

SPECIFICATIONS
SFA Project No. 21072

Amador Valley HS ReRoofing Amador Valley High School

Pleasanton Unified School District



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(No work in the above division)

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SECTION 01 73 20 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 SUMMARY

- A. **This Section includes the following for the said roof systems on: Vintage Hills, Foothill High School, AVHS and Lydiksen.**

1. **Vintage Hills: MPR, Bldg B and C**
2. **AVHS: Girls locker-room, Gym and Mat roof**
3. **Foothill: Bldgs E,F and G**
4. **Fairlands: Remove [e] shingle and underlayment**
5. **Lydiksen: MPR**
6. **Remove all dead equipment as designated / marked by owner/ Architect.**
7. **Remove all wood blocking and dispose of.**
8. **Remove [e] edge metal, skirt flashings and counterflashings to substrate.**
9. **Remove all termination metal to substrate.**
10. **Remove all [e] vents unless otherwise noted.**
11. **Remove all coping.**
12. **Retain and store all Dura blocks for re installation.**

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

- C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 SUBMITTALS

Regulatory requirements Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

- A. Standards: Comply with ANSI A10.6 and NFPA 241.
- B. Predemolition Conference: Conduct conference at Project site to comply with requirements.

1.5 PROJECT CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Notify Owner of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Hazardous Materials: Hazardous materials are present in construction to be selectively demolished.
- D. Storage or sale of removed items or materials on-site is not permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.6 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities affected by the Work have been disconnected and capped.

- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Owner.
- E. **Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs. Photographs to be taken on or prior to pre construction meeting.**

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
 - 1. Comply with requirements for existing services/systems interruptions specified in Summary.
- B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with walks, walkways, and other adjacent occupied and used facilities.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - 2. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

3. Dispose of demolished items and materials promptly

B. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Protect items from damage during transport and storage.
3. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.

3.5 DEMOLITION PROCEDURES

A. Remove [e] gravel surfaced BUR and cap sheet roofing and insulation to the substrate.

B. Remove [e] flashings to substrate.

C. Remove [e] metal on perimeter edge /skirt metal/counterflashing's.

D. Remove all wood blocking.

E. Re- use all rubber Dura Blocks.

F. Remove all equipment as designated by owner/ Architect and dispose of properly.

G. Remove all [e] gutters. Schedule 40 downspouts to remain.

H. Remove all walkways/ walk pads.

I. Remove all coping metal.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 01732

SECTION 05 51 50 – ALUMINUM ACCESS LADDER

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Exterior aluminum access ladders.

1.3 REFERENCES

- A. AA – Aluminum Association.
- B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- C. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- D. OSHA 1910.27 – Fixed Ladders.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product.
- B. Shop Drawings:
 - 1. Detail fabrication and erection of each ladder indicated. Include plans, elevations, sections, and details of metal fabrications and their connections.
 - 2. Provide templates for anchors and bolts specified for installation under other Sections.
 - 3. Provide reaction loads for each hanger and bracket.
- C. Qualification Data:
 - 1. Refer to Quality Assurance provisions for submittal requirements evidencing experience, certifications and resources.
- D. Selection Samples: For each finish specified, two complete sets of color chips representing manufacturer's full range of available colors.
- E. Verification Samples: For each finish specified, two samples, minimum size 6 inches (150 mm) square, represent actual product color.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in producing aluminum metal ladders similar to those indicated for this Project.
 - 1. Record of successful in-service performance.
 - 2. Sufficient production capacity to produce required units.

3. Professional engineering competent in design and structural analysis to fabricate ladders in compliance with industry standards and local codes.
- B. Installer Qualifications: Competent and experienced firm capable of selecting fasteners and installing ladders to attain designed operational and structural performance.
 - C. Product Qualification: Product design shall comply with OSHA 1910.27 minimum standards for ladders.
 - D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 1. Install ladder in area designated by Architect.
 2. Do not proceed with remaining work until workmanship and installation are approved by Architect.
 3. Rework mock-up as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurement before fabrication.
 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, indicate established dimensions on shop drawing submittal and proceed with fabrication.

1.8 WARRANTY

- A. Manufacturer has responsibility for an extended Corrective Period for work of this Section for a period of 5 years from date of Substantial Completion against all the conditions indicated below, and when notified in writing from Owner, manufacturer shall promptly and without inconvenience and cost to Owner correct said deficiencies.
 1. Defects in materials and workmanship.
 2. Deterioration of material and surface performance below minimum OSHA standards as certified by independent third party testing laboratory. Ordinary wear and tear, unusual abuse or neglect excepted.
 3. Within the warranty period, the manufacturer shall, at its option, repair, replace, or refund the purchase price of defective ladder.
- B. Manufacturer shall be notified immediately of defective products, and be given a reasonable opportunity to inspect the goods prior to return. Manufacturer will not assume responsibility, or compensation, for unauthorized repairs or labor. Manufacturer makes no other warranty, expressed or implied, to the merchantability, fitness for a particular purpose, design, sale, installation, or use, of the ladder; and shall not be liable for incidental or consequential damages, losses of or expenses, resulting from the use of ladder products.

1.9 EXTRA MATERIALS

- A. Furnish touchup kit for each type and color of paint finish provided.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: O'Keeffe's, Inc.; 325 Newhall St. San Francisco, CA 94124. ASD. Toll Free Tel: (888) 653-3333. Tel: (415) 824-4900. Fax: (415) 824-5900. Email: info@okeeffes.com. Web: http://www.okeeffes.com.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 APPLICATIONS/SCOPE

- A. Fixed and Cage Ladder Design:
 - 1. Safety cages are required on ladders over 24 feet (7315 mm)
 - 2. Safety cages are required on all ladders in high or hazardous areas.
 - 3. Landing platforms are required at 50 feet (15,240 mm) above the bottom of the ladder.
 - 4. Rail and harness fall arrest system as alternate to safety cage and landing platforms shall be a permissible manufacturer's option.
 - a. Fixed Ladder Bottom Bracket:
 - b. Bottom floor supported bracket.
 - c. Bottom wall supported bracket.
 - d. Bracket as drawn.
- B. Fixed Access Ladder:
 - 1. Tubular Rail Low Parapet Access Ladder with Walk-through Rail Extension.
 - a. Model 504 as manufactured by O'Keeffe's Inc.

2.3 FINISHES

- A. Mill finish. As extruded.
- B. Clear Anodic Finish: AA-M10C22A41 Mechanical finish as fabricated. Architectural Class I, clear coating 0.018 mm or thicker.
- C. Paint. Urethane over chemically pretreated substrate.
 - 1. Fire Red (RAL 2002).

2. Alert Orange (RAL 2003).
3. Warning Blue (RAL 5005).
4. Caution Yellow (RAL 1018).
5. Safety Green (RAL 6001).
6. As scheduled on drawings.

2.4 MATERIALS

- A. Aluminum Sheet: Alloy 5005-H34 to comply with ASTM B209.
- B. Aluminum Extrusions: Alloy 6063-T6 to comply with ASTM B221.

2.5 FABRICATION

- A. Rungs: Not less than 1-1/4 inches (32 mm) in section and 18-3/8 inches (467mm) long, formed from tubular aluminum extrusions. Squared and deeply serrated on all sides.
 1. Rungs shall withstand a 1,500 pound (454 kg) load without deformation or failure.
- B. Channel Side Rails: Not less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide.
- C. Heavy Duty Tubular Side Rails: Assembled from two interlocking aluminum extrusions no less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide. Construction shall be self-locking stainless steel fasteners, full penetration TIG welds and clean, smooth and burr-free surfaces.
- D. Walk-Through Rail and Roof Rail Extension: Not less than 3 feet 6 inches (1067 mm) above the landing and shall be fitted with deeply serrated, square, tubular grab rails.
- E. Landing Platform: 1-1/2 inches (38 mm) or greater diameter, tubular aluminum guardrails and decks of serrated aluminum treads.
- F. Ladder Safety Post: Retractable hand hold and tie off.
- G. Safety Cages:
 1. Fabricate ladder safety cages to comply with authority having jurisdiction. Assemble by welding. Spacing of primary hoops, secondary hoops and vertical bars shall not exceed that required by code.
 2. Safety cage hoops and vertical bars: 3/16 inch (5 mm) by 2 inches (51 mm) aluminum bar.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Coordinate anchorages. Furnish setting drawings, templates, and anchorage structural loads for fastener resistance.
- B. Do not begin installation until supporting structure is complete and ladder installation will not interfere with supporting structure work.
- C. If supporting structure is the responsibility of another installer, notify Architect of unsatisfactory supporting work before proceeding.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction.

3.3 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 06 10 50 - MISCELLANEOUS CARPENTRY

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.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Plywood replacement as required.
 - 2. Miscellaneous carpentry as required.
 - 3. Fascia board removal and replacement as required.

1.3 DEFINITIONS

- A. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. WCLIB - West Coast Lumber Inspection Bureau.
 - 2. WWPA - Western Wood Products Association.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
- B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
 - 1. Preservative-treated wood.

