## SECTION 05120 - STRUCTURAL STEEL

### PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. This Section includes fabrication and erection of structural steel work, as shown on drawings including schedules, notes, and details showing size and location of members, typical connections, and types of steel required.

1. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on drawings.
2. Miscellaneous Metal Fabrications are specified elsewhere in Division 5.
3. Refer to Division 3 for anchor bolt installation in concrete, Division 4 for anchor bolt installation in masonry.

### 1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.
2. High-strength bolts (each type), including nuts and washers.

    a. Include Direct Tension Indicators if used.

3. Structural steel primer paint.
4. Shrinkage-resistant grout.

C. Shop drawings prepared under supervision of a licensed Structural Engineer, including complete details and schedules for fabrication and assembly of structural steel members, procedures, and diagrams.

1. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols and show size, length, and type of each weld.

2. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as work of other sections.

D. Test reports conducted on shop- and field-bolted and welded connections. Include data on type(s) of tests conducted and test results.

E. Certified copies of each survey conducted by a licensed Land Surveyor, showing elevations and locations of base plates and anchor bolts to receive structural steel and final elevations and locations for major members. Indicate discrepancies between actual installation and contract documents.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of following, except as otherwise indicated:

1. American Institute of Steel Construction (AISC) "Code of Standard Practice for Steel Buildings and Bridges."

a. Paragraph 4.2.1 of the above code is hereby modified by deletion of the following sentence:

1) "This approval constitutes the owner's acceptance of all responsibility for the design adequacy of any detail configuration of connections developed by the fabricator as a part of his preparation of these shop drawings."

2. AISC "Specifications for Structural Steel Buildings," including "Commentary."
3. "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Structural Connections.
4. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel."
5. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use."

B. Qualifications for Welding Work: Qualify welding procedures and welding operators in accordance with AWS "Qualification" requirements.

1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.
2. If recertification of welders is required, retesting will be Contractor's responsibility.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site at such intervals to ensure uninterrupted progress of work.

B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not to delay work.

C. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged

materials from erosion and deterioration. If bolts and nuts become dry or rusty, clean and relubricate before use.

1. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Metal Surfaces, General: For fabrication of work that will be exposed to view, use only materials that are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names, and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating, and applying surface finishes.

B. Structural Steel Shapes, Plates, and Bars: ASTM A 36.

C. Cold-Formed Steel Tubing: ASTM A 500, Grade B.

D. Hot-Formed Steel Tubing: ASTM A 501.

E. Steel Pipe: ASTM A 53, Type E or S, Grade B; or ASTM A 501.

1. Finish: Black, except where indicated to be galvanized.

F. Steel Castings: ASTM A 27, Grade 65-35, medium-strength carbon steel.

G. Headed Stud-Type Shear Connectors: ASTM A 108, Grade 1015 or 1020, cold-finished carbon steel with dimensions complying with AISC Specifications.

H. Anchor Bolts: ASTM A 307, nonheaded type unless otherwise indicated.

I. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular low-carbon steel bolts and nuts.

1. Provide hexagonal heads and nuts for all connections.
2. Provide either hexagonal or square heads and nuts, except use only hexagonal units for exposed connections.

J. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows:

1. Quenched and tempered medium-carbon steel bolts, nuts, and washers, complying with ASTM A 325.

a. Where indicated as galvanized, provide units that are zinc coated, either mechanically deposited complying with ASTM B 695, Class 50, or hot-dip galvanized

complying with ASTM A 153.

2. Quenched and tempered alloy steel bolts, nuts, and washers, complying with ASTM A 490.

K. Direct Tension Indicators: ASTM F 959, type as required.

1. Use at Contractor's option.

L. Electrodes for Welding: Comply with AWS Code.

M. Structural Steel Primer Paint: GPA-313

N. Cement Grout: Portland cement (ASTM C 150, Type I or Type III) and clean, uniformly graded, natural sand (ASTM C 404, Size No. 2). Mix at a ratio of 1.0 part cement to 3.0 parts sand, by volume, with minimum water required for placement and hydration.

O. Metallic Shrinkage-Resistant Grout: Premixed factory-packaged ferrous aggregate grouting compound.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. 100 Non-Shrink Grout (Metallic); Conspec, Inc.
b. Firmix; Euclid Chemical Co.
c. Vibra-Foil; W. R. Grace.
d. Ferrogrout; L & M Construction Chemicals, Inc.
e. Embeco 885; Master Builders.
f. Protalico; Protex Industries, Inc.
g. Kemox G; Sika Corporation.
h. Ferrolith G; Sonneborn/Rexnord.

P. Nonmetallic Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining product containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with CE-CRD-C621.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. 100 Non-Shrink Grout (Non-Metallic); Conspec, Inc.
b. Supreme Grout; Cormix, Inc.
c. Sure Grip Grout; Dayton Superior.
d. Euco N.S.; Euclid Chemical Co.
e. Crystex; L & M Construction Chemicals, Inc.
f. Masterflow 713; Master Builders.
g. Sealtight 588 Grout; W. R. Meadows.
h. Propak; Protex Industries, Inc.
i. Set Non-Shrink; Set Products, Inc.

j. Five Star Grout; U.S. Grout Corp.

## 2.2 FABRICATION

A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.

1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.
2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

B. Connections: Weld or bolt shop connections, as indicated.

C. Bolt field connections, except where welded connections or other connections are indicated.

1. Provide high-strength threaded fasteners for principal bolted connections, except where unfinished bolts are indicated.
2. Provide unfinished threaded fasteners for only bolted connections of secondary framing members to primary members (including purlins, girts, and other framing members taking only nominal stresses) and for temporary bracing to facilitate erection.

D. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts."

E. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.

F. Assemble and weld built-up sections by methods that will produce true alignment of axes without warp.

G. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld shear connectors in field, spaced as shown, to beams and girders in composite construction. Use automatic end welding of headed stud shear connectors in accordance with manufacturer's printed instructions.

H. Steel Wall Framing: Select members that are true and straight for fabrication of steel wall framing. Straighten as required to provide uniform, square, and true members in completed wall framing.

I. Build up welded door frames attached to structural steel framing. Weld exposed joints continuously and grind smooth. Plug-weld steel bar stops to frames, except where shown removable. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than 10 inches o.c., unless otherwise indicated.

J. Holes for Other Work: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on final shop drawings.

K. Provide threaded nuts welded to framing and other specialty items as indicated to receive other work.

L. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.

M. Expansion Joints: Provide expansion joints in steel shelf angles when part of structural steel frame; locate at vertical brick expansion joints as indicated on drawings.

## 2.3 SHOP PAINTING

A. General: Shop-paint structural steel, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel that is partially exposed on exposed portions and initial 2 inches of embedded areas only.

1. Do not paint surfaces to be welded or high-strength bolted with friction-type connections.
2. Do not paint surfaces scheduled to receive sprayed-on fireproofing.
3. Apply 2 coats of paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

B. Surface Preparation: After inspection and before shipping, clean steelwork to be painted. Remove loose rust, loose mill scale, and spatter, slag, or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:

1. SP-1 "Solvent Cleaning."

C. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 1.5 mils. Use painting methods that result in full coverage of joints, corners, edges, and exposed surfaces.

D. Painting: Provide a one-coat, shop-applied paint system complying with Steel Structures Painting Council (SSPC) Paint System Guide No. 7.00.

## 2.4 SOURCE QUALITY CONTROL

A. General: Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.

1. Promptly remove and replace materials or fabricated components that do not comply.

B. Design of Members and Connections: Details shown are typical; similar details apply to similar

conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work.

1. Promptly notify Engineer whenever design of members and connections for any portion of structure are not clearly indicated.

## PART 3 - EXECUTION

### 3.1 ERECTION

A. Surveys: Employ a licensed land surveyor for accurate erection of structural steel. Check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Architect. Do not proceed with erection until corrections have been made or until compensating adjustments to structural steel work have been agreed upon with Engineer.

B. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

C. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.

D. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.

1. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.
2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
3. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.
4. For proprietary grout materials, comply with manufacturer's instructions.

E. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

F. Level and plumb individual members of structure within specified AISC tolerances.

G. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.

H. Splice members only where indicated and accepted on shop drawings.

I. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds, and grind smooth at exposed surfaces.

1. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
2. Do not enlarge unfair holes in members by burning or by using drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

J. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members that are not under stress, as acceptable to Architect. Finish gas-cut sections equal to a sheared appearance when permitted.

K. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.

1. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.

L. Touch-Up Painting: Cleaning and touch-up painting of field welds, bolted connections, and abraded areas of shop paint on structural steel is included in Division 9 under painting work.

## 3.2 QUALITY CONTROL

A. Owner will engage an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.

B. Owner will engage an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.

C. Testing agency shall conduct and interpret tests, state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.

D. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.

E. Testing agency may inspect structural steel at plant before shipment.

F. Correct deficiencies in structural steel work that inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as necessary to reconfirm any noncompliance of original work and to show compliance of corrected work.

G. Shop-Bolted Connections: Inspect or test in accordance with AISC specifications.

1. Verify that gaps of installed Direct Tension Indicators are less than gaps specified in ASTM F 959, Table 2.

H. Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:

1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
2. Perform visual inspection of all welds.
3. Perform tests of welds as follows. Inspection procedures listed are to be used at Contractor's option.

    a. Liquid Penetrant Inspection: ASTM E 165.
    b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration not acceptable.
    c. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T."
    d. Ultrasonic Inspection: ASTM E 164.

I. Field-Bolted Connections: Inspect in accordance with AISC specifications.

1 For Direct Tension Indicators, comply with requirements of ASTM F 959. Verify that gaps are less than gaps specified in Table 2.

J. Field Welding: Inspect and test during erection of structural steel as follows:

2. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
3. Perform visual inspection of all welds.
4. Perform tests of welds as follows:

    a. Liquid Penetrant Inspection: ASTM E 165.
    b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration not acceptable.
    c. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T."
    d. Ultrasonic Inspection: ASTM E 164.

**END OF SECTION 05120**

## SECTION 05220 - STEEL JOISTS AND JOIST GIRDERS

### GENERAL

#### RELATED DOCUMENTS

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

#### SUMMARY

A. This Section includes steel joists and joist girders for floor and roof framing. Types of joists required include the following:

1. K-Series Open Web Steel Joists.
2. LH-Series Longspan Steel Joists.
3. DLH-Series Deep Longspan Steel Joists.
4. Joist Girders.

B. Refer to Division 3 Sections for installation of anchors set in concrete.

C. Refer to Division 4 Sections for installation of anchors set in masonry.

#### SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data and installation instructions for each type of joist and accessories.

1. Include manufacturer's certification that joists comply with SJI "Specifications."

C. Shop drawings showing layout of joist members, special connections, joining and accessories. Include mark, number, type, location and spacing of joists and bridging.

1. Provide templates or location drawings for installation of anchor bolts and metal bearing plates.

#### QUALITY ASSURANCE

A. General: Provide joists fabricated in compliance with Steel Joist Institute (SJI) "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."

B. Qualification of Field Welding: Qualify welding processes and welding operators in accordance with American Welding Society (AWS) "Structural Welding Code - Steel," AWS D1.1.

C. Inspection: Inspect joists and girders in accordance with SJI "Specifications."

### DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle steel joists as recommended in SJI "Specifications." Handle and store joists in a manner to avoid deforming members and to avoid excessive stresses.

## PRODUCTS

### MATERIALS

A. Steel: Comply with SJI "Specifications" for chord and web sections.

B. Steel Bearing Plates: ASTM A 36.

C. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular hexagon type, low carbon steel.

D. Steel Prime Paint: Comply with SJI "Specifications."

E. Steel Prime Paint: Manufacturer's standard.

### FABRICATION

A. General: Fabricate steel joists in accordance with SJI "Specification."

B. Holes in Chord Members: Provide holes in chord members where shown for securing other work to steel joists; however, deduct area of holes from the area of chord when calculating strength of member.

C. Extended End: Provide extended ends on joists where indicated, complying with SJI "Specifications" and load tables.

D. Ceiling Extension: Provide ceiling extensions in areas having ceilings attached directly to joist bottom chord. Provide either an extended bottom chord element or a separate unit, to suit manufacturer's standards, of sufficient strength to support ceiling construction. Extend ends to within 1/2 inch of finished wall surface, unless otherwise indicated.

E. Top Chord Extension: Provide top chord extensions ("S" type) on joists where indicated, complying with SJI "Specifications" and load tables.

F. Bridging: Provide horizontal or diagonal type bridging for joists and joist girders, complying with SJI "Specifications."

1. Provide bridging anchors for ends of bridging lines terminating at walls or beams.

G. End Anchorage: Provide end anchorages, including steel bearing plates, to secure joists to adjacent construction, complying with SJI "Specifications."

H. Header Units: Provide header units to support tail joists at openings in floor or roof system not

framed with steel shapes.

I. Shop Painting: Remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories before application of shop paint.

1. Apply one shop coat of steel prime paint to joists and accessories, by spraying, dipping, or other method to provide a continuous dry paint film thickness of not less than 0.50 mil.

## EXECUTION

### ERECTION

A. Place and secure steel joists in accordance with SJI "Specifications," final shop drawings, and as herein specified.

B. Anchors: Furnish anchor bolts, steel bearing plates, and other devices to be built into concrete and masonry construction.

1. Provide unfinished threaded fasteners for anchor bolts, unless high strength bolts indicated.

C. Placing Joists: Do not start placement of steel joists until supporting work is in place and secured. Place joists on supporting work, adjust and align in accurate locations and spacing before permanently fastening.

D. Provide temporary bridging, connections, and anchors to ensure lateral stability during construction.

1. Where "open-web" joist lengths are 40 feet and longer, install a center row of bolted bridging to provide lateral stability before slackening of hoisting lines.

E. Bridging: Install bridging simultaneously with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at walls or beams.

F. Fastening Joists: Comply with the following:

1. Field weld joists to supporting steel framework and steel bearing plates where indicated in accordance with SJI "Specifications" for type of joists used. Coordinate welding sequence and procedure with placing of joists.
2. Bolt joists to supporting steel framework in accordance with SJI "Specifications" for type of joists used.

a. Use unfinished threaded fasteners for bolted connections, unless otherwise indicated.

G. Touch-Up Painting: After joist installation, wire brush welded areas, abraded or rusty surfaces,

and clean with solvent. Paint field-applied bolt heads and nuts and prepared surfaces on joists and steel supporting members. Use same type of paint as used for shop painting.

H. Touch-Up Painting: Cleaning and touch-up painting of field welds, abraded areas, and rust spots of shop painting is included under Division 9 painting work.

**END OF SECTION 05220**

## SECTION 05310 - STEEL DECK

## GENERAL

### RELATED DOCUMENTS

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

### SUMMARY

A. This Section includes steel deck units for floor and roof applications.

B. Header Duct used in conjunction with cellular metal floor deck is specified in Division 16; it is not work of this section.

### SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

1. Product data including manufacturer's specifications and installation instructions for each type of decking and accessories.

    a. Provide test data for mechanical fasteners used in lieu of welding for fastening deck to supporting structures.

2. Shop drawings showing layout and types of deck units, anchorage details, and conditions requiring closure strips, supplementary framing, sump pans, cant strips, cut openings, special jointing, and other accessories.

### QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of the following codes and standards, except as otherwise indicated:

1. American Iron and Steel Institute (AISI), "Specification for the Design of Cold-Formed Steel Structural Members."
2. American Welding Society (AWS), D1.3 "Structural Welding Code - Sheet Steel."
3. Steel Deck Institute (SDI), "Design Manual for Composite Decks, Form Decks and Roof Decks."

B. Qualification of Field Welding: Use qualified welding processes and welding operators in

accordance with "Welder Qualification" procedures of AWS.

1. Welded decking in place is subject to inspection and testing. Owner will bear expense of removing and replacing portions of decking for testing purposes if welds are found to be satisfactory. Remove work found to be defective and replace with new acceptable work.

C. Underwriters' Label: Provide metal floor deck units listed in Underwriters' Laboratories "Fire Resistance Directory", with each deck unit bearing the UL label and marking for specific system detailed.

1. Provide cellular floor deck units listed in UL "Electrical Construction Materials Directory" with each cellular metal floor deck unit bearing UL labels and marking. Provide units that will permit use of standard header ducts and outlets for electrical distribution systems.

D. FM Listing: Provide steel roof deck units that have been evaluated by Factory Mutual System and are listed in "Factory Mutual Approval Guide" for "Class I" fire-rated construction.

## PRODUCTS

### MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include but are not limited to the following:

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

1. Bowman Metal Deck Div., Cyclops Corp.
2. Consolidated Systems, Inc.
3. Epic Metals Corp.
4. Marlyn Steel Products, Inc.
5. H. H. Robertson Co.
6. Roll Form Products, Inc.
7. Roof Deck, Inc.
8. United Steel Deck, Inc.
9. Vulcraft Div., Nucor Corp.
10. Wheeling Corrugating Co.

### MATERIALS

A. Steel for Painted Metal Deck Units: ASTM A 611, grade as required to comply with SDI specifications.

B. Steel for Galvanized Metal Deck Units: ASTM A 446, grade as required to comply with SDI specifications.

C. Miscellaneous Steel Shapes: ASTM A 36.

D. Shear Connectors: Headed stud type, ASTM A 108, Grade 1015 or 1020, cold-finished carbon steel, with dimensions complying with AISC specifications.

E. Shear Connectors: Strap type, ASTM A 570, Grade D, hot-rolled carbon steel.

F. Sheet Metal Accessories: ASTM A 526, commercial quality, galvanized.

G. Galvanizing: ASTM A 525, G60.

H. Galvanizing Repair: Where galvanized surfaces are damaged, prepare surfaces and repair in accordance with procedures specified in ASTM A 780.

I. Paint: Manufacturer's baked-on, rust-inhibitive paint, for application to metal surfaces that have been chemically cleaned and phosphate chemical treated.

J. Flexible Closure Strips: Manufacturer's standard vulcanized, closed-cell, synthetic rubber.

K. Acoustic Sound Barrier Closures: Manufacturer's standard mineral fiber closures.

**FABRICATION**

A. General: Form deck units in lengths to span three or more supports, with flush, telescoped, or nested 2-inch laps at ends and interlocking or nested side laps, of metal thickness, depth, and width as indicated.

B. Roof Deck Units: Provide deck configurations that comply with SDI "Specifications and Commentary for Steel Roof Deck."

C. Acoustical Roof Deck Units:

1. Single-pan units: Single-pan fluted units with vertical webs perforated with approximate 5/32-inch-diameter holes staggered 3/8-inch o.c. Provide mineral fiber acoustical insulation strips of profile to fit void space between vertical ribs.
2. Multiple-pan cellular units: Composite units consisting of upper fluted section combined with lower flat plate section having interlocking side laps and approximate 5/32-inch perforations staggered on 3/8-inch centers under cells formed by upper unit. Provide mineral fiber acoustical insulation strips of profile to fit void space of each cell.

D. Non-Composite Steel Form Deck: Provide fluted sections of metal deck as permanent forms for reinforced concrete slabs.

E. Cellular Metal Floor Deck Units:

1. Fabricate flat-bottom units with top fluted section cells combined on a lower flat plate, of metal thickness, depth, and width of unit, number of cells per unit, and width of cells as indicated.

2. Fabricate double-cell units with top fluted section cells combined with matching fluted bottom section, of metal thickness, depth, and width of units, number of cells per unit, and width of cells as indicated.
3. Provide sufficient welds, forming sheets into cellular floor deck units to develop full horizontal shear strength at plane where steel sheets are joined.

