

- E. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

3.2 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing agency to perform field quality-control testing.
  - 1. Field and shop welds will be subject to testing and inspection.
  - 2. Remove and replace Work that does not comply with specified requirements.
  - 3. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

END OF SECTION 05400



## SECTION 05440- PRE-ENGINEERED, PRE-FABRICATED COLD FORMED STEEL ROOF TRUSSES

PART I GENERAL

## I.1 SUMMARY

- A. Section includes pre-engineered, pre-fabricated cold-formed steel framing elements. Work includes:
  - 1. Cold-Formed steel roof trusses.
  - 2. Anchorage, bracing and bridging.
- B. Related Sections
  - 1. Section 05310 – Metal Decking
  - 2. Section 05400 – Cold-Formed Steel Framing

## I.2 REFERENCES

- A. Reference standards:
  - 1. ASTM:
    - a. ASTM A653/A653M-94 "Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process."
    - b. ASTM A780-93a "Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings."
  - 2. American Welding Society (AWS)
    - a. AWS D1.1 "Structural Welding Code - Steel."
    - b. AWS D1.3 "Structural Welding Code - Sheet Steel."
  - 3. Light Gauge Steel Engineers Association Field Installation Guide
  - 4. American Iron and Steel Institute, North American Specification for the Design of Cold-Formed Steel Structural Members, 2001 American Iron and Steel Institute Standard for Cold-Formed Steel Framing – Truss Design, 2001

## I.3 PERFORMANCE REQUIREMENTS

- A. AISI "Specifications": Calculate structural characteristics of cold-formed steel truss members according to American Iron and Steel Institute "North American Specification for the Design of Cold-Formed Steel Structural Members, 2001"
- B. Structural Performance: Design, fabricate, and erect cold-formed steel trusses to withstand specified design loads within limits and under conditions required.
  - 1. Design Loads: As specified.
  - 2. Deflections: Live load deflection meeting the following (unless otherwise specified):
    - a. Roof Trusses: Vertical deflection less than or equal to Length/240.
  - 3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change (range) of 120 deg F (67 deg C).

## I.4 SUBMITTALS

- A. Submit manufacturer's product data and installation instructions for each type of cold-formed steel framing and accessory required.
- B. Submit detailed roof truss layouts indicating placement of trusses.
- C. Submit individual truss drawings, sealed and signed by a qualified registered Professional Engineer, verifying accordance with local building code and design requirements.
  - Include:
    - 1. Description of design criteria.
    - 2. Engineering analysis depicting member stresses and truss deflection.
    - 3. Truss member sizes and thickness and connections at truss joints.

4. Truss support reactions.
  5. Top chord, Bottom chord and Web bracing requirements.
- D. Submit final roof and floor plan drawings sealed and signed by a qualified registered Professional Engineer depicting final installed truss assembly.
- Include:
1. All truss to truss connections
  2. All truss to structure (bearing) connections
  3. Plan and details for the location of all permanent lateral and diagonal bracing and/or blocking required in the top chord, web, and bottom chord planes. (Diaphragms excluded)

#### I.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Fabrication shall be performed in a quality controlled manufacturing environment by a cold-formed steel truss fabricator with experience fabricating Cold-Formed Steel trusses equal in material, design, and scope to the trusses required for this Project.
1. Installation of Cold-Formed Steel truss roof or floor assembly shall be performed by an installer with experience installing Cold-Formed Steel trusses equal in material, design and scope to the trusses required for this Project.
- B. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel" and AWS D1.3 "Structural Welding Code--Sheet Steel."
1. Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure."

#### I.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's unopened containers or bundles, fully identified by name, brand, type and grade. Exercise care to avoid damage during unloading, storing and erection.
- B. Store trusses on blocking, pallets, platforms or other supports off the ground and in an upright position sufficiently braced to avoid damage from excessive bending.
- C. Protect trusses and accessories from corrosion, deformation, damage and deterioration when stored at job site. Keep trusses free of dirt and other foreign matter.

#### I.7 PROJECT CONDITIONS

- A. During construction, adequately distribute all loads applied to trusses so as not to exceed the carrying capacity of any one truss.

## PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Ultra-Span® Truss Manufacturer. Contact Aegis Metal Framing, LLC at 1-888-902-3447, or [www.aegismetallframing.com](http://www.aegismetallframing.com) for a list of authorized fabricators.

All-Span, Inc.  
9347 All-Span Drive  
Bridgeville, DE 19933  
888-567-5797  
FAX 302-349-9461  
Website: <http://www.allspaninc.com>

Contacts

Mr. J.J. Carter : [jjcarter@allspaninc.com](mailto:jjcarter@allspaninc.com)

Service Area

Connecticut Delaware District of Columbia Maine Maryland Massachusetts New Hampshire  
New Jersey New York North Carolina Pennsylvania Rhode Island Vermont Virginia West  
Virginia

Products

Cold Formed Trusses Cold Formed Floor Joists

Sanford Contracting, Inc.  
1400 Iron Horse Industrial Park  
North Billerica, MA 01862  
978-663-0200  
FAX 978-663-7701  
Website: <http://www.sanfordcontracting.com>

Contacts

: [sanford@netway.com](mailto:sanford@netway.com)

Service Area

Connecticut Maine Massachusetts New Hampshire Rhode Island Vermont

Products

Cold Formed Trusses Cold Formed Floor Joists

Steele Truss Company  
118 Trade Road  
Plattsburg, NY 12901  
800-562-9565  
FAX 518-561-0948  
Website: <http://www.steeltrusses.net>

Contacts

Mr. Joel Steele : [jsteele@steeltrusses.net](mailto:jsteele@steeltrusses.net)

Mr. Pete Wynn

Service Area

Connecticut District of Columbia Maine Maryland Massachusetts New Hampshire New Jersey  
New York Pennsylvania Rhode Island Vermont

Products

Cold Formed Trusses Cold Formed Floor Joists

Superior Steel Components-Marne

1245 Comstock Street  
Marne, MI 49435  
800-887-7133  
FAX 800-887-0460  
Website: <http://www.lgst.com>

Contacts

Mr. Gary Marshall : [garym@lgst.com](mailto:garym@lgst.com)  
Mr. Eric Greenfield

Service Area

Arkansas Connecticut Delaware Illinois Indiana Iowa Kentucky Maine Maryland  
Massachusetts Michigan Minnesota Missouri Nebraska New Hampshire New Jersey New  
York Ohio Pennsylvania Rhode Island South Dakota Tennessee Vermont West Virginia  
Wisconsin

Products

Cold Formed Trusses Cold Formed Wall Panels Cold Formed Floor Joists

Megquier & Jones, Inc.

1156 Broadway  
South Portland, ME 04106  
207-799-8555  
FAX 207-767-2117

Contacts

Mr. John MacGregor : [jmacgregor@megjones.com](mailto:jmacgregor@megjones.com)  
Mr. John C. Yohe

Service Area

Connecticut Maine Massachusetts New Hampshire Rhode Island Vermont

Products

Cold Formed Trusses Cold Formed Floor Joists

Butler Manufacturing

1540 Genessee St.  
Kansas City, MO 64102  
816-968-3618  
FAX 816-968-4399  
Website: <http://www.ButlerMfg.com>

Contacts

Mr. Michael Mansell : [MGMansell@ButlerMfg.com](mailto:MGMansell@ButlerMfg.com)

Mr. Terry Bennington : [TBennington@ButlerMfg.com](mailto:TBennington@ButlerMfg.com)

Service Area

All 50 States and District of Columbia

Products

Cold Formed Trusses

## 2.2 COMPONENTS

- A. System components: Aegis Metal Framing, LLC ULTRA-SPAN® and POSI-STRUT® light gauge steel roof truss and floor truss components.
- B. Provide manufacturer's standard steel truss members, bracing, bridging, blocking, reinforcements, fasteners and accessories with each type of steel framing required, as recommended by the manufacturer for the applications indicated and as needed to provide a complete cold-formed steel truss roof or floor assembly.

## 2.3 MATERIALS

- A. Materials:
  1. For all chord and web members: Fabricate components of structural quality steel sheet per ASTM A653 with a minimum yield strength of 50,000 psi.
  2. Bracing, bridging and blocking members: Fabricate components of commercial quality steel sheet per ASTM A653 with minimum yield strength of 33,000 psi.
- B. Ultra-Span steel truss components: Provide sizes, shapes and gauges indicated.
  1. Design Uncoated-Steel Thickness: 0.0350 inch (0.89 mm) (nominal 20 ga)
  2. Design Uncoated-Steel Thickness: 0.0460 inch (1.17 mm) (nominal 18 ga)
  3. Design Uncoated-Steel Thickness: 0.0570 inch (1.45 mm) (nominal 16 ga)
  4. Design Uncoated-Steel Thickness: 0.0730 inch (1.85 mm) (nominal 14 ga)
  5. Design Uncoated-Steel Thickness: 0.0970 inch (2.46 mm) (nominal 12 ga)
- C. Finish: Provide components with protective zinc coating complying with ASTM A653, minimum G60 coating.
- D. Fastenings:
  1. Manufacturer recommended self-drilling screws with corrosion-resistant plated finish. Fasteners shall be of sufficient size and number to ensure the strength of the connection.
  2. Welding: Comply with AWS D1.1 when applicable and AWS D1.3 for welding base metals less than 1/8" thick.
  3. Other fasteners as accepted by truss engineer.

## 2.4 FABRICATION

- A. Factory fabricate cold-formed steel trusses plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations and the requirements of this Section.
  1. Fabricate truss assemblies in jig templates.
  2. Cut truss members by sawing or shearing or plasma cutting.
  3. Fasten cold-formed steel truss members by screw fastening, or other methods as standard with fabricator.

- a. Locate mechanical fasteners and install according to cold-formed steel truss component manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.
- B. Care shall be taken during handling, delivery and erection. Brace, block, or reinforce truss as necessary to minimize member and connection stresses. Refer to LGSEA "Field Installation Guide".
- C. Fabrication Tolerances: Fabricate trusses to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet (1:960) and as follows:
  1. Spacing: Space individual trusses no more than plus or minus 1/8 inch (3mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
  2. Squareness: Fabricate each cold-formed steel truss to a maximum out-of-square tolerance of 1/8 inch (3mm).

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Examine structure, substrates and installation conditions. Do not proceed with cold-formed steel truss installation until unsatisfactory conditions have been corrected.
- B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

#### 3.2 INSTALLATION, GENERAL

- A. General:
  1. Erection of trusses, including proper handling, safety precautions, installation bracing and other safeguards or procedures is the responsibility of the Contractor and Contractor's installer. Refer to LGSEA "Field Installation Guide".
  2. Exercise care and provide installation bracing required to prevent toppling of trusses during erection. Provide Ultra-Span Stabilizer™ from Aegis Metal Framing for lateral bracing.
- B. Erect trusses with plane of truss webs vertical and parallel to each other, accurately located at design spacing indicated.
- C. Provide proper lifting equipment, including spreader bar, suited to sizes and types of trusses required, applied at lift points recommended by truss fabricator. Exercise care to avoid damage to truss members during erection and to keep horizontal bending of the trusses to a minimum.
- D. Provide framing anchors as indicated or accepted on the engineering design drawing or erection drawings. Anchor trusses securely at bearing points.
- E. Install trusses plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations.
  1. DO NOT cut truss members without prior approval of truss engineer.
  2. Fasten cold-formed steel trusses by screw fastening, welding or other methods, as standard with fabricator.
    - a. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to cold-formed truss manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.



3. Install trusses in one-piece lengths, unless splice connections are indicated.
4. Provide installation bracing and leave in place until trusses are permanently stabilized.
- F. Erection Tolerances: Install trusses to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet (1:960) and as follows:
  1. Space individual trusses no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
  2. Limit out-of-plane bow and plumb per LGSEA "Field Installation Guide".

### 3.3 ROOF TRUSS INSTALLATION

- A. Install trusses per installation documents provided for in Section 1.4 (D).
- B. Space trusses per sealed truss drawings.
- C. Do not alter, cut, or remove truss members or connections of truss members.
- D. Erect trusses with plane of truss webs plumb and parallel to each other, align, and accurately position at spacing indicated.
- E. Erect trusses without damaging truss members or connections.
- F. Anchor trusses securely at all points of support, per installation documents provided for in Section 1.4 (D).
- G. Install all continuous bridging and permanent truss bracing per installation documents provided for in Section 1.4 (D).
- H. Perform all truss-to-truss connections per installation documents provided for in Section 1.4 (D).

### 3.4 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanizing repair paint according to ASTM A780 and the manufacturer's instructions.

END OF SECTION

207-773-8507

## SECTION 05500 - METAL FABRICATIONS

### 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. Steel ladders.
2. Loose bearing and leveling plates.
3. Loose steel lintels.
4. Shelf angles.
5. Steel framing and supports for overhead doors.
6. Steel framing and supports for mechanical and electrical equipment.
7. Metal edgings.
8. Miscellaneous metal trim.
9. Pipe bollards.

#### 1.3 SUBMITTALS

- A. Product Data: For the following:

1. Paint products.
2. Grout.

- B. Shop Drawings: Detail fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

1. Provide templates for anchors and bolts specified for installation under other Sections.

- C. Welding Certificates: Copies of certificates for welding procedures and personnel.

#### 1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

- B. Welding: Qualify procedures and personnel according to the following:
1. AWS D1.1, "Structural Welding Code--Steel."
  2. AWS D1.2, "Structural Welding Code--Aluminum."
  3. AWS D1.3, "Structural Welding Code--Sheet Steel."
  4. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

## 1.5 PROJECT CONDITIONS

- A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

## 1.6 COORDINATION

- A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

## PART 2 - PRODUCTS

### 2.1 METALS, GENERAL

- A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

### 2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- C. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500.

- D. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
- E. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
  - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.
- F. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

### 2.3 ALUMINUM

- A. Aluminum Extrusions: ASTM B 221, alloy 6063-T6.

### 2.4 PAINT

- A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664; selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

### 2.5 FASTENERS

- A. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- B. Anchor Bolts: ASTM F 1554, Grade 36.
- C. Machine Screws: ASME B18.6.3.
- D. Lag Bolts: ASME B18.2.1.
- E. Wood Screws: Flat head, carbon steel, ASME B18.6.1.
- F. Plain Washers: Round, carbon steel, ASME B18.22.1.

- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

1. Material: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

## 2.6 CONCRETE FILL

- A. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

## 2.7 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Shear and punch metals cleanly and accurately. Remove burrs.
- C. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Weld corners and seams continuously to comply with the following:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  2. Obtain fusion without undercut or overlap.
  3. Remove welding flux immediately.
  4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- G. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

- H. Allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient.
- I. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- J. Remove sharp or rough areas on exposed traffic surfaces.
- K. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

## 2.8 STEEL LADDERS

- A. General: Fabricate ladders for locations shown, with dimensions, spacings, details, and anchorages as indicated.
  - 1. Comply with ANSI A14.3, unless otherwise indicated.
- B. Siderails: Continuous, 3/8-by-2-1/2-inch steel flat bars, with eased edges, spaced 16 inches apart.
- C. Bar Rungs: 5/8-inch- diameter steel bars, spaced 12 inches o.c.
- D. Fit rungs in centerline of side rails; plug-weld and grind smooth on outer rail faces.
- E. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted steel brackets. Size brackets to support design loads specified in ANSI A14.3.
- F. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.