1.5 QUALITY ASSURANCE

- A. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria":
 - 1. Miscellaneous lumber.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Provide dry lumber with 19 percent maximum moisture content.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: **AWPA C2 lumber**, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and **one of** the following:
 - a. Chromated copper arsenate (CCA).
- B. Kiln-dry material after treatment to a maximum moisture content of **19 percent for lumber**. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Application: Treat items to include the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.

2.3 DIMENSION LUMBER

- A. General: Provide dimension lumber of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.

1. Pressure treated Douglas Fir (north); NLGA, WCLIB, or WWPA.
2. Plywood: ½ inch APA CDX plywood, exterior grade, 5 ply plywood, or to match existing in thickness.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide lumber for support or attachment of other construction, including the following:
 1. Blocking. Blocking size and spacing shall meet current building code requirements for conduits and gas lines. Spacing of block shall be per current Uniform building code requirements.
 2. Nailers. Nailer size to accommodate location Minimum size to be: 2" x 4"
- B. For items of dimension lumber size, provide **Construction** grade lumber with **19** percent maximum moisture content and one **of** the following species:
 1. Pressure treated Douglas Fir(north); NLGA, WCLIB, or WWPA.

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 1. Where carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners **with hot-dip zinc coating complying with ASTM A 153/A**
- B. Wood Screws: ASME B18.6.1.
- C. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- D. Bolts: Steel bolts complying with ASTM A -307 hex nuts and, where indicated, flat washers.
- E. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 1. Material: Stainless steel with bolts and nuts complying with ASTM F 593

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.
- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- C. Apply field treatment complying with AWPAC M4 to cut surfaces of preservative-treated lumber and plywood.
- D. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.
- E. Countersink fastener heads on exposed carpentry work and fill holes with wood filler.
- F. Use fasteners of appropriate type and length. Pre-drill members when necessary to avoid splitting wood.

3.2 WOOD BLOCKING, AND NEW PLYWOOD INSTALLATION

- A. Install where indicated and where required for attaching other work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.
- C. Furnish and install new wood blocking at plywood replacement areas as required. Spacing shall meet current uniform building code.
- D. Furnish new plywood to match existing in thickness and utility. Furnish and install new plywood to replace damaged decking. Secure new plywood to substrate per current U.B.C.
- E. Furnish and install 2x wood nailers in specific locations as required to be installed.
- F. Fascia Board: Remove and replace Fascia board as directed by Architect.
- G. Furnish and install [n] plywood on deck and walls where drains are replaced.

END OF SECTION 06105

SECTION 07 19 00 – ELASTOMERIC COATING – PARAPET WALL WATERPROOFING

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 Elastomeric coatings for the following vertical parapet wall surfaces:
 - 1. Portland cement plaster (stucco).
 - 2. Concrete, concrete block, masonry block.
- B. Related Sections include the following:
 - 1. Division 7 Section "Modified Bitumen Roofing"

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Include manufacturer's printed statement of VOC content.
 - 2. Include manufacturer's standard colors.
- B. Samples: For each type and color of coating and substrate indicated, 12 by 12 inches (300 by 300 mm) in size, with specified water-repellent treatment applied to half of each Sample.
- C. Manufacturer Certificates: Signed by manufacturers certifying that coatings comply with requirements.
- D. Qualification Data: For Installer.
- E. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Test Application: Apply a finish sample for each type of coating and substrate required. Duplicate finish of approved sample.
 - 1. Locate each test application as directed by Architect/Owner.

2. Final approval by Architect of color and coating application will be from test applications.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.5 PROJECT CONDITIONS

A. Limitations: Proceed with application only when the following existing and forecasted weather and substrate conditions permit water repellents to be applied according to manufacturers' written instructions and warranty requirements:

1. Ambient temperature is above 40 deg F (4.4 deg C).
2. Rain is not predicted within 24 hours.
3. Application proceeds more than 24 hours after surfaces have been wet.
4. Substrate is not frozen, or surface temperature is above 40 deg F (4.4 deg C).
5. Windy conditions do not exist that may cause water repellent to be blown onto vegetation or surfaces not intended to be treated.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer and Applicator agree(s) to repair or replace materials that fail to maintain water repellency specified in Part 1 "Performance Requirements" Article within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.
2. Roofing systems manufacture to include all wall areas addressed in "umbrella" warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

B. Basis of design: Tremco Inc,

2.2 ELASTOMERIC COATING SYSTEM

A. Acrylic, Film-Forming Water Repellent: Pigmented, Fibrated, breathing coating of acrylic polymer emulsion; with the following characteristics.

1. Elastomeric Coating: Tremco Inc.; Solarguard - HyBuild
 - a. Solids by weight, 70%, ASTM 2369-93

- b. Elongation, 88%, ASTM 2370-92
 - c. Moisture Vapor Transmission, 5.5 perms, ASTM E 96-95
 - d. VOC, 41g/L, ASTM D3960-89
2. Colors: As selected by Architect from manufacturer's full range.
- B. Latex primer, manufacturer's standard primer for Acrylic Coating material.
- 1. Elastomeric prime Solarguard masonry primer
 - a. Weight per gallon, 12.1 lb/gal ASTM 1475
 - b. Solids by weight, 59% ASTM 1644

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect adjoining work, including sealant bond surfaces, from spillage or blow-over of coating. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of coating being deposited on surfaces. Cover live plants and grass.
- B. Coordination with Sealants: Do not apply coating until sealants for joints adjacent to surfaces receiving coating treatment have been installed and cured.
 - 1. Coating work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, coating, and sealant materials identical to those used in the work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Cracks in walls: All cracks larger than hairline should be considered, "moving" cracks and need to be cleaned and caulked.

3.2 APPLICATION

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of coating and to instruct Applicator on the product and application method to be used. Primer coat: Apply primer coat of fibrated elastomeric coating over entire surface to be addressed at the rate of 200 square feet per gallon.
- B. Apply a heavy-saturation spray coating of on surfaces indicated for treatment using low-pressure spray equipment. Comply with manufacturer's written instructions for using airless spraying procedure, unless otherwise indicated. Each coating application shall consist of one [1] gallon per 100 square feet applied in a continuous and uniform application.

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- C. Apply a second saturation spray coating, repeating first application, at same rate. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

3.3 CLEANING

- A. Immediately clean coating from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Repair damage caused by coating application. Comply with manufacturer's written cleaning instructions.

END OF SECTION 07 19 00

**SECTION 07 52 16.11 –
SBS MODIFIED BITUMINOUS MEMBRANE ROOFING, FLUID APPLIED**

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. Styrene-butadiene-styrene (SBS) modified bituminous Cool Roof white granulated membrane roofing system on wood deck, including but not limited to:
 - a. Roof insulation. Attach ½ inch primed Dens Deck with screws and plates.
 - b. Roof areas to receive tapered insulation / crickets systems shall be:
 - c. Roof membrane system consisting of base sheet, modified bitumen cap and membrane base flashings.
 - d. Installation of modified BUR system with White granulated Cool Roof surfacing sheet.
 - e. Schools receiving this system: Lydiksen [MPR] Vintage Hills [MPR/Bldgs B&C], Foothill High school [Bldgs E,F,G], AVHS [Girls Gym/lockerroom, Mat roof]

B. Related Sections:

1. Division 01732 Demolition Section
2. Division 06105 Carpentry section for wood deck repair, curbs, and blocking.
3. Division 07620 Section "Sheet Metal Flashing and Trim" for custom metal roof penetration flashings, flashings, and counterflashings.

1.3 DEFINITIONS

- A. Roofing Terminology: See ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
- B. ENDURE BIO: Is a two [2] part urethane, 100 % solids, bio based, asbestos free, cold process membrane interply adhesive. Is a certified BIO based material approved by USDA. Approved to be used in MB and BUR systems.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work. Provide roof plan showing orientation and types of roof deck, orientation of membrane roofing, and fastening spacing's and patterns for mechanically fastened components.
 - 1. Base flashings and built-up terminations.
 - a. Indicate details meet requirements of NRCA and FMG required by this Section.
 - 2. Crickets, saddles, and tapered insulation, including slopes.
 - 3. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
- C. Samples for Verification: For the following products:
 - 1. Sheet roofing materials, of color specified for exposed material.
 - 2. Dens Deck board primed.