F. Composite Steel Floor Deck: Fabricate deck units with integral embossing or raised pattern to furnish mechanical bond with concrete slabs. Fabricate open-beam deck units with fluted section having interlocking side laps.

G. Metal Cover Plates: Fabricate metal cover plates for end-abutting floor deck units of not less than same thickness as decking. Form to match contour of deck units and approximately 6 inches wide.

H. Metal Closure Strips: Fabricate metal closure strips, for cell raceways and openings between decking and other construction, of not less than 0.045-inch min. (18 gage) sheet steel. Form to provide tight-fitting closures at open ends of cells or flutes and sides of decking.

I. Roof Sump Pans: Fabricate from single piece of 0.071-inch min. (14 gage) galvanized sheet steel with level bottoms and sloping sides to direct water flow to drain. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3 inches wide. Recess pans not less than 1-1/2 inches below roof deck surface unless otherwise shown or required by deck configuration. Holes for drains will be cut in the field by others.

## EXECUTION

### INSTALLATION

A. General: Install deck units and accessories in accordance with manufacturer's recommendations, shop drawings, and as specified herein.

B. Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting members before being permanently fastened. Do not stretch or contract side lap interlocks.

C. Align deck units for entire length of run of cells and with close alignment between cells at ends of abutting units.

D. Place deck units flat and square, secured to adjacent framing without warp or deflection.

E. Do not place deck units on concrete supporting structure until concrete has cured and is dry.

F. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.

G. Do not use floor deck units for storage or working platforms until permanently secured.

H. Fastening Deck Units (U.N.O. on plans):

1. Fasten floor deck units to steel supporting members by nominal 5/8- inch puddle welds or elongated welds of equal strength, spaced not more than 12 inches o.c. with a minimum of two welds per unit at each support.
2. Tack weld or use self-tapping No. 8 or larger machine screws at 4 feet o.c. for fastening end closures.
3. Fasten roof deck units to steel supporting members by not less than 1/2-inch-diameter puddle welds or elongated welds of equal strength, spaced not more than 12 inches at every support, and at closer spacing where indicated. In addition, secure deck to each supporting member in ribs where side laps occur.
4. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.

    a. Use welding washers where recommended by deck manufacturer.

5. Mechanical fasteners, either powder-actuated or pneumatically driven, may be used in lieu of welding. Locate mechanical fasteners and install in accordance with deck manufacturer's instructions.
6. Mechanically fasten side laps of adjacent deck units between supports, at intervals not exceeding 36 inches o.c., using self-tapping No. 8 or larger machine screws.
7. Uplift Loading: Install and anchor roof deck units to resist gross uplift loading of 45 lbs. psf at eave overhang and 30 lbs. psf for other roof areas U.N.O. on plans.

    a. Keep the interiors of cells that will be used as raceways free of welds having sharp points or edges.

I. Cutting and Fitting: Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking, as shown.

J. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking, and support of other work shown.

K. Hanger Slots or Clips: Provide UL-approved punched hanger slots between cells or flutes of lower element where floor deck units are to receive hangers for support of ceiling construction, air ducts, diffusers, or lighting fixtures.

1. Hanger clips designed to clip over male side lap joints of floor deck units may be used instead of hanger slots.
2. Locate slots or clips at not more than 14 inches o.c. in both directions, not over 9 inches from walls at ends, and not more than 12 inches from walls at sides, unless otherwise indicated.
3. Provide manufacturer's standard hanger attachment devices.

L. Joint Covers: Provide metal joint covers at abutting ends and changes in direction of floor deck units, except where taped joints are required.

M. Roof Sump Pans: Place over openings provided in roof decking and weld to top decking surface. Space welds not more than 12 inches o.c. with at least one weld at each corner.

N. Shear Connectors: Weld shear connectors to supports through decking units in accordance with manufacturer's instructions. Do not weld shear connectors through two layers (lapped ends) of decking units. Weld only on clean, dry deck surfaces.

O. Closure Strips: Provide metal closure strips at open uncovered ends and edges of roof decking and in voids between decking and other construction. Weld into position to provide a complete decking installation.

1. Provide flexible closure strips instead of metal closures, at Contractor's option, wherever their use will ensure complete closure. Install with adhesive in accordance with manufacturer's instructions.

P. Touch-Up Painting: After decking installation, wire brush, clean, and paint scarred areas, welds, and rust spots on top and bottom surfaces of decking units and supporting steel members.

1. Touch-up galvanized surfaces with galvanizing repair paint applied in accordance with manufacturer's instructions.
2. Touch-up painted surfaces with same type of shop paint used on adjacent surfaces.

Q. In areas where shop-painted surfaces are to be exposed, apply touch-up paint to blend into adjacent surfaces.

R. Touch-Up Painting: Cleaning and touch-up painting of field welds, abraded areas, and rust spots, as required after erection and before proceeding with field painting, is included in Division 9 under "Painting."

**END OF SECTION 05310**

# INDEX

## 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. Rooftop equipment bases and support curbs.
2. Wood furring, grounds, cants, nailers, and blocking.
3. Sheathing.
4. Framing with dimension lumber.
5. Utility shelving.
6. Sheathing.
7. Plywood backing panels.
8. Building wrap.

#### 1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for the following products:

1. Insulating sheathing.
2. Air-infiltration barriers.
3. Metal framing anchors.
4. Construction adhesives.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

A. Keep materials under cover and dry. Protect from 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.

1. For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Gypsum Sheathing Board:

a. Georgia-Pacific Corp. - Dens-Glass Gold

2. Extruded Cellular Polystyrene Sheathing:

a. Amoco Foam Products Co.
b. Dow Chemical Company (The).
c. UC Industries, Inc.

3. Air-Infiltration Barriers:

a. Amoco Foam Products Co.
b. Celotex Corporation (The); Building Products Division.
c. DuPont Company; Fibers Department.
d. Tyvek Stucco Wrap

4. Metal Framing Anchors:

a. Silver Metal Products, Inc.
b. Simpson Strong-Tie Company, Inc.
c. Southeastern Metals Manufacturing Co., Inc.

## 2.2 LUMBER, GENERAL

A. Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.

B. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

1. For exposed lumber, furnish pieces with grade stamps applied to ends or back of each piece, or omit grade stamps and provide grade-compliance certificates issued by inspection agency.

C. 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.

1. Provide dressed lumber, S4S, unless otherwise indicated.
2. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

## 2.3 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.

B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

C. Moisture Content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.

D. Grade: For dimension lumber sizes, provide No. 3 or Standard grade lumber per ALSC's NGRs of any species. For board-size lumber, provide No. 3 Common grade per NELMA, NLGA, or WWPA; No. 2 grade per SPIB; or Standard grade per NLGA, WCLIB or WWPA of any species.

## 2.4 GYPSUM SHEATHING

A. Gypsum Sheathing Board: Water-resistant-core gypsum sheathing board complying with ASTM C 79 with long edges surfaced with water-repellent paper and as follows:

1. Type: X.
2. Edge Configuration: Square, for vertical application.
3. Thickness: 5/8 inch.

## 2.5 FOAM-PLASTIC SHEATHING

A. Extruded Cellular Polystyrene Sheathing: ASTM C 578, Type IV, in manufacturer's standard lengths and widths with T & G or shiplap long edges as standard with manufacturer.

1. Thickness: 1 inch.

B. Polyisocyanurate Foam Sheathing: Rigid, closed-cell foam board; formed by expanding polyisocyanurate resin using hydrochlorofluorocarbons (HCFCs); with aluminum foil facings laminated to both sides; complying with FS HH-I-1972/1, Class 1 or 2; with a thermal resistance (R-value) for 1-inch thickness of 7.2 deg F x h x sq. ft./Btu at 75 deg F; in thicknesses indicated. Foam-plastic core, 4-1/4 inches thick or less, and facings shall have flame spread of 25 or less, when tested individually.

## 2.6 AIR-INFILTRATION BARRIER

A. Asphalt-saturated organic felt complying with ASTM D 226, Type I (No. 15 asphalt felt), unperforated.

B. Air retarder complying with ASTM E 1677; made from polyolefins; either cross-laminated films, woven strands, or spunbonded fibers; coated or uncoated; with or without perforations to transmit water vapor but not liquid water; and as follows:

1. Minimum Thickness: 3 mils.
2. Minimum Water-Vapor Transmission: 10 perms (575 ng/Pa x s x sq. m) when tested according to ASTM E 96, Procedure A.
3. Maximum Flame Spread: 25 per ASTM E 84.
4. Minimum Allowable Exposure Time: 3 months.

## 2.7 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 a hot-dip zinc coating per ASTM A 153 or of Type 304 stainless steel.

B. Nails, Wire, Brads, and Staples: FS FF-N-105.

C. Power-Driven Fasteners: CABO NER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M)

F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

## 2.8 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch (25-mm) nominal thickness, compressible to 1/32 inch (0.8 mm); selected from manufacturer's standard widths to suit width of sill members indicated.

B. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by both adhesive and panel manufacturers.

C. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbonate (IPBC) as its active ingredient.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of rough carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.

C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

D. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

E. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Published requirements of metal framing anchor manufacturer.
2. "Table 1705.1--Fastening Schedule," of the Standard Building Code.

F. Use common wire nails, unless otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill as required.

G. Use hot-dip galvanized or stainless-steel nails where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity.

H. Countersink nail heads on exposed carpentry work and fill holes with wood filler.

### 3.2 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

A. Install wood grounds, nailers, blocking, and sleepers where shown and where required for screeding or attaching other work. Form to shapes shown and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

C. Install permanent grounds of dressed, preservative-treated, key-beveled lumber not less than 1-1/2 inches (38 mm) wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

### 3.3 FOAM-PLASTIC SHEATHING

A. Comply with manufacturer's written instructions for applying sheathing. Install vapor relief strips or equivalent for permitting escape of moisture vapor that otherwise would be trapped in stud cavity behind sheathing.

## 3.4 GYPSUM SHEATHING

A. General: Fasten gypsum sheathing to supports with galvanized roofing nails or divergent point galvanized staples. Nail or staple to comply with manufacturer's recommended spacing and referenced fastening schedule. Keep perimeter fasteners 3/8 inch (10 mm) from edges and ends of units. Fit units tightly against each other and around openings.

B. Install 24-by-96-inch (609-by-2438-mm) 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 1 stud spacing, 2 where possible.

C. Install 48-by-96-inch (1219-by-2438-mm) or longer sheathing vertically with long edges parallel to, and centered over, studs. Install solid wood blocking where end joints do not occur over framing.

## 3.5 AIR-INFILTRATION BARRIER

A. Cover sheathing with air-infiltration barrier as follows:

1. Apply asphalt-saturated organic felt horizontally with 2-inch (50-mm) overlap and 6 inch (150 mm) end lap; fasten to sheathing with galvanized staples or roofing nails.
2. Apply air retarder to comply with manufacturer's written instructions.
3. Apply air-infiltration barrier to cover upstanding flashing with 4-inch (100-mm) overlap.

**END OF SECTION 06100**

## SECTION 06105 - MISCELLANEOUS CARPENTRY

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

A. This Section includes the following:

1. Rooftop equipment bases and support curbs.
2. Wood furring, grounds, nailers, and blocking.
3. Sheathing.
4. Interior wood trim.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 6 Section "Finish Carpentry" for nonstructural carpentry items exposed to view and not specified in another Section.

#### 1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Wood treatment data as follows, including chemical treatment manufacturer's instructions for handling, storing, installing, and finishing treated materials:

1. For each type of preservative-treated wood product, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

A. Keep materials under cover and dry. Protect from 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.

### PART 2 - PRODUCTS

#### 2.1 LUMBER, GENERAL

A. Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

B. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species,

moisture content at time of surfacing, and mill.

1. For exposed lumber, furnish pieces with grade stamps applied to ends or back of each piece.

C. 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.

1. Provide dressed lumber, S4S, unless otherwise indicated.
2. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

## 2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. General: Where lumber or plywood is indicated as preservative treated or is specified to be treated, comply with applicable requirements of AWPA C2 (lumber) and AWPA C9 (plywood). Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC's Board of Review.

B. Pressure treat aboveground items with waterborne preservatives to a minimum retention of 0.25 lb/cu. ft. (4.0 kg/cu. m). After treatment, kiln-dry lumber and plywood to a maximum moisture content of 19 and 15 percent, respectively. Treat indicated items and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. 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.

C. Pressure treat wood members in contact with ground or freshwater with waterborne preservatives to a minimum retention of 0.40 lb/cu. ft.

## 2.3 DIMENSION LUMBER

A. General: Provide dimension lumber of grades indicated according to the ALSC National Grading Rule (NGR) provisions of the inspection agency indicated.

B. Interior Partitions: Provide framing of the following grade and species:

1. Grade: Construction, Stud, or No. 3.
2. Species: Spruce-pine-fir south; NELMA.
3. Species: Southern pine; SPIB.

C. Other Framing: Provide the following grades and species:

1. Grade: No. 2.
2. Species: Spruce-pine-fir south; NELMA.
3. Species: Southern pine; SPIB.

## 2.4 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.

B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

C. Moisture Content: 19 percent maximum for lumber items are not specified to receive wood preservative treatment.

D. Grade: For dimension lumber sizes, provide No. 3 or Standard grade lumber per ALSC's NGRs of any species. For board-size lumber, provide No. 3 Common grade per NELMA, NLGA, or WWPA; No. 2 grade per SPIB; or Standard grade per NLGA, WCLIB or WWPA of any species.

## 2.5 INTERIOR WOOD TRIM

A. Hardwood Trim: Provide finished hardwood lumber and moldings complying with the following requirements:

1. Species and Cut: Rift-sawn, clear, kiln-dried red oak selected for compatible grain and color.
2. Texture: Surfaced (smooth).
3. Lumber for Transparent Finish (Stained or Clear): Solid lumber stock.

B. Wood Molding Patterns: Provide stock moldings indicated, made to patterns included in WMMPA WM 7 and graded under WMMPA WM 4.

1. Moldings for Transparent Finish: N-Grade.
2. Moldings for Painted Finish: P-Grade.

## 2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Where miscellaneous carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of Type 304 stainless steel.

B. Nails, Wire, Brads, and Staples: FS FF-N-105.

C. Power-Driven Fasteners: CABO NER-272.

D. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

# PART 3 - EXECUTION

## 3.1 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.

C. Fit carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

D. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

E. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.

F. Countersink nail heads on exposed carpentry work and fill holes with wood filler.

G. Use fasteners of appropriate type and length. Predrill members when necessary to avoid splitting wood.

## 3.2 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

A. Install where shown and where required for screeding or attaching other work. Cut and shape to required size. Coordinate locations with other work involved.

B. Attach to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

## 3.3 WOOD TRIM INSTALLATION

A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints.

1. Match color and grain pattern across joints.
2. Install trim after gypsum board joint finishing operations are completed.
3. Drill pilot holes in hardwood before fastening to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads and fill holes.
4. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm) for plumb and level. Install adjoining trim with 1/32-inch (0.8-mm) maximum offset for flush installation and 1/16-inch (1.6-mm) maximum offset for reveal installation.

END OF SECTION 06105

## 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. Interior standing and running trim.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 6 Section "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.
2. Division 6 Section "Interior Architectural Woodwork" for interior woodwork not specified in this Section.

#### 1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Wood treatment data as follows, including chemical treatment manufacturer's instructions for handling, storing, installing, and finishing treated material:

1. For each type of preservative-treated wood product include certification by treating plant stating type of preservative solution and process used, net amount of preservative retained, and compliance with applicable standards.

C. Samples for verification of the following:

1. Lumber and panel products with nonfactory-applied finish, 50 sq. in. for lumber and 8 by 10 inches for panels for each species and cut, with one-half of exposed surface finished.

#### 1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed finish carpentry similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to 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. Do not deliver interior finish carpentry until 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.

#### 1.6 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 will maintain temperature and relative humidity at occupancy levels through the remainder of construction period.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

1. Fire-Rated Wood Door Frames:

a. Eggers Industries, Architectural Door Division.
b. Summit Door, Inc.
c. Weyerhaeuser Co.

### 2.2 MATERIALS, GENERAL

A. Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," for lumber and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee Board of Review.

B. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

1. For exposed lumber, furnish pieces with grade stamps applied to ends or back of each piece, or omit grade stamps entirely and provide certificates of grade compliance issued by inspection agency.

C. Softwood Plywood: Comply with DOC PS 1, "U.S. Product Standard for Construction and Industrial Plywood."

1. Product: Subject to compliance with requirements, provide "Medite II" by Medite Corp.

### 2.3 MISCELLANEOUS MATERIALS

A. 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.

1. Where finish carpentry materials are exposed in areas of high humidity, provide fasteners and anchorages with hot-dip galvanized coating complying with ASTM A 153.

B. Adhesives: Comply with manufacturer's recommendations for adhesives.

C. Glue: Aliphatic- or phenolic-resin wood glue recommended by manufacturer for general carpentry use.

D. Flashing: Comply with requirements of Division 7 Section "Sheet Metal Flashing and Trim" for flashing materials installed in finish carpentry.

1. Horizontal Joint Flashing for Siding: Preformed galvanized steel or aluminum Z-shaped flashing.

E. Sealants: Comply with requirements of Division 7 Section "Joint Sealants" for materials required for sealing siding work.

### 2.4 FABRICATION

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

B. Fabricate finish carpentry to dimensions, profiles, and details indicated.

1. Back out or kerf backs of the following members, except members with ends exposed in finished work:

a. Interior standing and running trim, except shoe mold and crown mold.

2. Ease edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting installation and performance of finish carpentry. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

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

B. Condition finish carpentry to average prevailing humidity conditions in installation areas before installation, for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

### 3.3 INSTALLATION, GENERAL

A. Do not use finish carpentry 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 plumb, level, true, and aligned with adjacent materials. Use concealed shims where required for alignment.

1. Scribe and cut finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
2. Countersink nails, fill surface flush, and sand where face nailing is unavoidable.
3. Install to tolerance of 1/8 inch in 96 inches for plumb and level. 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 standing and running trim and rails. Provide cutouts for mechanical and electrical items that penetrate exposed surfaces of trim and rails.

C. Finish according to specified requirements.

D. Refer to Division 9 Sections for final finishing of finish carpentry.

### 3.4 STANDING AND RUNNING TRIM INSTALLATION

A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long, except where necessary. Stagger joints in adjacent and related standing and running trim. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints, if required.

1. Match color and grain pattern across joints.
2. Install trim after gypsum board joint finishing operations are completed.
3. Drill pilot holes in hardwood before fastening to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads on exposed carpentry work and fill holes.

3.5 ADJUSTING

A. Repair damaged or defective finish carpentry where possible to eliminate functional or visual defects. Where not possible to repair, replace finish carpentry. Adjust joinery for uniform appearance.

3.6 CLEANING

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

3.7 PROTECTION

A. Provide final protection and maintain conditions that ensure finish carpentry is without damage or deterioration at the time of Substantial Completion.

END OF SECTION 06200

## 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. Interior standing and running trim.
2. Wood cabinets.
3. Plastic-laminate cabinets.
4. Plastic-laminate countertops.
5. Shop finishing interior woodwork.

B. Related Sections include the following:

1. Division 6 Section "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.
2. Division 6 Section "Finish Carpentry" for interior carpentry exposed to view that is not specified in this Section.
3. Division 6 Section "Paneling."
4. Division 8 Section "Flush Wood Doors."
5. Division 8 Section "Stile and Rail Wood Doors."
6. Division 8 Section "Wood Windows" for stock wood windows.
7. Division 9 Section "Wood Flooring."
8. Division 9 Section "Painting" for field finishing of interior architectural woodwork.