## 2.9 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates after fabrication.

## 2.10 LOOSE STEEL LINTELS

- A. Fabricate loose structural-steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- B. Weld adjoining members together to form a single unit where indicated.
- C. Galvanize loose steel lintels located in exterior walls.

## 2.11 SHELF ANGLES

- A. Fabricate shelf angles from steel angles of sizes indicated. Provide horizontally slotted holes to receive  $\frac{3}{4}$ -inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.
- B. Galvanize shelf angles to be installed in exterior walls.

## 2.12 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports that are not a part of structural-steel framework as necessary to complete the Work.
- B. Fabricate units from structural-steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
- C. Fabricate supports for operable partitions as follows:
  - 1. Beams: Continuous steel shapes of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
  - 2. Where wood nailers are attached to girders with bolts or lag screws, drill holes at 24 inches o.c.
- D. Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top plates as indicated. Drill baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness, unless otherwise indicated.
  - 1. Unless otherwise indicated, provide 1/2-inch baseplates with four 5/8-inch anchor bolts and 1/4-inch top plates.
- E. Galvanize miscellaneous framing and supports where indicated.



- H. Allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient.
- I. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- J. Remove sharp or rough areas on exposed traffic surfaces.
- K. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

## 2.8 STEEL LADDERS

- A. General: Fabricate ladders for locations shown, with dimensions, spacings, details, and anchorages as indicated.
  - 1. Comply with ANSI A14.3, unless otherwise indicated.
- B. Siderails: Continuous, 3/8-by-2-1/2-inch steel flat bars, with eased edges, spaced 16 inches apart.
- C. Bar Rungs: 5/8-inch- diameter steel bars, spaced 12 inches o.c.
- D. Fit rungs in centerline of side rails; plug-weld and grind smooth on outer rail faces.
- E. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted steel brackets. Size brackets to support design loads specified in ANSI A14.3.
- F. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.

## 2.9 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates after fabrication.

## 2.10 LOOSE STEEL LINTELS

- A. Fabricate loose structural-steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- B. Weld adjoining members together to form a single unit where indicated.
- C. Galvanize loose steel lintels located in exterior walls.

## 2.11 SHELF ANGLES

- A. Fabricate shelf angles from steel angles of sizes indicated. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.
- B. Galvanize shelf angles to be installed in exterior walls.

## 2.12 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports that are not a part of structural-steel framework as necessary to complete the Work.
- B. Fabricate units from structural-steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
- C. Fabricate supports for operable partitions as follows:
  - 1. Beams: Continuous steel shapes of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
  - 2. Where wood nailers are attached to girders with bolts or lag screws, drill holes at 24 inches o.c.
- D. Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top plates as indicated. Drill baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness, unless otherwise indicated.
  - 1. Unless otherwise indicated, provide 1/2-inch baseplates with four 5/8-inch anchor bolts and 1/4-inch top plates.
- E. Galvanize miscellaneous framing and supports where indicated.

3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

### 3.2 SETTING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
  1. Use nonshrink grout, nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
  2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

### 3.3 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings, if any.
- B. Anchor supports for operable partitions securely to and rigidly brace from building structure.
- C. Support steel girders on concrete or steel pipe columns. Secure girders with anchor bolts embedded in concrete or with bolts through top plates of pipe columns.
  1. Where grout space under bearing plates is indicated at girders supported on concrete, install as specified above for setting and grouting bearing and leveling plates.
- D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified above for setting and grouting bearing and leveling plates.
  1. Do not grout baseplates of columns supporting steel girders until girders are installed and leveled.

### 3.4 INSTALLING PIPE BOLLARDS

- A. Anchor bollards in place with concrete footings. Support and brace bollards in position in footing excavations until concrete has been placed and cured.

- B. Fill bollards solidly with concrete, mounding top surface.

### 3.5 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
  - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 Section "Painting."

END OF SECTION 05500

## SECTION 05511 - METAL STAIRS

### 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. Industrial stairs with steel floor plate treads.
  - 2. Handrails attached to walls adjacent to metal stairs.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal stairs capable of withstanding the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections. Apply each load to produce the maximum stress in each component of metal stairs.
  - 1. Treads and Platforms of Metal Stairs: Capable of withstanding a uniform load of 100 lbf/sq. ft. or a concentrated load of 300 lbf on an area of 4 sq. in., whichever produces the greater stress.
  - 2. Stair Framing: Capable of withstanding stresses resulting from loads specified above in addition to stresses resulting from railing system loads.
  - 3. Limit deflection of treads, platforms, and framing members to L/360 or 1/4 inch, whichever is less.
- B. Structural Performance of Handrails: Provide handrails complying with requirements in ASTM E 985 for structural performance, based on testing performed according to ASTM E 894 and ASTM E 935.

#### 1.4 SUBMITTALS

- A. Product Data: For metal stairs and the following:
  - 1. Steel floor plate.
  - 2. Paint products.

- B. Shop Drawings: Show fabrication and installation details for metal stairs. Include plans, elevations, sections, and details of metal stairs and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.
  - 1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Welding Certificates: Copies of certificates for welding procedures and personnel.
- D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Arrange for metal stairs specified in this Section to be fabricated and installed by the same firm.
- B. Fabricator Qualifications: A firm experienced in producing metal stairs similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

#### 1.6 COORDINATION

- A. Coordinate installation of anchorages for metal stairs. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Preassembled Stairs:
    - a. Alfab, Inc.
    - b. American Metal Works, Inc.
    - c. American Stair Corp., Inc.
    - d. Florida Stairs & Rails, Inc.

- e. National Stair & Rail, Inc.
- f. Sharon Companies, Ltd. (The).

## 2.2 FERROUS METALS

- A. Metal Surfaces, General: Provide metal free from pitting, seam marks, roller marks, and other imperfections where exposed to view on finished units. Do not use steel sheet with variations in flatness exceeding those permitted by referenced standards for stretcher-leveled sheet.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
- D. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- E. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

## 2.3 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 25 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.
- B. Plain Washers: Round, carbon steel, ASME B18.22.1.
- C. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
  - 1. Material: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

## 2.4 PAINT

- A. Shop Primers: Provide primers that comply with Division 9 Section "Painting."
- B. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664, selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.

## 2.5 CAST ABRASIVE NOSINGS

- A. Drill for mechanical anchors and countersink. Locate not more than 4 inches from ends and not more than 12 inches o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by manufacturer.
- B. Provide a plain surface texture, unless fluted or cross-hatched surfaces are indicated.

## 2.6 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, struts, handrails, railings, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
  - 1. Join components by welding, unless otherwise indicated.
  - 2. Use connections that maintain structural value of joined pieces.
- B. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.
  - 1. Industrial class, where indicated.
- C. Shop Assembly: Preassemble stairs in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- D. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Shear and punch metals cleanly and accurately. Remove sharp or rough areas on exposed surfaces.
- E. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- F. Weld connections to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. Weld exposed corners and seams continuously, unless otherwise indicated.
  - 5. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.



## 2.7 STEEL-FRAMED STAIRS

- A. Stair Framing: Fabricate stringers of structural-steel channels, plates, or a combination of both, as indicated. Provide closures for exposed ends of stringers. Bolt or weld headers to stringers; bolt or weld framing members to stringers and headers. If using bolts, fabricate and join so bolts are not exposed on finished surfaces.
- B. Steel Floor Plate Treads, Risers, and Platforms: Form to configurations shown in contract documents. Floor plate surface as shown on drawings with thickness necessary to support indicated loads, but not less than 1/4 inch.
  - 1. Abrasive-Surface Floor Plate: Fabricate from steel plate, with abrasive granules rolled into surface. Provide material with coefficient of friction of 0.6 or higher when tested according to ASTM C 1028.
  - 2. Form treads with integral nosing and back edge stiffener. Weld steel supporting brackets to stringers and weld treads to brackets.
  - 3. Fabricate platforms with integral nosings matching treads and weld to platform framing.

## 2.8 STEEL PIPE HANDRAILS AND RAILINGS

- A. General: Fabricate handrails to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness and anchorage, but not less than that needed to withstand indicated loads.
- B. Interconnect members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.
  - 1. At tee and cross intersections, cope ends of intersecting members to fit contour of pipe to which end is joined, and weld all around.
- C. Form changes in direction of handrails and rails as follows:
  - 1. As detailed.
- D. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- E. Close exposed ends of handrail and railing members with prefabricated end fittings.
- F. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns, unless clearance between end of rail and wall is 1/4 inch or less.
- G. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting railings and for attaching to other work. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.

- H. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.
- I. For nongalvanized handrails, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free from rack.
- C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete, unless otherwise indicated.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
- F. Field Welding: Comply with the following requirements:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

#### 3.2 INSTALLING STEEL TUBE HANDRAILS

- 1. Adjust handrails systems before anchoring to ensure matching alignment at abutting joints.

- B. Attach handrails to wall with wall brackets. Provide bracket with 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads. Secure wall brackets to building construction as follows:
1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
  2. For hollow masonry anchorage, use toggle bolts.
  3. For steel-framed gypsum board assemblies, use hanger or lag bolts set into wood backing between studs. Coordinate with stud installation to locate backing members.

### 3.3 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

END OF SECTION 05511

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# **DIVISION 6**

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NATIONAL ACCOUNTS

The following is a list of specification sections within this Division stipulating National Accounts the Owner has entered into with the specified manufacturer(s).

1. Section 06402 – INTERIOR ARCHITECTURAL WOODWORK: Cabinets, Countertops, Laboratory Tops, and Chair Rail.

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SECTION 06100 - ROUGH 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, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

- 1. Framing with dimension lumber.
- 2. Wood blocking and nailers.
- 3. Utility shelving.
- 4. Wood furring.
- 5. Wood Sheathing.
- 6. Plywood backing panels.

- B. Related Sections include the following:

- 1. Gypsum Board Assemblies: Section 09260

1.3 DEFINITIONS

- A. Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise indicated.

- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:

- 1. NELMA - Northeastern Lumber Manufacturers Association.
- 2. NLGA - National Lumber Grades Authority.
- 3. SPIB - Southern Pine Inspection Bureau.
- 4. WCLIB - West Coast Lumber Inspection Bureau.
- 5. 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.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials, both before and after exposure to elevated temperatures when tested according to ASTM D 5516 and ASTM D 5664.
  3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
- B. **Material Certificates:** For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee Board of Review.
- C. **Research/Evaluation Reports:** For the following, showing compliance with building code in effect for Project:
1. Preservative-treated wood.
  2. Fire-retardant-treated wood.
  3. Metal framing anchors.

#### 1.5 QUALITY ASSURANCE

- A. **Source Limitations for Fire-Retardant-Treated Wood:** Obtain each type of fire-retardant-treated wood product through one source from a single producer.

#### 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 MANUFACTURERS

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
1. Boise Cascade Corporation.
  2. Georgia-Pacific Corporation.
  3. Louisiana-Pacific Corporation.
  4. Metal Framing Anchors:
    - a. Alpine Engineered Products, Inc.
    - b. Cleveland Steel Specialty Co.
    - c. Harlen Metal Products, Inc.
    - d. KC Metals Products, Inc.

- e. Silver Metal Products, Inc.
- f. Simpson Strong-Tie Company, Inc.
- g. Southeastern Metals Manufacturing Co., Inc.
- h. United Steel Products Company, Inc.

## 2.2 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. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
  - 3. Provide dressed lumber, S4S, unless otherwise indicated.
  - 4. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.
- B. Wood Structural Panels:
  - 1. Plywood: Either DOC PS 1 or DOC PS 2, unless otherwise indicated.
  - 2. Oriented Strand Board: DOC PS 2.
  - 3. Thickness: As needed to comply with requirements specified but not less than thickness indicated.
  - 4. Factory mark panels according to indicated standard.

## 2.3 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWWA C2 (lumber) and AWWA C9 (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWWA C31 with inorganic boron (SBX).
  - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and one of the following:
    - a. Chromated copper arsenate (CCA).
    - b. Ammoniacal copper zinc arsenate (ACZA).
    - c. Ammoniacal, or amine, copper quat (ACQ).
- B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:

1. Nailers, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing members less than 18 inches above grade.

#### 2.4 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, provide materials that comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.
1. Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to ASTM D 5664, for lumber and ASTM D 5516, for plywood.
  2. Use treatment that does not promote corrosion of metal fasteners.
  3. Use Exterior type for exterior locations and where indicated.
  4. Use Interior Type A High Temperature (HT), unless otherwise indicated.

#### 2.5 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.

#### 2.6 MISCELLANEOUS LUMBER

- A. General: Provide lumber for support or attachment of other construction, including the following:
1. Blocking.
  2. Nailers.
  3. Furring.
- B. For items of dimension lumber size, provide Construction, Stud, or No. 2 grade lumber with 19 percent maximum moisture content and any of the following species:
1. Mixed southern pine; SPIB.
  2. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
  3. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.
  4. Northern species; NLGA.
  5. Western woods; WCLIB or WWPA.
- C. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine, No. 2 grade; SPIB.
  2. Hem-fir or Hem-fir (north), Construction or 2 Common grade; NLGA, WCLIB, or WWPA.
  3. Spruce-pine-fir (south) or Spruce-pine-fir, Construction or 2 Common grade; NELMA, NLGA, WCLIB, or WWPA.
  4. Northern species, No. 2 Common grade; NLGA.
  5. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.
- D. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

## 2.7 WOOD SHEATHING

- A. Plywood Floor Sheathing: Structural 1 sheathing.
1. Span Rating: Not less than 40/20.
  2. Thickness: See drawings.
- B. Plywood Roof Sheathing: Exterior, Structural I sheathing.
1. Span Rating: Not less than 48/24
  2. Thickness: Not less than 5/8 inch tongue and groove with H-clips.

## 2.8 PLYWOOD BACKING PANELS

- A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2 inch thick.

## 2.9 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
1. Where rough 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 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: CABO NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. 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.

- F. Lag Bolts: ASME B18.2.1..
- G. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- H. 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: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

## 2.10 METAL FRAMING ANCHORS

- A. General: Provide framing anchors made from metal indicated, of structural capacity, type, and size indicated, and as follows:
  - 1. Research/Evaluation Reports: Provide products acceptable to authorities having jurisdiction and for which model code research/evaluation reports exist that show compliance of metal framing anchors, for application indicated, with building code in effect for Project.
  - 2. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

## 2.11 MISCELLANEOUS MATERIALS

- A. Building Paper: Asphalt-saturated organic felt complying with ASTM D 226, Type I (No. 15 asphalt felt), unperforated.
- B. Building Wrap: Air-retarder sheeting made from polyolefins; cross-laminated films, woven strands, or spun-bonded fibers; coated or uncoated; with or without perforations; and complying with ASTM E 1677, Type I.
  - 1. Thickness: Not less than 3 mils.
  - 2. Permeance: Not less than 10 perms.
  - 3. Flame-Spread Index: 25 or less per ASTM E 84.
  - 4. Allowable Exposure Time: No more than three months.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Do not use materials with defects that impair quality of rough carpentry or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- C. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  - 1. CABO NER-272 for power-driven fasteners.
  - 2. Published requirements of metal framing anchor manufacturer.
  - 3. Table 23-II-B-1, "Nailing Schedule," and Table 23-II-B-2, "Wood Structural Panel Roof Sheathing Nailing Schedule," in the Uniform Building Code.

