers International (NACE) standards.

B. Surfaces to be painted shall be cleaned free of rust, dirt, foreign and deleterious materials before painting is started. Contractor shall do necessary preparatory work, sizing, sanding, etc. to produce a surface suitable to receive paint, natural finish, etc.

1. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

2. Use an appropriate cleaner compatible with the coating systems and surfaces as approved by the coating system manufacturer. Properly repair or replace items damaged by this work if repair work is not acceptable to Architect. Properly protect areas and items not to receive above cleaning methods.

3. Confirm compatibility of shop applied primers with specified finish coats to determine proper preparatory methods, and if a barrier primer coat is recommended by the coating system manufacturer.

C. Knots, pitch streaks and sappy spots shall be first touched up with shellac or sealer where the finish calls for paint or enamel.

D. Provide necessary filling of nail holes, cracks, etc., after the application of the first coat using a putty or filler of a color to match the finish. Putty and filler shall be brought flush with the adjoining surfaces in a neat and workmanlike manner. Necessary filling and repair operations shall also be performed to produce a sound and suitable surface to receive the new paint and finish.

E. Metal surfaces shall be first washed with appropriate solvent to remove any dirt or grease before applying materials. Where rust or scale is present, surfaces shall be properly cleaned and prepared as required by the manufacturer before painting.

1. Rust shall be removed by sanding, wire brushing, etc.

a. Treat existing surfaces with a rust conversion primer/sealer compatible with the specified finishes.

2. Shop coats of paint that become marred shall be sanded, cleaned, and touched up with required products. Necessary touch-up operations shall also be performed to produce a sound and suitable surface to receive the new paint and finish.

F. Galvanized steel should be tested for pre-treatments using the procedure from the National Coil Coaters Association, Technical Bulletin No. II-9 or from ASTM D-2092, Method B201, Volume 06.01. Galvanized metal surfaces that has been treated for wet storage stain control must have the treatment removed prior to painting. If the metal has been treated, solvent clean the steel per SSPC-SP1 and apply a test patch. If adhesion is unacceptable, Brush-Off Blasting per SSPC-SP7/NACE No. 4 is required to remove the treatment.

G. Existing glossy painted surfaces shall be washed thoroughly with a bi-sodium phosphate solution recommended by the paint manufacturer. Rinse, and allow to dry thoroughly. Properly repair or replace items damaged by this work if repair work is not acceptable to Architect. Properly protect areas and items not to receive above cleaning methods.

H. Test substrates for proper adhesion of paint and finish. Provide manufacturer's recommended adhesion testing meeting ASTM D 3359 and/or ASTM D 667 as appropriate for substrate being tested.

I. Test plaster, concrete, and concrete masonry surfaces scheduled to receive paint for alkalinity levels in order to confirm that surfaces do not exceed manufacturer's required alkalinity levels. Where alkalinity levels exceed required levels, provide manufacturer's proper high pH blocker primer.

J. Test surfaces scheduled to receive paint for moisture levels in order to confirm that surfaces do not exceed manufacturer's required moisture levels.

K. Where concrete and concrete masonry surface moisture levels exceed required levels, provide manufacturer's proper moisture blocker primer.

L. All other non-metallic surfaces such as gypsum board, plaster, wood, finished woodwork, etc. follow manufacturer's written requirements.

M. Test substrates for proper paint coverage. Provide manufacturer's recommended dry opacity testing meeting ASTM D 344.

N. Following required preparatory work, Contractor shall inspect surfaces for suitability to receive the specified paint or finishes. The application of paint or finishes shall be an indication of the Contractor's acceptance of the surface.

3.03 APPLICATION

A. Painting products shall be applied in strict accordance with manufacturer's requirements.

1. Drying time of primer, initial finish coat, and subsequent finish coats is temperature and humidity dependent and must follow the manufacturer's requirements before any coats are applied.