#### 1.3 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.

B. Rough carriages for stairs are a part of interior architectural woodwork. Platform framing, headers, partition framing, and other rough framing associated with stairwork are specified in Division 6 Section "Rough Carpentry."

#### 1.4 SUBMITTALS

A. Product Data: For each type of product indicated, including cabinet hardware and accessories, and finishing materials and processes.

B. Product Data: For hardboard, medium-density fiberboard, particleboard, plywood, high-pressure decorative laminate, adhesive for bonding plastic laminate, cabinet hardware and accessories, finishing materials and processes.

1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.

C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show details full size.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
3. Show locations and sizes of cutouts and holes for **plumbing fixtures, faucets, and other items** installed in architectural woodwork.
4. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.
5. Apply WIC-certified compliance label to first page of Shop Drawings.

D. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.

1. Shop-applied transparent finishes.
2. Plastic laminates.

E. Samples for Verification: For the following:

1. Lumber with or for transparent finish, **5 inches (125 mm) wide by 24inches (600 mm) long**, for each species and cut, finished on 1 side and 1 edge.
2. Veneer leaves representative of and selected from flitches to be used for transparent-finished woodwork.
3. Wood-veneer-faced panel products with or for transparent finish, 8 by 10 inches (200 by 250 mm) for each species and cut. Include at least one face-veneer seam and finish as specified.
4. Lumber and panel products with shop-applied opaque finish, 50 sq. in. (300 sq. cm) for lumber and 8 by 10 inches (200 by 250 mm) for panels, for each finish system and color, with **1/2 of** exposed surface finished.
5. Plastic-laminate-clad panel products, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish**, with separate samples of unfaced panel product used for core**.
6. Solid-surfacing materials, 6 inches (150 mm) square.
7. Corner pieces as follows:

    a. Cabinet front frame joints between stiles and rail, as well as exposed end pieces, 18 inches (450 mm) high by 18 inches (450 mm) wide by 6 inches (150 mm) deep.
    b. Miter joints for standing trim.

8. Exposed cabinet hardware and accessories, one unit for each type **and finish**.

F. Product Certificates: Signed by manufacturers of woodwork certifying that products furnished comply with requirements.

G. 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: An experienced installer 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. Fabricator Qualifications: A firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production **and installation** of interior architectural woodwork .

D. 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. Provide AWI Quality Certification Program indicating that woodwork complies with requirements of grades specified.

E. Fire-Test-Response Characteristics: Where fire-retardant materials or products are indicated, provide materials and products with specified fire-test-response characteristics as determined by testing identical products per test method indicated by UL, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify with appropriate markings of applicable testing and inspecting agency in the form of separable paper label or, where required by authorities having jurisdiction, imprint on surfaces of materials that will be concealed from view after installation.

F. Mockups: Before fabricating and installing interior architectural woodwork, build mockups for each form of construction and finish required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be **installed**.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting interior architectural woodwork fabrication.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed.
7. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

## 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. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and will maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between **43 and 70** percent during the remainder of the construction period.

C. 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.

2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

## 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.

B. Hardware Coordination: Distribute copies of approved hardware schedule specified in Division 8 Section "Door Hardware" to fabricator of architectural woodwork; coordinate Shop Drawings and fabrication with hardware requirements.

# PART 2 - PRODUCTS

## 2.1 WOODWORK FABRICATORS

A. Available Fabricators: Subject to compliance with requirements, fabricators offering interior architectural woodwork that may be incorporated into the Work include, but are not limited to, the following:

B. Fabricators: Subject to compliance with requirements, provide interior architectural woodwork by one of the following:

## 2.2 MATERIALS

A. General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

B. General: Provide materials that comply with requirements of the WIC quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

C. Wood Species and Cut for Transparent Finish: Rotary cut birch.

D. Wood Species for Opaque Finish: Birch.

E. Wood Products: Comply with the following:

1. Hardboard: AHA A135.4.
2. Medium-Density Fiberboard: ANSI A208.2, Grade [**MD**] [**MD-Exterior Glue**].

F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering high-pressure decorative laminates that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates by one of the following:

    a. Formica Corporation.
    b. Wilsonart International; Div. of Premark International, Inc.

G. Adhesive for Bonding Plastic Laminate: **Unpigmented** contact cement.

## 2.3 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 8 Section "Door Hardware [**(Scheduled by Naming Products)**] [**(Scheduled by Describing Products)**]."

B. Hardware Standard: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.

C. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, [**100**] [**135**] [**170**] degrees of opening[**, self-closing**].

D. Wire Pulls: Back mounted, **4 inches (100 mm) long, 5/16 inches (8 mm) in diameter**

E. Catches: **Magnetic catches, BHMA A156.9, B03141**

F. Adjustable Shelf Standards and Supports: **BHMA A156.9, B04071; with shelf rests, B04081**

G. Drawer Slides: Side-mounted, full-extension, zinc-plated steel drawer slides with steel ball bearings, BHMA A156.9, B05091, and rated for the following loads:

1. Box Drawer Slides: **75 lbf (330 N)**
2. File Drawer Slides: **150 lbf (670 N)**
3. Pencil Drawer Slides: 45 lbf (200 N).
4. Keyboard Slide: 75 lbf (330 N).

H. **Aluminum** Slides for Sliding Glass Doors: BHMA A156.9, B07063.

I. Door Locks: BHMA A156.11, E07121.

J. Drawer Locks: BHMA A156.11, E07041.

K. Grommets for Cable Passage through Countertops: 3/4" OD, **black**, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Product: Subject to compliance with requirements, provide "**SG** series" by Doug Mockett and Co., Inc.

L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.

M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

## 2.4 INSTALLATION MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

B. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.

C. Rough Carriages for Stairs: Comply with requirements in Division 6 Section "Rough Carpentry." Kiln-dry to less than 15 percent moisture content.

D. 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.

E. Handrail/Bumper Rail Brackets: Pairs of extruded-aluminum channels; one for fastening to back of rail and one for fastening to face of wall. They are then assembled in overlapping fashion and fastened together top and bottom with self-tapping screws. Sized to provide 1-1/2-inch (38-mm) clearance between handrail and wall.

## 2.5 FABRICATION, GENERAL

A. Interior Woodwork Grade: Provide **Premium** grade interior woodwork complying with the referenced quality standard.

B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

C. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

D. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:

1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch (19 mm) Thick or Less: 1/16 inch (1.5 mm).
2. Edges of Rails and Similar Members More Than 3/4 Inch (19 mm) Thick: 1/8 inch (3 mm).
3. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members and Rails: 1/16 inch (1.5 mm).

E. Complete fabrication, including assembly, **finishing,** and hardware application, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

F. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

1. Seal edges of openings in countertops with a coat of varnish.

G. Install glass to comply with applicable requirements in Division 8 Section "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.

## 2.6 PLASTIC-LAMINATE CABINETS

A. Quality Standard: Comply with AWI Section 400 requirements for laminate cabinets.

B. Quality Standard: Comply with WIC Section 15.

C. Grade: **Custom**

D. AWI Type of Cabinet Construction: **Flush overlay**

E. Reveal Dimension: **As indicated**.

F. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:

1. Horizontal Surfaces Other Than Tops: **HGS**.
2. Postformed Surfaces: **HGP**.
3. Vertical Surfaces: [**VGS**].
4. Edges: **HGS**

G. Materials for Semiexposed Surfaces: Provide surface materials indicated below:

1. Surfaces Other Than Drawer Bodies: **High-pressure decorative laminate, Grade VGS**] .
2. Drawer Sides and Backs: **Solid-hardwood lumber**.
3. Drawer Bottoms: **Hardwood plywood**.

H. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. Match color, pattern, and finish as indicated by laminate manufacturer's designations for these characteristics.
2. Match Architect's sample.
3. Provide Architect's selections from laminate manufacturer's full range of colors and finishes in the following categories:

   a. Solid colors.
   b. Solid colors with core same color as surface.
   c. Wood grains.
   d. Patterns.

I. Provide dust panels of 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

## 2.7 PLASTIC-LAMINATE COUNTERTOPS

A. Quality Standard: Comply with AWI Section 400 requirements for high-pressure decorative laminate countertops.

B. Quality Standard: Comply with WIC Section 16.

C. Grade: **Custom**.

D. High-Pressure Decorative Laminate Grade: **HGS**.

E. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. Match color, pattern, and finish as indicated by manufacturer's designations for these characteristics.
2. Match Architect's sample.
3. Provide Architect's selections from manufacturer's full range of colors and finishes in the following categories:

a. Solid colors.
b. Solid colors with core same color as surface.
c. Wood grains.
d. Patterns.

F. Grain Direction: Parallel to cabinet fronts.

G. Edge Treatment: **Same as laminate cladding on horizontal surfaces**

H. Core Material: **Particleboard or medium-density fiberboard**

I. Core Material at Sinks: **medium-density fiberboard made with exterior glue**

2.8 SHOP FINISHING

A. Quality Standard: Comply with AWI Section 1500, unless otherwise indicated.

B. Quality Standard: Comply with WIC Section 25, unless otherwise indicated.

1. Grade: Provide finishes of same grades as items to be finished.

C. General: Finish architectural woodwork at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.

D. General: The entire finish of interior architectural woodwork is specified in this Section, regardless of whether shop applied or applied after installation. The extent to which the final finish is applied at fabrication shop is Contractor's option, except shop apply at least the prime coat before delivery.

E. General: Priming **and finishing** of interior architectural woodwork required to be performed at fabrication shop are specified in this Section. Refer to Division 9 Section "Painting" **for final finishing of installed architectural woodwork and** for material and application requirements for woodwork not specified to receive final finish in this Section.

F. General: Shop finish transparent finished interior architectural woodwork at fabrication shop as specified in this Section. Refer to Division 9 Section "Painting" for finishing opaque finished architectural woodwork.

G. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.

1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and to end-grain surfaces. Concealed surfaces of plastic-laminate-clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative overlay.

H. Transparent Finish: Comply with requirements indicated below for grade, finish system, staining, and sheen, with sheen measured on 60-degree gloss meter per ASTM D 523:

1. Grade: **Custom.**.
2. AWI Finish System TR-2: Catalyzed lacquer.
3. WIC Finish System #5: Penetrating oil.
4. Staining: **Match approved sample for color**.
5. Wash Coat for Stained Finish: Apply a vinyl wash coat to woodwork made from closed-grain wood before staining and finishing.
6. **Semigloss, 55-75** gloss units.

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. Quality Standard: Install woodwork to comply with WIC Section 26 for the same grade specified in Part 2 of this Section for type of woodwork involved.

C. 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 (3 mm in 2400 mm).

D. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.

E. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with recommendations of chemical treatment manufacturer, including those for adhesives used to install woodwork.

F. 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.

G. 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 [**60 inches (1500 mm)**] 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 (3 mm in 2400 mm).

H. 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 (3 mm in 2400-mm) 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 (400 mm) o.c. with **No. 10 wafer-head screws sized for 1-inch (25-mm) penetration into wood framing, blocking, or hanging strips**

I. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
2. Install countertops with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
3. Secure backsplashes **to tops with concealed metal brackets at 16 inches (400 mm) o.c. to walls with adhesive**].
4. Calk space between backsplash and wall with sealant specified in Division 7 Section "Joint Sealants."

J. Paneling: Anchor paneling to supporting substrate with **concealed panel-hanger clips**. Do not use face fastening, unless [**covered by trim**] [**otherwise indicated**].

1. Install flush paneling with no more than 1/16 inch in 96-inch (1.5 mm in 2400-mm) vertical cup or bow and 1/8 inch in 96-inch (3 mm in 2400-mm) horizontal variation from a true plane.

K. 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.

L. 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

**SECTION 06 61 19 – QUARTZ SURFACING FABRICATIONS**
**SECTION 12 36 61 – QUARTZ SURFACING COUNTERTOPS**

## PART 1 GENERAL

### 1.01 SUMMARY

A. Section Includes: [Quartz surfacing] [Engineered stone] [Stone] for:
   1. Countertops.
   2. Window stools.
   3. Interior
   4. Other interior applications as shown on Drawings.

B. Related Sections:

1. Section [06 20 00 – Finish Carpentry:] [06 40 00 - Architectural Woodwork:] [09 20 00 – Plaster and Gypsum Board:] Provide framing and blocking to support quartz surfacing within specified tolerances and in accordance with manufacturer's instructions.

2. Section [07 92 00 - Joint Sealers:] Sealers between quartz surfacing and work of other Sections [which are not specified in this Section].

3. Templates showing cutouts required for installation of items installed on or penetrating through quartz surfacing shall be provided under Sections where items are specified. [Indicate if [sink] [and] [lavatory] cutouts are for top-mount or undercabinet installation.]

### 1.02 REFERENCES

A. ASTM International:
   1. ASTM C97 – Absorption and Bulk Specific Gravity of Dimension Stone.
   2. ASTM C99 – Modulus of Rupture of Dimension Stone.
   3. ASTM C170 – Compressive Strength of Dimension Stone.
   4. ASTM C217 – Weather Resistance of Slate.
   5. ASTM C482 – Bond Strength of Ceramic Tile to Portland Cement.
   6. ASTM C484 – Thermal Shock Resistance of Glazed Ceramic Tile.
   7. ASTM C501 – Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser.
   8. ASTM C531 – Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.
   9. ASTM C880 – Flexural Strength of Dimension Stone.
   10. ASTM C1028 – Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
   11. ASTM D256 – Izod Pendulum Impact Resistance of Plastics.
   12. ASTM D2047 – Static Coefficient of Friction of Polish-Coated Floor Surfaces by the James Machine.
   13. ASTM D2299 – Relative Stain Resistance of Plastics.
   14. ASTM E84 – Surface Burning Characteristics of Building Materials.

B. International Organization for Standardization:
   1. ISO 9002 – Quality systems -- Model for Quality Assurance in Production, Installation and Servicing.
   2. ISO 14001 – Environmental Management Systems

### 1.03 SUBMITTALS

A. Product Data:
   1. Quartz Surfacing: Submit manufacturer's product data, [sample warranty form,] and fabrication and installation instructions.
   2. Accessories: Submit manufacturer's product data and installation instructions.

B. Shop Drawings: Show field-verified dimensions, quartz surfacing dimensions, locations and dimensions of cutouts, required locations of support and blocking members, edge profiles, and installation details and methods. Identify color[s] and finish[es].

C. Samples:

1. [Samples for Color Selection: Submit [two] sets of manufacturer's standard colors and finishes.]
2. Samples for Color Approval: Submit [two] samples 10 x 10 inches (250 x 250 mm) of [each] color and finish selected.
3. Stone Adhesive: Submit [two] samples of an adhesive joint for [each] color quartz surfacing selected. Show color match of adhesive.

D. Fabricator Qualifications: Submit evidence of fabricator's qualifications.

E. Closeout Submittals: Submit completed warranty form.

## 1.04 DELIVERY, STORAGE, AND HANDLING

A. Packaging, Shipping, Handling, and Unloading: Observe manufacturer's recommendations and handle in manner to prevent breakage or damage. Brace parts if necessary. Transport in the near-vertical position with finished face toward finished face. Do not allow finished surfaces to rub during shipping or handling.

B. Storage and Protection: Store in racks in near-vertical position. Prevent warpage and breakage. Store inside away from direct exposure to sun. Store between 25 and 130 ºF (-4 and 54 ºC). Store with finished face toward finished face.

## 1.05 WARRANTY

A. Provide manufacturer's ten-year limited warranty against product defects when fabricated and installed by a CaesarStone certified fabricator.

# PART 2 PRODUCT

## 2.01 MANUFACTURERS

A. Qualifications: Manufacturer shall be ISO 9002 and ISO 14001 certified.

B. Acceptable Manufacturer:

1. **CaesarStone**
2. **Silestone**
3. **Zodiaq**
4. **Cambria**
5. **LG**

## 2.02 QUARTZ SURFACING

A. Composition: 93 percent crushed quartz aggregate combined with resins and pigments and fabricated into slabs using a vacuum vibro-compaction process.

B. Dimensions:
1. Thickness: Nominal [3/4 inch (20 mm)] [As shown on Drawings.]
2. Size: Slabs shall be not less than [56.5 x 120 inches (1.44 x 3.05 m)] to minimize number of joints in installation.

C. Identification: Material shall be labeled with batch number and imprinted on back with manufacturer's identifying mark.

D. Performance:
1. Flexural Strength: 7,420 psi, ASTM C880.
2. Compressive Strength: ASTM C-170
   a. Dry: 10,430 psi average.
   b. Wet: 11,265 psi average.
3. Izod Impact Strength: 0.361ft. lbs./inch of notch average; ASTM D256.
4. Bond Strength: 205 psi; ASTM C482 modified.
5. Modulus of Rupture: 2,110 average, ASTM C99.
6. Mohs Hardness: 6.5-7.5; scratch test.
7. Absorption: 0.022%; ASTM C97.
8. Stain and Acid Resistance: Not affected; ASTM D2299.
9. Surface Burning Characteristics: Flame spread = 10, smoke density = 195; ASTM E84.
10. Thermal Shock Resistance: Passes 5 cycles, 75°F-295°F; ASTM C484.
11. Coefficient of Thermal Expansion: $1.36x10^{-5}$ inch per °F.; ASTM C531.
12. Weathering Resistance: Not affected after seven days in 1% sulfuric acid; ASTM C217.
13. Freeze-Thaw Resistance: No visible damage or discoloration after 25 cycles (-45°C to 23°C); S.L.P. with ASTM C62 as guide.
14. Wear Resistance: 36.12 gram average; ASTM C501, tested with 1 kg. load, 1000 cycles at 70 r.p.m.
15. Static Coefficient of Friction:
   a. Polished Finish: 0.68 average by ASTM D2047, James Machine; 0.87 average (dry) and 0.54 average (wet) by ASTM C1028, Dynamometer Pull Method.
   b. Honed Finish: 0.69 average by ASTM D2047, James Machine; 0.73 average (dry) and 0.68 average (wet) by ASTM C1028, Dynamometer Pull Method.

E. Color and Finish:
1. Provide color[s] and [finish[es] selected by [Architect] from manufacturer's stocked standards. [Allow for selection of up to [sixteen] colors.]
2. Finish:
   a. Polished Surface shall have gloss greater than or equal to 35% at 50°.
   b. Honed Surface shall have a matte finish.

F. Exposed Edges [and Corners]:
1. Countertops:
   a. Edges: [Square]
   b. Outside Corners: [Square.] [[3/4 inch (20 mm)]
2. [Backsplash] [and] [Wall Cladding]:
   a. Edges: [Square.]
   b. Outside Corners: [Square butt joints.]

## 2.03 ACCESSORIES

A. Mounting Adhesives:
1. Provide structural-grade silicone or epoxy adhesives of type recommended by manufacturer for application and conditions of use.
2. Acceptable Silicone Manufactures:
   a. Dow Corning.
   b. GE Sealants and Adhesives.
3. Acceptable Epoxy Manufacturers:
   a. Akemi North America.
   b. Bonstone Material Corporation.
   c. Tenax USA.
4. Provide spacers, if required, of type recommended by adhesive manufacturer.

B. Stone Adhesive:
   1. Provide epoxy or polyester adhesive of type recommend by manufacturer for application and conditions of use.
   2. Acceptable Manufacturers:
      a. Akemi North America.
      b. Bonstone Material Corporation.
      c. Tenax USA.
   3. Color: Adhesive which will be visible in finished work shall be tinted to match quartz surfacing.