### 3.2 WOOD BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached 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. Build anchor bolts into masonry during installation of masonry work. Where possible, secure anchor bolts to formwork before concrete placement.

### 3.3 GYPSUM SHEATHING

- A. General: Fasten gypsum sheathing to supports with galvanized roofing nails or divergent point galvanized staples; comply with GA-253 and manufacturer's recommended spacing and referenced fastening schedule. Keep perimeter fasteners 3/8 inch from edges and ends of units.
- B. Install 24-by-96-inch sheathing horizontally with long edges at right angles to studs with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent board without forcing. Abut ends of boards over centers of studs and stagger end joints of adjacent boards not less than one stud spacing, two where possible.
- C. Install 48-by-96-inch and longer sheathing vertically with long edges parallel to, and centered over, studs. Install solid wood blocking where end joints do not occur over framing. Fit units tightly against each other.

### 3.4 SHEATHING TAPE APPLICATION

- A. Apply sheathing tape to joints between sheathing panels and at items penetrating sheathing. Apply at upstanding flashing to overlap both flashing and sheathing.

END OF SECTION 06100



## SECTION 06200 - FINISH 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, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Exterior standing and running trim.
  - 2. Interior standing and running trim for field-painted finish.
  - 3. Interior plywood paneling.
  - 4. Shelving.

#### 1.3 DEFINITIONS

- A. Inspection agencies, and the abbreviations used to reference them, include the following:
  - 1. NELMA - Northeastern Lumber Manufacturers Association.
  - 2. NHLA - National Hardwood Lumber Association.
  - 3. NLGA - National Lumber Grades Authority.
  - 4. RIS - Redwood Inspection Service.
  - 5. SCMA - Southern Cypress Manufacturers Association.
  - 6. SPIB - Southern Pine Inspection Bureau.
  - 7. WCLIB - West Coast Lumber Inspection Bureau.
  - 8. WWPA - Western Wood Products Association.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Include construction details, material descriptions, dimensions of individual components and profiles, textures, and colors.
  - 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. Samples for Initial Selection: Color charts consisting of actual materials in small sections for each type of material indicated.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect materials against weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels. Provide for air circulation within and around stacks and under temporary coverings.
- B. Deliver interior finish carpentry only when environmental conditions meet requirements specified for installation areas. If finish carpentry must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Primed Hardboard Trim:
    - a. ABT Co.; a Louisiana-Pacific Company.
    - b. Georgia-Pacific Corp.
    - c. Temple-Inland Forest Products Corp.
  - 2. Hardwood Veneer Plywood Paneling:
    - a. Champion International Corp.
    - b. Chesapeake Hardwood Products, Inc.
    - c. Georgia-Pacific Corp.
    - d. Ply-Gem Manufacturing.
    - e. Weyerhaeuser Company.

## 2.2 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable grading rules of inspection agencies certified by the American Lumber Standards' Committee Board of Review.
  - 1. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.
- B. Softwood Plywood: DOC PS 1.
- C. Hardwood Plywood: HPVA HP-1.
- D. Hardboard: AHA A135.4
- E. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.

## 2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated lumber and plywood are indicated, use materials impregnated with fire-retardant chemicals by a pressure process or other means acceptable to authorities having jurisdiction to produce products with the following fire-test-response characteristics:
  - 1. Flame-spread index of not greater than 25 when tested according to ASTM E 84.
- B. For exposed items indicated to receive transparent finish, do not use chemical formulations that contain colorants or that bleed through or otherwise adversely affect finishes.
- C. Exterior-Type Fire-Retardant Treatment: Organic-resin-based formulation that shows no increase in flame spread of treated material after being weathered according to ASTM D 2898, Method A.
- D. Kiln-dry material after treatment to levels required for untreated material. Do not use material that does not comply with requirements for untreated material or is warped or discolored.

## 2.4 FIRE-RATED INTERIOR DOOR WINDOW FRAMES

- A. Frames, complete with casings, fabricated from fire-retardant particleboard or fire-retardant, medium-density fiberboard with veneered exposed surfaces, or from solid fire-retardant-treated wood. Frames comply with NFPA 80 and are listed and labeled, and marked for intended use, for use with doors provided, by a testing and inspecting agency acceptable to authorities having jurisdiction, based on testing according to NFPA 252.
  - 1. Species: Birch.
  - 2. Fire Rating: 45 minutes.

## 2.5 SHELVING AND CLOTHES RODS

- A. Shelving: 3/4-inch particleboard shelving with radiused and filled front edge.
  - 1. Shelf Cleats: 3/4-by-3-1/2-inch boards of same species and grade indicated above for interior lumber trim for opaque finish.

## 2.6 MISCELLANEOUS MATERIALS

- A. Fasteners for Exterior Finish Carpentry: Provide nails or screws of the following materials, in sufficient length to penetrate minimum of 1-1/2 inches into substrate, unless otherwise recommended by manufacturer:
  - 1. Hot-dip galvanized steel.
  - 2. Prefinished aluminum in color to match stain, where face fastening of material to receive stain is unavoidable.
- B. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
- C. Flashing: Comply with requirements in Division 7 Section "Sheet Metal Flashing and Trim" for flashing materials installed in finish carpentry.
- D. Sealants: Comply with requirements in Division 7 Section "Joint Sealants" for materials required for sealing siding work.

## 2.7 FABRICATION

- A. Wood Moisture Content: Comply with requirements of specified inspection agencies and with manufacturer's written recommendations for moisture content of finish carpentry at relative humidity conditions existing during time of fabrication and in installation areas.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.

- B. Before installing finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours, unless longer conditioning is recommended by manufacturer.

### 3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
  - 1. Do not use manufactured units with defective surfaces, sizes, or patterns.
- B. Install finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
  - 1. Scribe and cut finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
  - 2. Countersink fasteners, fill surface flush, and sand where face fastening is unavoidable.
  - 3. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
  - 4. Coordinate finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate finish carpentry.

### 3.4 ADJUSTING

- A. Replace finish carpentry that is damaged or does not comply with requirements. Finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

### 3.5 CLEANING

- A. Clean finish carpentry on exposed and semiexposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

END OF SECTION 06200

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SECTION 06402 - INTERIOR ARCHITECTURAL WOODWORK

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. Wood cabinets.
  - 2. Plastic-laminate cabinets.
  - 3. Plastic-laminate countertops.
  - 4. Laminated-plastic laboratory tops.
  - 5. Chair rail.

1.3 NATIONAL ACCOUNT

- A. CVS/Pharmacy has entered into a national account agreement with Leggett & Platt Genesis Inc. for furnishing the interior architectural woodwork specified in this section. Complete installation shall be by the Contractor. For pricing quotations, placing orders, and further information, please call Leggett & Platt Genesis Inc. at (800) 257-9315.

1.4 DEFINITIONS

- A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items, unless concealed within other construction before woodwork installation.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Engage a qualified woodworking firm, approved by the Owner, to assume undivided responsibility for installation of interior architectural woodwork.
  - 1. An experienced installer, approved by the Owner, who has completed architectural woodwork similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork, construction, finishes, and other requirements.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

## 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.

## 1.8 COORDINATION

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

## PART 2 - PRODUCTS

### 2.1 INSTALLATION MATERIALS

- A. Rough Carriages for Stairs: Comply with requirements in Division 6 Section "Rough Carpentry." Kiln-dry to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.
- C. Handrail Brackets: Cast from malleable iron with wall flange drilled for exposed anchor and with support arm for screwing to underside of rail. Sized to provide 1-1/2-inch clearance between handrail and wall.



## PART 3 - EXECUTION

## 3.1 PREPARATION

- A. Condition woodwork to average prevailing humidity conditions in installation areas before installation.
- B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

## 3.2 INSTALLATION

- A. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in Part 2 of this Section for type of woodwork involved.
- B. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.
- C. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.
- D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- E. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 96 inches long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.
  - 1. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base, if finished.
  - 2. Install wall railings on indicated metal brackets securely fastened to wall framing.
  - 3. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches.
- F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
  - 1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
  - 2. Maintain veneer sequence matching of cabinets with transparent finish.
  - 3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips.

- G. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
  - 1. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
  - 2. Secure backsplashes to tops with concealed metal brackets at 16 inches o.c. and to walls with adhesive.
  - 3. Calk space between backsplash and wall with sealant specified in Division 7 Section "Joint Sealants."
- H. Complete the finishing work specified in this Section to extent not completed at shop or before installation of woodwork. Fill nail holes with matching filler where exposed. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats were applied in shop.
- I. Refer to Division 9 Sections for final finishing of installed architectural woodwork.

### 3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06402

# **DIVISION 7**

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## NATIONAL ACCOUNTS

The following is a list of specification sections within this Division stipulating National Accounts the Owner has entered into with the specified manufacturer(s).

1. Section 07240 – EXTERIOR INSULATION AND FINISH SYSTEM – EIFS
2. Section 07530 – FULLY ADHERED EPDM ROOFING SYSTEM: Roofing System.

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## SECTION 07210 - BUILDING INSULATION

### 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. Concealed building insulation.
  - 2. Foundation wall/under slab insulation

#### 1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
  - 1. Surface-Burning Characteristics: ASTM E 84.
  - 2. Fire-Resistance Ratings: ASTM E 119.
  - 3. Combustion Characteristics: ASTM E 136.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

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

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Glass-Fiber Insulation:
    - a. CertainTeed Corporation.
    - b. Johns Manville Corporation.
    - c. Knauf Fiber Glass.
    - d. Owens Corning.

## 2.2 INSULATING MATERIALS

- A. General: Provide insulating materials that comply with requirements and with referenced standards.
  - 1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.
- B. Faced Mineral-Fiber Blanket Insulation: ASTM C 665, Type III (blankets with reflective membrane facing), Class A (membrane-faced surface with a flame spread of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil-scrim-kraft, foil-scrim, or foil-scrim-polyethylene vapor-retarder membrane on one face; consisting of fibers manufactured from glass.
  - 1. Provide R-value as indicated on drawings.
- C. Extruded -- Polystyrene Drainage Panels: ASTM C 578, Type IV, 1.65 lb./cu. ft. and fabricated with one side having a matrix of drainage and edge channels.
  - 1. Provide R-value as indicated on drawings.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.



### 3.2 PREPARATION

- A. Clean substrates of substances harmful to insulations or of interfering with insulation attachment.

### 3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Water-Piping Coordination: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
- E. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.

### 3.4 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between closed-cell (nonbreathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.
  - 1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
- D. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements:
  - 1. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
  - 2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.

### 3.5 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07210

SECTION 07240 – EXTERIOR INSULATION AND FINISH SYSTEM - EIFS

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. Materials and installation of StoTherm Premier NExT to frame and block construction.
  - 2. Installation of Sto coating on Trellis Unit.
- B. Related Sections include the following:
  - 1. Direct- Applied Exterior Finish System (DEFS): Section 09540.
  - 2. Gypsum Board Assemblies: Section 09260.
  - 3. Trellis Unit: Section 10340.

1.3 NATIONAL ACCOUNT

- A. CVS/Pharmacy has entered into a national account agreement with Sto Corporation for furnishing the exterior insulation and finish system specified in this section. Complete installation shall be by the Contractor. For pricing quotations, placing orders, and further information, please call Sto Corp at (888) 786-3437.

1.4 DESIGN REQUIREMENTS

- A. Design for maximum allowable system deflection, normal to the plane of the wall, of L/240.
- B. Design for wind load in conformance with code requirements.
- C. Prevent the accumulation of water behind the system, either by condensation or leakage through the construction.
- D. Provide EIFS ultra-high impact mesh full height on all columns and on all EIFS build-outs adjacent to pedestrian traffic as indicated on contract drawings.
- E. Provide expansion joints in the system where they exist in the supporting construction, where frame construction adjoins CMU construction, and where DEFS on soffits adjoins EIFS.

- F. Provide minimum 3/4 inch wide joint where EIFS adjoins sidewalk or finished grade.
- G. Provide minimum 1/2 inch wide joints at penetrations through the EIFS (windows, doors, etc.).
- H. Provide sealant by Dow Corning for joints in accordance with recommendations of Dow Corning.

#### 1.5 QUALITY ASSURANCE

##### A. Contractor Requirements:

1. Engaged in application of Sto EIFS for a minimum of three (3) years.
2. Knowledgeable in the proper use and handling of Sto materials.
3. Employ skilled mechanics who are experienced and knowledgeable in Class PB EIFS application, and familiar with the requirements of the specified work.
4. Successful completion of minimum of three (3) projects of similar size and complexity to the specified project.
5. Provide the proper equipment, manpower and supervision on the job site to install the system in compliance with specifications and details.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product.
- B. Protect coatings (pail products) from freezing and temperatures in excess of 90°F. Store away from direct sunlight.
- C. Protect Portland cement based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.

#### 1.7 PROJECT/SITE CONDITIONS

- A. Maintain ambient and surface temperatures above 40° F during application and drying period, minimum 24 hours after application of materials.
- B. Provide supplementary heat for installation in temperatures less than 40° F.
- C. Provide protection of surrounding areas and adjacent surfaces from application of materials.

#### 1.8 COORDINATION/SCHEDULING

- A. Coordinate installation of windows so sill flashing extends over face of finished wall system.

- B. Coordinate waterproofing of framed gutter so it is waterproof prior to installation of wall system materials.
- C. Install coping and sealant immediately after installation of the finish coating when coatings are dry.

1.9 WARRANTY

- A. Provide manufacturer's standard ten (10) year labor and material warranty.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. EIFS over Frame Construction, EIFS on CMU: Sto Premier EIFS as furnished by Sto Corp.
- B. Air and moisture barrier where required by state energy code: StoGuard as furnished by Sto Corp.
- C. Primer and finish on stucco over CMU: Sto Hot Prime and Sto SilcoLit furnished by Sto Corp.
- D. Direct applied finish for soffits: Sto Quik Gold for Soffits furnish by So Corp.
- E. Sheathing for Frame Construction: As specified in Section 09260 "Gypsum Board Assemblies".

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS

- A. Prequalify under Quality Assurance requirements of this specification (Paragraph 1.5A).

3.2 EXAMINATION

- A. Inspect surfaces for:
  - 1. Contamination -- algae, chalkiness, dirt, dust, efflorescence, form oil, fungus, grease, laitance, mildew or other foreign substances.
  - 2. Surface absorption and chalkiness.
  - 3. Cracks -- measure crack width and record location of cracks.
  - 4. Damage and deterioration.

5. Moisture content and moisture damage -- use a moisture meter to determine if the surface is dry enough to receive the EIFS system and record any areas of moisture damage.
  6. Compliance with specification tolerances -- record areas that are out of tolerance (greater than 1/4 inch in 8'-0" deviation in plane).
- B. Inspect sheathing application for compliance with applicable requirement:
1. Glass mat faced gypsum sheathing -- Georgia-Pacific Publication 102250
- C. Report deviations from the requirements of project specifications or other conditions that might adversely affect the system installation to the General Contractor.

### 3.3 SURFACE PREPARATION

- A. Remove surface contaminants in accordance with ASTM D 4261
- B. Replace weather-damaged sheathing and repair damaged or cracked surfaces.
- C. Level surfaces to comply with required tolerances.

### 3.4 INSTALLATION

- A. Install wall system in compliance with manufacturer's published written instructions.