2. Cure time of the completed coating application is temperature and humidity dependent and must follow the manufacturer's requirements for a fully cured painted surface before any further contractual work occurs to the painted surface, or that could adversely affect the painted surface.

a. Painted surfaces must be fully cured prior to installing items subject to direct contact with said surfaces.

B. Materials shall be thoroughly mixed immediately before application of paint. Materials shall be evenly spread and smoothly flowed on without runs or sags or other defects.

C. Painting and finishing shall not be done while surfaces are damp. Coats shall be thoroughly dry and cured before applying succeeding coats. Interior work except on masonry, pipe covering or other soft or rough surfaces, shall be sanded between coats with fine sandpaper to produce an even, smooth finish, unless otherwise specified.

D. Final interior finish coat shall not be applied until other work has been finished and materials and debris have been removed and the premises have been left in a broom clean condition.

1. Painted surfaces must be fully cured prior to installing items subject to direct contact with said surfaces.

E. Final exterior finish coat shall not be applied until other work has been finished and materials and debris have been removed.

1. Painted surfaces must be fully cured prior to installing items subject to direct contact with said surfaces.

3.04 WORKMANSHIP

A. Workmanship shall be of the very best. Only skilled mechanics shall be employed.

B. Finish work shall be uniform and of approved color and shall be smooth, free from runs, sags and defective application. Edges of paint adjoining other materials or colors shall be sharp and clean, without overlapping. Before applying succeeding coats, primers and undercoats shall be completely integral and performing the function for which they are specified. Scratches, abrasions or any other disfigurements shall be properly prepared, sanded, and touched up, and any foreign matter removed before proceeding with the following coat.

C. Paint shall be applied by a brush, roller or spray. Materials when brushed shall be evenly flowed on with brushes best suited for the type of material being applied. When using a roller, covers shall be of a type most suited for approved materials and textures. Spray applied paint shall be uniformly applied under pressure using recommended equipment.

D. Apply paint to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks. Where applicable due to project conditions blend in with previously painted surfaces not indicated to receive new finishes.

1. Finished surfaces shall have uniform color, dry opacity, and sheen.

3.05 CLEANING AND PROTECTION

A. Protect work of other trades, whether being painted or not, against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, and leave in an undamaged condition.

B. Provide "Wet Paint" signs to warn occupants of and to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

D. At the end of each work day, remove empty cans, rags, cleaning pads, rubbish, and other discarded paint materials from the site.

E. Just prior to final completion and acceptance, the Contractor shall examine painted and refinished surfaces and retouch or refinish as necessary and required to leave surfaces in perfect condition.

F. Upon completion of work, painting contractor shall remove paint and varnish spots from floors and other surfaces and remove rubbish and accumulated materials of whatever nature not caused by other trades from premises and leave work in a clean, orderly and acceptable condition. Clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces or to generate dust.

3.06 SCHEDULE OF PAINTING

A. Products listed on the SCHEDULE OF PAINTING have been recommended by the paint system manufacturers for the intended use and establish a level of quality. If the Contractor submits and/or uses the specified products, the Contractor agrees that the specified products are proper for the intended use. If the Contractor does not agree with the use of the specified products, and recommends the use of alternative products that meet or exceed the level of quality of the specified products, the Contractor shall submit written explanation and supporting data from the manufacturer for the proposed products. Only products confirmed in writing by the paint manufacturer that meet or exceed the level of quality of the specified products will be considered. If accepted, proposed products shall be covered under the provisions of the warranty.

B. Painting and finishing to new and existing surfaces shall be done in accordance with the following schedule except as otherwise noted herein.

1. Prior to application of finishes, perform proper cleaning and preparatory work, moisture/alkalinity/adhesion testing, etc. to all surfaces to be painted/coated as specified within this section. The application of paint or finishes shall be an indication of the Contractor's acceptance of the surface.

2. Paint exposed surfaces unless noted otherwise. Exposed surfaces include 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.

3. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of permanently fixed equipment or furniture, paint surfaces behind such equipment or furniture with prime coat only.

4. Paint interior surfaces of ducts with a flat, non-specular black paint where visible through registers or grilles.

5. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.