C. Joint Sealants:
   1. Clear silicone sealant of type recommended by manufacturer for application and conditions of use.
   2. Provide anti-bacterial type in [[toilet] [and] [bath] rooms,] [food preparation areas,] [and]
   3. Acceptable Manufactures:
      a. Dow Corning.
      b. GE Sealants and Adhesives.

D. Solvent: Product recommended by adhesive manufacturer to clean surface of quartz surfacing to assure adhesion of adhesives [and sealants].

E. Cleaning Agents: Non-abrasive, soft-scrub type kitchen cleansers.

## 2.04 FABRICATION

A. Fabricator: Firm shall have five years experience fabricating architectural stone and shall have water-cooled cutting tools. [Firm shall be authorized in writing by manufacturer.]

B. Shop Assembly: Observe proper safety procedures and comply with manufacturer's instructions.

C. Layout: Layout joints [to minimize joints and to avoid L-shaped pieces of quartz surfacing.]

D. Inspect Material:
   1. Inspect material for defects prior to fabrication.
   2. Color Match: Materials throughout Project shall be from the same batch and shall bear labels with same batch number. Visually inspect materials to be used for adjacent pieces to assure acceptable color match. Inspect in lighting conditions similar to those on Project.
   3. Variation in distribution of aggregates in quartz surfacing which are within manufacturer's tolerances is not a defect.

E. Tools: Cut and polish with water-cooled power tools.

F. Cutouts:

   1. Cutouts shall have [3/8 inches (10 mm)] [____ inches (_____ mm)] minimum inside corner radius. Inside corners shall be reinforced in an acceptable manner to prevent cracking.
   2. Where edges of cutout will be exposed in finished work, polish edges.
   3. [If the remaining material outside a cutout is less than [three inches (76 mm)] wide, reinforce area by laminating it with a strip of quartz surfacing.]

G. Laminations: Laminate layers of quartz surfacing as required to create built-up all areas requiring additional thickness.

## PART 3 EXECUTION

### 3.01 ACCEPTABLE INSTALLER

A. Installer: Firm shall have five years experience installing architectural stone.

### 3.02 EXAMINATION

A. Site Verification:
   1. Verify dimensions by field measurements prior to fabrication.
   2. Verify that substrates supporting quartz surfaces are plumb, level, and flat to within 1/16 inch in ten feet (1.6 mm in 3000 mm) and that necessary supports and blocking are in place.
   3. [Base Cabinets: Cabinet units shall be securely fixed to adjoining units and back wall.]

B. Inspect finished surfaces for damage. Do not install until damage materials have been repaired in an acceptable manner or replaced.

### 3.03 PREPARATION

A. Protect finished surfaces against scratches. Apply masking where necessary. Guard against grit, dust, and other trades.

B. Remodeling:
   1. Where necessary, remove existing [countertops] [and] [materials to be demolished] in accordance with [Section 02 42 00 – Removal and Salvage of Construction Materials] [_____].
   2. Verify that remaining construction is of sufficient strength and tolerances to support quartz surfacing and make necessary repairs.
   3. [Disconnect utilities as specified in other sections.]

### 3.04 INSTALLATION

A. Install materials in accordance to manufacturer's recommendations. Lift and place to avoid breakage.

B. Preliminary Installation and Adjustment: Position materials to verify that materials are correctly sized and prepared. Make necessary adjustments.
   1. If jobsite cutting, grinding, or polishing is required, use water-cooled tools. Protect jobsite and surfaces against dust and water. Perform work away from installation site if possible.
   2. Countertops: Gypsum drywall back walls [which are not [fire] may be routed up to half the thickness of the drywall to allow countertop to fit.
   3. Allow gaps for expansion of not less than 1/16 inch (1.5 mm) per five feet when installed between walls or other fixed conditions.
   4. [Drainage: where drainage is required], shim countertops slightly to insure positive drainage.]

C. Permanent Installation:
   1. After verifying fit, remove quartz surfacing from position, clean substrates of dust and contamination, and clean quartz surfacing back side and joints with solvent.
   2. Apply sufficient quantity of mounting adhesive in accordance with adhesive manufacturer's recommendations to provide permanent, secure installation.
   3. Spacing of mounting adhesive shall not exceed:
      a. Horizontal Surfaces: 2 inches on center.
      b. Vertical Surfaces: 2 inches on center; provide temporary shims until adhesive cures.
   4. Install surfacing plumb, level, and square and flat to within 1/16 inch in ten feet (1.6 mm in 3000 mm).

D. Joints:
   1. Joints Between Adjacent Pieces of Quartz Surfacing:
      a. Joints shall be flush, tight fitting, level, and neat.
      b. Securely join with stone adhesive. Fill joints level with quartz surfacing.
      c. Clamp or brace quartz surfacing in position until adhesive sets.

2. Joints Between Backsplashes and Countertops: Seal joints with silicone sealer.

## 3.05 REPAIR

A. Repair or replace damaged materials in a satisfactory manner.

## 3.06 CLEANING

A. Remove masking and excess adhesives and sealants. Clean exposed surfaces.

## 3.07 PROTECTION

A. Protect surfacing from damage by other Sections.

## 3.08 SCHEDULES

C. Toilet Rooms – Rooms 102 and 103:
   1. Countertops: CaesarStone Sierra, Color 9255; 3/4" thick; waterfall front edge.
   2. Wainscoat: CaesarStone Baja, Color 3200; 3/4" thick; square top edge and butt joint corner.

D. Lobby - Room 101
   1. Reception Desk: CaesarStone Concrete, Color 2003
      a. Countertops: Polished finish,1-1/4" thick; bullnosed exposed edges.
      b. Vertical Cladding: Honed finish, 3/4" thick, quirk joints.
   2. Wall Behind Desk: Copper Canyon, Color 9480; 3/4" thick; see drawings for edge trim and sandblasted graphics.

**END OF SECTION**

# INDEX

## SECTION 07210 - THERMAL INSULATION

### PART 1 - GENERAL

#### 1.1 SCOPE OF WORK

A. Provide all labor, equipment, and materials to install rigid insulation, and recovery board over deck substrates indicated on the drawings. Install cants, crickets where indicated on drawings.

#### 1.2 RELATED SECTIONS

A. Division 6 "Rough Carpentry"

B. Division 7 “Modified Bituminous Membrane Roofing”

#### 1.3 SUBMITTALS

A. Samples and product literature for all products listed.

B. Design Loads: Submit copy of minimum design load calculations according to ASCE 7-02, Method 2 for Components and Cladding, sealed by a Texas registered professional engineer. In no case shall the design loads be taken to be less than those detailed in article 1.6 of this specification.

#### 1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original unopened packages, dry, undamaged, seals and labels intact.

B. Store all insulation delivered to the site in enclosed trailers.

#### 1.5 ENVIRONMENTAL REQUIREMENTS

A. Apply insulation only when the weather conditions are in compliance with the roof system limitations.

B. Protect the installed insulation from water penetration at the end of each day's work.

C. Application of the roof system shall immediately follow the installation of the roof insulation as it is installed.

#### 1.6 DESIGN AND PERFORMANCE CRITERIA

A. Uniform Wind Uplift Load Capacity

1. Installed roof system over steel decks, shall withstand negative (uplift) design wind loading pressures complying with the following criteria. Attachment shall be installed exactly as given in article 3.3.

a. Design Code: ASCE 7-02, Method 2 for Components and Cladding.

b. Category III Building with an Importance Factor of 1.15

c. Wind Speed: 105 mph

d. Ultimate Pullout Value: 485 pounds per each of the fastener.

e. Exposure Category: C

f. Design Roof Height: 31 feet

g. Roof Pitch: 1/4 inches per foot max.

h. Topographic Factor: 1.0

| Roof Area | Design Uplift Pressure |
|---|---|
| Zone 1 - Field of roof | 32.2 psf |
| Zone 2 – Eaves and rakes | 54.0 psf |
| Zone 3 - Corners | 54.0 psf |

Note: Edge Zone Width = 12 ft. 5 in.

PART 2 - PRODUCTS

2.1 GENERAL

A. When a particular make or trade name is specified, it shall be indicative of a standard required.

2.2 MATERIALS

A. Tapered Polyisocyanurate Insulation Board: 2 inch minimum, 1/4-inch per foot with fiberglass reinforced facers. Johns Manville, E'NRG'3, Average LTTR-value: 29.14.

B. Recovery Board: Temple-Inland, Fully Coated FiberBase HD. ASTM C 209, 1/2 inch, LTTR-value: 1.39.

C. Tapered Perlite Crickets: ASTM C 728, 1/2" per foot where indicated on the plans.

2.3 RELATED MATERIALS

A. Fasteners & Plates: Steel & Wood Deck: CRHD fasteners with steel plates, Olympic Mfg.

B. Cant Strips: Fiberglass, Glass Cant.

C. As required by the membrane manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrate surfaces to receive roof and deck insulation and associated work and conditions under which insulation will be installed. Do not proceed with roofing until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

B. Verify deck and surfaces are clean, smooth, dry, free of depressions or irregularities prior to beginning installation of materials.

C. Verify roof openings, curbs, pipes, sleeves, ducts, penetrations or vents through roof are solidly set, wood nailing strips are in place.

D. Verify all specifications related to Carpentry, have been followed prior to beginning installation of

insulation. Beginning installation means acceptance of substrate.

3.2 PROTECTION

A. During execution of work covered by this Section, the Contractor shall provide protection for roof insulation from water and wind penetration at the end of each day's work.

B. Protect the roof insulation in areas that will receive excessive traffic with a surface protection such as plywood.

C. All workmen shall wear clean, soft rubber-soled shoes for any application work where they may be walking on the in-place insulation.

3.3 GENERAL INSTALLATION

A. Base layer of Polyisocyanurate Insulation board shall be fully attached to the steel deck with specified fastening system as listed below.

1. Fasteners in FIELD, Zone 1 of the roof are placed 11 fasteners per 4 x 8 board.
2. Fasteners at PERIMETERS, Zone 2 of the roof are placed, Width = 12 ft. 5 in, 17 fasteners per 4 x 8 board.
3. Fasteners at CORNERS, Zone 3 of the roof are placed, Width = 12 ft. 5 in, 22 fasteners per 4 x 8 board.
4. Placement of any fastener from edge of insulation board shall be a minimum of three inches, and a maximum of six (6) inches.

B. Filler pieces of insulation require at least two fasteners per piece if size of insulation is less than four square feet.

C. Minimum penetration into deck shall be one (1) inch minimum for metal.

D. Offset joints of second layer of Polyisocyanurate and recovery board with those of the underlying Insulation.

E. All boards shall be cut and fitted where the roof deck intersects a vertical surface. The boards shall be cut to fit a minimum of 1/4" away from the vertical surface.

F. Trim surface of insulation where necessary at roof drains so completed surface is flush with rim of drain.

G. Cant Strips/Crickets: Install preformed 45-degree cant strips at junctures of vertical surface. Install crickets where indicated on the plans.

END OF SECTION

**SECTION 07231 - ROOF INSULATION**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Special Conditions, Bid Form, and other Division 1 Specification sections, apply to work of this section.

B. RELATED SECTIONS:
1. Section 07324 - Tapered Roof Insulation
2. Section 07411 - Metal Roof Panels
3. Section 07525 - Modified Bitumen Sheet Roofing

1.2 SUMMARY

A. This portion of the specification describes materials and workmanship required for the installation of rigid insulation over preformed metal decks prior to installing other components of the finished roof systems.

B. All materials described herein shall be furnished and installed by the roofing contractor unless specifically noted otherwise.

C. Roof Areas covered under this section: As shown on drawings.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Insulation shall be delivered to the site in an undamaged and dry condition. Materials received which is not dry or is otherwise damaged shall be rejected.

B. Storage under polyethylene or similar non-breathing film stock shall not be permitted.

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

D. Any unused insulation remaining on the roof at the end of the workday shall be returned to storage.

1.4 INSULATION - GENERAL

A. Insulation boards shall be full size except when cutting is required at roof edges and openings. Boards that are broken, cracked, have been exposed to moisture, or are otherwise damaged shall not be used.

B. The proper installation and fit of wood nailers, blocking, and other rough carpentry in appropriate locations shall be verified prior to installation of roof insulation.

C. Caution shall be exercised with construction traffic to avoid damage to new insulation. Breaking or crushing of insulation is unacceptable and any damaged insulation shall be replaced at the roofing contractor's expense.

D. Insulation shall be laid with end joints staggered and all joints tight; however, boards shall not be forced into place.

E. No more insulation shall be applied during any work period than can be covered by all plies of roofing during the same work period. At the end of the work period, temporary edge seals shall be installed to protect the roof insulation. Upon resumption of work, they must be removed. Such seals shall consist of strips of roofing felt applied and topcoated with asphalt mastic.

F. Insulation surfaces shall be cleared of all debris before roofing is placed.

PART 2 - PRODUCTS

2.1 BASE SHEET

A. Base sheet: ASTM D-4601, asphalt coated, glass fiber base sheet.
B. Base sheet fasteners: Spot Mop

2.2 INSULATION

A. Insulation configuration:

1. First Layer:

a. Type: Polyisocyanurate - FSHH-I-1972/2(1), Class 1
b. Thickness: 2.0 inches
c. As listed by Factory Mutual

2. Second Layer

a. Type: Perlite - ASTM C728-82
b. Thickness: 1 inch

3. Tapered edge strip: ASTM C728-82, perlite, tapered from 1-5/8 inch to 1/8 inch (on twelve inch dimension), size 12 x 48 inches or as approved by the manufacturer's representative.

4. Cants: ASTM C728-82, wood treated.

5. Crickets: ASTM C728-82, perlite, factory fabricated, ½ inch slope, 2 x 4 feet dimension.

B. All insulation materials must be approved by the manufacturer of primary roof materials. Samples should be provided to the manufacturer and written approval from the manufacturer of primary roof materials is required prior to ordering these materials for the project.

2.3 INSULATION SECUREMENT OF SECOND LAYER OF INSULATION

A. Fasteners:

1. FM approved toggle bolt fasteners and plates listed in the 1997 FMRC Approval Guide: Insulation and Fastener Tables for Approved Glass and Approved Organic Felt Asphaltic Built Up Roofs. (Page 1-179)

2.4 MATERIALS FOR SURFACE PREPARATION AND ADHESION.

A. Hot Adhesive

| Test | Typical Value | Test Method |
|---|---|---|
| Softening Point | 185-205°F | ASTM D 36 |
| Flash Point | 550°F or greater | ASTM D 92 |
| Penetration | 20 units, 25°C | ASTM D 5 |
| Ductility | 4.0 cm, 25°C | ASTM D 113 |
| Penetration Index | 3.0 | Calculated Value |
| Tensile Strength | 90 PSI | ASTM D 412 |
| Elongation | 150% | ASTM D 412 |
| Density | 1.0 or greater | ASTM D 70 |
| Fire Resistance | Pass, Class A | ASTM E 108/UL 790 |
| Asbestos Content | 0% | EPA 600/M4-82-020 |
| Cold Temperature Bend | 40°F | ASTM D 3111 |
| Softening Point Temperature Fallback | 10°F or less | HRC 632 (5 hours, 500°F, 450g. material in closed one quart container) |

| | | |
|---|---|---|
| Compatibility with Type VI Glass Ply Sheet and Coated Glass, Polyester and Glass/Polyester Sheets | Oliensis Test, no exudate | ASTM D 1370 |
| Average Adhesion Strength to Felt Coating After Conditioning: | | |
| 1) 24 Hrs. @ 158°F | 4.5 lb/in. | ASTM D 1876 |
| 2) 7 Days @ 158°F | 6.9 lb/in. | |

2.5 SECUREMENT OF TAPERED EDGE STRIPS, CRICKETS AND SADDLES OVER MECHANICALLY ATTACHED INSULATION

A. Adhesive

1. Hot Asphalt: Type III Asphalt, ASTM D 312

PART 3 - EXECUTION

3.1 CONDITION OF DECK

A. Prior to installing, deck must be inspected and all deficiencies corrected.
B. The roofing contractor shall perform all other work of preparing the deck. When insulation is applied, the deck shall be dry and free of dew, frost, ice, and snow.
C. The roofing contractor shall notify the building owner's representative of any improper installations.

3.2 BASE SHEET

A. Install base sheet over deck prior to installation of insulation.

1. Cut base sheet in 18 to 20 foot lengths and allow to relax. Install loose laid over prepared surface.
2. Side laps and end laps: Four (4) inches.

3.3 PITCH DAMS

A. Before placing second layer of insulation and/or setting cant strips, a strip of finishing felt, 12 inches wide shall be applied in all corners against vertical surfaces. The strip shall be applied in a 1/16 inch thick application of asphalt roof cement and shall extend out on the insulation 6 inches from the corner. Similarly apply felt pitch dams at all roof openings.
B. Apply pitch dams at roof edges as detailed on drawings.
C. At low gravel stops, approximately ½ width of the felt strip shall hang over the edge until after roofing plies have been applied, after which the strip shall be folded back on top of the roofing and secured with asphalt roof cement.
D. It is intended that pitch dams be installed at all locations where there is possibility of bitumen drippage into the area below or down exterior wall.
E. The roofing contractor shall notify the building owner's representative of any improper installations.

3.4 HEATING OF BITUMEN

A. Kettles shall be equipped with thermometers calibrated to indicate bitumen temperature and shall be free of any noncompatible materials.

B. Asphalt shall never be heated to or above its flash point. Avoid heating at or above the finished blowing temperature (FBT); should conditions make this prohibition impracticable, and exception is granted by building owner, heating above the FBT shall not be done for more than 4 hours. Application temperature shall not vary more than 25 degrees F above or below the "equiviscous" temperature (EVT). The EVT represents the ideal mop-bucket temperature for good application. Cutting or any other alteration of bitumens will not be permitted.

C. Bitumen temperatures shall be checked regularly to insure compliance with the above requirements.

3.5 THERMAL INSULATION - MECHANICAL ATTACHMENT OF BOTTOM LAYER OF INSULATION

A. First Layer:

1. Mechanically attach first course of polyisocyanurate insulation through underlying base sheet, into steel deck, with approved FM fastener and plate assembly.
2. Fastener pattern and density to conform to Factory Mutual requirements as set forth in the 1997 FMRC Approval Guide.
3. Contractor to provide protection to equipment and furniture below from dust and debris.

B. Second Layer:

1. Install insulation boards in a pour of specified adhesive at the rate of 30 lbs./100 sq. ft.
2. Immediately after placement, walk insulation boars to achieve solid bond.

C. Insulation installation requirements:

1. Stagger joints at least six inches.
2. Install insulation boards in courses parallel to roof edges mopping surface up.
3. Firmly butt each insulation board to surrounding boards. Do not jam or deform boards.
4. Maximum insulation gap: 1/4 inch. Fill insulation board joint gaps larger than 1/4 inch with roof insulation.
5. Maximum elevation variation between boards at joints: 1/8 inch.
6. Cut and fit insulation boards where roof deck intersects vertical surfaces. Cut board 1/4 inch from vertical surface.
7. Filler size: 18 inches in length or width, minimum.
8. Promptly spread any bitumen pools that may accumulate on insulation surface to achieve smooth surface for modified bitumen roofing installation.

3.6 TAPERED EDGE INSTALLATION

A. Tapered edge strips shall be adhered with the specified insulation adhesive.
B. Tapered edge strips are to be installed around all drains to form a continuous 48 inch square sump.
C. Tapered edge strips shall be used at low perimeter roof edge where nailer and gravel stop is raised.