1.5 INFORMATIONAL SUBMITTALS

- A. Contractor's Product Certificate: Submit notarized certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
- B. Qualification Data: For Installer, Manufacturer, and Roofing Inspector.
 - 1. Include letter from Manufacturer written for this Project indicating approval of Installer.
- C. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1. Submit evidence of compliance with performance requirements, including UL listing certificate.
 - 2. Indicate that proposed system components are compatible.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of built-up roofing.
- E. Warranties: Unexecuted sample copies of special warranties.
- F. Field Quality Control Reports: Daily reports of Roofing Inspector. Include weather conditions, description of work performed, tests performed, defective work observed, and corrective actions taken to correct defective work.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: To include in maintenance manuals.
- B. Warranties: Executed copies of warranties.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of ten [10] years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified. Contractor must have an established office/shop located within a fifty [50] miles radius of project to properly service project and leak response.
- B. Manufacturer Qualifications: Approved manufacturer with UL listed roofing systems comparable to those specified for this Project, with minimum ten [10] years' experience in manufacture of comparable products in successful use in similar applications, and able to furnish warranty with provisions matching specified requirements.
 - 1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
 - a. Product data, including certified independent test data indicating compliance with requirements.
 - b. Samples of each component.
 - c. Sample submittal from similar project.
 - d. Project references: Minimum of five installations of specified products not less than five years old, with Owner and Architect contact information.
 - e. Sample warranty, unexecuted with follow up inspections and dates indicated on warranty form.
 - f. Sample copy of weekly report
 - 2. **Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements. Only prime contractor will be allowed to submit request for substitution. Submittals by manufactures and marketing companies will not be allowed.**
 - 3. **Request for substitution: Submit separate request for each substitution. Document each request with complete data substantiating compliance of proposed substitution with the requirements of contract documents. Schedule for submittal for Architect review and comment: Ten [10] days prior to date of bid. Give itemized comparison of proposed substitution with specified product, product by product, listing variations and reference to**

specifications. 3rd party independent test results are required with each product. Highlight all specified standards and limitations in both the specified product submittal and the substituted product request to make comparison direct and obvious. Submittals that are not complete, not highlighted and not clear shall be rejected upon receipt.

4. **Provide same warranty for substitution as for specified system.**
 5. Approved manufacturers must meet separate requirements of Submittals Article.
- C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:
1. An authorized full-time technical employee of the manufacturer.
 2. An independent party certified as a Registered Roof Observer by the Roof Consultants Institute, retained by the Contractor or the Manufacturer and approved by the Manufacturer.
- D. Preinstallation Roofing Conference: Conduct conference at Project site.
1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Examine substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 5. Review structural loading limitations of roof deck during and after roofing.
 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 7. Review governing regulations and requirements for insurance and certificates if applicable.
 8. Review temporary protection requirements for roofing system during and after installation.
 9. Review roof observation and repair procedures after roofing installation.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.9 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
 - 1. Provide tie-offs at end of each day's work to cover exposed roofing and insulation with a course of roofing sheet securely in place with joints and edges sealed.
 - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
 - 3. Remove temporary plugs from roof drains at end of each day.
 - 4. Remove and discard temporary seals before beginning work on adjoining roofing.

1.10 WARRANTY

- A. Warranty, General: Warranties specified shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

- B. **Manufacturer's Warranty:** Manufacturer's standard or customized form, in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
 - 1. Manufacturer's warranty includes roofing membrane, base flashings, fasteners, roofing membrane accessories and other components of roofing system specified in this Section.
 - 2. Warranty Period: 20 years from date of Substantial Completion.
- C. **Installer's Warranty:** Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, and walkway products, for the following warranty period:
 - 1. Warranty Period: Five years from date of Substantial Completion.
- D. **Manufacturer Inspection and Preventive Maintenance Requirement:** By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's annual inspections and preventive maintenance is included in the Contract Sum.
 - 1. Inspections to occur in the following years subsequent to completion: 2, 5, 10 and 15 completing: Follow up inspections with reports to owner, preventative maintenance and housekeeping.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Basis-of-Design Manufacturer/Product:** The roof system specified in this Section is based upon products of Tremco, Inc., www.tremcoroofing.com, named in other Part 2 articles. Subject to compliance with requirements, provide the named product or an approved comparable product by one of the following:
 - 1. Owner Approved Equal based upon meeting:

Product/System requirements, warranty coverage/ language, project monitoring and listed in most current edition of the CRRC listings.
- B. **Source Limitations:** Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. **General Performance:** Roofing shall withstand exposure to weather without failure or leaks due to defective manufacture or installation.
 - 1. **Accelerated Weathering:** Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.

2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.
- C. Flashings and Fastening: Comply with requirements of Division 07 Sections "Sheet Metal Flashing and Trim" and "Roof Specialties." Provide base flashings, perimeter flashings, detail flashings and component materials and installation techniques that comply with requirements and recommendations of the following:
 1. NRCA Roofing Manual (Sixth Edition) for construction details and recommendations.
 2. SMACNA Architectural Sheet Metal Manual (Seventh Edition) for construction details.
- D. Exterior Fire-Test Exposure: ASTM E 108, UL Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- E. Fire-Resistance Ratings: Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- F. Energy Star Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.
- G. Energy Performance: Roofing system shall have an initial solar reflectance index of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.
- H. FM requirements: Comply with FM requirements for wind uplift based on I-90 fastening pattern.

2.3 ROOFING MEMBRANE MATERIALS

- A. Sheathing Paper: Red rosin type, minimum 3 lb/100 sq. ft. (0.16 kg/sq. m).
 1. Base Sheet: ASTM D 6162 Type III Grade S heavy-duty base sheet.
 - a. Basis of design product: Tremco, Endure 300 Base or equal.
 - b. Tear strength, ASTM D 5147 590 lbf/in MD and 590 lbf/in XMD
 - c. Tensile Strength, ASTM 5147 355 lbf/in MD and 310 lbf/in XMD
 - d. Thickness: 2.5 mm
- B. SBS Modified Bituminous Cap Sheet:

1. **Roof finishing sheet:** ASTM D 6163 Type I Grade G SBS-modified asphalt-coated glass-fiber-reinforced sheet, granular surfaced with a factory applied white reflective granule; CRRC listed and California Title 24 Energy Code compliant.
 - a. Basis of design product: Tremco, POWERply Standard FR GT24W, or equal
 - b. Exterior Fire-Test Exposure, ASTM E 108: Class A.
 - c. Tensile Strength at 73 deg. F (23 deg. C), minimum, ASTM D 5147: Machine direction 70 lbf/in (12.0 kN/m); Cross machine direction 50 lbf/in (8.8 kN/m).
 - d. Tear Strength at 73 deg. F (23 deg. C), minimum, ASTM D 5147: Machine direction, 90 lbf (400 N); Cross machine direction 90 lbf (400 N).
 - e. Elongation at 73 deg. F (23 deg. C), minimum, ASTM D 5147: Machine direction 4 percent; Cross machine direction 4 percent.
 - f. Low Temperature Flex, maximum, ASTM D 5147: -10 deg. F (-23 deg. C).
 - g. Thickness, minimum, ASTM D 5147: 0.157 inch (4 mm).
 - h. Solar Reflectance Index (SRI), ASTM E 1980: 88.
- C. Base Flashing Backer Sheet:
 1. ASTM D 6163 Type III Grade S heavy-duty base sheet, or equal
 - a. Basis of design product: Tremco, Powerply Heavy Duty Base
 - b. Tear strength, ASTM D 5147 220 lbf/in/MD and 240 lbf/in XMD
 - c. Tensile Strength, ASTM 5147 220 lbf/in MD and 190 lbf/in XMD
 - d. Thickness: 3.0 mm
- D. Base Flashing Sheet: for walls and curbs
 1. ASTM D 6163 Type I Grade G SBS-modified asphalt-coated glass-fiber-reinforced sheet, granular surfaced with a factory applied white reflective granule; CRRC listed and California Title 24 Energy Code compliant.
 - a. Basis of design product: Tremco, POWERply Standard FR GT24W, or equal
 - b. Exterior Fire-Test Exposure, ASTM E 108: Class A.
 - c. Tensile Strength at 73 deg. F (23 deg. C), minimum, ASTM D 5147: Machine direction 70 lbf/in (12.0 kN/m); Cross machine direction 50 lbf/in (8.8 kN/m).
 - d. Tear Strength at 73 deg. F (23 deg. C), minimum, ASTM D 5147: Machine direction, 90 lbf (400 N); Cross machine direction 90 lbf (400 N).

- e. Elongation at 73 deg. F (23 deg. C), minimum, ASTM D 5147: Machine direction 4 percent; Cross machine direction 4 percent.
- f. Low Temperature Flex, maximum, ASTM D 5147: -10 deg. F (-23 deg. C).
- g. Thickness, minimum, ASTM D 5147: 0.157 inch (4 mm).
- h. Solar Reflectance Index (SRI), ASTM E 1980: 88.

E. Glass-Fiber Fabric: Woven glass-fiber cloth treated with asphalt, ASTM D 1668 Type I.

2.4 FLUID APPLIED MATERIALS

A. BIO Adhesive

- 1. Basis of design product: Tremco, BIO ENDURE ADHESIVE, or equal
- 2. Bio base content: ASTM D6866 71%
- 3. Density ASTM D1475 11.1lbs./gal
- 4. Volume solids ASTM D2697 100%
- 5. Weight solids ASTM D1644 100%

B. Asphalt primer, water-based, polymer modified.

- 1. Basis of design product: Tremco, TREMprime WB.
- 2. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 2 g/L.

C. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.

2.5 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing membrane.

- 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Cold-Applied Adhesive:

- 1. Roof Cement, Asphalt-Based: ASTM D 4586, Type II, Class I, fibrated roof cement formulated for use in installation and repair of asphalt ply and modified bitumen roofing plies and flashings; UL-classified for fire resistance.