6. Paint access panels, electrical panels, air diffusing outlets, supply and exhaust grilles, louvers, exposed conduit, primed hardware items, primed outlet covers, primed wall and ceiling plates and other items in painted areas to match the areas in which they occur unless otherwise directed by the Architect.

7. Finish doors on tops, bottoms, and side edges the same as exterior faces.

8. Sand lightly using low-dust emission wet methods between each succeeding enamel or varnish coat, and any other coating products meeting manufacturer’s requirements.

9. Do not paint prefinished surfaces.

C. It is the intent that the indicated enumeration of coats on surfaces will give approved coverage coatings and each coat shall be applied heavy enough to obtain this result or additional coat(s) will be required at no additional cost. Finished surfaces shall have uniform color, dry opacity, and sheen.

D. The indicated enumeration of coats is the minimum acceptable number of each item. Substitution of one heavy coat is not an acceptable substitution for two coats.

1. Each coat at a minimum must achieve the manufacturers recommended minimum dry film thickness for the specified item.

E. Abbreviations shown are:

1. S-W = Sherwin-Williams

2. PPG = PPG Paints

F. Exterior Painting

1. Non-ferrous and galvanized metal, except pre-finished metal work, but including stacks, flues, vents, vent enclosures, fan enclosures, etc. on roof regardless of metal type; eggshell sheen finish, 2 finish coats over 1 primer coat:

a. Primer Coat

1. S-W, Pro Cryl Metal Primer B66-310

2. PPG, Pitt-Tech DTM Primer 90-712

b. First and Second Finish Coats

1. S-W, Pro Industrial Zero VOC Acrylic B66 Series

2. PPG, Pitt-Tech DTM Finish 90-374

c. Notes:

1. At flues and vents subject to high temperatures, in lieu of above provide manufacturer's high temperature resistant primer coat and finish coats to assure a proper, stable coating.

2. At existing painted surfaces after proper preparatory work has occurred provide manufacturer's proper Primer Coat compatible with existing surfaces before applying the 2 finish coats.

3. Provide specified TSP cleaning to existing surfaces to remove dirt, grease, etc. before painting.

2. Galvanized ferrous metal including railings, guardrail assemblies, pipe bumpers, and wall mounted ladders; gloss sheen finish, 2 finish coats over 1 primer coat:

a. Primer Coat

1. S-W, Pro Cryl Metal Primer B66-310

2. PPG, Pitt-Tech DTM Primer 90-712

b. First and Second Finish Coats

1. S-W, Pro Industrial Urethane Enamel B54 Series

2. PPG, Glyptex Urethane Enamel PP4139

c. Notes:

d. At existing painted surfaces after proper preparatory work has occurred provide manufacturer's proper Primer Coat compatible with existing surfaces before applying the 2 finish coats.

3. Ferrous metal, including but not limited to metal doors and frames; gloss sheen finish, 2 finish coats over shop primer coats:

a. First and Second Finish Coats

1. S-W, Pro Industrial Urethane Enamel B54 Series

2. PPG, Glyptex Urethane Enamel PP4139

b. Notes:

1. Bare metal surfaces shall be touched up with manufacturers required primer before painting, confirm compatibility with shop primer coats

a. S-W, DTM Primer B66W1

b. PPG, Pitt-Tech DTM Primer 90-712

2. At existing painted surfaces after proper preparatory work has occurred provide manufacturer's proper Primer Coat compatible with existing surfaces before applying the 2 finish coats.