3.7 CANTS

A. Treated wood cant strips shall be installed at all 90 degree angles where the horizontal installation of insulation meets the vertical sides of roof penetrations and walls. Cants to be mechanically attached to wood blocking as per Factory Mutual Loss Prevention DATA 1-49. Cants must be installed prior to application of flashings.

END OF SECTION 07231

## SECTION 07234 - TAPERED ROOF INSULATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Special Conditions, Bid Form, and other Division-1 Specification sections, apply to work of this section.

#### 1.2 SUMMARY

A. It is the intent of this specification to provide the owner with an insulation system that will provide positive drainage of all standing water, and the assurance of long term thermal performance throughout the life of the installed roof membrane.

B. The entire insulation system shall be installed in accordance with the latest published data of the American Society of Testing Materials (ASTM) Standards, Underwriters Laboratory (UL) and Factory Mutual (FM) fire rating and wind/uplift classification.

C. Manufacturers' literature shall be submitted to the project manager denoting the system used, the 'R' value stated, minimum and maximum thickness of the insulation, complete code compliance, and written confirmation of total adherence to these specifications.

D. Roof Areas covered under this section: as shown on drawings.

#### 1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Insulation shall be delivered to the site in an undamaged and dry condition. Material received which is not dry or is otherwise damaged shall be rejected.

B. Storage under polyethylene or similar non-breathing film stock shall not be permitted.

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

D. Any unused insulation remaining on the roof at the end of the workday shall be returned to storage.

#### 1.4 TAPERED INSULATION - GENERAL

A. Insulation boards shall be full size except when cutting is required at roof edges and openings. Boards that are broken, cracked, have been exposed to moisture, or are otherwise damaged shall not be used.

B. The proper installation and fit of wood nailers, blocking, and other rough carpentry in appropriate locations shall be verified prior to installation of roof insulation.

C. Caution shall be exercised with construction traffic to avoid damage to new insulation. Breaking or crushing of insulation is unacceptable and any damaged insulation shall be replaced at the roofing contractor's expense.

D. Insulation shall be laid with end joints staggered and all joints tight; however, boards shall not be forced into place.

E. No more insulation shall be applied during any work period than can be covered by all plies of roofing during the same work period. At the end of the work period, temporary edge seals shall be installed to protect the roof insulation. Upon resumption of work, they must be removed. Such seals shall consist of strips of roofing felt

applied and top coated with asphalt mastic.

F. Insulation surfaces shall be cleared of all debris before roofing is placed.

1.5 SHOP DRAWINGS

A. Shop drawings should be presented in a clear and thorough manner.

B. All tapered insulation panes should be installed in accordance with shop drawings approved by project manager.

C. All locations, roof penetrations, and other pertinent information regarding the roof assembly shall be noted.

D. All shop drawings should reflect on-site field measurements of roof.

PART 2 - PRODUCTS

2.1 GENERAL

A. This section is complimentary to the membrane roofing system specified. All insulation materials supplied must be compatible with / and to the approval of the roofing system manufacturer.

2.2 MATERIAL

A. Tapered insulation system shall be a rigid board type specifically formulated, and manufactured for the use as a thermal insulation over roof decking.

B. Insulation supplied must provide a minimum average system resistance factor of R-10. The thermal resistance ratings shall be based on a mean average temperature of 75 degrees F. All "R" value calculation shall be based on the latest Thermal Standards Technical Bulletin 28-1

C. Insulation shall be:

1. Perlite rigid board insulation: BMCA (GAF) Perlite rigid board insulation. Rigid mineral perlite board consisting of mineral aggregate binders, having an "R" value of 2.78 per inch and conforming to Federal Specifications HHI-529-B, and ASTM Standard C-278. Material shall be in 48" panel sizes, and supplied by an authorized BMCA (GAF) fabricator.

D. It is the intent of this specification to supply compatible insulation components that will provide assure system performance. Therefore, it is suggested that all material supplied be from a single insulation source whenever possible.

PART 3 - INSTALLATION

3.1 TAPERED INSULATION SYSTEMS

A. Tapered insulation system shall be installed in a minimum of two layers, with all joints staggered with solid mopping of specified asphalt at the rate of 30# /square.

B. The base layer of insulation shall be installed in a total thickness of 1 inch.

C. The top layer of insulation (tapered) will be factory fabricated to provide a smooth continuous slope of not less than 1/4" per foot.

3.2 TAPERED INSULATION SADDLES

A. Roof saddles are to be placed in valleys between roof drains.

B. All saddle shall have a four (4) way slope twice that of roof deck.

C. In no case should width of saddles be less than 1/4 of total span between drains.

D. Saddles shall be used for drainage purposes only, and shall not contribute to minimum "R" value system calculation specified herein.

END OF SECTION 07234

**SECTION 07260 - AIR/WATER INFILTRATION BARRIERS**

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes materials and installation methods of the primary air barrier membrane system.
B. Section includes materials and installation methods of damproof coursing and through-wall flashing membranes.
C. Related Sections:
   1. Masonry: Section 04810
   2. Insulation: Section 07210
   3. Fire stopping: Section 07920
   4. Roofing: Section 07525
   5. Sealants: Section 07920
   6. Door frames: Section 08110
   7. Window frames: Section 08410, 08520
   8. Gypsum board: Section 09255

1.02 REFERENCES

A. The following standards are applicable to this section:
   1. ASTM E283-91: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
   2. ASTM E330-90: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
   3. ASTM E96: Water Vapor Transmission of Materials.
   4. CGSB 37-GP-56M: Membrane, Modified, Bituminous, Prefabricated, and Reinforced.

1.03 SYSTEM DESCRIPTION

A. Provide a continuous air barrier system where indicated.
B. Provide a continuous air and vapor barrier system where indicated.

1.04 SUBMITTALS

A. Prior to commencing the Work, submit documentation from an approved independent testing laboratory certifying that the air leakage rates of the air barrier membranes, including primary membrane and transition sheets, exceed the requirements of the Massachusetts Energy Code.
B. Prior to commencing the Work, submit copies of manufacturers current ISO certification. Membrane, primers, sealants, and adhesives shall be included.
C. Prior to commencing the Work, submit references clearly indicating that the membrane manufacturer has successfully completed projects on an annual basis of similar scope and nature for a minimum of fifteen years. Submit references for a minimum of ten projects.
D. Prior to commencing the Work, submit manufacturers product data, samples and complete set of standard details for the air barrier membrane system showing a continuous plane of air tightness throughout the building envelope.

1.05 QUALITY ASSURANCE

A. Installer: Submit in writing a document stating that the applicator of the primary air barrier membranes specified in this section is recognized by the manufacturer as suitable for the execution of the Work.

B. Perform Work in accordance with the manufacturer's written instructions of the air barrier membrane and this specification.
C. Maintain one copy of manufacturer's written instructions on site.

D. At the beginning of the Work and at all times during the execution of the Work, allow access to Work site by the air barrier membrane manufacturers' representative.
E. Components used in this section shall be sourced from one manufacturer, including sheet membrane, air barrier sealants, primers, mastics, and adhesives.
F. Pre-Installation Conference: Convene prior to commencing work of this section.
G. Mock-Up:
   1. Where directed, construct typical exterior wall panel incorporating substrate, window frame, attachment of insulation, and showing air barrier membrane application details.
   2. Allow 24 h for inspection of mock-up before proceeding with air barrier Work. Mock-up may remain as part of the Work.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.
B. Store role materials on end in original packaging.
C. Store air barrier membranes, adhesives and primers at temperatures of 40°F and above to facilitate handling.
D. Keep solvent away from open flame or excessive heat.
E. Protect rolls from direct sunlight until ready for use.

1.07 PROJECT CONDITIONS

A. Perform Work only when conditions are acceptable to the manufacturer of the materials being installed.
B. Ensure all preparation work is complete prior to installing air/vapor barrier membrane.

1.08 CO-ORDINATION

A. Ensure continuity of the air barrier membrane system throughout the scope of this section.

1.09 ALTERNATES

A. Alternate submission format to include:
   1. Submit evidence that alternate materials meet or exceed performance characteristics of Product requirements as well as documentation from an approved independent testing laboratory certifying that the air leakage rates of the air barrier membranes, including primary membrane and transition sheets, exceed the requirements of the Massachusettes Energy Code.
   2. Submit copies of the manufacturer's current ISO certification
   3. Submit references clearly indicating that the membrane manufacturer has successfully completed projects on annual basis of similar scope and nature for a minimum of fifteen years.
   4. Submit manufacturer's complete set of details for air barrier membrane system showing a continuous plane of air tightness throughout the building envelope.
B. Submit requests for alternatives to this specification a minimum of ten (10) working days prior to tender closing for evaluation. Include a list of fifteen projects executed over the past fifteen years.
C. Acceptable alternates will be confirmed by addendum. Substitute materials not approved in writing prior to tender closing shall not be permitted for use on this project.

**PART 2: PRODUCTS**

2.01 MANUFACTURER
A. Acceptable Manufacturer: Henry Company
B. Primary Air Barrier Membrane:
   1. Liquid Air Barrier: **Air-Bloc 31** as manufactured by Henry . A one component elastomeric membrane, spray, trowel or brush applied, having the following characteristics:
      a. Air permeability: 0.0002 CFM/ft2 @ 1.6 lbs/ft2 to ASTM E283 with no increased air leakage when subjected to a sustained wind load of 10.5 lbs/ft2 for 1 hour and gust wind load pressure

of 62.8 lbs/ft2 for 10 seconds when tested at 1.6 lbs/ft2 ;
b. Water vapor permeance: 12.3 perms to ASTM E96 Method B;
c. Low temperature flexibility and crack bridging: Pass -4°F to ASTM C836;

C. Transition Membrane
1. **Blueskin®SA** as manufactured by Henry. An SBS modified bitumen, self-adhering type, integrally laminated to a cross laminated polyethylene film, and having the following physical properties:
a. Thickness: 0.0394" (40 mils) min.
b. Air leakage: 0.0001 CFM/ft2 @ 1.6 lbs/ft2 to ASTM E283
c. Vapor permeance: 0.05 perms to ASTM E96;
d. Low temperature flexibility: Pass @ -22°F to CGSB 37-GP-56M;
e. Elongation: 200% min. to ASTM D412;

D. Transition Membrane Primer
1. **Blueskin®Primer** as manufactured by Henry. A synthetic rubber based adhesive type, quick setting, having the following physical properties:
a. Color: Blue;
b. Weight: 6.7 lbs/gal.;
c. Solids by weight: 35%;
d. Drying time (initial set): 30 minutes;
2. **Aquataca™ Primer** as manufactured by Henry. A polymer emulsion type, quick setting, non-flammable during application, low VOC, having the following physical properties:
a. Colour: Aqua;
b. Weight: 1.0 kg/l;
c. Solids by weight: 53%;
d. Water based, no solvent odours
e. Drying time (initial set): 30 minutes at 50% RH at 70 °F;

E. Through-wall flashing membrane and damp proof course (Self-Adhering):
1. **Blueskin®TWF** as manufactured by Henry. An SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film, having the following physical properties:
a. Thickness: 0.0394" (40 mils).
b. Film Thickness: 9.0 mils
c. Tear Resistance: 13 lbs. MD to ASTM D1004;
d. Tensile Strength (film): 5000 psi ASTM D882
e. Puncture Resistance: 40 lbf to ASTM E154;
f. Low temperature flexibility: -22°F to CGSB 37-GP-56M;

## PART 3: EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions are ready to accept the Work of this section. Notify contractor in writing of any discrepancies. Commencement of the work or any parts thereof shall mean acceptance of the prepared substrate.

3.02 PREPARATION

A. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane.

B. Application of Air-Bloc 31 can be carried out 16 hours after forms work has been removed from poured concrete.

3.03 INSTALLATION

A. Primer for Transition and Through-wall Flashing Membrane (Self-Adhering Type only)
1. Apply primer for self-adhering membranes at rate recommended by manufacturer.
2. Apply primer to all areas to receive transition sheet and / or through-wall flashing membrane, as indicated on drawings by roller or spray and allow minimum 30 minute open time. Primed surfaces not covered by BlueskinÒ SA transition membrane or BlueskinÒ TWF through-wall flashing membrane during the same working day must be re-primed.

B. Transition Sheet
1. Position Blueskin®SA self-adhered transition membrane and remove protective film. Press firmly into place. Ensure minimum 2" overlap at all end and side laps.

2. Promptly roll all laps with a counter top roller to effect seal.
3. Ensure all preparatory work is complete prior to installing Air-Bloc 31.

C. Through-wall Flashing Membrane (Self-Adhering Type)
1. Align and position the leading edge of Blueskin®TWF self-adhering through-wall flashing membrane with the front horizontal edge of the foundation walls or self angles, partially remove protective film and roll membrane over surface and up vertically.
2. Press firmly into place. Ensure minimum 2" overlap at all end and side laps.
3. Promptly roll all laps and membrane to effect the seal.
4. Ensure through-wall flashing membrane extends fully to the exterior face of the exterior masonry veneer. Trim off excess as directed by the consultant.
5. Apply through-wall flashing membrane along the base of masonry veneer walls, over windows, doors and all other wall openings. Membrane shall form continuous flashing and shall extend up a minimum of 8" up the back-up wall.

D. Primary Air Barrier
1. When transition membrane is installed, apply Air-Bloc 31 by spray, trowel or brush over entire surface as indicated, to a wet film thickness of 90 mils requiring an average application of 18.6 ft2/gal. Overlap Blueskin®SA a minimum of 1". Spray, trowel or brush around all projections ensuring a complete and continuous seal.

## 3.04 PROTECTION OF FINISHED WORK

A. Air-Bloc 31 and Blueskin®SA is not designed for permanent exposure. Product designed to withstand job site exposure for up to six weeks (less in summer applications), however good practice calls for covering as soon as possible. Wherever possible, begin covering membrane on south exposures, followed by remainder of surface.

END OF SECTION 07260

## SECTION 07520 – MODIFIED BITUMINOUS MEMBRANE ROOFING

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. Section 061000 for "Rough Carpentry".

C. Section 072100 for "Roof and Deck Insulation".

d. Section 076200 for "Sheet Metal Flashing and Trim".

1.2 DESCRIPTION:

A. Modified bituminous sheet roofing work including but not limited to:

Two plies Type IV fiberglass felt, 40-mil SBS stripping membrane, mineral surfaced, fire retardant, dual polyester and fiberglass scrim reinforced, SBS/SIS rubber modified roof membrane SBS (styrene-butadiene-styrene) SIS (Styrene-Isoprene- Styrene), Type IV steep roofing asphalt, torch grade SBS mineral surfaced rubber modified roof membrane flashings.

1.3 REFERENCES: The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

Roofing Terminology: Refer to ASTM D 1079 for definitions of terms related to roofing work not otherwise defined in this Section.

ASTM D 41 1994 Asphalt Primer Used in Roofing, Damproofing, and Waterproofing

ASTM D 312 2000 Asphalt Used in Roofing

ASTM D 2178 1997a Asphalt Glass Felt Used in Roofing and Waterproofing.

ASTM D 2822 1997e1 Asphalt Roof Cement.

ASTM D 5147 2001a Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material.

B. FACTORY MUTUAL ENGINEERING AND RESEARCH CORPORATION (FM)

FM A/S4470 Class 1 Roof Covers

1.4 REGULATORY REQUIREMENTS:

A. Fire and Wind Uplift Rating: Provide modified bitumen roof system and component materials that have been tested for application and slopes indicated and are listed by Factory Mutual Corporation to comply with Standard No.4470 Approval requirements for Class 1 Fire and 1-90 Windstorm Classification.

B. Provide roof-covering materials bearing Factory Mutual Classification Marking on bundle, package, or container indicating that materials have been produced under FM's Classification and Follow-up Service.

1.3 QUALITY ASSURANCE:

A. Manufacturer Qualifications: Roofing system manufacturer shall be ISO 9001 Certified and have a minimum of 10 years experience in manufacturing modified bitumen roofing products in the United States. Show evidence that the products and materials are manufactured in the United States and that materials provided conform to all requirements specified herein, and are chemically and physically compatible with each other and are suitable for inclusion within the total roof system specified herein. The Roofing System Manufacturer shall indemnify the Architect for attorney's fees, related expenses and judgments incurred through litigation arising out of application or performance of the roof system, even if the litigation is groundless, false or fraudulent. The Architect shall be indemnified for a maximum aggregate sum of amount of $100,000.

B. Installer Qualifications: Installer (Roofer) shall be specializing in Built-up bituminous roof application with minimum 5 years experience and who is currently certified by modified bituminous sheet roofing system manufacturer as qualified to install manufacturer's roofing materials. Any one or more of the following causes may be considered sufficient for the disqualification of installer:

1. Lack of responsibility as revealed by either financial, experience or equipment statements.

2. Lack of expertise as shown by past work and judged from the standpoint of workmanship and performance history.

3. Uncompleted work under other contracts which, in the judgment of the Owner, might hinder or prevent the prompt completion of additional work if awarded.

4. Being in arrears on existing contracts, in litigation with an Owner, or having defaulted on a previous contract.

C. Installer's Field Supervision: Installer to maintain a full-time supervisor/foreman on job site during all phases of modified bituminous sheet roofing work and at any time roofing work is in progress, proper supervision of workmen shall be maintained. A copy of the Specifications shall be in the possession of the supervisor/foreman at all times.

D. It shall be the Contractor's responsibility to respond immediately to correction of roof leakage during construction.

E. Pre-application Roofing Conference: Approximately 2 weeks before scheduled commencement of modified bitumen sheet roofing installation and associated work, meet at Project site with Installer, installer of each component of associated work, installers of deck or substrate construction to receive roofing work, installers of rooftop units and other work in and around roofing that must precede or follow roofing work (including mechanical work if any), Architect, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of the Work, including test agencies, and governing authorities. Review foreseeable methods and procedures related to roofing work, including but not necessarily limited to the following:

1. Tour representative areas of roofing substrates, inspect and discuss condition of substrate, roof drains, curbs, penetrations, and other preparatory work.

2. Review roofing system requirements (drawings, specifications, and other contract documents).

3. Review required submittals, both completed and yet to be completed.

4. Review and finalize construction schedule related to roofing work and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

5. Review required inspection, testing, certifying, and material usage accounting procedures.

6. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement).

7. Record (Contractor) discussions of conference, including decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.

1.4 SUBMITTALS:

A. Manufacturer's Certification: (Use form attached to end of this Section) The Manufacturer's Certification Form must be signed by a corporate officer of the roofing system manufacturer with the Corporate Seal affixed thereto.

B Product data for each type of product specified include manufacturer's technical product data, installation instructions. Include data substantiating that materials comply with specified requirements.

C. For all modified bituminous sheet roofing include independent test data according to ASTM Designation D 5147-97 "Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material", substantiating that materials comply with specified requirements.

D. Minimum, 3-by-5-inch samples of each colored modified bituminous mineral surfaced cap sheet and flashing materials to be exposed as finished roof surface.

E. Copy of the Manufacturer's Indemnify Agreement

G. Manufacturer's ISO 9001 Certification.

H. Manufacturer's Warranty: Submit sample copy of specified roofing manufacturer's "Thirty (30) Year Warranty".

I. Manufacturer's Inspection Reports: The Roofing System Manufacturer will provide, when the project is in progress the following:

1. Keeping the Architect informed as to the progress and quality of the work as observed.

2. Provide jobsite inspections at least two (2) times a week.

3. Provide detailed weekly written reports to the Architect along with digital photographs of work in progress. All reports and photographs shall be descriptive of actual work in progress and be presented in a pre-approved manner.