### 3.5 TRELLIS UNIT – INSTRUCTIONS FOR COATING

- A. Surface Preparation  
Wipe fiberglass surface with a mild solvent wipe (common isopropyl alcohol) to remove all dust and surface residue immediately prior to priming.
- B. Priming  
Product: 801 Sto Primer

Surface to receive Sto Primer shall be clean and dry.

Apply Sto Primer to all surfaces, which will receive finish.

Apply minimum 3 wet mils of Sto Primer using roller, spray or brush

(Note: Sto Primer contains sand. Consult the spray equipment manufacturer before removing any filters from spraying equipment to facilitate spraying)

Do not apply Sto Primer if ambient temperatures are below 40°F (4°C).

Do not apply Sto Primer if the surface temperature is within 5°F (3°C) of the ambient dew point temperature.

Allow Sto Primer to dry completely before applying finish. Sto Primer typically dries within 4 hours at 70°F (20°C) and 50% RH. Actual drying time will vary with ambient and surface temperatures.

Protect Sto Primer from rain, freezing, and continuous high humidity until completely dry.

Consult Sto Primer product literature or Sto Corp. for additional information.

C. Finish

Product: 136 StoSilco® Lit 1.0

Application:

Surface to receive StoSilco® Lit shall be clean and dry.

Apply Sto Silco® Lit to primed surface using a steel trowel or appropriate spray equipment.

Use trowel to scrape the material down to a uniform thickness no greater than the largest aggregate size.

Achieve final texture by floating with the appropriate float in a figure-eight motion.

Always work to a wet edge and do not interrupt the finishing operation except where the finish can be terminated at a clean architectural break.

Do not apply Sto Silco® Lit if ambient temperatures are below 40°F (4°C) or above 100°F (38°C).

Do not apply Sto Silco® Lit if the surface temperature is within 5°F (3°C) of the ambient dew point temperature.

Protect Sto Silco® Lit from rain, freezing, and continuous high humidity until completely dry. StoSilco® Lit normally dries in 24 hours at 70°F (20°C) and 50% RH. Actual drying time will vary with ambient and surface temperatures.

Consult Sto Silco® Lit product literature or Sto Corp. for additional information.

D. Adjacent Areas

The contractor shall protect adjacent areas of construction from spillage or overspray during the installation of Sto products.

E. Clean-up

Clean tools and equipment with water immediately after use. Dried material can only be removed mechanically.

3.6 PROTECTION

A. Provide protection of installed materials from water infiltration into or behind them.

B. Provide protection of installed materials from dust, dirt, precipitation, freezing and continuous high humidity until coatings are fully dry.

END OF SECTION 07240

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SECTION 07530 – FULLY ADHERED EPDM ROOFING SYSTEM

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 NATIONAL ACCOUNT

- A. CVS/Pharmacy has entered into a national account agreement with Carlisle/Versico for furnishing the roofing system specified in this section. Complete installation shall be by the Contractor. For pricing quotations, placing orders, and further information, call Carlisle/Versico at (800) 479-6832.
- B. CVS/Pharmacy has entered into a national account agreement with Firestone Building Products Co. for furnishing the roofing system specified in this section. Complete installation shall be by the Contractor. For pricing quotations, placing orders, and further information, call Firestone Building Products Co. at (317) 816-3206.

1.3 GENERAL NOTES

- A. Preceding job start up, contractor shall decide to his satisfaction that all specifications contained herein are workable.
- B. Contractor will perform all work by competent, trained, and properly equipped personnel in strict accordance with good roofing practices and applicable industry standards.
- C. Contractor will observe all published safety prevention policies and practices relating to application of roofing system and related work. All federal, state, and local codes shall be followed.
- D. Contractor will follow application, safety, etc. information as published in the most current edition of the Firestone RubberGard EPDM Roofing System Technical Specifications.
- E. Questions concerning this specification should be directed to Firestone Technical Services Department or Mark Munley, National Accounts Manager at 1 800.428.4442.

#### 1.4 WORK INCLUDED

- A. Work under this section covers the installation of a new Fully Adhered EPDM roofing system for CVS. In addition, contractor shall include all related items of work as noted herein or indicated on the drawings or otherwise required to complete the specified elements of work and provide the necessary warranties for this work.
- B. Contractor will dispose of all materials properly. Any material removal shall comply with state and local codes and requirements and shall be disposed of in a legal manner.

#### 1.5 SECTION INCLUDES

- A. Substrate preparation.
- B. Wood nailer installation.
- C. Membrane installation.
- D. Membrane flashing installation.
- E. Walkway pads.

#### 1.6 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D1079 for definition of terms related to roofing work not otherwise defined in the section
- B. Firestone: Firestone Building Products Co., Headquarters, 525 Congressional Blvd., Carmel, IN 46032-5607
- C. American Society for Testing and Materials ( ASTM ): 1916 Race Street, Philadelphia, PA 19103

#### 1.7 SYSTEM DESCRIPTION

- A. Non-Reinforced elastomeric sheet roofing, that is adhered to acceptable substrate with system manufacture's bonding adhesive.

#### 1.8 PERFORMANCE REQUIREMENTS

- A. General: Install sheet membrane roofing and base flashing that are watertight; will not permit the passage of liquid water; and will withstand wind loads, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.

- C. FM Listing: Provide sheet membrane, base flashings, and component materials that meet requirements of FM 4450 and FM 4470 as part of a roofing system and that are listed in FM's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM markings.
1. Roofing system shall comply with the following:
    - a. Fire/Windstorm Classification: Class 1A-90.
- 1.9 QUALITY ASSURANCE
- A. Manufacturer:
1. Company specializing in manufacturing the roofing membrane specified in this Section with ten years of manufacturing experience.
  2. System supplier must have ISO 9002 certification.
  3. Manufacturer must be able to provide the project with the membrane and Isocyanurate insulation that is produced in their facilities.
- B. Applicator:
1. Shall be a Firestone Red Shield Licensed Contractor.
  2. Shall have at least five years experience in installing specified system.
- C. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method indicated below by UL, FM, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and slopes indicated.
  2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing materials are a part.
- D. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site. Meet with the same participants and review the same items listed for the preinstallation conference. In addition, review status of submittals and coordination of work related to roof construction. Notify participants at least 5 working days before conference.
- E. Preinstallation Conference: Before installing roofing system, conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings." Notify participants at least 5 working days before conference.
1. Meet with Owner; Architect; Owner's insurer, if applicable; testing and inspecting agency representative; roofing Installer; roofing system manufacturer's representative; deck Installer; 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. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
4. Review loading limitations of deck during and after roofing.
5. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing.
6. Review governing regulations and requirements for insurance, certificates, and inspection and testing, if applicable.
7. Review temporary protection requirements for roofing system during and after installation.
8. Review roof observation and repair procedures after roofing installation.
9. Document proceedings, including corrective measures or actions required, and furnish copy of record to each participant.

#### 1.10 REGULATORY REQUIREMENTS

- A. Conform to applicable local building code requirements.

#### 1.11 QUALITY INSPECTION/OBSERVATION

- A. Inspection by Manufacturer: Provide a final inspection of the roofing system by a Technical Representative employed by roofing system manufacturer.
  1. Technical Representative shall not perform any sales functions.
  2. Contractor shall complete any necessary repairs required for issuance of warranty.

#### 1.12 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in manufacturer's original containers dry, undamaged, seals and labels intact and legible.
- B. Store all materials clear of ground and moisture with weather protective covering.
- C. Keep all combustible materials away from ALL ignition sources.
- D. 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.
- E. 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.

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

1.13 ENVIRONMENTAL REQUIREMENTS

- A. Install roofing membrane only when surfaces are clean, dry, smooth and free of snow or ice.
- B. Do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application. Consult Firestone Technical Specifications on cold weather application.

1.14 WARRANTY

- A. Type/Term:
  - 1. Provide 15 year Firestone Red Shield Roofing System Limited Warranty. Warranty shall include membrane, roof insulation, and all other products supplied by Firestone Building Products.
  - 2. Provide a separate Firestone ISO 95+ Insulation Warranty. Warranty term shall coincide with Red Shield Warranty.
- B. Coverage:
  - 1. Red Shield Warranty:
    - a. Limit of liability: No Dollar Limitation
    - b. Scope of coverage: Repair any leak in the Firestone EPDM Roofing System caused by the ordinary wear and tear of the elements, manufacturing defect in Firestone brand materials, and the workmanship used to install these materials.
  - 2. Insulation Warranty:
    - a. Limit of liability: No Dollar Limitation
    - b. Scope of coverage:

PART 2 - PRODUCTS

2.1 NAILERS FOR FLANGES AND ROOF ACCESSORIES

- A. Description: Structural Grade No. 2 or better Southern Pine, Douglas Fir, or Exterior Grade plywood. All wood shall be pressure treated for rot resistance.
  - 1. Nailer width: Minimum 3 1/2 in. (nominal) wide or as wide as the nailing flange of each roof accessory.
  - 2. Nailer thickness: Thickness of roof insulation.

B. Reference Standards:

1. Southern Pines: PS 20; SPIB Grading Rules.
2. Western Woods: PS 20; WWPA Grading Rules.
3. Plywood: PS 1; APA Grade Stamps.
4. Pressure preservative treatment: AWPB LP2.

2.2 MANUFACTURERS – MEMBRANE MATERIALS

- A. Firestone Adhered single-ply membrane system: Non-Reinforced elastomeric sheet roofing, that is adhered to acceptable substrate with manufacturers bonding adhesive.
- B. Approved Equals: Carlisle Syntec System: Carlisle Corp.

2.3 ELASTOMERIC SHEET ROOFING AND FLASHING MEMBRANE

- A. Description: Non-reinforced, cured, synthetic single-ply membrane composed of Ethylene Propylene Diene Terpolymer (EPDM) conforming to the following physical properties:

1. Membrane Type: .060 Standard

Property:	Specification:
Specific Gravity	1.15 +/- 0.05
Tensile Strength, Minimum, psi ( MPa )	1305 ( 9 )
Elongation, Minimum, %	300
Tear Resistance, lbf / in ( kN / M )	150 ( 26.3 )
Ozone Resistance, 166 hours @ 100 pphm @ 104°F with 50% extension	No Cracks
Heat Aging, 28 days @ 240°F	
Tensile Strength, Minimum psi ( MPa )	1205 ( 8.3 )
Elongation, Minimum %	200
Brittleness Point, max., °F, °C	-49 ( -45 )
Water Absorption, change in weight after immersion in water for 166 hours @ 158°F, %	+8, -2
Tolerance On Nominal Thickness, %	+/- 10
Water Vapor Permeability, Perm-Mils	2.0

- E. Batten Covers:
  - 1. Description: Cured 60 mil EPDM membrane laminated to 35 mil EPDM tape adhesive.
  - 2. Product/Producer:
    - a. QuickSeam Batten Cover by Firestone.
  
- F. Splice Adhesive:
  - 1. Description: Butyl-based, formulated for compatibility with EPDM membrane.
  - 2. Product/Producer:
    - a. RubberGard Splice Adhesive by Firestone.
  
- G. Bonding Adhesive:
  - 1. Description: Neoprene-based, formulated for compatibility with EPDM membrane & a wide variety of substrate materials, including masonry, wood, and insulation facings.
  - 2. Product/Producer:
    - a. RubberGard Bonding Adhesive by Firestone.
  
- H. Pourable Sealer:
  - 1. Description: 2-Part urethane , 2-color for reliable mixing.
  
- I. Seam Plates, Batten Strips and Insulation Plates:
  - 1. Description: Steel with a Galvalume coating.
  - 2. Reference Standard: Corrosion-resistant to meet FM-4470 criteria.
  
- J. Termination Bar:
  - 1. Description: 1.3" X 0.10" thick aluminum bar with integral caulk ledge.
  - 2. Product/Producer:
    - a. RubberGard Bonding Adhesive by Firestone.
  
- K. Roof Walkway Pads:
  - 1. Description: EPDM Walkway Pads, 0.30" X 30" X 30" with EPDM tape adhesive strips laminated to the bottom.
  - 2. Product/Producer:
    - a. QuickSeam Walkway Pads by Firestone.

## 2.5 INSULATION MATERIALS

- A. General: Provide preformed roof insulation boards that comply with requirements, selected from manufacturer's standard sizes and of thicknesses indicated.
  - 1. Provide preformed, tapered insulation boards where indicated for sloping to drain. Fabricate with the following taper:
    - a. 1/4 inch per 12 inches, unless otherwise indicated.
  - 2. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.
- B. Polyisocyanurate Board Insulation: Rigid, cellular polyisocyanurate thermal insulation with core formed by using HCFCs as blowing agents to comply with ASTM C 1289, classified by facer type as follows:
  - 1. Facer Type: Type II, felt or glass-fiber mat on both major surfaces.
  - 2. Provide minimum R-value of 25, as determined by the long term thermal resistance (LTTR) method.

## 2.6 INSULATION ACCESSORIES

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatible with sheet roofing material.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions of FM 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.
- C. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric mat, water permeable and resistant to ultraviolet degradation, type and weight as recommended by roofing system manufacturer for application.

## 2.7 WALKWAYS

- A. Walkway Pads: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads, approximately 3/14 inch thick, and acceptable to roofing system manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine roof deck to determine that it is sufficiently rigid to support roofers and their mechanical equipment and that deflection will not strain or rupture roof components or deform deck.



- B. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work.
- C. Examine roof substrate to verify that it is properly sloped to drains.
- D. Start work with sealants and adhesives at 60° - 80° F.
- E. Fumes from adhesive solvents may be drawn into the building during installation through rooftop intakes. Appropriate measures must be taken to assure that fumes from adhesive solvents are not drawn into the building through air intakes.
- F. The surface must be clean, dry, smooth, free of sharp edges, fins, loose or foreign materials, oil, grease and other materials which may damage the membrane. All roughened surfaces which could cause damage shall be properly repaired before proceeding.
- G. All surface voids of the immediate substrate greater than 1/4" wide must be properly filled with an acceptable insulation or suitable fill material.

### 3.2 PROTECTION OF OTHER WORK

- A. Protect metal, glass, plastic, and painted surfaces from adhesives and sealants.
- B. Protect neighboring work, property, cars, and persons from spills and overspray from adhesives, sealants and coatings.
- C. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trades.

### 3.3 MATERIAL STORAGE AND HANDLING

- A. Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.
- B. Consult container labels and Material Safety Data Sheets (MSDS) for specific safety instructions.

### 3.4 WOOD NAILER LOCATION AND INSTALLATION

- A. Total wood nailer height shall match the total thickness of insulation being used and shall be installed with a 1/8" gap between each length and at each change of direction.
- B. Wood nailers shall be firmly fastened to the deck. Mechanically fasten wood nailers to resist a force of 200 lbs. per lineal foot.

### 3.5 INSULATION INSTALLATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated and to Shop Drawings.
- D. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inches or greater, install required thickness in 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. 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 with insulation.
  - 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- G. Attached Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type indicated.
  - 1. Fasten insulation according to the insulation and roofing system manufacturers' written instructions to meet specified wind-uplift requirements, but not less than 1 fastener for each 4 sq. ft. and at least 2 fasteners per board.