- a. Basis of design product: Tremco, ELS.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 190 g/L.
 - c. Non-Volatile Matter, ASTM D 4586: 85 percent.
- C. Joint Sealant: Elastomeric joint sealant compatible with roofing materials, with movement capability appropriate for application.
1. Joint Sealant, Polyurethane:ASTM C 920, Type S, Grade NS, Class 25 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints..
 - a. Basis of design product: Tremco, TremSEAL D.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 85 g/L.
 - c. Hardness, Shore A, ASTM C 661: 40.
 - d. Color: White.
- D. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FM Global 4470, designed for fastening roofing components to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.
- E. Metal Flashing Sheet: Metal flashing sheet is specified in Division 07 Section "Sheet Metal Flashing and Trim."
- F. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.
- G. Fluid applied membrane: Fluid applied reinforced membrane for pipes, penetrations and projections: Two [2] part Bio based fluid applied membrane by roof systems manufacture.

2.6 ROOF INSULATION

- A. Roof Insulation, General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
 1. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes at backside of curbs.
- B. Roof Board Primed Dens Deck:
 1. Dens Deck: ASTM C 1177 ½ inch primed Dens Deck
- C. Insulation Cant Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.

- D. Cant Strips: ASTM C 208, Type II, Grade I, cellulosic –fiber.
- E. Tapered Edge Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
- F. Substrate Joint Tape: Minimum 6 inch (150 mm) wide, coated, glass-fiber joint tape.
- G. Tapered insulation: ASTM C 209 Polyisocyanurate tapered system.

2.7 SURFACING MATERIALS

- A. Acrylic Roof Coating, Fire-Retardant Elastomeric: Intumescent and solar reflectant, Energy Star qualified, CRRC listed, and California Title 24 Energy Code compliant, formulated for use on bituminous roof surfaces.
 - 1. Basis of design product: Tremco, Polarcote FR, or equal
 - 2. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: Not more than 30 g/L.
 - 3. Reflectance, minimum, ASTM C 1549: 82 percent.
 - 4. 4. Solar Reflectance Index (SRI), ASTM E 1980: 103.

2.8 WALKWAYS

- A. Walkway pads, ceramic-granule-surfaced reinforced asphaltic composition slip-resisting pads, manufactured as a traffic pad for foot traffic, 1/2-inch (13 mm) thick minimum.
 - 1. Basis of design product: Tremco, Trem-Tred, or equal
 - 2. Flexural Strength at max. load, minimum, ASTM C 203: 210 psi (1.5 kPa).
 - 3. Granule adhesion (weight loss), maximum, ASTM D 4977: 1.1 gram.
 - 4. Impact Resistance at 77 deg. F (25 deg. C), ASTM D 3746: No Damage to Roof.
 - 5. Pad Size: 36 by 48 inch (914 by 1220 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.

2. Wood Roof Deck: Verify that wood deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch (1.6 mm) out of plane relative to adjoining deck.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 INSTALLATION, GENERAL

A. Install roofing system in accordance with manufacturer's recommendations.

B. Install roofing system in accordance with the following NRCA Manual Plates and NRCA recommendations, as applicable; modify as required to comply with requirements of FM Global references above:

1. Base Flashing for Wall-supported Deck: Plates MB-5 and MB-5S.
2. Base and Surface-mounted Counterflashing: Plates MB-4 and MB-4S..
3. Embedded Edge Metal Flashing Edge (Gravel-stop): Plates MB-3 and MB-3S.
4. Gutter at Draining Edge: Plates MB-22 and MB-22S.
5. Expansion Joint with Metal Cover: Plates MB-7 and MB-7S and Division 07 Section "Sheet Metal Flashing and Trim."
6. Equipment Support Curb: Plates MB-9 and MB-9S.
7. Raised Curb Detail at Rooftop HVAC Units (Job site constructed wood curb): Plates MB-13 and MB-13S and Division 06 Section "Miscellaneous Rough Carpentry."
8. Penetration, Structural Member through Roof Deck: Plates MB-15 and MB-15S.
9. Penetration, Sheet Metal Enclosure for Piping Through Roof Deck: Plates MB-16 and MB-16S
10. Penetration, Isolated Stack Flashing: Plates MB-17 and MB-17S.
11. Penetration, Plumbing Vent: Plates MB-18 and MB-18S.
12. Stucco stop detail at building walls.

3.4 INSULATION INSTALLATION

- A. Comply with built-up roofing manufacturer's written instructions for installing roof insulation.
- B. Cant Strips: Install and secure preformed 45-degree cant strips at junctures of built-up roofing with vertical surfaces or angle changes greater than 45 degrees.
- C. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - 1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- D. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- E. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- F. Mechanically Fastened Insulation: Install layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - 1. Fasten first layer of insulation according to requirements in FM Global's "RoofNav" for specified Windstorm Resistance Classification. Requirements based upon FM I-90 wind uplift fastening pattern.
 - 2. Set cants and tapered edge and secondary layers in low rise foam application.

3.5 FLUID APPLIED ROOFING MEMBRANE INSTALLATION, GENERAL

- A. Install roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing" and as follows:
 - 1. Deck Type: Wood deck.
 - 2. Base Sheet: One.
 - a. Adhering Method: Fluid applied.
 - 3. Granular-Surfaced SBS-Modified Asphalt Cap Sheet:
 - a. Adhering Method: Fluid applied.
- B. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.
- C. Cooperate with testing agencies engaged or required to perform services for installing roofing system.

- D. Coordinate installation of roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
 - 1. Provide tie-offs at end of each day's work configured as recommended by NRCA Roofing Manual Appendix: Quality Control Guidelines - Insulation to protect new [and existing] roofing.
 - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
 - 3. Remove temporary plugs from roof drains at end of each day.
 - 4. Remove and discard temporary seals before beginning work on adjoining roofing.
- E. Fluid applied mixing: Mix Part A [base] for 1 minute before adding Part B [curative]. After adding part B, mix the combined materials for a minimum of two [2] minutes. Make sure to mix areas around the side walls and bottom of pail.
 - 1. Apply fluid applied adhesive at the rate of two [2] gallons per 100 square feet, interply.
- F. Substrate-Joint Penetrations: Prevent adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.6 BASE-SHEET INSTALLATION

- A. Loosely lay one course of rosin sheet, lapping edges and ends a minimum of 2 inches and 6 inches, respectively. Scatter nail in place with square head nails driven flush.
- B. Install lapped base-sheet course, extending sheet over and terminating beyond cants. Attach base sheet as follows:
 - 1. Adhere to insulation in a solid application of fluid applied adhesive @ the rate of two [2] gallons per 100 square feet.
 - 2. Press base sheet into adhesive with weighted roller.

3.7 SBS-MODIFIED BITUMINOUS MEMBRANE INSTALLATION

- A. Install modified bituminous roofing membrane [basesheet] cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, installing as follows:
 - 1. Unroll roofing membrane sheets and allow them to relax for minimum time period required by manufacturer. Back nail as required for slope.
 - 2. Adhere to base sheet in a continuous application of fluid applied adhesive at the rate of two [2] gallons per 100 square feet.

3. Press membrane into adhesive using a weighted roll. Side laps 4 inches and end laps 6 inches. Heat weld all laps

B. Laps: Accurately align roofing membrane sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Install roofing membrane sheets so side and end laps shed water. Completely bond and seal laps, leaving no voids.

1. Repair tears and voids in laps and lapped seams not completely sealed.

2. Heat weld all laps.

3.8 FLASHING AND STRIPPING INSTALLATION

A. Install base flashing over cant strips and other sloped and vertical surfaces, at roof edges, and at penetrations through roof; secure to substrates according to roofing system manufacturer's written instructions, and as follows:

1. Prime substrates with asphalt primer if required by roofing system manufacturer.

2. Backer Sheet Application: Install backer sheet and adhere to substrate in a continuous application of fluid applied adhesive.

3. Flashing Sheet Application: Adhere flashing sheet to substrate in a continuous application of fluid applied adhesive at the rate of two [2] gallons per 100 square feet.

B. Extend base flashing up walls or parapets a minimum of 12 inches (300 mm) above built-up roofing and 6 inches (150 mm) onto field of roof membrane.

C. Flashing Sheet Top Termination: Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.

1. Seal top termination of base flashing with a metal termination bar and joint sealant.

D. Flashing Sheet Bottom Termination: Adhere flashing sheet to roof membrane sheet continuously along bottom of flashing sheet.

E. Install roofing membrane cap-sheet stripping where metal flanges and edgings are set on membrane roofing according to roofing system manufacturer's written instructions.

F. Pipes/penetrations/projections: Clean prime and coat all pipes/penetrations and projections with AG Bio base @ the rate of two [2] gallons per 100 square feet. While base is wet, embed Perma fab reinforcement around projection, allow to cure and top coat with AG top coat @ the rate of one [1] gallon per 100 square feet. Extend onto the field of the roof and square off neatly.

G. Gravelstop: After installation of new cool roof cap, furnish and install a bead of ICE coating at the intersection of the [n] cool roof cap and gravelstop rise. Cover adhesive completely.

H. Baseflashing @ corners: Apply BIO to all corners from field sheet up to counterflashing.

3.9 SURFACING AND COATING INSTALLATION

- A. Apply Coating as required to touch up roof membrane, paint vent pipes, conduits and miscellaneous projections. Note: if the Cool roof cap marred or discolored, the cap will be replaced with new, like kind.