4. Reporting to the Architect in writing, any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.

5. Confirming, after completion of the project and based on manufacturer's observations and tests, that manufacturer has observed no application procedures in conflict with the specifications other than those that may have been previously reported.

1.5 INSURANCE CERTIFICATION:

A. Assist with reparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.6 DELIVERY, STORAGE AND HANDLING:

A. Deliver products to site with seals and labels intact, in manufacturer's original containers, dry and undamaged.

B. Store and handle roofing sheets in a dry, well-ventilated, weather-tight place to ensure no possibility of significant moisture exposure.

C. Store rolls of felt and other sheet materials on pallets or other raised surface. Stand all roll materials on end. Cover roll goods with a canvas tarpaulin or other breathable material (not polyethylene)

D. Do not leave unused rolled goods on the roof overnight or when roofing work is not in progress unless protected from weather and other moisture sources.

E. Handle and store materials or equipment in a manner to avoid significant or permanent deflection of deck.

1.6 PROJECT CONDITIONS:

A. Asphalt Kettles: All job-site kettles shall have a fume re-burning system, a closed asphalt induction system, and a visible thermometer and a thermostatic control to provide monitoring of the bitumen temperature when it is heated in accordance with the manufacturer's instructions.

B. Weather Condition Limitations: Do not apply roofing membrane during inclement weather or when a 40% chance of precipitation is expected. Proceed with roofing work only when existing and forecasted weather conditions will permit unit of Work to be installed in accordance with manufacturers' recommendations and warranty requirements.

C. Do not apply roofing insulation or membrane to damp deck surface.

D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

1.7 FIRE WATCH:

A. When torch applied materials are installed the Contractor shall provide a fire watch.

B. Provide fire watch during torch application and continue for one hour after torch work has been completed. All roof areas worked on should be checked for hot spots and signs of smoldering. If available, infrared roof scanners should be used. The inside of the building should also be inspected for signs of fire and smoke.

C. Provide at least two 10 lb (4.5 kg) multipurpose dry chemical portable extinguisher within 20 ft. (6.1 m) horizontal travel distance of torch-applied roofing equipment.

D. No full-time torch shall be used under any circumstances.

1.8 SEQUENCE AND SCHEDULING:

A. Sequence installation of modified bituminous sheet roofing with related units of Work specified in other Sections to ensure that roof assemblies, including roof accessories, flashing, trim, and joint sealers, are protected against damage from effects of weather, corrosion, and adjacent construction activity.

1.9 WARRANTY:

A. Manufacturer's Warranty: "FIFTEEN (15) Year NDL Warranty", signed by a corporate officer of the corporation of modified bitumen sheet roofing system manufacturer, will pay all authorized cost or repair to the roof membrane system necessary to stop any leaks which occur during a FIFTEEN (15) year period from the date of completion. Leaks which occur only as a result of the following will be repaired:

Deterioration of the membrane or flashing system resulting from ordinary wear and tear by the elements. Workmanship on the part of the authorized contractor in the application of the roofing system. Splits or breaks in the roof membrane or flashing system not caused by structural

movement or failure or any movement of material underlying the roofing membrane or base flashing. Blisters, wrinkles, ridges, fishmouths, or open laps in the membrane. Slippage of the membrane or base flashing.

PART 2 - PRODUCTS

2.1 GENERAL:

A. When a particular performance standard is specified, it shall be indicative of a minimum standard required. Products not meeting these minimum performance requirements, shall not be bid and will not be considered.

B. Provide as listed or approved substitution. All request for substitution must be submitted at least 7 DAYS prior to bidding and shall include the Substitution Request Form attached to the end of this Section.

C. Obtain each type of roofing sheet, bitumen, membrane flashings, and vapor retarder (if any), from a single manufacturer. Provide secondary products as recommended by manufacturer of primary products for use with roofing system specified.

2.2 BITUMINOUS MATERIALS:

A. Asphalt Primer: ASTM D 41, V.O.C compliant. Manufacturer of roof membrane.

B. Asphalt Roofing Mastic: ASTM D4586 Standard Specification for Asphalt Roof Cement.V.O.C compliant. Manufacturer of roof membrane.

C. Asphalt Adhesive: ASTM-D 312, Type IV.

2.3 SHEET MATERIALS:

A. Fiberglass Felt: ASTM D-2178, TYPE IV.

B. Modified Bitumen Stripping Sheet Membrane: SBS rubber modified (styrene-butadiene-styrene), smooth surfaced membrane; reinforced with a dual fiberglass scrim conforming to the following minimum performance requirements according to ASTM D-5147, 2 in/min. @ 73.4°F:

| | Machine Direction | Cross Machine Direction |
|---|---|---|
| Tensile Strength | 215 lbf/in. | 230 lbf/in. |
| Elongation | 4.5 % | 4.5 % |
| Tear Strength | 275 lbf/in. | 275 lbf/in. |
| Low Temp. Flex. | Passes -30° F | |
| Thickness | 40 mils | |

C. Modified Bitumen Sheet Membrane: SBS/SIS rubber modified (styrene-butadiene-styrene/styrene-isoprene-styrene), fire retardant, mineral surfaced membrane; reinforced with Kevlar fibers and a dual polyester/fiberglass scrim conforming to the following minimum performance requirements according to ASTM D-5147, 2 in/min. @ 73.4°F:

| | Machine Direction | Cross Machine Direction |
|---|---|---|
| Tensile Strength | 700 lbf/in. | 750 lbf/in. |
| Elongation | 6.0% | 6.0% |
| Tear Strength | 1,300 lbf/in. | 1,400 lbf/in. |
| Low Temp. Flex. | Passes -30° F | |
| Thickness | 155 mils | |

F. Flashing Membrane: Mineral surfaced SBS rubber modified (styrene-butadiene-styrene) mineral surfaced, rubber modified roof membrane; reinforced with a woven fiberglass scrim designed for torching applications, conforming to the following minimum performance requirements according to ASTM D-5147, 2 in/min. @ 73.4°F:

| | Machine Direction | Cross Machine Direction |
|---|---|---|
| Tensile Strength | 310 lbf/in. | 310.lbf/in. |
| Elongation | 6.0 % | 6.0 % |
| Tear Strength | 510.lbf | 510.lbf |
| Low Temp. Flex. | Passes -40°F | |
| Thickness | 195 mils | |

2.4 MISCELLANEOUS MATERIAL:

A. Fasteners for masonry walls and vertical surfaces: Provide hardened steel nails with flat heads, diamond shaped points, and mechanically deformed shanks not less one inch long for securing felts, modified bitumen sheets, and metal items to masonry or concrete walls and vertical surfaces. Use power-driven fasteners only when approved in writing.

B. Penetration Seal: Chem Curb System, Chem Link, Inc.

C. Caulking Sealant: 1-part polyurethane sealant, Tuff-Stuff.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrate surfaces to receive modified bitumen sheet roofing system and associated work and conditions under which roofing will be installed. Do not proceed with roofing until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.2 GENERL INSTALLATION REQUIREMENTS:

A. Insure roof membrane manufacture is present at job start-up.

B. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing modified bitumen sheet roofing system. Insure roof membrane manufacture is present at job start-up.

C. Protect other work from spillage of modified bitumen roofing materials, and prevent liquid materials from entering or clogging drains and conductors. Replace or restore other work damaged by installation of modified bituminous sheet roofing system work.

D. Code Compliance: Where required, install and test modified bitumen sheet roofing system to comply with governing regulations and specified requirements.

E. Coordinate installing roofing system components so that insulation and roofing plies are not exposed to precipitation or left exposed overnight.

F. Asphalt Kettles: All jobsite kettles shall have a fume re-burning system, a closed asphalt induction system, and a visible thermometer and a thermostatic control to provide monitoring of the bitumen temperature when it is heated in accordance with the manufacturer's instructions.

G. Asphalt Bitumen Heating: Heat and apply bitumen according to EVT Method as recommended by NRCA. Do not raise temperature above minimum normal fluid-holding temperature necessary to attain EVT (plus 5 deg. F or 14 deg. C, at point of application) more than 1 hour prior to time of application. Determine flash point, finished blowing temperature, EVT, and fire-safe handling temperature of bitumen either by information from manufacturer or by suitable tests. Do not exceed recommended temperature limits during bitumen heating. Do not heat bitumen to a temperature higher than 25 deg. F (14 deg. C) below flash point. Discard bitumen that has been held at temperature exceeding finished blowing temperature (FBT) for more than 3 hours. Keep kettle lid closed except when adding bitumen.

H. Bitumen Mopping Weights: For interply mopping, apply bitumen at the rate of 25-28 lbs of asphalt per roof square (plus or minus 25 percent on a total-job average basis).

I. Substrate Joint Penetrations: Prevent bitumen from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction. Where mopping is applied directly to substrate, tape substrate joints or, where steep asphalt is used, hold asphalt back 2 inches from both sides of the joint.

J. Apply roofing materials as specified herein unless recommended otherwise by manufacturer's instructions. Keep roofing materials dry before and during application. Do not permit phased construction. Complete application of roofing plies, cap sheet and flashing in a continuous operation. Begin and apply only as much roofing in one day as can be completed that same day.

K. Water Cutoffs: At end of each day's roofing installation, protect exposed edge of incomplete work, including ply sheets and any insulation. Provide temporary covering of two plies of No. 15 roofing felt set in full moppings of hot bitumen; remove at beginning of next day's work. Seal off flutes in metal decking along cut off edge. Pull membrane free or cut to expose the insulation when resuming work, and remove the insulation sheets used for fill-in.

3.3 BASE PLY INSTALLLATION:

A. Fiberglass ply sheets: Install two ply sheets, Type IV fiberglass felt, shingled uniformly to achieve two plies throughout over insulation. Shingle in proper direction to shed water on each large area of roofing.

B. Lap ply sheet ends six inches. Stagger end laps twelve inches minimum. Broom all felts in.

C. Extend plies two inches beyond top edges of cants at wall and projection bases.

3.4 SBS/SIS MEMBRANE APPLICATION:

A. The mineral surfaced SBS/SIS membrane shall then be solidly bonded to the base layers with specified asphalt at the rate of 30 lbs. per 100 sq. ft.

B. The roll must push a puddle of asphalt in front of it with asphalt slightly visible at all side laps. Care should be taken to eliminate air entrapment under the membrane.

C. Subsequent rolls of SBS/SIS membrane shall be installed across the roof as above with a minimum of 4" side laps and 8" end laps. The end laps shall be staggered. The SIS membrane shall be laid in the same direction as the underlayers, but the laps shall not coincide with the laps of the base layers.

D. Apply asphalt no more than five (5) feet ahead of each roll being embedded.

E. Extend SBS/SIS membrane two inches above the top edge of all cants in full mopping of asphalt and to the outside edge of sheet metal edge flashing as shown on the drawings.

F. Broadcast minerals into the bleed out of bitumen while bitumen is at its recommended EVT temperature to achieve uniform color throughout.

G. Coat all exposed asphalt at laps with Bleed Out coating where granule embedment has not occurred.

3.5 HEAT FUSED FLASHING MEMBRANE INSTALLATION:

A. All base flashings are to be installed and completed on a daily basis. No condition should exist that will permit moisture entering behind, around, or under the roof or flashing membrane.

B. Prepare all walls, penetrations and expansion joints to be flashed and where shown on the drawings, with asphalt primer at the rate of .75 to 1 gallon per square. Allow primer to dry tack free.

C. The heat fused flashing membrane will be adhered to an underlying base ply of 40 mil SBS stripping membrane bonded in asphalt adhesive and nailed-off at all vertical surfaces where shown on the drawings.

D. The entire sheet of flashing membrane must be heated to the point when surface bitumen melts and begins to flow. Both surfaces along the lap areas shall be heated. The heated area will immediately be worked into place and securely bonded.

E. Seal all vertical laps of flashing membrane with an additional ply of 8-inch wide flashing membrane. All laps must be tested with a round nosed trowel putting pressure against the side lap to insure that a complete, positive bond has been achieved and to protect against a superficially closed lap.

F. After the laps have been tested, and a complete positive bond has been achieved, the applicator shall heat the seam edge and trowel along the seam edge. Troweling shall continue until a sloped, beveled edge has been produced.

G. Secure top of flashing membrane with termination bar and fasten 8-inches o.c.

H. Factory fabricated flashings; cap flashings and similar work to be coordinated with modified bitumen roofing work are specified in other Sections.

I. Miscellaneous sheet metal accessory items, including piping vents to be coordinated with modified bituminous roofing system work, are specified in other Sections.

3.7 PROTECTION:

A. During execution of work covered by this Section, the Contractor shall provide protection for equipment, materials, inside and outside the building against falling debris, sparks, and water. Protection shall be provided in a manner to minimize interference, interruption, and inconvenience to other trades.

B. Protect building surfaces against damage from roofing work.

C. All workmen shall wear clean, soft rubber-soled shoes for any application work where they may be walking on the inplace roofing membrane. Precautions shall be taken to protect the membrane and to maintain a clean appearance. Protect roofing during remainder of construction period.

D. At end of construction period, or at a time when remaining construction will in no way affect or endanger roofing, inspect roofing and prepare a written report, with copies to Owner, describing nature and extent of deterioration or damage found.

3.8 FINAL INSPECTION:

A. At completion of roofing installation and associated work, meet with Installer, installer of associated work. Owner, Architect, roofing system manufacturer's representative and other representatives directly concerned with performance of roofing system.

B. Walk roof surface areas of the building, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish

copy of list to each party attending.

C. The Owner, Architect and Roofing System Manufacturer reserve the right to request a certified photographic recorded thermographic scan of the roof during final inspection to determine if any damp or wet materials have been installed. The thermographic scan and photographic records shall be provided by the Roofing Contractor free of charge.

D. If core cuts verify the presence of damp or wet materials, the Roofing Contractor shall be required to replace the damaged areas at his own expense.

E. Repair or replace (as required) deteriorated or defective work found at time of above inspection to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

F. The Contractor is to notify the Owner upon completion of corrections.

3.9 CLEANING:

A. Remove drippage of the bitumen adhesives from all walls, windows, floors, ladders, and finished surfaces.

B. In areas where finished surfaces are soiled by asphalt or any other source of soiling caused by work of this Section, consult manufacturer of surfaces for cleaning
advice and conform to their instructions.

**ROOFING SYSTEM MANUFACTURER'S CERTIFICATION FORM**

Re: **UTRGV School of Medicine**
3804 S. Jackson Rd.
Edinburg, Texas 78539

_____, Certifies that;
(Roofing System Manufacturer)

_____, is currently authorized by
(Roofing Contractor)

the roofing system manufacturer to install the specified roofing system for the referenced project and that;

_____, is ISO 9001 Certified,
(Roofing System Manufacturer)

has reviewed all Project Documents in their entirety and approved of them as written and drawn.

Roofing System Manufacturer will provide field inspection services by a full time employee of the manufacturer, no less than two times a week, during, and until all roof construction work is completed and accepted by the Owner.

Roofing System Manufacturer will provide the manufacturer's 15-year NDL guarantee as stipulated in the Contract Documents upon completion of the project.

The Roofing System Manufacturer shall indemnify the Architect for attorney's fees, related expenses and judgments incurred through litigation arising out of application or performance of the roof system, even if the litigation is groundless, false or fraudulent. The Architect shall be indemnified for a maximum aggregate sum of amount of $100,000.

By: _____
Name

Its _____
Title

(Affix Corporate Seal)

Date _____

**ROOFING SUBSTITUTION REQUEST - BIDDING PHASE** (Page 1 of 2)

PROJECT: **UTRGV School of Medicine**
3804 S. Jackson Rd.
Edinburg, Texas 78539

TO: Boultinghouse Simpson Gates Architects
3301 N. McColl Road
McAllen, Texas 78501

FROM:

_____

Bidder/Supplier hereby requests acceptance of the following product or system as a substitution in accord with provisions of the Bidding Documents:

1. SPECIFIED PRODUCT OR SYSTEM: Substitution request for (Generic Description)

_____

Specification Section No._____

Article(s)_____

Para.(s)_____

2. SUPPORTING DATA: **All items must be attached for verification**
* Product data, description of product(s)
* Factory Mutual 4470 Certification
* Independent Test Data according to ASTM-5147 @ $77^0$F.
* Roofing System Manufacturer's ISO Certification
* Roofing System Manufacturer's Certification form
* Unexecuted copy of manufacturer's Warranty & Indemnification Agreement
* Sample(s) attached.

3. PREVIOUS INSTALLATIONS: Identification of three (3) similar projects on which proposed substitution was used. Include copies of issued manufacturer's warranty. Attach List Indicating;
* Project
* Address
* Architect
* Owner
* Date Installed
* Roof System

4. EFFECT OF SUBSTITUTION: __ No __ Yes (If yes, explain):

_____

_____

5. BIDDER'S/SUPPLIER'S STATEMENT OF CONFORMANCE OF PROPOSED SUBSTITUTION TO CONTRACT REQUIREMENT:

I/We have investigated the proposed substitution. I / We:

* Believe that it is equal or superior in all respects to specified product, except as stated above; and
* Will provide the same warranty as specified for specified product; and
* Have included complete implications of the substitution as specified; and
* Will pay redesign and other costs caused by the substitution which subsequently become apparent; and
* Will pay costs to modify all other parts of the Work as may be needed, to make all parts of the Work complete and functioning resulting from the substitution.

Bidder/Supplier:_____

By:_____

Date_____

Answer all questions and complete all blanks -- use "NA" if not applicable.

**END OF SECTION**

## SECTION 07620 - SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SUMMARY: Provide flashing and sheet metal components.

1.02 SUBMITTALS: Shop Drawings product data and mockups of all sheet metal.

1. For manufactured and ANSI/SPRI approved shop fabricated gravel stops, coping, fascia, scuppers, and all other sheet metal fabrications.
2. Indicate material profile, jointing pattern, jointing details, fastening methods, flashing, terminations, and installation details.
3. Indicate type, gauge and finish of metal.

1.03 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers in satisfactory use in similar service for five years. Use experienced installers. Deliver, handle and store materials in accordance with manufacturer's instructions.

B. Reference Standards: Applicable portions of SMACNA, ASTM and NAAMM publications.

C. Reference 2006 IBC, Section 1504 Performance Requirements, and ANSI/SPRI ES-1.

1.04 WARRANTIES

A. Pre-finished metal material shall require a written twenty (20)-year non-prorated warranty covering fade, chalking and film integrity. The material shall not show a color change greater than 5 NBS color units per ASTM D2244 or chalking excess of 8 units per ASTM D659. If either occurs material shall be replaced per warranty, at no cost to the Owner.

B. Contractor's Warranty: The Contractor shall provide the Owner with a notarized written warranty assuring that all sheet metal work including caulking and fasteners to be watertight and secure for a period of two years from the date of final acceptance of the building. Warranty shall include all materials and workmanship required to repair any leaks that develop, and make good any damage to other work or equipment caused by such leaks or the repairs thereof.

C. Changes: Changes or alterations in the edge metal system without prior written consent from the manufacturer shall render the system unacceptable for a warranty.

PART 2 PRODUCTS

2.01 SHEET METAL FOR COUNTERFLASHINGS, METAL COPING CAPS.

A. Prefinished galvanized sheet, prefinished, cold formed, min 5,000 psi, galvanized steel, conforming to Fed Spec QQS 775-C, ASTM A-361 and A-525. Finish shall be a high performance factory applied fluor-carbon finish, Kynar 500 or equal. Color selection from the manufacturer's standard color, selected by the Architect.