### 3.6 MEMBRANE PLACEMENT AND ATTACHMENT

- A. Beginning at the low point of the roof, place the Firestone RubberGard membrane without stretching over the acceptable substrate and allow to relax a minimum of 30 minutes before attachment or splicing.
- B. After making sure the sheet is placed in its final position, fold it back evenly onto itself so as to expose the underside.
- C. Sweep the mating surface of the membrane with a stiff broom to remove excess dusting agent (if any) or other contaminants from the mating surface.
- D. Apply Bonding Adhesive at about the same time to both the exposed underside of the sheet and the substrate to which it will be adhered so as to allow approximately the same drying time. Apply Bonding Adhesive so to provide an even and uniform film thickness. Do not apply bonding adhesive to areas that will be subsequently spliced.

- E. Allow Bonding Adhesive to flash off until tacky. Touch the Bonding Adhesive surface with a clean, dry finger to be certain that the adhesive does not stick or string. As you are touching the adhesive, pushing straight down to check for stringing, also push forward on the adhesive at an angle to ensure that the adhesive is ready throughout its thickness. If either motion exposes wet or stringy adhesive when the finger is lifted, then it is not ready for mating.
- F. Starting at the fold, roll the previously coated portion of the sheet into the coated substrate slowly and evenly so as to minimize wrinkles.
- G. Compress the bonded half of the sheet to the substrate with a stiff push broom.
- H. Fold the unadhered half of the membrane sheet back onto itself, and repeat the bonding procedure to complete the bonding of the sheet.

### 3.7 MEMBRANE LAP SPLICING

#### A. General

1. Position the sheet at the splice area by overlapping membrane 5 inches. Once the membrane is in place, mark the bottom sheet 1/2" to 3/4" from the edge of the top sheet every 4 to 6 feet. Tack the sheet back with Firestone QuickPrime at 5' centers and at factory splices or as necessary to hold back the membrane at the splicing area.
2. Remove excess amounts of dusting agent on the sheet and at factory splices using a stiff push broom. Stir Firestone QuickPrime thoroughly before and during use. Dip the QuickScrubber into the bucket of QuickPrime, keeping the QuickScrubber flat. Apply the QuickPrime using long back and forth type strokes with pressure along the length of the splicing area until surfaces become a dark gray in color. Apply QuickPrime to both surfaces at the same time to allow the same flash off time. Change the scrub pad each 200 feet of 3 inch field splice, or when the pad will no longer hold the proper amount of QuickPrime. Additional scrubbing is required at areas that may have become contaminated or have excess amounts of dusting agent, and at all factory splices.
3. Position the QuickSeam Splice Tape on the bottom sheet, aligning the edge of the release paper with the markings. Immediately roll the splice tape with a 3"-4" wide silicone or silicone sleeved steel hand roller or a short nap 3" paint roller.
4. When the QuickSeam Splice Tape has been installed for the entire splice length allow the top sheet to rest on top of the tape's paper backing. Trim the top sheet as necessary to assure that 1/8"-1/2" of the QuickSeam Splice Tape will be exposed on the finished splice.
5. To remove the paper backing from the tape, first roll back the RubberGard membrane sheet, then peel the paper backing off the QuickSeam Splice Tape by pulling against the weight of the bottom sheet at approximately a 45 degree angle to the tape and parallel with the roof surface. Allow the top sheet to fall freely onto the exposed QuickSeam Splice Tape. Broom the entire length of the splice as the release paper is being removed.
6. Roll the splice using a 1-1/2"-2" wide silicone or silicone sleeved steel hand roller, first across the splice, and then along the entire length of the splice.

### 3.8 MEMBRANE SECUREMENT

- A. Secure membrane at all locations where the membrane terminates or goes through an angle change greater than 2" in 12" except for round pipe penetrations less than 18" in diameter and square penetrations less than 4" square.
- B. Mechanically fasten Reinforced Perimeter Fastening Strips per Firestone recommendations.

### 3.9 FLASHING – PENETRATIONS

#### A. General:

- 1. Flash all penetrations passing through the membrane.
- 2. The flashing seal must be made directly to the penetration.

#### B. Pipes, Round Supports, etc.

- 1. Flash with Firestone Pre-Molded EPDM Pipe Flashings where practical.
- 2. Flash using FormFlash when Pre-Molded EPDM Pipe Flashing is not practical.

#### C. Structural Steel Tubing: Use a field fabricated pipe flashing detail provided that the minimum corner radius is greater than 1/4" and the longest side of the tube does not exceed 12". When the tube exceeds 12" use a standard curb detail.

#### D. Roof Drains

- 1. Provide a clean even finish on the mating surfaces between the clamping ring and the drain bowl.
- 2. Taper insulation around the drain to provide a smooth transition from the roof surface to the drain. Use pre-manufactured tapered insulation with facer or suitable bonding surface to achieve slope. Slope shall not exceed Firestone recommendations.
- 3. Position the RubberGard membrane, then cut a hole for the roof drain to allow 1/2" -3/4" of membrane extending inside the clamping ring past the drain bolts.
- 4. Make round holes in the RubberGard membrane to align with clamping bolts. Do not cut the membrane back to the bolt holes.
- 5. Place Water Block Seal on top of drain bowl where the clamping ring seats below the membrane.
- 6. Install the roof drain clamping ring and clamping bolts. Tighten the clamping bolts to achieve constant compression.

#### E. Pipe Clusters and Unusual Shaped Penetrations

- 1. Fabricate penetration pockets to allow a minimum clearance of 1" between the penetration and all sides.
- 2. Secure penetration pockets per Firestone Details
- 3. Fill penetration pockets with Pourable Sealer, so as to shed water. Pourable Sealer shall be a minimum of 2" deep.

- F. Hot Pipes: Protect the rubber components from direct contact with steam or heat sources when the in-service temperature is in excess of 180° F. In all such cases flash to an intermediate insulated "cool" sleeve per Firestone details.
  - G. Flexible Penetrations
    - 1. Provide a weathertight gooseneck set in Water Block Seal and secured to the deck.
    - 2. Flash in accordance with Firestone Details
  - H. Scuppers
    - 1. Set welded watertight scupper in Water Block Seal and secure to the structure.
    - 2. Flash in accordance with Firestone Details.
  - I. Expansion Joints
    - 1. Install as shown on roof drawings in accordance with Firestone details.
- 3.10 FLASHING - WALLS, PARAPETS, MECHANICAL EQUIPMENT CURBS, SKYLIGHTS, ETC.
- A. General: Using the longest pieces practical, flash all walls, parapets, curbs, etc., a minimum of 8" high per Firestone Details.
  - B. Evaluate Substrate: Evaluate the substrate and overlay per Firestone specifications as necessary.
  - C. Complete the splice between flashing and the main roof sheet with Splice Adhesive before adhering flashing to the vertical surface. Provide lap splices in accordance with Firestone Details.
  - D. Apply Bonding Adhesive at about the same time to both the flashing and the surface to which it is being bonded so as to allow approximately the same flash off time. Apply Bonding Adhesive in a uniform coating.
  - E. Allow Bonding Adhesive to flash off until tacky. Touch the Bonding Adhesive surface with a clean, dry finger to be certain that the adhesive does not stick or string. While touching the adhesive, pushing straight down to check for stringing, also push forward on the adhesive at an angle to ensure that the adhesive is ready throughout its thickness. If either motion exposes wet or stringy adhesive when the finger is lifted, then it is not ready for mating. Flash off time will vary depending on ambient air conditions.
  - F. Roll the flashing into the adhesive evenly and carefully so as to minimize wrinkles.
  - G. Ensure proper contact of flashing by brooming in place.
  - H. Provide termination directly to the vertical substrate as shown on roof drawings.
  - I. Install T-Joint covers at field and flashing splice intersections as required by Firestone.

- J. Install intermediate flashing attachment as required by Firestone Specifications and Details.

### 3.11 FLASHING - ROOF EDGE METALS

- A. Apply QuickPrime to the metal edging and membrane as described in Firestone Specifications.
- B. Place the roll of QuickSeam Flashing on the roof a few feet ahead of the application starting point, positioned so that it unrolls from the top of the roll. Remove approximately 2'-3' of release paper and apply to the metal flange and RubberGard membrane. Lap adjacent rolls of QuickSeam Flashing a minimum of one inch.
- C. With a 2"-3" wide silicone or silicone sleeved steel hand roller, roll the QuickSeam Flashing ensure proper adhesion. Additional attention must be given to factory splice intersections and to any change in plane.
- D. Apply 6" length of QuickSeam Flashing, a QuickSeam Joint Cover, or 6"x6" FormFlash to the inside edge of the QuickSeam Flashing at all overlaps.
- E. Apply 6" length of QuickSeam Flashing, a QuickSeam Joint Cover, or 6"x6" FormFlash at all intersections between the QuickSeam Flashing and field fabricated splices.
- F. Where QuickSeam Flashing will not completely cover the metal flange, an additional piece of QuickSeam Flashing must be applied to the metal edge laps. Apply Seam Edge Treatment at the intersections of the flashing sections.
- G. When the roof slope is greater than 1 in 12, apply Seam Edge Treatment along the back edge of the QuickSeam Flashing.

### 3.12 TEMPORARY CLOSURE

- A. Temporary closures which ensure that moisture does not damage any completed section of the new roofing system are the responsibility of the applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.

### 3.13 ROOF WALKWAYS

- A. Install walkways at all access points to the roof and around all rooftop equipment that may require maintenance and as shown on roof drawings.
- B. Layout Firestone RubberGard Walkway Pads so that the flat surface is over the completed RubberGard membrane, spacing each pad a minimum of 1" and a maximum of 3" from each other to allow for drainage. Walkway pads may not be used within 10' of any roof edge or perimeter. These areas will require the installation of concrete pavers.

- C. If the installation of Firestone RubberGard Walkway Pads over field fabricated splices or within 6" of a splice edge cannot be avoided, flash in the splice using QuickSeam Flashing prior to installing the walkway pad. The QuickSeam Flashing shall extend beyond the walkway pad a minimum of 6" on either side.
- D. Remove the release paper. Turn the walkpad over and place it in the QuickPrime.
- E. Walk on the pad to press in place assuring proper adhesion.
- F. If loose laid pavers are used for walkways. Adhere a layer of RubberGard membrane beneath them to isolate them from the roofing membrane. Protection layers must extend a minimum of 2" beyond the paving stone.

### 3.14 SHEET METAL WORK

- A. Install Firestone sheet metal as shown on roof drawings.
- B. Follow current industry guidelines for installation or Firestone requirements, whichever is more stringent.

### 3.15 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed as required by the manufacturer
- B. Correct identified defects or irregularities.

### 3.16 CLEAN-UP

- A. Protect sheet membrane roofing 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. Clean all contaminants from building and surrounding areas.
- C. Remove trash, debris, equipment from project site and surrounding areas.
- D. Repair or replace damaged building components or surrounding areas to the satisfaction of the building owner.

END OF SECTION 07530

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SECTION 07620 - 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 sheet metal flashing and trim in the following categories:
  - 1. Roof-drainage systems.
  - 2. Exposed trim and fasciae.
  - 3. Copings.
  - 4. Metal flashing.
  - 5. Reglets.
  - 6. Overhead-piping safety pans.
  - 7. Soffit vent.

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.
- B. Fabricate and install flashings at roof edges to comply with recommendations of FM Loss Prevention Data Sheet 1-49 for the following wind zone:
  - 1. Wind Zone 1: Wind pressures of 21 to 30 psf.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experience Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1.5 PROJECT CONDITIONS

- A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Ensure best possible weather resistance, durability of Work, and protection of materials and finishes.

## PART 2 - PRODUCTS

## 2.1 METALS

- A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated and with not less than the strength and durability of alloy and temper designated below:
  - 1. Anodized Aluminum Sheet: ASTM B 209, 5005-H14, with a minimum thickness of 0.030 inch.
- B. Galvanized Steel Sheet: ASTM A 526, G 90, commercial quality, or ASTM A 527, G 90, lock-forming quality, hot-dip galvanized steel sheet with 0.20 percent copper, mill phosphatized where indicated for painting; not less than 0.0396 inch thick, unless otherwise indicated.

## 2.2 REGLETS

- A. General: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces and compatible with flashing indicated.
- B. 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.
- C. Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
- D. 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.
- E. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of the counterflashing lower edge.
  - 1. Material: Galvanized steel, 0.0217 inch thick.
- F. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Fry Reglet Corporation.
  - 2. Hickman: W.P. Hickman Co.
  - 3. Keystone Flashing Company.

## 2.3 MISCELLANEOUS MATERIALS AND ACCESSORIES

- A. Solder: ASTM B 32, Grade Sn50, used with rosin flux.

- B. Fasteners: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.
- C. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
- D. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealants."
- E. Epoxy Seam Sealer: 2-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior and interior nonmoving joints, sealants as specified in Division 7 Section "Join Sealants".
- F. Adhesives: Type recommended by flashing sheet metal manufacturer for waterproof and weather-resistant seaming and adhesive application of flashing sheet metal.
- G. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.
- H. Gutter Screen: 1/4-inch hardware cloth installed in sheet metal frames. Fabricate screen and frame of same basic material as gutters and downspouts.
- I. Coping Joints: Contractor shall have the option of providing one of the following profiles:
  - 1. Joints with overlapping, matching metal cap adhered to base coping with non-staining, one-part, neutral curing, ultra low-modulus silicone sealant complying with ASTM C920 and equal to "890" as manufactured by Pecora Corporation.
  - 2. Joints with overlapping, non-staining, low-modulus, extruded silicone compound in matte texture and matching coping color, equal to "Sil-Span" as manufactured by Pecora Corporation. Width shall be manufacturer's standard sufficient enough for adhesive attachment to base coping with compatible non-staining, one-part, low-modulus, neutral curing, high performance silicone sealant, complying with ASTM C920 and equal to "864" by Pecora.

#### 2.4 FABRICATION, GENERAL

- A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.
- B. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

- C. Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.
- D. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- E. Seams: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
- F. Expansion Provisions: Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- G. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
- H. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.
- I. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.
- J. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.
  - 1. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

## 2.5 SHEET METAL FABRICATIONS

- A. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.
- B. Roof-Drain Flashing: Fabricate from the following material:
  - 1. Lead: 4.0 lb/sq. ft., hard tempered.
- C. Scuppers: Fabricate from the following material:
  - 1. Aluminum: 0.0320 inch thick.
- D. Exposed Trim, and Fasciae: Fabricate from the following material:
  - 1. Aluminum: 0.030 inch thick.

- E. Soffit Vent: Where indicated and as profiled on Drawings, provide 3-inch wide perforated soffit vent form the following material:
  - 1. Galvanized Steel: 0.0276-inch thick.
- F. Copings: Fabricate from the following material:
  - 1. Aluminum: 0.030 inch thick.
- G. Base Flashing: Fabricate from the following material:
  - 1. Galvanized Steel: 0.0276 inch thick.
- H. Counterflashing: Fabricate from the following material:
  - 1. Galvanized Steel: 0.0217 inch thick.
- I. Flashing Receivers: Fabricate from the following material:
  - 1. Galvanized Steel: 0.0217 inch thick.
- J. Drip Edges: Fabricate from the following material:
  - 1. Aluminum: 0.0320 inch thick.
- K. Eave Flashing: Fabricate from the following material:
  - 1. Aluminum: 0.0320 inch thick.
  - 2. Stainless Steel: 0.0156 inch thick.
  - 3. Terne-Coated Stainless Steel: 0.015 inch thick.
  - 4. Galvanized Steel: 0.0217 inch thick.
  - 5. Aluminum-Zinc Alloy-Coated Steel: 0.0217 inch thick.
  - 6. Coil-Coated Galvanized Steel: 0.0217 inch thick.
- L. Equipment Support Flashing: Fabricate from the following material:
  - 1. Galvanized Steel: 0.0276 inch thick.
- M. Roof-Penetration Flashing: Fabricate from the following material:
  - 1. Galvanized Steel: 0.0276 inch thick.
- N. Overhead-Piping Safety Pans: Fabricate from the following material:
  - 1. Galvanized Steel: 0.0396 inch thick.