3.10 WALKWAY INSTALLATION

- A. Walkway Pads: Install walkway pads using units of size indicated or, if not indicated, of manufacturer's standard size according to walkway pad manufacturer's written instructions. Set two [2] walk pads at each unit.
 - 1. Set walkway pads in cold-applied adhesive.

3.11 FIELD QUALITY CONTROL

- A. Roofing Inspector: Owner will engage a qualified roofing inspector to perform roof tests and inspections and to prepare test reports.
- B. Roofing Inspector: Contractor shall engage a qualified roofing inspector for a minimum of 6 full-time days on site to perform roof tests and inspections and to prepare start up, interim, and final reports. Roofing Inspector's quality assurance inspections shall comply with criteria established in ARMA/NRCA's "Quality Control Guidelines for the Application of Built-up Roofing."
- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation at commencement and upon completion.
 - 1. Notify Architect and Owner 48 hours in advance of date and time of inspection.
- D. Repair or remove and replace components of built-up roofing where test results or inspections indicate that they do not comply with specified requirements.
 - 1. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.12 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.14 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
1. Owner:
 2. Address:
 3. Building Name/Type:
 4. Address:
 5. Area of Work:
 6. Acceptance Date:
 7. Warranty Period:
 8. Expiration Date:
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. peak gust wind speed exceeding 74 mph (33 m/s);
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. vapor condensation on bottom of roofing; and
 - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
 2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
 3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
 4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
 5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use

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or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed by:

1. Authorized Signature:
2. Name:
3. Date:

F.

END OF SECTION 075216.11

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

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 the following sheet metal flashing and trim:
 - 1. Edge metal and termination metal
 - 2. Gutters
 - 3. Counterflashings
 - 4. Formed low-slope roof flashing and trim.
- B. Related Sections include the following:
 - 1. Division 01 73 20 Section "Select Demolition"
 - 2. Division 6 Section "Miscellaneous Carpentry" for wood nailers, curbs, and blocking.
 - 3. Division 7 Section "Modified Bitumen Membrane" for installing sheet metal flashing and trim integral with roofing.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Fabricate and install roof edge flashing and copings capable of resisting the following forces according to recommendations in FMG Loss Prevention Data Sheet 1-49:
- C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
- D. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:
 - 1. Identify material, thickness, weight, and finish for each item and location in Project.
 - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 - 3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
 - 4. Details of expansion-joint covers, including showing direction of expansion and contraction.
- C. Samples for Initial Selection: For each type of sheet metal flashing and trim indicated with factory-applied color finishes.
 - 1. Include similar Samples of trim and accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Sheet Metal Flashing: 12 inches long. Include fasteners, cleats, clips, closures, and other attachments.
 - 2. Trim: 12 inches long. Include fasteners and other exposed accessories.
 - 3. Accessories: Full-size Sample.

1.5 QUALITY ASSURANCE

- A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
 - 1. Copper Standard: Comply with CDA's "Copper in Architecture Handbook."
- B. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.
 - 2. Review methods and procedures related to sheet metal flashing and trim.
 - 3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
 - 4. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.
- B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.7 COORDINATION

- A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 - 2. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 SHEET METALS

- A. Kynar Coated Steel Sheet: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Galvanized Steel Sheet: ASTM A 526, twenty four [24] gauge
 - 2. Exposed Finishes: Apply the following coating:
 - a. Kynar coated metal 500 or Hylar 5000 with pre coated finish with 0.2 mil baked on primer and .08 mil baked on topcoat. For 1.0 dry mil thickness.
 - 1) Color: Selected by owner.
 - 2) Back paint concealed metal surfaces with protective
- B. Lead Sheet: ASTM B 749, Type L51121, copper-bearing lead sheet.

2.3 UNDERLAYMENT MATERIALS

- A. Self adhering membrane: sheet complying with ASTM D 6163 Type I grade by roof systems manufacturer. SA by roof systems manufacture.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
 - 1. Nails for Copper Sheet: Copper or hardware bronze, 0.109 inch (2.8 mm) minimum and not less than 7/8 inch (22 mm) long, barbed with large head.
 - 2. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.
 - 3. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
 - 4. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
 - 5. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
- C. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
- D. Solder for Lead-Coated Copper: ASTM B 32, Grade Sn60, 60 percent tin and 40 percent lead.
- E. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
- F. Solder for Zinc-Tin Alloy-Coated Stainless Steel: ASTM B 32, 100 percent tin.
- G. Solder for Lead: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
- H. Solder for Zinc: ASTM B 32, 60 percent lead and 40 percent tin with low antimony, as recommended by manufacturer.
- I. Burning Rod for Lead: Same composition as lead sheet.
- J. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
- K. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

- L. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
- M. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- N. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- O. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 MANUFACTURED SHEET METAL FLASHING AND TRIM

- A. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated[with factory-mitered and -welded corners and junctions].
 - 1. Manufacturers:
 - a. Fry Reglet Corporation.
 - 2. Material: Galvanized steel, twenty four [24] gauge
 - 3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
 - 4. Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
 - 5. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
 - 6. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
 - 7. Flexible Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
 - 8. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

2.6 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
- B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

- C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 1. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 - 2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- D. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- E. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with [elastomeric] [butyl] sealant concealed within joints.
- F. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
- G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
 - 1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" and FMG Loss Prevention Data Sheet 1-49] for application but not less than thickness of metal being secured.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Roof Edge Flashing Gravel Stop and Fascia Caps: Fabricate in minimum 96-inch- long, but not exceeding 10-foot- long, sections. Furnish with 6-inch- wide joint cover plates.
 - 1. Joint Style: Lap, 4 inches wide.
- B. Copings: Fabricate in minimum 96-inch-long, but not exceeding 10-foot-long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and [drill elongated holes for fasteners on] interior leg. Miter corners, seal, and solder or weld watertight.
 - 1. Joint Style: Butt, with 12-inch wide concealed backup plate
 - 2. Fabricate copings from the following material:
 - a. Galvanized Steel: Twenty-four [24] gauge in thickness. Kynar coated. Color chosen by Architect and PUSD
- C. Counterflashing: Fabricate from the following material:
 - 1. Galvanized Steel: Twenty-four [24] gauge thick.
- D. Flashing Receivers: Fabricate from the following material:
 - 1. Galvanized Steel: Twenty-four [24] gauge thick TPA coated metal.

2.8 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
 - 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
 - 1. Coat side of lead sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene underlayment.

3. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.
- C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
 - D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.
 - E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 1. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
 - F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with elastomeric sealant concealed within joints.
 - G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.
 1. Galvanized or Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners.
 2. Aluminum: Use aluminum or stainless-steel fasteners.
 3. Copper Use copper or stainless-steel fasteners.
 4. Stainless Steel: Use stainless-steel fasteners.
 - H. Seal joints with elastomeric sealant as required for watertight construction.
 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
 2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."
 - I. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm) except where pretinned surface would show in finished Work.
 1. Do not solder prepainted, sheet.
 2. PretStainless-Steel Soldering: Pretin edges of uncoated sheets to be soldered using solder recommended for stainless steel and phosphoric acid flux. Promptly wash off acid flux residue from metal after soldering.

3. Copper Soldering: Tin uncoated copper surfaces at edges of sheets using solder recommended for copper work.
4. Where surfaces to be soldered are lead coated, do not tin edges, but wire brush lead coating before soldering.
5. Lead-Coated Copper Soldering: Wire brush edges of sheets before soldering.
6. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely. Completely remove flux and spatter from exposed surfaces.

J. Aluminum Flashing: Rivet or weld joints in uncoated aluminum where necessary for strength.

3.3 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal roof flashing and trim to comply with performance requirements[, sheet metal manufacturer's written installation instructions,] and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.
 1. Interlock bottom edge of roof edge flashing with continuous cleats anchored to substrate at 24-inch centers.
- C. Copings: Furnish and install new metal copings. Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.
 1. Interlock exterior bottom edge of coping with continuous cleats anchored to substrate at 16-inch centers.
 2. Anchor interior leg of coping with screw fasteners and washers at 18-inch centers.
- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with elastomeric sealant.
 1. Secure in a waterproof manner by means of snap-in installation and sealant or lead wedges and sealant, interlocking folded seam or blind rivets and sealant, anchor and washer at 36-inch centers].
- F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:
 1. Furnish and install pre-fabricated 4lb lead boot or 24 gage GSM.

2. Seal with elastomeric sealant and clamp flashing to pipes penetrating roof except for lead flashing on vent piping.

G. Gutters: Furnish and install new 24 gage Kynar gutters. Color chosen by PUSD.

3.4 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

3.5 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 62 00

SECTION 07 72 00 - ROOF ACCESSORIES

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 the following:
 - 1. Relief vents.
 - 2. Roof hatches.
 - 3. Aluminum Ladders.
 - 4. Aluminum Ladder Extenders.
- B. Related Sections include the following:
 - 1. Division 7 Section "Sheet Metal Flashing and Trim" for shop- and field-fabricated metal flashing and counterflashing, scuppers, gutters and downspouts, fasciae, roof expansion-joint covers, valleys, and miscellaneous sheet metal trim and accessories.
 - 2. Division 7 Section "Manufactured Roof Specialties" for fasciae, copings, gravel stops, and roof expansion-joint covers.
 - 3. Division 7 Sections for roofing accessories included as part of roofing Work.
 - 4. Division 9 Section "Painting" for shop primers and field painting.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, materials, dimensions of individual components and profiles, and finishes.
- B. Submit design and/or test data to Architect for review and/or submittal to the Division of the State Architect if identified as a deferred approval item.
- C. Shop Drawings: Show fabrication and installation details. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, elevations, sections, details, and attachments to other Work.