1. Continuous Clip – Min. 22 gauge G-90 Finish
2. Metal Coping – 24 gauge – Kynar Finish
3. Stucco Reglets – FRY "ST" Stainless steel, Type 304 (0.020") with a standard uncoated finish.

B. Bituminous Paint: Acid and alkali resistant, black color.

C. Plastic Cement: FS SS-C-153, cutback asphalt type, modified with Styrene – Butadiene – Styrene (SBS)

D. Fasteners:
1. Pop Rivets: Full stainless steel Series 42 or 44, as appropriate.
2. Screws: Self-tapping stainless steel, 300 series, with integral EPDM washers, "ZAC" Type screws.
3. Nails: Roofing, stainless steel, ring shank, minimum 1-1/2" in length with 1/2" diameter head, 8 gauge.

E. Solder and Flux: Type recommended for materials being used.

F. Sealant (for Sheet Metal and Aluminum Sheet): One-component polyurethane, conforming to requirements of FS TT-S-230C, non-staining and non-bleeding.

G. Miscellaneous Materials:
1. Counterflashing Wind Clips: 24 gage, 2D, stainless steel, shop-fabricated, provide and install, 30" O.C..
2. Lead for roof drains and vent pipes: 4 lbs per sq. ft., .066 thickness
3. Splash Blocks: Provide and install under all downspouts/or scupper outlets off the roof. Concrete, 3000 psi at 28 days.
4. Splash Pan: Stainless steel, 24 gage 2D finish. Provide and install with protection pans under all scupper outlets on the roof.
5. Waterproofing Membrane: 35 mil, reinforced polypropylene membrane sheet goods as manufactures by Lexsuco or preapproved equal.

2.02 FABRICATION - GENERAL

A. Manufacturer-prefabricated or Shop-fabricate work to greatest extent possible. Comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates. Comply with material manufacturer's instructions and recommendations. Form exposed sheet metal work without excessive oil canning, buckling, and tool marks, true to line and levels as indicated, with exposed edges folded back to form hems.

B. Fabricate copings to size and dimensions as indicated on the drawings.

C. Submit sheet metal models for approval by the Architect.

2.03 FABRICATION

A. Form sections identical to profile as shown or approved submittals.

B. Limit single-piece lengths to ten feet (10').

C. Fabricate corner pieces with minimum 18" maximum 48" long extensions, mitered by cutting and welded as one piece.

D. Buff sand flange prior to applying any primers on Kynar metal.

E. Hem all exposed edges three-fourths inch (3/4") minimum.

F. Back-paint flashing in contact with masonry or dissimilar materials with bituminous paint.

G. Integrate flashing in a manner consistent with detailing.

H. Continuous clip shall be 22 gauge galvanized mill finish.

G. Work shall be performed in accordance with current SMACNA guidelines (Architectural Sheet Metal Manual as issued by Sheet Metal and Air Conditioning Contractors National Association, Inc.), latest edition.

H. Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations, and with SMACNA "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 which will be permanently watertight and weatherproof.

I.

J. Install sheet metal to comply with referenced ANSI/SPRI, SMACNA and NRCA standards.

K. Round all corners of all flanges.

L. Bed flanges in SBS, modified asphalt cement.

2.04 FINISH

A. Back-paint all concealed metal surfaces with bituminous paint where expected to be in contact with cementitious materials or dissimilar metals.

PART 3 EXECUTION

3.01 INSPECTION

A. Verify roof openings, curbs, pipes, sleeves, ducts or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.

B. Verify membrane termination and base flashings are in place, sealed and secure.

C. Beginning of installation means acceptance of conditions.

D. Verify that attachment procedure meets FM Global 1-49, Loss Prevention Data.

3.02 PREPARATION

A. Field measure site conditions prior to fabricating work. Provide all shop drawings and mock-ups one month prior to installation to the Architect for approval.

B. Install starter and edge strips and cleats before starting installation. Fasten new cleats 6" o.c.

3.03 INSTALLATION

A. Gravel guard/fascia shall be installed with expansion joints, fifty feet (50') on center, one-half inch (½") expansion leeway, with a cover plate. Install caulk tape on each side of all cover plates.

B. Secure metal flashings per specifications and details.

C. Lock seams and end joints.

D. Form joints for coping cap with a 3/8" opening between sections. Back the opening with an internal drainage plate formed to the profile of fascia piece.

3.04 PIPE PENETRATIONS THRU THE ROOF

A. Chem Curb kit with urethane curbs sized to fit application.

B. Pro Pak, two-components, urethane pourable sealant

C. M-1 Structural Sealant

D. Install per manufacturer's recommendations

END OF SECTION

## SECTION 07710 - MANUFACTURED ROOF SPECIALTIES

### 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. Copings.
2. Fasciae.
3. Gravel stops.
4. Reglets.
5. Counterflashing.

B. Related Sections include the following:

1. Division 7 Section "Sheet Metal Flashing and Trim" for shop- and field-fabricated metal flashing and counterflashing, scuppers, gutters and downspouts, trim and fascia units, roof expansion-joint covers, and miscellaneous sheet metal accessories.
2. Division 7 Section "Roof Expansion Assemblies" for roof expansion-joint covers.
3. Division 7 Section "Roof Accessories" for manufactured curbs, roof hatches, gravity ventilators, penthouse ventilators, ridge vents, and smoke vents. Roof accessories installed integrally with roofing membrane are specified in roofing system Sections as roofing work.

#### 1.3 SUBMITTALS

A. Product Data: For each type of product specified. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes.

B. Shop Drawings: Indicate layout, joining, profiles, accessories, anchorage, flashing connections, and relationship to supporting structure and to adjoining roof and wall construction.

C. Samples for Initial Selection: Manufacturer's sample finishes showing the full range of colors and textures available for units with factory-applied color finishes.

D. Samples for Verification: Of the following products, in manufacturer's standard sizes, showing the full range of color, texture, and pattern variations expected. Prepare Samples from the same material to be used for the Work. Furnish straight Samples in lengths specified below or where corner pieces are required for Project; furnish corner Samples with each leg in lengths specified below:

1. Copings: 8 inches long.
2. Fascia: 8-inch- long sections of each distinctly different fascia component, exposed as finish work.
3. Gravel Stops: 8 inches long, including scuppers if specified.
4. Reglets and Counterflashing: 8 inches long.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide manufactured roof specialties capable of withstanding wind loads, structural movement, thermally induced movement, and exposure to weather without failing.

B. Provide manufactured roofing specialties, incorporating roof edge treatment that complies 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 lbf/sq. ft. (1.00 to 1.44 kPa).

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of manufactured roof specialty from one source and by a single manufacturer.

1.6 PROJECT CONDITIONS

A. Coordinate work of this Section with adjoining work for proper sequencing of each installation to ensure best-possible weather resistance and protection of materials and finishes against damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Extruded-Aluminum Copings:

a. Architectural Products Co.

2. Extruded-Aluminum Fascia :

a. Architectural Products Co.
b. Hickman: W.P. Hickman Co.
c. MM Systems Corp.

3. Aluminum Reglets:

a. Fry Reglet Corporation.
b. Hickman: W.P. Hickman Co.
c. Keystone Flashing Company.
d. MM Systems Corp.

4. Galvanized Steel Reglets:

a. Cheney Flashing Company.
b. Fry Reglet Corporation.
c. Hickman: W.P. Hickman Co.

2.2 METALS

A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), 6063-T5 alloy and temper, or as recommended by manufacturer for use intended and as required for proper application of finish indicated.

B. Galvanized Steel Sheets: ASTM A 653, G90 (ASTM A 653M, Z275) coating designation; commercial quality; at least 0.034 inchthick, unless otherwise indicated.

2.3 COPINGS

A. Provide copings in shapes and sizes indicated, with shop-fabricated corners. Include anchor plates formed from at least 0.028-inch- thick, galvanized steel sheet; cleats or other attachment devices; concealed splice plates; and trim and other accessories indicated or required for complete installation, with no exposed fasteners.

B. Provide exposed coping components fabricated from the following metal:

1. Extruded aluminum in thickness indicated, but not less than 0.090 inch.

2.4 FASCIA

A. Provide fasciae in shapes and sizes indicated, with shop-mitered and -welded corners. Include water dams formed from at least 0.028-inch- thick, galvanized steel sheet; anchor plates; cleats or other attachment devices; concealed splice plates; and trim and other accessories indicated or required for complete installation, with no exposed fasteners.

B. Provide exposed fascia components fabricated from the following metal:

1. Extruded aluminum in thickness indicated, but not less than 0.090 inch.

2.5 REGLETS

A. General: Provide reglets of type, material, and profile indicated, compatible with flashing. Form to securely interlock with counterflashing.

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. EIFS Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.

D. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.

E. 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.

F. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of the counterflashing's lower edge.

G. Material: Fabricate reglets from the following metal in thickness indicated:

1. Aluminum Sheet: 0.090 inch thick.
2. Galvanized Steel Sheet: 0.022 inch (0.55 mm) thick.

2.6 COUNTERFLASHING

A. Provide counterflashing fabricated from the same metal as reglets and compatible with reglet system installed.

B. Provide counterflashing fabricated from the following metal in thickness indicated:

1. Aluminum Sheet: 0.090 inch thick.
2. Galvanized Steel Sheet: 0.022 inch thick.

2.7 ACCESSORIES

A. General: Provide manufacturer's standard accessories designed and manufactured to match and fit roof edge treatment system indicated.

B. Exposed Fasteners: Stainless steel, nonmagnetic, of manufacturer's standard type and size for product and application indicated. Match finish of exposed heads with material being fastened.

C. Concealed Fasteners: Same metal as item fastened or other noncorrosive metal as recommended by manufacturer.

D. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

E. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coat.

F. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

G. Foam-Rubber Seal: Manufacturer's standard foam.

H. Adhesives: Type recommended by manufacturer for substrate and project conditions, and formulated to withstand minimum 60-lbf/sq. ft. wind-uplift force.

2.8 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

C. Finish manufactured roof specialties after fabrication and assembly if products are not fabricated from prefinished metals.

D. 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 unacceptable. 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.

2.9 ALUMINUM FINISHES

A. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.

B. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated;

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: As selected by Architect from the full range of industry colors and color densities.

## 2.10 GALVANIZED STEEL SHEET FINISHES

A. Surface Preparation: Clean galvanized surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. Remove pretreatment from galvanized steel sheet fabricated from coil stock by mechanical methods.

B. Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating of type compatible with the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified to comply with ASTM A 780.

C. Factory Priming for Field-Painted Finish: Where field painting after installation is indicated, apply the air-dried primer specified below immediately after cleaning and pretreating.

1. Shop Primer: Zinc-rich primers complying with performance requirements of SSPC-Paint 20.

D. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard 2-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 milfor topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

1. Color and Gloss: As selected by Architect from manufacturer's full range of colors and glosses.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Examine walls, roof edges, and parapets for suitable conditions for roof edge system installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

A. Promptly remove protective film, if any, from exposed surfaces of finished metals. Strip with care to avoid damage to finish.

B. Prepare concrete, concrete masonry block, cement plaster, and similar surfaces to receive roof edge system specified. Install blocking, cleats, water dams, and other anchoring and attachment accessories and devices required.

## 3.3 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Coordinate with installation of roof deck and other substrates to receive work of this Section and with vapor retarders, roofing insulation, roofing membrane, flashing, and wall construction, as required to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight. Anchor products securely to structural substrates to withstand lateral and thermal stresses and inward and outward loading pressures.

B. Isolation: Where metal surfaces of units contact dissimilar metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces or provide other permanent separation as recommended by aluminum producer.

C. Expansion Provisions: Install running lengths to allow controlled expansion for movement of metal components in relation not only to one another but also to adjoining dissimilar materials, including flashing and roofing membrane materials, in a manner sufficient to prevent water leakage, deformation, or damage.

## 3.4 CLEANING AND PROTECTING

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

B. Protection: Provide protective measures as required to ensure work of this Section will be without damage or deterioration at the time of Substantial Completion.

END OF SECTION 07710

**SECTION 07720 - ROOF ACCESSORIES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Roof curbs.
2. Equipment supports.
3. Roof walkways.

B. Related Sections include the following:

1. Division 6 Section "Rough Carpentry" for roof sheathing, wood cants, and wood nailers.
2. Division 7 Section "Sheet Metal Flashing and Trim"
3. Division 7 Section "Manufactured Roof Specialties"
4. Division 7 Section "Roof Expansion Assemblies" for roof expansion-joint covers.
5. Division 7 Sections for roofing accessories included as part of roofing Work.
6. Division 9 Section "Painting" for shop primers and field painting.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, materials, dimensions of individual components and profiles, and finishes.

B. Coordination Drawings: Roof plans drawn to scale and coordinating penetrations and roof-mounted items. Show the following:

1. Size and location of roof accessories specified in this Section.
2. Method of attaching roof accessories to roof or building structure.
3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.

1.4 QUALITY ASSURANCE

A. Standards: Comply with the following:

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Roof Curbs and Equipment Supports:

   a. AES Industries, Inc.
   b. Conn-Fab Sales, Inc.
   c. Custom Curb, Inc.
   d. Metallic Products Corporation.
   e. Pate Co.(The).
   f. Roof Products & Systems Corp.
   g. Uni-Curb, Inc.
   h. Vent Products Co., Inc.

2. Roof Walkways:

   a. Roof Blok.
   b. West Tile
   c. Sunny Brook

## 2.2 ROOF CURBS

A. General: Provide roof curbs capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported on roof curbs. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

B. Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 0.0747-inch-thick, structural-quality, hot-dip galvanized or aluminum-zinc alloy-coated steel sheet; factory primed and prepared for painting with welded or sealed mechanical corner joints.

1. Provide preservative-treated wood nailers at tops of curbs and formed flange at perimeter bottom for mounting to roof.
2. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
3. Provide manufacturer's standard rigid or semirigid insulation where indicated.
4. Provide formed cants and base profile coordinated with roof insulation thickness.
5. Fabricate units to minimum height of 8 inches, unless otherwise indicated.
6. Sloping Roofs: Where slope of roof deck exceeds 1/4 inch per foot (1:48), fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.

## 2.3 EQUIPMENT SUPPORTS

A. General: Provide equipment supports capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

B. Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 0.0747-inch-(1.9-mm-) thick, structural-quality, hot-dip galvanized or aluminum-zinc alloy-coated steel sheet; factory primed and prepared for painting with welded or sealed mechanical corner joints.

1. Provide preservative-treated wood nailers at tops of curbs and formed flange at perimeter bottom for mounting to roof.
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 (200 mm), unless otherwise indicated.
4. Sloping Roofs: Where slope of roof deck exceeds 1/4 inch per foot (1:48), fabricate support units with

height tapered to match slope to level tops of units.

## 2.4 ROOF WALKWAYS PAVERS

A. Concrete Type:

1. For Flat Roofs: Provide resilient, hard rubber pads under each support unit to isolate supports from and protect roof membrane.

## 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.

# 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 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 metal panels.
d. Joints between different materials listed above.
e. Perimeter joints between materials listed above and frames of doors and windows.
f. Control and expansion joints in ceiling and overhead surfaces.
g. Other joints as indicated.

2. Exterior joints in the following horizontal traffic surfaces:

a. Control and expansion joints in brick pavers.
b. Control, expansion, and isolation joints in cast-in-place concrete slabs.
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. Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
c. Other joints as indicated.

4. Interior joints in the following horizontal traffic surfaces:

a. Control and expansion joints in flooring.
b. Other joints as indicated.

B. Related Sections include the following:

1. Division 2 Section "Pavement Joint Sealants" for sealing joints in pavements, walkways, and curbing.
2. Division 4 Section "Unit Masonry" for masonry control and expansion joint fillers and gaskets.
3. Division 9 Section "Gypsum Board Assemblies" for sealing perimeter joints of gypsum board partitions to reduce sound transmission.
4. Division 9 Section "Acoustical Panel Ceilings" for sealing edge moldings at perimeters of acoustical ceilings.

1.3 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

## 1.4 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

## 1.5 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.

## 1.6 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.

## 1.7 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.

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.

# PART 2 - PRODUCTS

## 2.1 PRODUCTS AND MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified in the sealant schedules at the end of Part 3.

## 2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, 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.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range for this characteristic.

## 2.3 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant in the Elastomeric Joint-Sealant Schedule at the end of Part 3, including those referencing ASTM C 920 classifications for type, grade, class, and uses.

B. Additional Movement Capability: Where additional movement capability is specified in the Elastomeric Joint-Sealant Schedule, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at the time of installation and remain in compliance with other requirements of ASTM C 920 for uses indicated.

C. Available Products: Subject to compliance with requirements, elastomeric sealants that may be incorporated in the Work include, but are not limited to, the following:

1. GC-5 Synthacalk, Pecorra Corp.;
2. SONOPLASTIC TWO-PART SEALANT, Sonneborn Bldg. Product Div.
3. cm-60, Meadows, W.R.

## 2.4 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 B: Bicellular material with a surface skin.

C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.

## 2.5 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, and surface dirt.
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.
3. Remove laitance and form-release agents from concrete.
4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

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. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install 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.
   a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

3.4 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

END OF SECTION 07920

SECTION 074213.23 - METAL COMPOSITE MATERIAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes metal composite material wall panels.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at **Project site**.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include fabrication and installation layouts of metal composite material panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.

C. Samples: For each type of metal composite material panel indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Warranties: Samples of special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal composite material panel systems that fail in materials or workmanship within specified warranty period.

1. Warranty Period: **Two** years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal composite material panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Finish Warranty Period: **10** years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal composite material panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 330:

1. Wind Loads: **130 mph.**
2. Deflection Limits: For wind loads, no greater than **1/240** of the span.

B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E 283 at the following test-pressure difference:

1. Test-Pressure Difference: **1.57 lbf/sq. ft. (75 Pa).**

C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:

1. Test-Pressure Difference: **2.86 lbf/sq. ft. (137 Pa)**.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): **120 deg F (67 deg C), ambient** .

E. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

F. Fire Propagation Characteristics: Metal composite material wall panel system passes NFPA 285 testing.

### 2.2 METAL COMPOSITE MATERIAL WALL PANELS

A. Metal Composite Material Wall Panel Systems: Provide factory-formed and -assembled, metal composite material wall panels fabricated from two metal facings that are bonded to a solid, extruded thermoplastic core; formed into profile for installation method indicated. Include

attachment assemblies components**, panel stiffeners**, and accessories required for weathertight system.

1. **Manufacturers:**
   a. **Alcoa Architectural Products**
   b. **ALPOLOC Materials; Mitsubishi Plastics Composite America**
   c. **ALUCOBOND; 3A Composites USA, Inc.**
   d. **CENTRIA Architectural Systems**
   e. **Firestone Metal Products LLC**

B. Aluminum-Faced Composite Wall ALUCOBOND: Formed with 0.020-inch- (0.50-mm-) thick, **anodized** aluminum sheet facings.

1. Panel Thickness: **0.236 inch (6 mm)**.
2. Core: **Standard**.
3. Exterior Finish: **Coil-coated KYNAR 500 or HYLAR 5000 based polyvinylidene fluoride (PVDF).**

   a. Color: **As indicated by manufacturer's designations or as selected by Architect from manufacturer's full range**

C. Attachment Assembly Components: Formed from extruded aluminum.

D. Attachment Assembly: Manufacturer's standard.

## 2.3 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal composite material panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal composite material panels unless otherwise indicated.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal composite material panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal composite material panels.