## 2.6 ALUMINUM FINISHES

- A. General: Comply with Aluminum Association's (AA) "Designation System for Aluminum Finishes" for finish designations and application recommendations.

- B. Class I, Color Anodic Finish: AA-C22A42/A44 (Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 606.1 or AAMA 608.1.

- 1. Color: To match exterior finish and insulation system (EFIS).

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof.
- B. Install exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- C. Roof-Edge Flashings: Secure metal flashings at roof edges according to FM Loss Prevention Data Sheet 1-49 for specified wind zone.
- D. Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- E. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-terminated edges of sheets to be soldered to a width of 1-1/2 inches, except where pre-terminated surface would show in finished Work.
  - 1. Do not solder the following metals:
    - a. Aluminum.

2. Pretinning is not required for the following metals:
    - a. Lead.
  3. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
- F. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards. Fill joint with sealant and form metal to completely conceal sealant.
1. Use joint adhesive for nonmoving joints specified not to be soldered.
- G. Sealant and Coping Compound: Install in accordance with manufacturer's written instructions and recommendations for conditions encountered.
- H. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- I. Seams: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
- J. Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.
1. Underlayment: Where installing stainless steel or aluminum directly on cementitious or wood substrates, install a slip sheet of red-rosin paper and a course of polyethylene underlayment.
  2. Bed flanges of Work in a thick coat of roofing cement where required for waterproof performance.
- K. Install reglets to receive counterflashing according to the following requirements:
1. Where reglets are shown in concrete, furnish reglets for installation under Division 3 Section "Cast-in-Place Concrete."
  2. Where reglets are shown in masonry, furnish reglets for installation under Division 4 Section "Unit Masonry."
- L. Counterflashings: Coordinate installation of counterflashings with installation of assemblies to be protected by counterflashing. Install counterflashings in reglets or receivers. Secure in a waterproof manner by means of snap-in installation and sealant, lead wedges and sealant, interlocking folded seam, or blind rivets and sealant. Lap counterflashing joints a minimum of 2 inches and bed with sealant.
- M. Roof-Drainage System: Install drainage items fabricated from sheet metal, with straps, adhesives, and anchors recommended by SMACNA's Manual or the item manufacturer, to drain roof in the most efficient manner. Coordinate roof-drain flashing installation with roof-drainage system installation. Coordinate flashing and sheet metal items for steep-sloped roofs with roofing installation.

- N. Overhead-Piping Safety Pans: Suspend pans from pipe and install drain line to plumbing waste or drain line.
- O. Equipment Support Flashing: Coordinate equipment support flashing installation with roofing and equipment installation. Weld or seal flashing to equipment support member.
- P. Roof-Penetration Flashing: Coordinate roof-penetration flashing installation with roofing and installation of items penetrating roof. Install flashing as follows:
  - 1. Turn lead flashing down inside vent piping, being careful not to block vent piping with flashing.
  - 2. Seal and clamp flashing to pipes penetrating roof, other than lead flashing on vent piping.
- Q. Splash Pans: Install where downspouts discharge on low-sloped roofs, unless otherwise shown. Set in roof cement or sealant compatible with roofing membrane.

### 3.3 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.
- B. Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

END OF SECTION 07620



2. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
3. Fabricate units to minimum height of 8 inches, unless otherwise indicated.
4. Sloping Roofs: Where slope of roof deck exceeds 1/4 inch per foot, fabricate support units with height tapered to match slope to level tops of units.

## 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, single-wall construction with 1-inch minimum 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.
- B. Type: Single-leaf personnel access.
  1. For Ladder Access: 30 by 36 inches.
- C. Material: Galvanized steel sheets.

## 2.5 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.

## 2.6 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.

### 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.

#### 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 07811 - SPRAYED FIRE-RESISTIVE MATERIALS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes sprayed fire-resistive materials applied to surfaces that are concealed from view behind other construction when the Work is completed.

#### 1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Compatibility and adhesion test reports.
- C. Product test reports.
- D. Research/evaluation reports.

#### 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer, approved by manufacturer to install manufacturer's products. A manufacturer's willingness to sell its sprayed fire-resistive materials to Contractor or to an installer engaged by Contractor does not in itself confer qualification on the buyer.
- B. Sprayed Fire-Resistive Materials Testing: By a qualified testing and inspecting agency engaged by Contractor or manufacturer to test for compliance with specified requirements for performance and test methods.
  - 1. Sprayed fire-resistive materials are randomly selected for testing from bags bearing the applicable classification marking of UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
  - 2. Testing is performed on specimens of sprayed fire-resistive materials that comply with laboratory testing requirements specified in Part 2 and are otherwise identical to installed fire-resistive materials, including application of accelerant, sealers, topcoats, tamping, troweling, rolling, and water overspray, if any of these are used in final application.
- C. Compatibility and Adhesion Testing: Engage a qualified testing and inspecting agency to prepare compatibility and adhesion test reports.
  - 1. Test for bond per ASTM E 736 and requirements in UL's "Fire Resistance Directory" for coating materials. Provide bond strength indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.

2. Verify that manufacturer, through its own laboratory testing or field experience, has not found primers or coatings to be incompatible with sprayed fire-resistive material.
- D. Fire-Test-Response Characteristics: Where indicated, provide products identical to those tested for fire resistance per ASTM E 119 by a testing agency acceptable to authorities having jurisdiction.
1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
  2. Identify products with appropriate markings of applicable testing and inspecting agency.
- E. Provide products containing no detectable asbestos as determined according to the method specified in 40 CFR 763, Subpart E, Appendix E, Section 1, "Polarized Light Microscopy."

#### 1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply sprayed fire-resistive material when ambient or substrate temperature is 40 deg F or lower unless temporary protection and heat is provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.
- B. Ventilate building spaces during and after application of sprayed fire-resistive material. Use natural means or, if they are inadequate, forced-air circulation until fire-resistive material dries thoroughly.
- C. Sequence and coordinate application of sprayed fire-resistive materials with related work.
1. Provide temporary enclosure as required to confine spraying operations and protect the environment.
  2. Provide temporary enclosures for applications to prevent deterioration of fire-resistive material due to exposure to weather and to unfavorable ambient conditions for humidity, temperature, and ventilation.
  3. Avoid unnecessary exposure of fire-resistive material to abrasion and other damage likely to occur during construction operations subsequent to its application.
  4. Do not apply fire-resistive material to metal roof deck substrates until concrete topping, if any, has been completed. For metal roof decks without concrete topping, do not apply fire-resistive material to metal roof deck substrates until roofing has been completed; prohibit roof traffic during application and drying of fire-resistive material.
  5. Do not apply fire-resistive material to metal floor deck substrates until concrete topping has been completed.
  6. Do not begin applying fire-resistive material until clips, hangers, supports, sleeves, and other items penetrating fire protection are in place.

7. Defer installing ducts, piping, and other items that would interfere with applying fire-resistive material until application of fire protection is completed.
8. Do not install enclosing or concealing construction until after fire-resistive material has been applied, inspected, tested and corrections have been made to defective applications.

#### 1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by Contractor and by Installer, in which manufacturer agrees to repair or replace sprayed fire-resistive materials that fail in materials or workmanship within two years from date of Substantial Completion.
  1. Failures include, but are not limited to, cracking, flaking, spalling, eroding in excess of specified requirements; peeling; or delaminating of sprayed fire-resistive materials from substrates.

### PART 2 - PRODUCTS

#### 2.1 CONCEALED SPRAYED FIRE-RESISTIVE MATERIALS

- A. General: For concealed applications of sprayed fire-resistive materials, provide manufacturer's standard products complying with requirements indicated for material composition and physical properties representative of installed products.
- B. Products: Subject to compliance with requirements, provide the following:
  1. Cementitious Sprayed Fire-Resistive Material:
    - a. Grace, W. R. & Co.--Conn., Construction Products Div.; Monokote Type MK-6s.
- C. Material Composition: As follows:
  1. Cementitious sprayed fire-resistive material consisting of factory-mixed, dry formulation of gypsum or portland cement binders and lightweight mineral or synthetic aggregates mixed with water at Project site to form a slurry or mortar for conveyance and application.
- D. Physical Properties: Minimum values, unless otherwise indicated, or higher values required to attain designated fire-resistance ratings, measured per standard test methods referenced with each property as follows:
  1. Dry Density: 15 lb/cu. ft. for average and individual densities regardless of density indicated in referenced fire-resistance design, or greater if required to attain fire-resistance ratings indicated, per ASTM E 605 or AWCI Technical Manual 12-A, Section 5.4.5, "Displacement Method."

2. Thickness: Provide minimum average thickness required for fire-resistance design indicated according to the following criteria, but not less than 0.375 inch, per ASTM E 605:
  - a. Where the referenced fire-resistance design lists a thickness of 1 inch or greater, the minimum allowable individual thickness of sprayed fire-resistive material is the design thickness minus 0.25 inch.
  - b. Where the referenced fire-resistance design lists a thickness of less than 1 inch but more than 0.375 inch, the minimum allowable individual thickness of sprayed fire-resistive material is the greater of 0.375 inch or 75 percent of the design thickness.
  - c. No reduction in average thickness is permitted for those fire-resistance designs whose fire-resistance ratings were established at densities of less than 15 lb/cu. ft..
3. Bond Strength: 200 lbf/sq. ft. minimum per ASTM E 736 under the following conditions:
  - a. Field test sprayed fire-resistive material that is applied to flanges of wide-flange, structural-steel members on surfaces matching those that will exist for remainder of steel receiving fire-resistive material.
  - b. If surfaces of structural steel receiving sprayed fire-resistive material are primed or otherwise painted for coating materials, perform series of bond tests specified in UL's "Fire Resistance Directory." Provide bond strength indicated in referenced UL fire-resistance criteria, but not less than 200 lbf/sq. ft. minimum per ASTM E 736.
  - c. Minimum thickness of sprayed fire-resistive material tested in laboratory shall be 0.75 inch.
4. Compressive Strength: 5.21 lbf/sq. in. as determined in the laboratory per ASTM E 761. Minimum thickness of sprayed fire-resistive material tested shall be 0.75 inch and minimum dry density shall be as specified, but not less than 15 lb/cu. ft..
5. Corrosion Resistance: No evidence of corrosion per ASTM E 937.
6. Deflection: No cracking, spalling, or delamination per ASTM E 759.
7. Effect of Impact on Bonding: No cracking, spalling, or delamination per ASTM E 760.
8. Air Erosion: Maximum weight loss of 0.025 g/sq. ft. in 24 hours per ASTM E 859. For laboratory tests, minimum thickness of sprayed fire-resistive material is 0.75 inch, maximum dry density is 15 lb/cu. ft., test specimens are not prepurged by mechanically induced air velocities, and tests are terminated after 24 hours.
9. Fire-Test-Response Characteristics: Provide sprayed fire-resistive materials with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
  - a. Flame-Spread Index: 10 or less.
  - b. Smoke-Developed Index: 0.
10. Fungal Resistance: No observed growth on specimens per ASTM G 21.

## 2.2 AUXILIARY FIRE-RESISTIVE MATERIALS

- A. General: Provide auxiliary fire-resistive materials that are compatible with sprayed fire-resistive materials and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Substrate Primers: For use on each substrate and with each sprayed fire-resistive product, provide primer that complies with one or more of the following requirements:
  - 1. Primer's bond strength complies with requirements specified in UL's "Fire Resistance Directory," for coating materials based on a series of bond tests per ASTM E 736.
  - 2. Primer is identical to those used in assemblies tested for fire-test-response characteristics of sprayed fire-resistive material per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Examine substrates, areas, and conditions, with Installer present, to determine whether they are in satisfactory condition to receive sprayed fire-resistive material and to verify the following:
  - 1. Substrates are free of oil, grease, rolling compounds, incompatible primers, loose mill scale, dirt, or other foreign substances capable of impairing bond of fire-resistive materials with substrates under conditions of normal use or fire exposure.
  - 2. Objects penetrating fire-resistive material, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
  - 3. Substrates are not obstructed by ducts, piping, equipment, and other suspended construction that will interfere with applying fire-resistive material.
- B. Clean substrates of substances that could impair bond of fire-resistive material, including dirt, oil, grease, release agents, rolling compounds, loose mill scale, and incompatible primers, paints, and encapsulants.
- C. Conduct tests according to fire-resistive material manufacturer's written recommendations to verify that substrates are free of oil, rolling compounds, and other substances capable of interfering with bond.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.
- E. Cover other work subject to damage from fallout or overspray of fire-resistive materials during application.

- F. Extend fire-resistive material in full thickness over entire area of each substrate to be protected. Unless otherwise recommended in writing by sprayed fire-resistive material manufacturer, install body of fire-resistive covering in a single course.
- G. Spray apply fire-resistive materials to maximum extent possible. Following the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by sprayed fire-resistive material manufacturer.
- H. Apply concealed sprayed fire-resistive material in thicknesses and densities not less than those required to achieve fire-resistance ratings designated for each condition, but apply in greater thicknesses and densities if specified in Part 2 "Concealed Sprayed Fire-Resistive Materials" Article.
- I. Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.
- J. Repair or replace work that has not been successfully protected.

### 3.2 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.
- B. Testing Services: Testing and inspecting of completed applications of sprayed fire-resistive material shall take place in successive stages, in areas of extent. Do not proceed with application of sprayed fire-resistive material for the next area until test results for previously completed applications of sprayed fire-resistive material show compliance with requirements. Tested values must equal or exceed values indicated and required for approved fire-resistance design.
- C. Remove and replace applications of sprayed fire-resistive material where test results indicate that it does not comply with specified requirements for cohesion and adhesion, for density, or for both.
- D. Apply additional sprayed fire-resistive material per manufacturer's written instructions where test results indicate that thickness does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

END OF SECTION 07811  
CVS 2/00



## SECTION 07841 - THROUGH-PENETRATION FIRESTOP SYSTEMS

## 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. Work required to complete, as indicated by the Contract Documents, and furnish all supplementary items necessary for the proper installation of UL Rated Firestop Systems and Devices.
  - 1. Seal empty holes.
  - 2. Seal penetration at floors, fire rated walls and smoke barrier walls.
  - 3. Seal holes accommodating penetrating items such as cables, cable trays, pipes, ducts and conduits.
  - 4. Systems shall be UL Rated for appropriate required time rating.

## 1.3 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
  - 1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
  - 2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
  - 3. Fire-resistance-rated floor assemblies.
  - 4. Fire-resistance-rated roof assemblies.
- B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
- C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
  - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.

2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
  3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- D. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

#### 1.4 QUALITY ASSURANCE

- A. **Installer Qualifications:** An experienced installer who is qualified by having the necessary experience, staff, and training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to an installer engaged by Contractor does not in itself confer qualification on buyer.
- B. **Source Limitations:** Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- C. **Fire-Test-Response Characteristics:** Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
  2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
    - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
    - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
      - 1) UL in "Fire Resistance Directory."