4. Exposed structural steel, steel lintels, pipe bollards, railings and guardrails, metal doors and frames, wall mounted ladders, entrance skylight canopies including columns, plates, etc.; gloss sheen finish, 2 finish coats over 1 primer coat:

   a. Primer Coat

      1. S-W, Macropoxy 646 Fast Cure Epoxy B58 Series

      2. PPG, Amerlock 2 Epoxy

   b. First and Second Finish Coats

      1. S-W, Acrolon 218 HS Acrylic Polyurethane B65 Series

      2. PPG, Amercoat 450H Polyurethane

   c. Notes:

      1. Clean surfaces prior to application of finishes with:

         a. S-W, Great Lakes Lab Extra Muscle Prepaint Cleaner

         b. PPG, Dura Prep 120 Cleaner

      2. Galvanized surfaces to receive manufacturers required preparatory methods including any required barrier coats.

      3. Shop primed or existing painted surfaces to receive a barrier coat prior to application of Primer Coat:

         a. S-W, ProIndustrial ProCryl Metal Primer

         b. PPG, the specified Amerlock 2 Epoxy primer is a "surface tolerant" epoxy mastic that does not require a separate barrier coat over shop primed steel.

5. Precast concrete wall panels, concrete, and CMU; flat sheen finish, 2 finish coats over 1 primer coat:

   a. Primer Coat

      1. S-W, Loxon Primer A24 series for Concrete and Masonry

      2. PPG, Permacrete 4-100 Concrete Block and Masonry Filler

   b. First and Second Finish Coats

      1. S-W, Loxon XP A24 series

      2. PPG, Permacrete 4-22 100% Acrylic Coating

   c. Notes:

      1. System to be installed per manufacturers requirements for a pure acrylic water-repellant coating system

      2. At existing painted surfaces after proper preparatory work has occurred provide manufacturer's proper Primer Coat compatible with existing surfaces before applying the 2 finish coats.

      3. Existing painted surfaces to be media blasted to remove paint down to bare concrete.

      4. Provide specified TSP cleaning to existing surfaces to remove dirt, grease, etc. before painting.

6. Exposed surfaces of concrete, and non-textured GFRC to receive textured acrylic elastomeric field applied coating system; flat sheen, fine sand texture finish, 2 finish coats over 1 primer coat:

   a. Primer Coat

      1. PPG, Permacrete 4-2 High Build Acrylic Primer

      2. Dryvit Systems, Inc., Weatherprime Acrylic Primer

   b. First and Second Finish Coats

      1. PPG, Permacrete 4-50 Texture Coatings Fine

      2. Dryvit Systems, Inc., Weatherlastic Sandpebble Fine

   c. Note:

      1. System to be installed only after surface imperfections have been corrected, cracks have been treated, and proper preparatory work has been completed per manufacturer's requirements.

7. Finished wood trim, fascia, soffits, sills, siding, fencing, trash enclosures, etc.; Semi-Transparent Stain, 2 finish coats:

   a. First and Second Finish Coats

      1. S-W, Woodscapes Semi-Transparent Exterior Stain

      2. PPG, Flood Pro Series, Semi-Transparent Stain, Acrylic/Oil

8. Finished wood trim, fascia, soffits, sills, siding, fencing, trash enclosures, etc.; Opaque Stain, 2 finish coats:

   a. First and Second Finish Coats

      1. S-W, Woodscapes Solid Color Exterior Stain

      2. PPG, Flood Pro Series, Solid Color Stain, 100% Acrylic Latex

G. Interior Painting

1. Exposed ferrous metal work including but not limited to steel lintels, pipe bollards, railings and guardrails, metal doors and frames; semi-gloss sheen finish, 2 finish coats over shop primer coats:

   a. First and Second Finish Coats

      1. S-W, ProMar 200 Interior Latex Acrylic-Alkyd B34W08251

      2. PPG, Speedhide WB Alkyd 6-1510

   b. Notes:

      1. Bare metal surfaces shall be touched up with manufacturers required primer before painting, confirm compatibility with shop primer coats

         a. S-W, ProCryl Universal Metal Primer

         b. PPG, Seal Grip 17-921 Acrylic Primer

      2. At existing painted surfaces after proper preparatory work has occurred provide manufacturer's proper Primer Coat compatible with existing surfaces before applying the 2 finish coats.