1.4 QUALITY ASSURANCE

- A. Standards: Comply with the following:
 - 1. SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.
 - 2. NRCA's "Roofing and Waterproofing Manual" details for installing units.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Relief Vents:
 - a. Bristolite Skylights.
 - b. Dur-Red Products, Inc.
 - c. Metallic Products Corporation.
 - d. Trimco, Inc.
 - e. Vent Products Co., Inc.
 2. Roof Hatches:
 - a. JL Industries.
 - b. Bilco Company
 - c. Milcor, Inc.
 - d. O'Keeffe's Inc.
 3. Prefabricated Aluminum Ladder:
 - a. Dur-Red Products, Inc.
 - b. O'Keeffe's Inc.
 4. Prefabricated Ladder Extension:
 - a. Bilco Company; "Ladder-Up" Safety Post, Model 1.

2.2 MATERIALS, GENERAL

- A. Aluminum Sheet: ASTM B 209 for alclad alloy 3005H25 or alloy and temper required to suit forming operations, with mill finish, unless otherwise indicated.
- B. Extruded Aluminum: ASTM B 221 alloy 6063-T52 or alloy and temper required to suit structural and finish requirements, with mill finish, unless otherwise indicated.
- C. Galvanized Steel Sheet: ASTM A 653/A 653M with G90 coating designation; commercial quality, unless otherwise indicated.
1. Structural Quality: Grade 40, where indicated or as required for strength.
- D. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M with Class AZ-50 coating, structural quality, Grade 40, or as required for strength.
- E. Insulation: Manufacturer's standard rigid or semirigid glass-fiber board of thickness indicated.
- F. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, complying with AWPA C2; not less than 1-1/2 inches thick.
- G. Security Grilles: 3/4-inch- diameter, hardened steel bars spaced 6 inches o.c. in one direction and 12 inches o.c. in the other. Weld bar intersections and ends of bars to structural frame or primary curb walls. Clean and paint with rust-inhibitive metal primer.

- H. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.
 - 1. Where removing exterior exposed fasteners affords access to building, provide nonremovable fastener heads.
- I. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.
- J. Bituminous Coating: SSPC-Paint 12, solvent-type bituminous mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coating.
- K. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
- L. Elastomeric Sealant: Generic type recommended by unit manufacturer that is compatible with joint surfaces; ASTM C 920, Type S, Grade NS, Class 25, and Uses NT, G, A, and, as applicable to joint substrates indicated, O.
- M. Roofing Cement: ASTM D 4586, nonasbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

2.3 RELIEF VENTS

- A. Low-Profile Gravity Ventilators: Provide units of sizes, style, and profile indicated; fabricated from the following materials and including the following features:
 - 1. Material: Galvanized steel sheet.
 - a. Finish: Baked enamel.
 - 2. Bird Screens: 1/2-inch- square mesh with 0.062-inch- diameter, stainless-steel wire.
 - 3. Manual Dampers: Designed for operation from floor directly below ventilator unit.
 - 4. Roof Curb Construction: Provide curb-mount units designed for installing 1-1/2-inch-thick wood curbs.

2.4 ROOF HATCHES

- A. General: Fabricate units to withstand 40-lbf/sq. ft. external and 20-lbf/sq. ft. internal loading pressure. Frame with minimum 9-inch- high, integral-curb, double-wall construction with 1-1/2-inch insulation, formed cants and cap flashing (roofing counterflashing), with welded or sealed mechanical corner joints. Provide double-wall cover (lid) construction with 1- inch-thick insulation core. Provide gasketing and equip with corrosion-resistant or hot-dip galvanized hardware including pintle hinges, hold-open devices, interior padlock hasps, and both interior and exterior latch handles. Roof hatches shall be approved by the project engineer prior to installation.
- B. Type: Single-leaf personnel access.
 - 1. For Ladder Access: 30 by 36 inches.

- C. Material: Aluminum.
 - D. Sloping Roofs: Where slope or roof deck exceeds 1/4 inch per foot, fabricate hatch curbs with height tapered to match slope to level tops of units.
- 2.5 Prefabricated Aluminum Ladder: Comply with OSHA requirements. As shown on the drawings.
- A. Wall mounted.
- 2.6 Prefabricated Ladder Extension: Provide ladder extension at each aluminum ladder to roof hatch.
- 2.7 FINISHES, GENERAL
- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
 - C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- 2.8 ALUMINUM FINISHES
- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
 - B. Conversion-Coated and Factory-Primed Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below).
 - C. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's specifications for cleaning, conversion coating, and painting.
 - 1. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 603.8 except with a minimum dry film thickness of 1.5 mils, medium gloss.
 - 2. Color: As selected by Architect from manufacturer's full range.

2.9 GALVANIZED STEEL SHEET FINISHES

- A. Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
 - 1. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- B. Factory Priming for Field-Painted Finish: Where field painting after installation is indicated, apply the air-dried primer specified below immediately after cleaning and pretreating.
 - 1. Shop Primer: Exterior galvanized metal primer per Division 9 Section "Painting."
- C. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil for topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils. Colors as selected by Architect from manufacturer's standard color range.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's written instructions. Coordinate installation of roof accessories with installation of roof deck, roof insulation, flashing, roofing membranes, penetrations, equipment, and other construction involving roof accessories to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight. Anchor roof accessories securely to supporting structural substrates so they are capable of withstanding lateral and thermal stresses, and inward and outward loading pressures.
- B. Install roof accessory items according to construction details of NRCA's "Roofing and Waterproofing Manual," unless otherwise indicated.
- C. Separation: Separate metal from incompatible metal or corrosive substrates, including wood, by coating concealed surfaces, at locations of contact, with bituminous coating or providing other permanent separation.
- D. Flange Seals: Unless otherwise indicated, set flanges of accessory units in a thick bed of roofing cement to form a seal.
- E. Cap Flashing: Where required as component of accessory, install cap flashing to provide waterproof overlap with roofing or roof flashing (as counterflashing). Seal overlap with thick bead of mastic sealant.
- F. Operational Units: Test-operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.
- G. Heat-and-Smoke Vents: Locate, install, and test according to NFPA 204M.

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3.2 CLEANING AND PROTECTION

- A. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings.

END OF SECTION 07720

SECTION 07 72 33.02 - ROOF HATCH LADDER SAFETY POST

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Provide factory-fabricated ladder safety posts.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data.
- B. Shop Drawings: Submit shop drawings including profiles, accessories, location, adjacent construction interface, and dimensions.
- C. Warranty: Submit executed copy of manufacturer's standard warranty.

1.3 QUALITY ASSURANCE

- A. Manufacturer: A minimum of 5 years experience manufacturing similar products.
- B. Installer: A minimum of 2 years experience installing similar products.
- C. Manufacturer's Quality System: Registered to ISO 9001 Quality Standards including in-house engineering for product design activities.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

1.5 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis-of-Design Manufacturer: Type LU Ladder Safety Post by The BILCO Company, P.O. Box 1203, New Haven, CT 06505, 1-800-366-6530, Fax: 1-203-535-1582, Web: www.bilco.com. Comply with the following:

2.2 LADDER SAFETY POST

- A. Furnish and install where indicated on plans ladder safety post Model LU-1. The ladder safety post shall be pre-assembled from the manufacturer.
- B. Performance characteristics:
 - 1. Tubular post shall lock automatically when fully extended.
 - 2. Safety post shall have controlled upward and downward movement.
 - 3. Release lever shall disengage the post to allow it to be returned to its lowered position.
 - 4. Post shall have adjustable mounting brackets to fit ladder rung spacing up to 14" (356mm) on center and clamp brackets to accommodate ladder rungs up to 1-3/4" (44mm) in diameter.
- C. Post: Shall be manufactured of high strength square tubing. A pull up loop shall be provided at the upper end of the post to facilitate raising the post.
- D. Material of construction: Shall be steel Model LU-1
- E. Balancing spring: A stainless steel spring balancing mechanism shall be provided to provide smooth, easy, controlled operation when raising and lowering the safety post.
- F. Hardware: All mounting hardware shall be Type 316 stainless steel.
- G. Finishes: Factory finish shall be yellow powder coat steel Model LU-1

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and openings for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install products in strict accordance with manufacturer's instructions and approved submittals. Locate 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.

3.3 ADJUSTING AND CLEANING

- A. Clean exposed surfaces using methods acceptable to the manufacturer which will not damage finish.