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.

- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

#### 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

#### 1.7 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Notify Owner's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Hilti Construction Chemicals, Inc.
  - 2. Specified Technologies Inc.
  - 3. 3M Fire Protection Products.
  - 4. Tremco.

## 2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
  - 1. Permanent forming/damming/backing materials, including the following:
    - a. Slag-/rock-wool-fiber insulation.
    - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
    - c. Fire-rated form board.
    - d. Fillers for sealants.
  - 2. Temporary forming materials.
  - 3. Substrate primers.
  - 4. Collars.
  - 5. Steel sleeves.

## 2.3 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.
- B. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- D. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- E. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- F. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.

- G. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- H. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
  - 1. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
  - 2. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

## 2.4 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:
  - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
  - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

### 3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
  - 1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: Engage a qualified independent inspecting agency to inspect through-penetration firestop systems and to prepare test reports.
  - 1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.
- B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued.
- C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

### 3.5 IDENTIFICATION

- A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."
  2. Contractor's name, address, and phone number.
  3. Through-penetration firestop system designation of applicable testing and inspecting agency.
  4. Date of installation.
  5. Through-penetration firestop system manufacturer's name.
  6. Installer's name.

### 3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

END OF SECTION 07841

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SECTION 07920 - JOINT SEALANTS

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 sealants for the following applications, including those specified by reference to this Section:

1. Exterior joints in the following vertical surfaces and nontraffic horizontal surfaces:
  - a. Control and expansion joints in unit masonry.
  - b. Joints in exterior insulation and finish systems.
  - c. Joints between different materials listed above.
  - d. Perimeter joints between materials listed above and frames of doors and windows.
  - e. Control and expansion joints in ceiling and overhead surfaces.
  - f. Other joints as indicated.
2. Exterior joints in the following horizontal traffic surfaces:
  - a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
  - b. Tile control and expansion joints.
  - c. Joints between different materials listed above.
  - d. Other joints as indicated.
3. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
  - a. Control and expansion joints on exposed interior surfaces of exterior walls.
  - b. Perimeter joints of exterior openings where indicated.
  - c. Vertical control joints on exposed surfaces of interior unit masonry.
  - d. Perimeter joints between interior wall surfaces and frames of interior doors, and windows.
  - e. Joints between plumbing fixtures and adjoining walls, floors, and counters.
  - f. Other joints as indicated.
4. Interior joints in the following horizontal traffic surfaces:
  - a. Control and expansion joints in cast-in-place concrete slabs.
  - b. Other joints as indicated.

### 1.3 PERFORMANCE REQUIREMENTS

- A. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

### 1.4 QUALITY ASSURANCE

- A. **Installer Qualifications:** An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.
- B. **Source Limitations:** Obtain each type of joint sealant through one source from a single manufacturer.
- C. **Preconstruction Field-Adhesion Testing:** Before installing elastomeric sealants, field test their adhesion to joint substrates as follows:
  - 1. Locate test joints where indicated or, if not indicated, as directed by Architect.
  - 2. Conduct field tests for each application indicated below:
    - a. Each type of elastomeric sealant and joint substrate indicated.
    - b. Each type of nonelastomeric sealant and joint substrate indicated.
  - 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
  - 4. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
  - 5. **Test Method:** Test joint sealants by hand-pull method described below:
    - a. Install joint sealants in 60-inch-long joints using same materials and methods for joint preparation and joint-sealant installation required for the completed Work. Allow sealants to cure fully before testing.
    - b. Make knife cuts from one side of joint to the other, followed by two cuts approximately 2 inches long at sides of joint and meeting cross cut at one end. Place a mark 1 inch from cross-cut end of 2-inch piece.
    - c. Use fingers to grasp 2-inch piece of sealant between cross-cut end and 1-inch mark; pull firmly at a 90-degree angle or more in direction of side cuts while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
    - d. For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.
  - 6. Report whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.

7. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

#### 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:
  1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.
  2. When joint substrates are wet.
- B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

#### 1.7 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  1. Warranty Period: Five years from date of Substantial Completion.

- C. Special Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: 10 years from date of Substantial Completion.
- D. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
  - 1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
  - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
  - 3. Mechanical damage caused by individuals, tools, or other outside agents.
  - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

## PART 2 - PRODUCTS

### 2.1 SEALANTS

#### A. General:

- 1. Compatibility: Provide joint sealers, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- 2. Colors: Provide color of exposed joint sealers indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard color.

#### B. Elastomeric Joint Sealants:

- 1. Standard: Provide manufacturer's standard chemical curing, elastomeric sealant of base polymer indicated which complies with ASTM C 920 requirements, including those referenced for Type, Grade, Class, and Uses.
- 2. Multicomponent Pourable Urethane Sealant: Where joint sealants of this type are indicated, provide products complying with the following:
  - a. Products:
    - 1) Chem-Calk 550; Bostik Inc.
    - 2) Pourthane; W.R. Meadows, Inc.
    - 3) NR-300 Urexpan, Type M; Pecora Corporation.
    - 4) Sikaflex – 2c SL; Sika Corporation.
    - 5) SL2; Sonneborn Building Products Div., ChemRex Inc.
    - 6) THC-900; Tremco.

- b. Type and Grade: M (multicomponent) and P (pourable).
  - c. Class: 25.
  - d. Applications: Exterior and interior joints in horizontal surfaces of concrete.
3. Low-Modulus Nonacid-Curing Silicone Sealant: Where joint sealants of this type are indicated, provide products complying with the following:
- a. Products:
    - 1) 790; Dow Corning.
    - 2) Silpruf; GE Silicones.
    - 3) 864; Pecora Corporation.
    - 4) Omniseal; Sonneborn Building Products Div., ChemRex Inc.
    - 5) Spectrem 1; Tremco.
  - b. Type and Grade: S (single component) and NS (nonsag).
  - c. Class: 25.
  - d. Additional Movement Capability: 50 percent movement in extension and 50 percent movement in compression for a total of 100 percent movement when tested or adhesion and cohesion under maximum cyclic movement in accordance with ASTM C719.
  - e. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.
  - f. Applications: Exterior and interior perimeter joints of metal frames in exterior walls.
4. Mildew-Resistant Silicone Sealant: Where joint sealants of this type are indicated, provide products formulated with fungicide that are intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes, and that comply with the following:
- a. Products:
    - 1) 786 Mildew Resistant; Dow Corning.
    - 2) Sanitary 1700; GE Silicones.
    - 3) 898 Silicone Sanitary Sealant; Pecora Corporation.
    - 4) Tremsil 600 White; Tremco.
  - b. Type and Grade: S (single component) and NS (nonsag).
  - c. Class: 25.
  - d. Use Related to Exposure: NT (nontraffic).
  - e. Applications: Interior joints in horizontal surfaces of nonporous substrates that are subject to in-service exposures of high humidity.

## C. Latex Joint-Sealants:

1. Latex Sealant: Where joint sealants of this type are indicated, provide products in accordance with ASTM C834, complying with the following:
  - a. Products:
    - 1) Chem-Calk 600; Bostik Inc.
    - 2) AC-20; Pecora Corporation.
    - 3) Sonolac; Sonneborn Building Products Div., ChemRex, Inc.
    - 4) Tremflex 834; Tremco.
  - b. Applications: Interior joints in field-painted vertical and overhead surfaces at perimeter of hollow metal door frames; in gypsum drywall and all other interior joints not indicated otherwise.

## D. Miscellaneous Joint Sealants:

1. Acoustical Sealant for Concealed Joints: Manufacturer's standard, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound.

## 2.2 PREFORMED JOINT SEALANTS

- A. Preformed Silicone-Sealant System: For each product, provide manufacturer's standard system consisting of precured low-modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral-curing silicone sealant for bonding extrusions to substrates.
- B. Preformed Foam Sealants: For each product, provide manufacturer's standard preformed, precompressed, impregnated, open-cell foam sealant manufactured from high-density urethane foam impregnated with a nondrying, water-repellent agent; factory produced in precompressed sizes and in roll or stick form to fit joint widths indicated and to develop a watertight and airtight seal when compressed to the degree specified by manufacturer; and complying with the following:
  1. Properties: Permanently elastic, mildew resistant, nonmigratory, nonstaining, and compatible with joint substrates and other joint sealants.
  2. Impregnating Agent: Manufacturer's standard.
  3. Density: Manufacturer's standard.

## 2.3 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

- B. Cylindrical Sealant Backings: ASTM C 1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
  - 1. Type C: Closed-cell material with a surface skin.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

## 2.4 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean,

sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:

- a. Masonry.
3. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- a. Metal.
  - b. Glass.
- B. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  1. Do not leave gaps between ends of sealant backings.
  2. Do not stretch, twist, puncture, or tear sealant backings.
  3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.



- F. Install sealants by proven techniques to comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
  2. Completely fill recesses provided for each joint configuration.
  3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealants from surfaces adjacent to joint.
  2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
    - a. Use masking tape to protect adjacent surfaces of recessed tooled joints.
- H. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:
1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
  2. Apply a bead of silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's printed schedule and covering a bonded area of not less than a 3/8 inch. Hold edge of sealant bead inside of masking tape by 1/4 inch.
  3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
  4. Complete installation of horizontal joints before installing vertical joints. Lap vertical joints over horizontal joints. At end of joints, cut silicone extrusion with a razor knife.
- I. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, to produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant to comply with sealant manufacturer's written instructions.

### 3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field-test joint-sealant adhesion to joint substrates as follows:
1. Extent of Testing: Test completed elastomeric sealant joints as follows:
    - a. Perform 10 tests for the first 1000 feet of joint length for each type of elastomeric sealant and joint substrate.
  2. Test Method: Test joint sealants by hand-pull method described below:
    - a. Make knife cuts from one side of joint to the other, followed by two cuts approximately 2 inches long at sides of joint and meeting cross cut at one end. Place a mark 1 inch from cross-cut end of 2-inch piece.
    - b. Use fingers to grasp 2-inch piece of sealant between cross-cut end and 1-inch mark; pull firmly at a 90-degree angle or more in direction of side cuts while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
    - c. For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.
  3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field adhesion test log.
  4. Inspect tested joints and report on the following:
    - a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
    - b. Whether sealants filled joint cavities and are free from voids.
    - c. Whether sealant dimensions and configurations comply with specified requirements.
  5. Record test results in a field adhesion test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
  6. Repair sealants pulled from test area by applying new sealants following same procedures used to originally seal joints. Ensure that original sealant surfaces are clean and new sealant contacts original sealant.
- B. Evaluation of Field-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements, will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

**DIVISION 8**

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## NATIONAL ACCOUNTS

The following is a list of specification sections within this Division stipulating National Accounts the Owner has entered into with the specified manufacturer(s).

1. Section 08110 – STEEL DOORS AND FRAMES: Steel Doors and Frames
2. Section 08211 – FLUSH WOOD DOORS: Flush Wood Doors
3. Section 08331 – OVERHEAD COILING DOORS: Rolling Service Door.
4. Section 08334 – OVERHEAD COILING GRILLES: Security Grilles and Pharmacy Grille.
5. Section 08381 – TRAFFIC DOORS: Traffic doors.
6. Section 08410 – ALUMINUM ENTRANCES AND STOREFRONTS: Storefront Windows.
7. Section 08461 – SLIDING AUTOMATIC ENTRANCE DOORS: Telescoping Door.
8. Section 08512 – DRIVE-THRU WINDOW: Drive-Thru Window Package
9. Section 08711 – DOOR HARDWARE: Door Hardware.

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## SECTION 08110 - STEEL DOORS AND FRAMES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Steel doors.
  - 2. Steel door frames.
  - 3. Fire-rated door and frame assemblies.

#### 1.3 DEFINITIONS

- A. Steel Sheet Thicknesses: Thickness dimensions, including those referenced in ANSI A250.8, are minimums as defined in referenced ASTM standards for both uncoated steel sheet and the uncoated base metal of metallic-coated steel sheets.

#### 1.4 NATIONAL ACCOUNT

- A. CVS/Pharmacy has entered into a national account agreement with DH Pace Door Services for furnishing the Hollow Steel Doors and Frames package specified in this section. Complete installation shall be by the Contractor. For pricing quotations, placing orders, and further information, call DH Pace Door Services at (417) 831-5585.

#### 1.5 QUALITY ASSURANCE

- A. Steel Door and Frame Standard: Comply with ANSI A 250.8, unless more stringent requirements are indicated.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.
  - 1. Test Pressure: Test at atmospheric pressure.
  - 2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to authorities having jurisdiction that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.

3. Temperature-Rise Rating: Where indicated, provide doors that have a temperature-rise rating of 450 deg F maximum in 30 minutes of fire exposure.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.
- B. Inspect doors and frames on delivery for damage, and notify shipper and supplier if damage is found. Minor damages may be repaired provided refinished items match new work and are acceptable to Architect. Remove and replace damaged items that cannot be repaired as directed.
- C. Store doors and frames at building site under cover. Place units on minimum 4-inch-high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If door packaging becomes wet, remove cartons immediately. Provide minimum 1/4-inch spaces between stacked doors to permit air circulation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Steel Doors and Frames:
    - a. Builders Hardware Corporation.

### 2.2 MATERIALS

- A. Hot-Rolled Steel Sheets: ASTM A 569/A 569M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- B. Cold-Rolled Steel Sheets: ASTM A 366/A 366M, Commercial Steel (CS), or ASTM A 620/A 620M, Drawing Steel (DS), Type B; stretcher-leveled standard of flatness.
- C. Metallic-Coated Steel Sheets: ASTM A 653/A 653M, Commercial Steel (CS), Type B, with an A40 zinc-iron-alloy (galvannealed) coating; stretcher-leveled standard of flatness.

### 2.3 DOORS

- A. General: Provide doors of sizes, thicknesses, and designs indicated.



- B. Interior Doors: Provide doors complying with requirements indicated below by referencing ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level:
  - 1. Level 1 and Physical Performance Level C, (Standard Duty), Model 2 (Seamless).
- C. Exterior Doors: Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:
  - 1. Level 2 and Physical Performance Level B (Heavy Duty), Model 2 (Seamless).
- D. Vision Lite Systems: Manufacturer's standard kits consisting of glass lite moldings to accommodate glass thickness and size of vision lite indicated.

#### 2.4 FRAMES

- A. General: Provide steel frames for doors and other openings that comply with ANSI A250.8 and with details indicated for type and profile. Conceal fastenings, unless otherwise indicated.
- B. Frames of 0.042-inch- thick steel sheet for:
  - 1. Level 1 steel doors.
  - 2. Wood doors where indicated.
- C. Frames of 0.053-inch- thick steel sheet for:
  - 1. Door openings wider than 48 inches.
  - 2. Level 2 steel doors.
- D. Smoke Seals: Pemko S88D x length of head and jamb perimeter.
- E. Door Silencers: Except on weather-stripped frames, fabricate stops to receive three silencers on strike jambs of single-door frames and two silencers on heads of double-door frames.
- F. Weatherstripping: Pemko 316AV at head and jambs.
- G. Plaster Guards: Provide 0.016-inch- thick, steel sheet plaster guards or mortar boxes to close off interior of openings; place at back of hardware cutouts where materials might obstruct hardware operation.
- H. Supports and Anchors: Fabricated from not less than 0.042-inch- thick, electrolytic zinc-coated or metallic-coated steel sheet.
  - 1. Wall Anchors in Masonry Construction: 0.177-inch- diameter, steel wire complying with ASTM A 510 may be used in place of steel sheet.