2. Metal work not primed; semi-gloss sheen finish, 2 finish coats over 1 primer coat:
    a. Primer Coat
        1. S-W, ProCryl Universal Metal Primer
        2. PPG, Seal Grip 17-921 Acrylic Primer
    b. First and Second Finish Coats
        1. S-W, ProMar 200 Interior Latex Acrylic-Alkyd B34W08251
        2. PPG, Speedhide WB Alkyd 6-1510
3. Structural steel, including associated plates, brackets, etc., steel joists, bulb tees, metal floor and roof deck; semi-gloss sheen finish, 2 finish coats over shop primer coats:
    a. First and Second Finish Coats
        1. S-W, ProMar 200 Interior Latex Acrylic-Alkyd B34W08251
        2. PPG, Speedhide WB Alkyd 6-1510
    b. Notes:
        1. Bare metal surfaces shall be touched up with manufacturers required primer before painting, confirm compatibility with shop primer coats
            a. S-W, ProCryl Universal Metal Primer
            b. PPG, Seal Grip 17-921 Acrylic Primer
        2. At galvanized metal surfaces provide manufacturer's required Primer Coat before applying the 2 finish coats
            a. S-W, DTM Primer B66W1.
            b. PPG, Pitt-Tech DTM Primer 90-712
        3. At existing painted surfaces after proper preparatory work has occurred provide manufacturer’s proper Primer Coat compatible with existing surfaces before applying the 2 finish coats.
4. Concrete block surfaces; semi-gloss sheen finish, 2 finish coats over 1 primer coat:
    a. Primer Coat
        1. S-W, Interior/Exterior Latex Block Filler
        2. PPG, Speedhide Block Filler 6-7
    b. First and Second Finish Coats
        1. S-W, ProMar 200 Interior Latex Acrylic-Alkyd, B34W08251
        2. PPG, Speedhide WB Alkyd 6-1510
    c. Notes:
        1. At existing painted surfaces after proper preparatory work has occurred provide manufacturer’s proper Primer Coat compatible with existing surfaces before applying the 2 finish coats.

5. Concrete block surfaces indicated to receive epoxy wall coating; semi-gloss sheen finish, 2 finish coats over 1 primer coat:

   a. Primer Coat

      1. S-W, Heavy Duty Block Filler B42W46

      2. PPG, Speedhide Block Filler 6-7

   b. First and Second Finish Coats

      1. S-W, Pro Industrial Pre-Catalyzed Waterbased Epoxy K46-150

      2. PPG, Pitt-Glaze WB1 Pre-Catalyzed Water-Borne Acrylic Epoxy 16-510

   c. Notes:

      1. At existing painted surfaces after proper preparatory work has occurred provide manufacturer's proper Primer Coat compatible with existing surfaces before applying the 2 finish coats.

6. Concrete block surfaces, indicated to receive epoxy wall coating; gloss sheen finish, 2 finish coats over 1 primer coat:

   a. Primer Coat

      1. S-W, Heavy Duty Block Filler B42W46

      2. PPG, Speedhide Block Filler 6-7

   b. First and Second Finish Coats

      1. S-W, Pro Industrial Water Based Catalyzed Epoxy B73 Series

      2. PPG, Aquapon WB Water Base Epoxy 98-101 Series

   c. Notes:

      1. At existing painted surfaces after proper preparatory work has occurred provide manufacturer's proper Primer Coat compatible with existing surfaces before applying the 2 finish coats.

7. Gypsum board, impact resistant cement board, plaster, acoustic diffuser ceiling and wall panels, spandrel panels, MDF panels, wood trim indicated to be painted, etc.: finish sheen as noted, 2 finish coats over 1 primer coat:

   a. Primer Coat

      1. S-W, ProMar 200 Zero VOC Interior Latex Primer B28W2600

      2. PPG, Speedhide Zero VOC Interior Latex Primer 6-4900xi

   b. First and Second Finish Coats

      1. S-W, ProMar 200 Zero VOC Interior Latex B20W12651 / B30W02651

      2. PPG, Speedhide Zero VOC Interior Latex 6-4340xi / 6-4110xi

   c. Notes:

      1. Walls and trim to have eggshell sheen finish, ceilings and soffits to have flat sheen finish.

      2. MDF panels to have coatings spray applied to achieve the desired results.

3. At existing painted surfaces after proper preparatory work has occurred provide manufacturer's proper Primer Coat compatible with existing surfaces before applying the 2 finish coats.