END OF SECTION

SECTION 07 72 33.03 - ROOF HATCH RAIL SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Provide factory-fabricated fixed hatch railing system.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data.
- B. Shop Drawings: Submit shop drawings including profiles, accessories, location, adjacent construction interface, and dimensions.
- C. Warranty: Submit executed copy of manufacturer's standard warranty.

1.3 QUALITY ASSURANCE

- A. Manufacturer: A minimum of 5 years experience manufacturing similar products.
- B. Installer: A minimum of 2 years experience installing similar products.
- C. Manufacturer's Quality System: Registered to ISO 9001 Quality Standards including in-house engineering for product design activities.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

1.5 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis-of-Design Manufacturer: Type Bil-Guard® 2.0 Roof Hatch Railing System by The BILCO Company, P.O. Box 1203, New Haven, CT 06505, 800-366-6530, Fax: 1-203-535-1582, Web: www.bilco.com.

2.2 HATCH RAIL SYSTEM

- A. Furnish and install where indicated on plans hatch rail system Model [insert RL2-S; RL2-NB; RL2-L; RL2-E; RL2-F, RL2-SS, RL2-D]. The hatch rail system shall be field assembled and installed (by others) per the manufacturer's instructions.
- B. Performance characteristics:
 - 1. High visibility safety yellow powder coat paint finish
 - 2. Hatch rail system shall attach to the capflashing of the roof hatch and shall not penetrate any roofing material.
 - 3. Hatch rail system shall satisfy the requirements of OSHA 29 CFR 1910.29 and shall meet OSHA strength requirements with a factor of safety of two.
 - 4. Corrosion resistant construction with a five-year warranty.
 - 5. Hinged gate shall ensure continuous barrier around the roof hatch.
 - 6. Self-closing gate hinge and positive latching system provided with hatch rail system.
- C. Posts and Rails: 1-1/4" (32mm) 6061 T6 schedule 40 aluminum pipe
- D. Hardware: Mounting brackets shall be 3/8" (9mm) thick extruded aluminum. Pivoting post guides with compression fittings and latching mechanism shall be cast aluminum. Self-closing hinges and all fasteners shall be type 316 stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and openings for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected

3.2 INSTALLATION

- A. Install products in strict accordance with manufacturer's instructions and approved submittals. Locate 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.

3.3 ADJUSTING AND CLEANING

- A. Clean exposed surfaces using methods acceptable to the manufacturer which will not damage finish.

END OF SECTION

SECTION 09 24 00 - PORTLAND CEMENT PLASTER

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 the following:

- 1. Exterior portland cement plasterwork (stucco) on metal lath plaster bases.

- B. Related Sections include the following:

- 1. Division 6 Section "Rough Carpentry" for wood framing and furring, sheathing, and water-resistant barriers included in portland cement plaster assemblies.
 - 2. Division 7 Section "Building Insulation" for thermal insulations and vapor retarders included in portland cement plaster assemblies.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of factory-prepared finish coat indicated.
- C. Samples for Verification: For each type of colored and textured finish coat indicated; 12 by 12 inches, and prepared on rigid backing.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For portland cement plaster assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
- B. Mockups: Before plastering, prepare mockups of at least 4 feet by 4 feet area by full thickness to demonstrate final aesthetic effects and set quality standards for materials and execution.
 - 1. Install mockups for each type of finish indicated and with materials, including lath and support systems, indicated for final work.
 - 2. For interior plasterwork, simulate finished lighting conditions for review of mockups.
 - 3. Obtain Architect's acceptance of panel's visual quality before commencement of work.

4. Retain panel(s) during construction as a standard for judging completed work.
5. Remove panel(s) at completion and acceptance of work.

- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
- D. Standards: Plastering shall be done in accordance with these specifications; the "Reference Specifications" of the California Lathing and Plastering Contractor's Association, Inc. (latest edition); The Metal Lath manufacturer's Association specifications, and Title 24, 2016 CBC, Chapter 25.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.6 PROJECT CONDITIONS

- A. Comply with ASTM C 926 requirements.
- B. Exterior Plasterwork:
 1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
 2. Apply plaster when ambient temperature is greater than 40 deg F.
 3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.
- C. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 1. Products: Subject to compliance with requirements, provide one of the products specified.
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 METAL LATH

- A. Expanded-Metal Lath: ASTM C 847 with ASTM A 653/A 653M, G60, hot-dip galvanized zinc coating.

1. Manufacturers:
 - a. California Expanded Metal Products Company (CEMCO).
 - b. Gold Bond Building Products Div., National Gypsum Co.
 - c. Milcor Division; Inryco, Inc.
 - d. United States Gypsum Co..
 - e. Western Metal Lath & Steel Framing Systems.
 2. Diamond-Mesh Lath: Self-furring.
 - a. Weight: 3.4 lb/sq. yd.
 3. 3/8-Inch Rib Lath:
 - a. Weight: 3.4 lb/sq. yd.
- B. Wire-Fabric Lath:
1. Manufacturers:
 - a. Davis Wire Corporation.
 - b. Jaenson Wire Company.
 - c. Keystone Steel & Wire.
 2. Woven-Wire Lath: ASTM C 1032; self-furring, with stiffener wire backing.
 - a. 17 gage. x 1-1/2 inch galvanized.
- C. Paper Backing: FS UU-B-790, Type I Grade D, Style 2 vapor-permeable paper. Two layers, 30 minute and in accordance with 2016 CBC Section 2510.6.
- 2.3 ACCESSORIES
- A. General: Comply with ASTM C 1063 and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.
- B. Zinc and Zinc-Coated (Galvanized) Accessories:
1. Manufacturers:
 - a. California Expanded Metal Products Company (CEMCO).
 - b. Fry Regelet Corporation
 - c. Gold Bond Building Products Div., National Gypsum Co.
 - d. Keene Corporation
 - e. Milcor Division; Inryco, inc.
 - f. United States Gypsum Co.
 - g. Western Metal Lath & Steel Framing Systems.
 2. Foundation Weep Scream: Western No. 7 or No. 36. Fabricated from hot-dip galvanized steel sheet, ASTM A 653/A 653M, G60 zinc coating.
 3. Cornerite: Fabricated from metal lath with ASTM A 653/A 653M, G60, hot-dip galvanized zinc coating.
 4. External-Corner Reinforcement: Fabricated from metal lath with ASTM A 653/A 653M, G60, hot-dip galvanized zinc coating.

5. Cornerbeads: Western No. 1A. Fabricated from zinc or zinc-coated (galvanized) steel.
 - a. Small nose cornerbead with expanded flanges; use unless otherwise indicated.
 - b. Small nose cornerbead with perforated flanges; use on curved corners.
 - c. Small nose cornerbead with expanded flanges reinforced by perforated stiffening rib; use on columns and for finishing masonry corners.
 - d. Allow full encasement of plaster.
6. Casing Beads: Western No. 66. Fabricated from zinc-coated (galvanized) steel; square-edged style; with expanded flanges.
7. Control Joints: Keene XJ15-3. Fabricated from zinc-coated (galvanized) steel; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
8. Expansion Joints: Fabricated from zinc-coated (galvanized) steel; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.
9. Two-Piece Expansion Joints: Western No. 40. Fabricated from zinc-coated (galvanized) steel; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4-to-5/8-inch wide; with perforated flanges.
10. Soffit vent screeds: As indicated

2.4 MISCELLANEOUS MATERIALS

- A. Water for Mixing: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch long, free of contaminants, manufactured for use in portland cement plaster.
 1. Products:
 - a. Dur-O-Fiber AR Glass; Dur-O-Wall
 - b. Harbourite; Fibermesh, Inc.
- C. Bonding Compound: ASTM C 932.
- D. Steel Drill Screws: Galvanized, for metal-to-metal fastening, ASTM C 1002 or ASTM C 954, as required by thickness of metal being fastened; with wafer head that is suitable for application; in lengths required to achieve penetration through joined materials of not fewer than 1/4 inch.
- E. Fasteners for Attaching Metal Lath to Substrates: Complying with ASTM C 1063.
 1. Nails: Galvanized furring nails, No. 12 gauge 3/8 inch head with 3/8 inch wad spacers for lath attachment. Minimum 1-1/4 inch penetration into structure.
 2. Ring Shank Hook Staples: No. 9 W & M gauge, 1/2 inch wide x 1-1/2" inches long "J" staple for soffit application only.
 3. Earthquake Staples: No. 16 gauge, galvanized, round or flattened wire, with chisel or divergent points, 3/4 inch crown and 1-1/4 inch legs for soffit application only.
- F. Wire Ties: 16 gage galvanized.

- G. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing), produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- H. Isolation Strip at Exterior Walls:
 - 1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), unperforated.
 - 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.
- I. Window and/or Door Flashing, provide either of the following:
 - 1. Kraft paper flashing conforming to F.S. UU-B-790A, Style 4, Grade A,B,C; 6 inch minimum width in the vertical wall plane.
 - 2. Self-adhered rubberize asphaltic membrane i.e. Vicor by Grace Manufacturing, 6 inch minimum width in the vertical wall plane.