- I. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where zinc-coated items are to be built into exterior walls, comply with ASTM A 153/A 153M, Class C or D as applicable.

## 2.5 FABRICATION

- A. General: Fabricate steel door and frame units to comply with ANSI A250.8 and to be rigid, neat in appearance, and free from defects including warp and buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site.
- B. Exterior Door Construction: For exterior locations and elsewhere as indicated, fabricate doors, panels, and frames from metallic-coated steel sheet. Close top and bottom edges of doors flush as an integral part of door construction or by addition of 0.053-inch-thick, metallic-coated steel channels with channel webs placed even with top and bottom edges.
- C. Interior Door Faces: Fabricate exposed faces of doors and panels, including stiles from the following material:
  1. Cold-rolled steel sheet.
- D. Core Construction: Manufacturer's standard core construction that produces a door complying with SDI standards.
- E. Clearances for Non-Fire-Rated Doors: Not more than 1/8 inch at jambs and heads, except not more than 1/4 inch between pairs of doors. Not more than 3/4 inch at bottom.
- F. Clearances for Fire-Rated Doors: As required by NFPA 80.
- G. Single-Acting, Door-Edge Profile: Square edge.
- H. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
- I. Fabricate concealed stiffeners, reinforcement, edge channels, and moldings from either cold- or hot-rolled steel sheet.
- J. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.
- K. Thermal-Rated (Insulating) Assemblies: At exterior locations, provide doors fabricated as thermal-insulating door and frame assemblies and tested according to ASTM C 236 or ASTM C 976 on fully operable door assemblies.
  1. Provide thermal-rated assemblies with U-value of 0.41 Btu/sq. ft. x h x deg F or better.

- L. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements in ANSI A250.6 and ANSI A115 Series specifications for door and frame preparation for hardware.
- M. Frame Construction: Fabricate frames to shape shown.
  - 1. For exterior applications, fabricate frames with mitered or coped and continuously welded corners.
  - 2. For interior applications, fabricate knock-down frames with mitered or coped corners, for field assembly.
- N. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.
- O. Locate hardware as indicated on Shop Drawings or, if not indicated, according to ANSI A250.8.
- P. Glazing Stops: Manufacturer's standard, formed from 0.032-inch-thick steel sheet.
  - 1. Provide nonremovable stops on secure side of interior doors for glass in doors.
- Q. Astragals: As required by NFPA 80 to provide fire ratings indicated. Refer to Section 08711.

## 2.6 FINISHES

- A. Prime Finish: Manufacturer's standard, factory-applied coat of rust-inhibiting primer complying with ANSI A250.10 for acceptance criteria.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Install steel doors, frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.
- B. Placing Frames: Comply with provisions in SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
  - 1. Place frames before construction of enclosing walls and ceilings.
  - 2. In masonry construction, provide at least three wall anchors per jamb; install adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.

3. In metal-stud partitions, provide at least three wall anchors per jamb; install adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Attach wall anchors to studs with screws.
  4. For in-place gypsum board partitions, install knock-down, drywall slip-on frames.
  5. Install fire-rated frames according to NFPA 80.
  6. For openings 90 inches or more in height, install an additional anchor at hinge and strike jambs.
- C. Door Installation: Comply with ANSI A250.8. Fit hollow-metal doors accurately in frames, within clearances specified in ANSI A250.8. Shim as necessary to comply with SDI 122 and ANSI/DHI A115.1G.
1. Fire-Rated Doors: Install within clearances specified in NFPA 80.

### 3.2 ADJUSTING AND CLEANING

- A. Prime-Coat Touchup: Immediately after installation, sand smooth any rusted or damaged areas of prime coat and apply touch up of compatible air-drying primer.
- B. Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION 08110

SECTION 08211 - FLUSH WOOD DOORS

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.
- B. Coordinate with the following sections:
  - 1. Painting
  - 2. Steel Doors and frames.
  - 3. Door Hardware

1.2 SUMMARY

- A. This Section includes the following:
  - 1. Solid-core doors with wood-veneer.
  - 2. Factory finishing flush wood doors.
  - 3. Factory fitting flush wood doors to frames and factory machining for vision lites and hardware.

1.3 NATIONAL ACCOUNT

- A. CVS/Pharmacy has entered into a national account agreement with DH Pace Door Services for furnishing the Wood Doors package specified in this section. Complete installation shall be by the Contractor. For pricing quotations, placing orders, and further information, call DH Pace Door Services at (417) 831-5585.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.
- B. Quality Standard: Comply with WIC's "Manual of Millwork."
  - 1. Provide WIC-Certified Compliance Certificate indicating that doors comply with requirements of grades specified.
  - 2. Provide WIC-Certified Compliance Certificate for installation.

- C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

- 1. Temperature-Rise Rating: At exit enclosures, provide doors that have a temperature-rise rating of 450 deg F maximum in 30 minutes of fire exposure.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

#### 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

#### 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship, have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section, or show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
  - 1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
  - 2. Warranty shall be in effect during the following period of time from date of Substantial Completion:
    - a. Solid-Core Interior Doors: 5 years from substantial completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Flush Wood Doors:
    - a. Builders Hardware Corporation.

### 2.2 DOOR CONSTRUCTION, GENERAL

- A. Doors for Opaque Finish:
  - 1. Grade: Custom.
  - 2. Faces for Interior Doors: Any closed-grain hardwood of mill option.

### 2.3 SOLID-CORE DOORS

- A. Particleboard Cores: Comply with the following requirements:
  - 1. Particleboard: ANSI A208.1, Grade LD-2.
  - 2. Blocking: Provide wood blocking in particleboard-core doors as follows:
    - a. 5-inch top-rail blocking, in doors indicated to have closers.
    - b. 5-inch bottom-rail blocking, doors indicated to have kick, mop, or armor plates.
- B. Interior Veneer-Faced Doors:
  - 1. Core: Particleboard.
  - 2. Construction: Five or seven plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.
  - 3. Construction: Seven plies, either bonded or nonbonded construction.
- C. Fire-Rated Doors:
  - 1. Construction: Construction and core specified above for type of face indicated or manufacturer's standard mineral-core construction as needed to provide fire rating indicated.
  - 2. Blocking: For mineral-core doors, provide composite blocking with improved screw-holding capability approved for use in doors of fire ratings indicated as needed to eliminate through-bolting hardware.
    - a. 4-1/2-by-10-inch lock blocks, 5-inch midrail blocking, in doors indicated to have exit devices.

3. Edge Construction: Provide mill option clear styles and rails primed to receive paint.
4. Pairs: Furnish formed-steel edges and astragals to receive paint seals for pairs of fire-rated doors, unless otherwise indicated.
  - a. Finish steel edges and astragals to receive paint same color as doors.
5. Pairs: Provide fire-rated pairs with fire-retardant stiles matching face veneer that are labeled and listed for kinds of applications indicated without formed-steel edges and astragals.

## 2.4 LIGHT FRAMES

### A. Wood Beads for Light Openings in Wood Doors:

1. Wood Species: Same species as door faces.
2. Profile: Manufacturer's standard shape.
3. At 45-minute, fire-rated, wood-core doors, provide wood beads and metal glazing clips approved for such use.

### B. Wood-Veneered Beads for Light Openings in Fire Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire rating indicated. Include concealed metal glazing clips where required for opening size and fire rating indicated.

## 2.5 FABRICATION

### A. Fabricate doors in sizes indicated for Project-site fitting.

### B. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:

1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements in NFPA 80 for fire-rated doors.

### C. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
2. Metal Astragals: Premachine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

### D. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.



2.6 SHOP PRIMING

- A. Doors for Opaque Finish: Shop prime faces and edges of doors, including cutouts, with one coat of wood primer specified in Division 9 Section "Painting."
- B. Doors for Transparent Finish: Shop seal faces and edge of doors, including cutouts, with stain (if required), other required pretreatments, and first coat of finish as specified in Division 9 Section "Painting."

2.7 FACTORY FINISHING

- A. General: Comply with WIC's "Manual of Millwork" for factory finishing.
- B. Finish doors at factory.
- C. Transparent Finish:
  - 1. Grade: Custom.
  - 2. Finish: AWI System TR-6 catalyzed polyurethane.
  - 3. Finish: WIC System #1d. polyurethane, #5 catalyzed polyurethane.
  - 4. Staining: As indicated on drawings.
  - 5. Sheen: Satin.
- D. Opaque Finish:
  - 1. Grade: Custom.
  - 2. Finish: Manufacturer's standard finish with performance comparable to WIC System #7b. opaque pigmented lacquer.
  - 3. Color: As indicated on drawings.
  - 4. Sheen: Semigloss.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
  - 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Division 8 Section "Door Hardware."

- B. Manufacturer's Written Instructions: Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.
  - 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.
  - 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold.
    - a. Comply with NFPA 80 for fire-rated doors.
  - 2. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
  - 3. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.
- F. Field-Finished Doors: Refer to the following for finishing requirements:
  - 1. Division 9 Section "Painting."

### 3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08211

## SECTION 08311 - ACCESS DOORS AND FRAMES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawing 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. Ceiling access doors and frames.

#### 1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain doors and frames through one source from a single manufacturer.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Access Doors:
    - a. Cesco Products (888) 412-3726; Product: Model #LWT (SD)  
Size: as indicated on the drawings.

#### 2.2 PAINT

- A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664; selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.

## 2.3 FABRICATION

- A. General: Provide access door assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Steel Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
  - 1. Exposed Flanges: Nominal 1 to 1-1/2 inches wide around perimeter of frame.
  - 2. Provide mounting holes in frames to attach frames to metal or wood framing in plaster and drywall construction and to attach masonry anchors in masonry construction.
- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

## 2.4 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.

## 2.5 STEEL FINISHES

- A. Surface Preparation: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed metal fabrications:
  - 1. Exteriors (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- B. Apply shop primer to uncoated surfaces of metal fabrications. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Advise installers of other work about specific requirements relating to access door and floor door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices.

B. Reference Standards:

1. ASTM D4637-96: Standard Specification for EPDM Sheet used in single-ply roof membrane
2. ASTM D297: Methods for Rubber Products, Chemical Analysis.
3. ASTM D412, Die C: Test Methods for Rubber Properties in Tension.
4. ASTM D471: Test Methods for Rubber Property, Effect of Liquids.
5. ASTM D573: Test Method for Rubber, Deterioration in an Air Oven.
6. ASTM D624, Die C: Test Method for rubber property-Tear Resistance
7. ASTM D746: Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.
8. ASTM D751: (Grab Method) Method of Testing Coated Fabrics.
9. ASTM D816: (Modified) Methods of Testing Rubber Cements.
10. ASTM D1149: Test Method for Rubber Deterioration, Surface Ozone Cracking in a Chamber.
11. ASTM D2240: Test Method for Rubber Property - Durometer Hardness.
12. ASTM E96: Test Methods for Water Vapor Transmission of Materials.

C. Product/Producer:

1. RubberGard EPDM membrane by Firestone.

2.4 ELASTOMERIC SHEET ROOFING SYSTEM COMPONENTS

A. Roof Flashing:

1. Description: Semi-cured 45 mil EPDM membrane laminated to 35 mil EPDM tape adhesive
2. Product/Producer:
  - a. QuickSeam Flashing by Firestone.

B. Elastomeric Uncured Flashing

1. Description: Non-reinforced, self curing, synthetic, single-ply flashing composed of Ethylene Propylene Diene Terpolymer (EPDM) conforming to the following physical properties as indicated by ASTM D4811-90 standard specification for Non-vulcanized rubber sheet used as roof flashing.
  - a. Nominal Thickness: .060 inch

Property:	Specification:
Thickness	0.055
Green Strength Modulus 100% @ 75°F(psi)	25-250
Elongation, (Ultimate), %	400
modulus 100% @ 122°F(psi)	12

Elongation (Ultimate) %	200
Shelf Stability: Modulus 100% at 75°F(psi)	250
Elongation, min, %	400
Vulcanizability: Tensile strength, min, (psi)	406
Elongation, min, %	400
Tensile Set: min, %	80
Dimensional Stability, max, %	+/- 10
Weatherability , no cracks or crazing	pass
Water Vapor Permeability, Perm-Mils	2.0

b. Reference Standards:

- 1) ASTM D412: Test Methods for Rubber Properties in Tension
- 2) ASTM D471: Test Methods for Rubber Property-Effect of liquids
- 3) ASTM D573: Test Methods for Rubber-Deterioration in Air oven
- 4) ASTM D624: Test Methods for Rubber Property-Tear Resistance
- 5) ASTM D1149: Test Method for Rubber Deterioration-Surface Ozone Cracking in a chamber
- 6) ASTM D1204: Test Method for Linear Dimensional Changes on a Non-rigid Thermoplastic Sheet or Film at Elevated Temperatures
- 7) ASTM D2137: Test Methods for Rubber Property-Brittleness Point of Flexible Polymers and Coated Fabrics

2. Product/Producer:

- a. EPDM FormFlash flashing membrane by Firestone.

C. Lap Splice Tape:

1. Description: 35 mil EPDM-based, formulated for compatibility with EPDM membrane and high-solids primer.
2. Product/Producer:
  - a. QuickSeam Splice Tape by Firestone.

D. Adhesive Primer:

1. Description: High-solids, butyl based primer formulated for compatibility with EPDM membrane & tape adhesive.
2. Product/Producer:
  - a. QuickPrime by Firestone.

- F. Install sealants by proven techniques to comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
  2. Completely fill recesses provided for each joint configuration.
  3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealants from surfaces adjacent to joint.
  2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
    - a. Use masking tape to protect adjacent surfaces of recessed tooled joints.
- H. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:
1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
  2. Apply a bead of silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's printed schedule and covering a bonded area of not less than a 3/8 inch. Hold edge of sealant bead inside of masking tape by 1/4 inch.
  3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
  4. Complete installation of horizontal joints before installing vertical joints. Lap vertical joints over horizontal joints. At end of joints, cut silicone extrusion with a razor knife.
- I. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, to produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant to comply with sealant manufacturer's written instructions.

### 3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field-test joint-sealant adhesion to joint substrates as follows:
1. Extent of Testing: Test completed elastomeric sealant joints as follows:
    - a. Perform 10 tests for the first 1000 feet of joint length for each type of elastomeric sealant and joint substrate.
  2. Test Method: Test joint sealants by hand-pull method described below:
    - a. Make knife cuts from one side of joint to the other, followed by two cuts approximately 2 inches long at sides of joint and meeting cross cut at one end. Place a mark 1 inch from cross-cut end of 2-inch piece.
    - b. Use fingers to grasp 2-inch piece of sealant between cross-cut end and 1-inch mark; pull firmly at a 90-degree angle or more in direction of side cuts while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
    - c. For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.
  3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field adhesion test log.
  4. Inspect tested joints and report on the following:
    - a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
    - b. Whether sealants filled joint cavities and are free from voids.
    - c. Whether sealant dimensions and configurations comply with specified requirements.
  5. Record test results in a field adhesion test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
  6. Repair sealants pulled from test area by applying new sealants following same procedures used to originally seal joints. Ensure that original sealant surfaces are clean and new sealant contacts original sealant.
- B. Evaluation of Field-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements, will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.