8. Gypsum board surfaces indicated to receive epoxy wall coating; eggshell sheen finish, 2 finish coats over 1 primer coat:

   a. Primer Coat

      1. S-W, ProMar 200 Zero VOC Wall Primer B28W2600

      2. PPG, Speedhide Zero VOC Primer 6-4900xi

   b. b. First and Second Finish Coats

   c. First and Second Finish Coats

      1. S-W, Pro Industrial Pre-Catalyzed Waterbased Epoxy K45-150

      2. PPG, Pitt-Glaze WB1 Pre-Catalyzed Water-Borne Acrylic Epoxy 16-310

   d. Notes:

      1. At existing painted surfaces after proper preparatory work has occurred provide manufacturer's proper Primer Coat compatible with existing surfaces before applying the 2 finish coats.

9. Faces and edges of wood base, trim, field finished wood doors, etc., to receive stain finish; satin top coat sheen finish, 3 finish coats over 1 stain coat:

   a. Stain Coat

      1. S-W, Wood Classics 250 Oil Stain A49 Series

      2. PPG, Deft Oil Based Stain DFT 400

   b. First and Second Finish Coats, and Third Finish Top Coat (Satin)

      1. S-W, Wood Classics WB Poly Satin

      2. PPG, Deft WB Poly Satin DFT 157

   c. Notes:

      1. Sand lightly between finish coats per manufacturers requirements.

10. Insulation covering of exposed piping in finished areas; flat sheen finish, 2 finish coats over 1 primer coat:

   a. Primer Coat

      1. S-W, ProMar 200 Zero VOC Interior Latex Primer B28W2600

      2. PPG, Speedhide Zero VOC Interior Latex Primer 6-4900xi

   b. First and Second Finish Coats

      1. S-W, ProMar 200 Zero VOC Interior Latex B30W02651

      2. PPG, Speedhide Zero VOC Interior Latex 6-4110xi

   c. Notes:

1. Verify and coordinate compatibility of finish materials with insulation covering materials and provide necessary products for a complete and proper finish.

2. At existing painted surfaces after proper preparatory work has occurred provide manufacturer's proper Primer Coat compatible with existing surfaces before applying the 2 finish coats.

11. Exposed uncovered piping, electrical conduit, wiremold, gas lines, unfinished radiation and heating units, in finished areas; low sheen finish, 2 finish coats over 1 primer coat:

a. Primer Coat

1. S-W, ProCryl Universal Metal Primer

2. PPG, Seal Grip 17-921 Acrylic Primer

b. First and Second Finish Coats

1. S-W, ProMar 200 Interior Latex Acrylic-Alkyd B33W08251

2. PPG, Speedhide WB Alkyd 6-1410

c. Notes:

1. At galvanized metal surfaces provide manufacturer's required Primer Coat before applying the 2 finish coats

a. S-W, DTM Primer B66W1

b. PPG, Pitt-Tech Plus DTM Primer 90-912

2. At existing painted surfaces after proper preparatory work has occurred provide manufacturer's proper Primer Coat compatible with existing surfaces before applying the 2 finish coats.

12. Exposed galvanized sheet metal, including ductwork, in finished areas; flat sheen finish, 2 finish coats over 1 primer coat:

a. Primer Coat

1. S-W, DTM Primer B66W1

2. PPG, Pitt-Tech Plus DTM Primer 90-712

b. First and Second Finish Coats

1. S-W, ProMar 200 Zero VOC Interior Latex B30W02651

2. PPG, Speedhide Zero VOC Interior Latex 6-4110xi

c. Notes:

1. At existing painted surfaces after proper preparatory work has occurred provide manufacturer's proper Primer Coat compatible with existing surfaces before applying the 2 finish coats.

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