2.5 PLASTER MATERIALS (No Plastic Cement)

- A. Portland Cement: ASTM C 150, Type I or III.
 - 1. Color for Base Coats: Gray.
- B. Masonry Cement: ASTM C 91, Type N.
 - 1. Color for Base Coats: Gray.
- C. Lime: ASTM C 206, Type S; or ASTM C 207, Type S.
- D. Sand Aggregate: ASTM C 897.
 - 1. Color for Job-Mixed Finish Coats: In color matching Architect's sample.
- E. Ready-Mixed Integral Color Finish-Coat Plaster: Mill-mixed portland cement, aggregates, coloring agents, and proprietary ingredients.
 - 1. Products:
 - a. LaHabra Stucco.
 - b. King Stucco Inc.
 - c. Superior Stucco Products
 - d. Western Stucco Products Inc.
 - 2. Color: As selected by Architect from manufacturer's full range.
- F. Additives: "PRF", Gibco Industries.

2.6 PLASTER MIXES

- A. General: Comply with ASTM C 926 for applications indicated.
 - 1. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 2 lb of fiber/cu. ft. of cementitious materials. Reduce aggregate quantities accordingly to maintain workability.
- B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:
 - 1. Portland Cement Mixes:
 - a. Scratch Coat (3/8"): For cementitious material, mix 1 part portland cement, 3 oz. PRF (per 94 lbs Portland cement). Use 4 parts sand per part of cementitious material (sum of separate volumes of each component material).
 - b. Brown Coat (3/8"): For cementitious material, mix 1 part portland cement, 3 oz. PRF (per 94 lbs. Portland cement). Use 5 parts sand per part of cementitious material (sum of separate volumes of each component material).
- C. Base-Coat Mixes for Use over Brick and Monolithic Concrete: Single base coats for two-coat plasterwork as follows:
 - 1. Portland Cement Mix (1/2"): For cementitious material, mix 1 part portland cement and 3 oz. PRF (per 94 lbs. Portland cement). Use 4 parts sand per part of cementitious material (sum of separate volumes of each component material).
- D. Base-Coat Mixes for Use over Brick and Concrete Unit Masonry: Single base coats for two-coat plasterwork as follows:
 - 1. Portland Cement Mix: For cementitious material, mix 1 part portland cement and 3 oz. PRF (per 94 lbs. Portland cement). Use 4 parts sand per part of cementitious material (sum of separate volumes of each component material).
- E. Factory-Prepared Finish-Coat Mixes (1/8"): For ready-mixed finish-coat plasters, comply with manufacturer's written instructions. Add water only.
 - 1. Finish coat shall be textured as noted on the Drawings or as selected by Architect.
- F. Mixing: Mechanically mix cementitious and aggregate material for plasters to comply with applicable referenced application standard and with recommendations of plaster manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.
- B. Prepare solid-plaster bases that are smooth or that do not have the suction capability required to bond with plaster according to ASTM C 926.
- C. Coordination with Sprayed Fire-Resistive Materials:
 1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
 2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of plaster assemblies and without reducing the fire-resistive material thickness to less than that required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

- A. Fire-Resistance-Rated Assemblies: Install components according to requirements for design designations from listing organization and publication indicated on Drawings.
- B. Sound Attenuation Blankets: Where required, install blankets before installing lath unless blankets are readily installed after lath has been installed on one side.
- C. Acoustical Sealant: Where required and indicated, seal joints between edges of plasterwork and abutting construction with acoustical sealant.
- D. Sealant: Seal around all window frames and transition to provide a "water tight" exterior finish.

3.4 INSTALLING NONSTRUCTURAL STEEL FRAMING, GENERAL

- A. General: Comply with requirements in ASTM C 1063 for applications indicated.
 1. Comply with ASTM C 754 for installation of items not addressed in ASTM C 1063.
- B. Install supplementary framing, blocking, and bracing at terminations in plaster assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement.
 1. Isolate ceiling assemblies where they abut or are penetrated by building structure.

2. Isolate partition framing and wall furring where it abuts structure, except at floor. At head of assemblies, install slip-type joints that avoid axial loading and that support assembly laterally.

D. Do not bridge building control and expansion joints with steel framing or furring members. Frame both sides of joints independently.

E. Soffits: Unless otherwise detailed on Drawings, install furred or suspended soffits to comply with requirements for ceiling installation; install framed soffits to comply with requirements for partition installation.

3.5 INSTALLING METAL LATH

A. General: Install expanded metal lath or stucco netting where plaster base is required. Provide appropriate type, configuration and weight of material selected from materials indicated which comply with referenced lathing installation standards.

1. Comply with the requirements of ML/SFA "Specification for METAL Lathing and Furring" applicable to each installation condition indicated.

B. Ceramic Tile Setting Beds:

1. Use diamond mesh lath, 3.4 lbs. per square yard, paper backed. Maximum variation in the backing surface shall not exceed 1/8" in 8 feet from the required plane.

C. Exterior Sheathed Wall Surfaces, Wood Construction:

1. Install 2 layers 60 minute, Grade D paper, shingle style over sheathing with 3 inch edge laps and 6 inch end laps. Over building paper install stucco netting. Fasten with nails as herein specified at 6 inches on center into solid structure. Do not nail randomly into sheathing. Horizontal nailing at 6 inches on center at block and at plates typical.

D. Soffits, Wood Construction: Use 3/8 inch ribbed lath, 3.4 lbs per square yard. Attach lath with earthquake staples at each rib at each support and with ring shank hook staple placed around a 10d common nail laid flat under the surface of the lath not more than 3 inches from the edge of each sheet to each support.

E. Exterior Sheathed Wall Surfaces; Steel Stud Construction: Install 2 layers 60 minute, Grade D paper, shingle style over sheathing with 3 inch edge laps and 6 inch end laps. Over building paper install self furring stucco netting. Provide wadding for sheet metal screw attachment to maintain 1/4 inch minimum spacing of netting from backing surface. Self furring stucco netting shall be installed to maintain 1/4 inch spacing of netting from backing surface in all conditions.

F. Soffits; Steel Construction: Use 3/8 inch ribbed lath, 3.4 lbs per square yard. Attach lath with twisted wire 24 inches on center at each support and not more than 3 inches from edge of each sheet to each support.

3.6 INSTALLING ACCESSORIES

A. Install according to ASTM C 1063 and at locations indicated on Drawings.

- B. Reinforcement for External Corners:
 - 1. Install lath-type external-corner reinforcement at exterior locations.
 - 2. Install cornerbead at interior locations.
- C. Control Joints: Install control joints at locations indicated on Drawings, or if not indicated in specific locations complying with following criteria and approved by Architect for visual effect as follows:
 - 1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:
 - a. Vertical Surfaces: 144 sq. ft..
 - b. Horizontal and other Nonvertical Surfaces: 100 sq. ft..
 - 2. At distances between control joints of not greater than 18 feet o.c.
 - 3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1. 10 feet maximum in both vertical and horizontal dimensions.
 - 4. Where control joints occur in surface of construction directly behind plaster.
 - 5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.
 - 6. Attach control joints to stucco mesh by wire tying at 24 inches on center.
- D. Drip Screeds: Install drip screed a minimum of 4 inches above grade, unless otherwise shown.
- E. Soffit Vent Screeds: Install soffit vent screed where shown sufficient to vent all concealed attics, joist spaces, etc.
- F. Window Flashing: Install window flashing material at window head, jambs and sill. Lap adjacent flashing material 6 inches minimum.

3.7 PLASTER APPLICATION

- A. General: Comply with ASTM C 926.
 - 1. Do not deviate more than plus or minus 1/8 inch in 10 feet from a true plane in finished plaster surfaces, as measured by a 10-foot straightedge placed on surface.
 - 2. Grout hollow-metal frames, bases, and similar work occurring in plastered areas, with base-coat plaster material, before lathing where necessary. Except where full grouting is indicated or required for fire-resistance rating, grout at least 6 inches at each jamb anchor.
 - 3. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground, unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
 - 4. Provide plaster surfaces that are ready to receive field-applied finishes indicated.
- B. Curing: Moisture cure Portland cement plaster base and finish coats to comply with ASTM C 926, including between coats and curing required by 2016 CBC, Table 2512.6.
- C. Bonding Compound: Apply on unit masonry and concrete plaster bases.

- D. Plaster Finish Coats: Apply to provide finish and texture to match Architect's sample.
- E. Sand smooth-troweled finishes lightly to remove trowel marks and arises.
- F. Apply fog coat over patches and adjacent areas where there is a transition in surface plane.
- G. Concealed Interior Plasterwork:
 - 1. Where plaster application will be concealed behind built-in cabinets, similar furnishings, and equipment, apply finish coat.
 - 2. Where plaster application will be concealed above suspended ceilings and in similar locations, finish coat may be omitted.
 - 3. Where plaster application will be used as a base for adhesive application of tile and similar finishes, finish coat may be omitted.
- H. Caulk or seal around all window frames and transitions to provide a "water tight" ext. finish.

3.8 CUTTING AND PATCHING

- A. Cut, patch, replace, and repair plaster as necessary to accommodate other work and to restore cracks, dents, and imperfections. Repair or replace work to eliminate blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.9 CLEANING AND PROTECTION

- A. Remove temporary protection and enclosure of other work. Promptly remove plaster from doorframes, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION 09 24 00

(3/06)