D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal composite material panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

E. Panel Sealants: ASTM C 920; as recommended in writing by metal composite material panel manufacturer. Provide sealant types recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.

## 2.4 FABRICATION

A. General: Fabricate and finish metal composite material panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Fabricate metal composite material panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

## 2.5 FINISHES

A. Panels and Accessories:
1. **Coil-coated KYNAR 500 or HYLAR 5000 based polyvinylidene fluoride (PVDF).**

# PART 3 - EXECUTION

## 3.1 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal composite material panel manufacturer's written recommendations.

## 3.2 METAL COMPOSITE MATERIAL PANEL INSTALLATION

A. Attachment Assembly, General: Install attachment assembly required to support metal composite material wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.

1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.

B. Installation: Attach metal composite material wall panels to supports at locations, spacings, and with fasteners recommended by manufacturer to achieve performance requirements specified.

1. Wet Seal Systems: Seal horizontal and vertical joints between adjacent metal composite material wall panels with sealant backing and sealant. Install sealant backing and sealant according to requirements specified in Section 079200 "Joint Sealants."

C. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

D. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

## 3.3 CLEANING

A. Remove temporary protective coverings and strippable films, if any, as metal composite material panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal composite material panel installation, clean finished surfaces as recommended by metal composite material panel manufacturer. Maintain in a clean condition during construction.

END OF SECTION 074213.23

**SECTION 077200 - ROOF ACCESSORIES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following: Factory fabricated roof curb adapter.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, materials, dimensions of individual components and profiles, and finishes.

B. Coordination Drawings: Roof plans drawn to scale and coordinating penetrations and roof-mounted items. Show the following:
   1. Size and location of roof accessories specified in this Section.
   2. Method of attaching roof accessories to roof or building structure.
   3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
   4. Coordinate dimensions with shop drawings of equipment to be supported.

1.4 QUALITY ASSURANCE

A. Substitutions: Requests for substitution shall be submitted in writing at least 10 days prior to bid date and shall be accompanied by product literature and samples. No substitution will be permitted after bid date.

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

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. G-90 galvanized steel with paint-grip coating.

B. Insulation: Manufacturer's standard rigid or semirigid glass-fiber board of 2" thickness, 1-1/2lb density, R8 value.

C. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, complying with AWPA C2; not less than 1-1/2 inches thick.

D. Fasteners: Stainless steel metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.

E. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.

F. Bituminous Coating: SSPC-Paint 12, solvent-type bituminous mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coating.

G. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

H. Elastomeric Sealant: Generic type recommended by unit manufacturer that is compatible with joint surfaces; ASTM C 920, Type S, Grade NS, Class 25, and Uses NT, G, A, and, as applicable to joint substrates indicated, O.

I. Roofing Cement: ASTM D 4586, nonasbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

## 2.2 ROOF CURBS

A. General: Provide roof curbs capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported on roof curbs. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

B. Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 16 gauge, galvanized steel with paint grip coating, with welded corners and with seams joined by continuous water and air-tight welds. Tack or spot welding is unacceptable.

1. All external welds shall be prepared and coated with corrosion inhibitor compound.
2. Curb adapter walls shall be insulated with 1-1/2" thick, three-pound density insulation. Exposed edges shall be encapsulated to ensure no insulation erodes into the air stream. Insulation shall be either foil faced or coated with antimicrobial coating such that the fibers are not airborne over the life of the building.
3. Provide preservative-treated wood nailers at tops of curbs and formed flange at perimeter bottom for mounting to roof.
4. Provide formed cants and base profile coordinated with roof insulation thickness.
5. The Manufacturer shall limit static pressure gain to .25 inches/water gauge
6. Fabricate units to minimum height of 18 inches, unless otherwise indicated.
7. Changes in airflow direction to be accomplished by 90-degree elbows with turning vanes.
8. Curb adapters shall be manufactured in one piece except when width exceeds 108". If width exceeds 108", the curb shall be designed with prefabricated joints for ease of installation. It will be manufactured in separate pieces with the number and length of the pieces determined by the total length of the unit. The Manufacturer shall supply drawings for assembly and installation.
9. Curb adapters shall provide full support of the new unit and shall include 3/8" gasketing.
10. Counter flashing shall extend over the original curb a minimum of 1" and be welded and weatherproof.

## 2.3 FINISHES, GENERAL

A. Surface preparation: Oil, grease and other deposits of surface contamination shall be removed by solvent or detergent washing. All surfaces must be clean, dry and free of any dirt, dust, grease, oil or other deleterious materials prior to coating. Care shall be taken to ensure surfaces remain clean before and during coating process.

B. Application system:
   1. Coating shall provide a standard 5 year manufacturer's limited warranty.
   2. Metal surfaces shall be finished with a corrosion protection system equal to one of the following:
      a. Energy Guard ZRU Primer. Finish coat shall consist of EnergyGuard DCC Cabinet Casing polyurethane coating. Coatings shall be applied by a certified applicator and shall result in a finish with an ASTMB117-90 salt spray rating of 10,000 hours.
      b. Prime coat of ICI Devran 201 Universal Epoxy Primer to thickness of not less than 3.0 mils DFT (dry film thickness) nor more than 8.0 mils DFT. Minimum recoat time for Devran 201 Universal Epoxy Primer is 3.5 hours at 77 F with 80% relative humidity. Finish coat shall consist of Devthane 379 UVA Aliphatic Urethane Gloss Enamel applied to thickness of not less than 1.0 mils DFT nor more than 5.0 mils DFT.

## 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 weather tight. 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. 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.

C. Flange Seals: Unless otherwise indicated, set flanges of accessory units in a thick bed of roofing cement to form a seal.

D. Cap Flashing: Where required as component of accessory, install cap flashing to provide waterproof overlap with roofing or roof flashing (as counter flashing). Seal overlap with thick bead of mastic sealant.

E. 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 077200

**SECTION 077300 - WIND LOAD RATED ROOF CURBS AND RESTRAINT BRACKETS**

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. Design, construct, furnish and install roof curbs, brackets and related items to meet governing building codes, as demonstrated by comprehensive analysis that the load resisting capabilities meet or exceed requirements.

1.3 QUALITY ASSURANCE

A. Meet requirements of the International Building Code, ASCE Std 7, TDI, and other applicable codes for the location. This specification shall be a minimum requirement for wind load design consideration, and is not intended as a substitute for legislated, more stringent, national, state or local requirements.

B. Wind-induced forces shall be determined by governing code requirements. See attached Design Wind Pressure Requirements Memo by Structural Engineer.
   1. Wind-generated force shall be reduced into an equivalent statically applied force.
   2. The statically applied force shall act in horizontal and vertical directions at the center of gravity of the rooftop mounted equipment, resulting in torsion, flexure, tension and shear forces that the wind restraint brackets shall be shown to be able to resist.

C. Install products in strict accordance with applicable codes and manufacturers' standards. Whenever a conflict occurs between the manufacturers or construction standards, the most stringent shall apply.

1.4 SUBMITTALS

A. Manufacturer's statement showing that the curbs and wind load restraint brackets meet the applicable code requirements, signed and sealed by a licensed professional engineer (PE). Provide the following:
   1. Wind restraint calculations for all connections of rooftop-mounted equipment to roof curb, and roof curb to the structure.
   2. Drawings showing curbs, wind restraint bracket dimensions, make and model compatible with rooftop unit, including type of connection hardware required.

PART 2 - PRODUCTS

2.1 ROOF CURBS AND RESTRAINTS

A. Approved manufacturers of roof curbs and wind load restraint brackets:
   1. Curbs Plus, Complete Curbs, Thybar Corporation.

2. Others shall obtain a written pre-approval one week prior to bidding.

B. Products shall be made of a material (Prime G-90 galvanized steel or galvalume) compatible with roof curb and the rooftop unit base-rail material. Dissimilar metals shall not to be used.
   1. Fully welded mitered corners for wind load consideration
   2. Base flange attachments for securing curb to structure.
   3. Factory installed wood nailer for attachment of roofing material.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's written instructions.

B. Attach rooftop equipment to roof curbs with wind load restraint brackets of size, type and quantity as determined by equipment manufacturer.

C. Attach roof curb to the building structure at the curb base flanges. Base flange attachment options include anchor bolts, welded connections and mechanical fasteners.

D. Do not install wind load restraint brackets in a manner that will result in inadequate maintenance access, base-rail damage, or roof curb reduced weight carrying capacity.

E. Prior to performing installation of restraint brackets, notify Engineer of any conflicts with other trades or equipment that may result in undesirable contact due to inadequate space or other unforeseen conditions. Notify Engineer of any discrepancies between the specifications and field conditions or changes required due to specific equipment selection prior to installation.

F. Corrective work necessitated by discrepancies or conflicts after installation shall be at the contractor's expense.

3.2 INSPECTION

A. On completion of installation, inspect the completed system and report in writing any installation error or other faults in the system that could affect the wind load resistant capabilities of the roof top assembly.

B. The Contractor shall submit a report to the project designer, including the above report with consequent steps taken to properly complete the wind load restraint installation.

END OF SECTION 077300

# INDEX

## SECTION 08100 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1:01 The work under this section shall include the furnishing of all items shown on the drawings and as specified, including, but not limited to, the following:

A. Steel Doors
B. Steel Door Frames
C. Steel borrowed lites and side lites

1:02 Related Sections

A. Section 04000: Masonry mortar
B. Section 06200: Finish carpentry
C. Section 07900: Caulking and sealing
D. Section 08200: Wood Doors and Frames
E. Section 08700: Finish Hardware
F. Section 08800: Glass and Glazing
G. Section 09900: Painting of steel doors and frames.

1:03 References

A. Steel Doors and Frames in this section must meet all standards as established by the following listing agencies:
   1. Door and Hardware Preparation ANSI 115.1.
   2. Life Safety Codes NFPA-101
   3. Fire Doors and Windows NFPA-80
   4. Steel Door Institute ANSI/SDI-100
   5. American's with Disability Act

1:04 Submittals

A. Coordinate approved shop drawings with all other trades and manufacturers whose products are used in conjunction with the Steel Doors and Frames as listed under section 08100.
B. Finish hardware supplier will furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to cut, reinforce or otherwise prepare the doors and frames to receive the finish hardware items, as required.
C. The steel door and frame supplier shall furnish to the architect (6) complete copies of the proposed steel door and frames schedule and/or shop drawings. Using the same reference number for details and openings as those on the contract drawings. After receipt of the approved door schedule the steel door and frame supplier shall make any corrections to the door schedule and submit to the architect (6) sets of corrected schedules, for file and field use, if required.

1:05 Quality Assurance

A. Provide Steel Doors and Frames manufactured by a single firm specializing in the production of this type of work.
B. Provide Steel Doors and Frames complying with the Steel Door Institute recommended specifications for Standard Steel Doors and Frames ANSI/SDI 100 (Latest edition), and as herein specified.

1:06 Delivery, Storage and Handling

A. All steel doors and frames must be properly marked with door opening mark number to correspond with the door schedule.
B. Deliver all steel doors in cartons and palletized to provide protection during transit and job storage.
C. Inspect doors and frames upon delivery for damage. Minor damage is to be repaired, provided the finish items are equal in all respects to new work and acceptable to the architect.
D. Store doors and frames at the building site under cover. Place units on wood sills or on the floor in a manner that will prevent rust and damage. Avoid the use of non-vented plastic or canvas shelters

which could create a humidity chamber. If the wrapper on the door becomes wet, remove the carton immediately. Provide a 1/4 inch space between stacked doors to promote air circulation.

1:07 Job Conditions

A. Installer must examine the conditions under which steel doors and frames will be installed and notify the contractor in writing of any condition detrimental to the proper and timely completion of the work.

PART 2 PRODUCTS

2:01 Acceptable Manufacturers - As long as they meet the following specifications

A. Ceco Door Products
B. Dean Steel Manufacturing Company
C. Other SDI or NAAMM members that conform to the specific requirements of this specification.

2:02 Hardware Locations and General Reinforcements

A. Locate hardware on doors and frames in accordance with the manufactures standard locations.
B. When steel frames are used with wood doors the hardware preparation on the doors is governed by its location on the frames. If the doors are to be factory mortised, the door supplier is responsible for coordinating hardware locations.
C. Hardware reinforcements are to be in accordance with the minimum standard gages as listed in SDI-100.
D. Doors shall be mortised, reinforced and function holes provided at the factory in accordance with the hardware schedule and templates provided by the hardware supplier. Trough bolt holes, attachment holes, or drilling and tapping for surface hardware, shall be done by others.

2:03 Steel Doors

A. Material - Exterior doors
1. Face Sheets are to be made of commercial quality 16 gage zinc coated steel that complies with ASTM A525 A60.
2. Reinforce tops and bottoms of all doors with a continuous steel channel not less than 16 gage, extending the full width of the door and welded to the face sheet.

2:06 STEEL FRAMES

A. Materials - All exterior.
1. Shall be 16 gage zinc coated steel that complies with ASTM designations A526 A60.
2. All frames are to be assembled so that the face miter seam is "closed and tight". Weld the face seam and the full web of the frame corner or intersection. Grind and dress smooth the weld area. Apply a zinc rich primer over the grinding area, and finish with a matching prime paint.

B. Materials for all other frames.
Shall be 16 gage that complies with ASTM A366-68 or ASTM A569-66T
1. All Frames are to be assembled so that the face miter seam is "closed and tight". Weld the face miter seam. Grind and dress smooth the weld, finish with a matching prime paint.

C. Fabrication
1. General design and construction
a. Provide steel frames for doors, transoms, sidelights, borrowed lites, and other openings to the size and design as shown on the architectural drawings.
b. All finished work shall be strong and rigid, neat in appearance square, true and free of defects, warp or buckle.
c. Jamb depths, trim, profile and backbends shall be as scheduled by the architect and shown on approved shop drawings.
d. Hardware reinforcements are to be in accordance with the minimum standard gages as

listed in SDI-100.

f. Frames shall be mortised, reinforced, drilled and tapped at the factory for template mortised hardware only, in accordance with approved hardware schedule and template provided by the hardware contractor. Where surface mounted hardware is to be applied, frames shall have reinforcing plates only; all drilling and tapping shall be done by others.

D. Anchors

1. Floor anchors shall be provided at each jamb.
2. Anchors for installation in masonry walls shall be of the "T" type.
3. Anchors for installation in stud partitions shall be steel of a suitable design, not less than 18 gauge thickness, insert type with notched clip to engage stud inserted in back of the frame.
4. Dust boxes or mortar guards shall be no less than 26 gage on frames to be set in masonry or on strike mortises in drywall or plaster partitions.
5. Loose glazing stops shall be of galvanized steel, not less than 16 gage, butted at corner joints and secured to the frame with countersunk cadmium or zinc-plated screws.
6. Drill stop to receive three silencers on single-door frames and 2 silencers on double-door frames.

2.07 Prime finish:

A. Doors and frames are to be thoroughly cleaned, and chemically treated to insure maximum finish paint adhesion. All surfaces of the door and frame exposed to view shall receive a factory applied coat of rust inhibiting primer. The finish shall meet the requirements for acceptance stated in ANSI A224.1 "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces." The prime finish is not intended to be the final layer of protection from the elements. Field painting using a good grade of oil base paints shall be provided in accordance with the recommendations of the door and frame manufacturer. For specialty types of finished coatings, the paint supplier should also be consulted.

PART 3: EXECUTION

3:01 Inspection

It is the responsibility of the General Contractor to assure that scratches are properly cleaned and touched up with a rust inhibiting primer.

3:03 Installation:

A. Door Frames

1. Prior to installation, all frames must be checked for rack, twist and out of square conditions.
2. Place frames prior to enclosing walls and ceilings. Set frames accurately in position, plumbed and braced securely until permanent anchors are set. Remove shipping bar spreader and insert a wood spreader cut to the size of the opening width, notched to clear the frame stops.
3. Fill frames in masonry walls with mortar.
4. When temperature conditions necessitate an additive to be used in the plaster or mortar to prevent freezing, the contractor installing the frames shall coat the inside of the frames, in the field, with a corrosion inhibiting bituminous material.
5. SDI-105, "Recommended Erection Instructions for Steel Frames" and SDI-110 "Standard Steel Doors and Frames for Modular Masonry Construction" shall indicate the proper installation procedures.
6. Install fire-rated frames in accordance with NFPA 80

B. Doors

1. Install doors plumb and in true alignment in a prepared opening and fasten them to achieve the maximum operational effectiveness and appearance.
2. Proper door clearance must be maintained in accordance with SDI-110.
3. Where necessary, metal hinge shims are acceptable to maintain clearances.
4. "Installation Guide for Doors and Hardware" published by DHI is recommended for further details.

C. Hardware must be applied in accordance with hardware manufacturer's templates and instructions.

3.03 Adjust and Clean

A. Final adjustments

Check and re-adjust operating finish hardware items in hollow metal work just prior to final inspection. Leave work in complete and proper condition.

B. Prime Coat Touch-Up

1. Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply to touch-up or compatible air-drying primer.

3:04 Schedules

A. After installation, copies of the door schedules shall be placed in a file folder to be turned over to the owner when the building is accepted.

END OF SECTION 08110L

**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.

1.2 SUMMARY

A. This Section includes the following:

1. Solid-core doors with wood-veneer faces.

B. Related Sections include the following:

1. Division 8 Section "Glazing" for glass view panels in flush wood doors.

1.3 SUBMITTALS

A. Product Data: For each type of door include details of core and edge construction, and trim for openings, if needed.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.
4. Indicate finish requirements.
5. Indicate fire ratings for fire doors.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.

B. Quality Standard: Comply with the following standard:

1.AWI Quality Standard: AWI's "Architectural Woodwork Quality Standards" for grade of door, core, construction, finish, and other requirements.

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. Test Pressure: Test at atmospheric pressure.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's written instructions.

1. Individually package doors in plastic bags or cardboard cartons.

B. Mark each door with individual opening numbers used on Shop Drawings. Use removable tags or concealed markings.

1.6 PROJECT CONDITIONS

A.Environmental Limitations: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during the remainder of the construction period to comply with requirements of the referenced quality standard for Project's geographical location.

1.7 WARRANTY

A. General Warranty: Door manufacturer's warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form, signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span, or do not comply with tolerances in referenced quality standard.

1.Warranty shall be in effect during the following period of time after the date of Substantial Completion:
a.Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Flush Wood Doors:
a.Ampco Products, Inc.
b. Buell Door Co.
c. Eggers Industries; Architectural Door Division.
d. V-T Industries Inc.
e. Weyerhaeuser Co.

2.2 DOOR CONSTRUCTION, GENERAL

A. Doors for Transparent Finish: Comply with the following requirements:

1. Grade: Premium (Grade A faces).
2.Faces: White birch, rotary cut.
3.Match between Veneer Leaves: Pleasing match.
4.Match within Door Faces: Running match.
5.Pair and Set Match: Provide for pairs of doors and for doors hung in adjacent sets.
6.Stiles: Same species as face.

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 at particleboard-core doors as follows:
a.5-inch top-rail blocking, at doors indicated to have closers.

b. 5-inch bottom-rail blocking, at exterior doors and doors indicated to have kick, or mop plates.
c. 5-inch midrail blocking, at doors indicated to have exit devices.

B. Interior Veneer-Faced Doors: Comply with the following requirements:

1. Core: Particleboard core.

2. Construction: Five plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.

C. Fire-Rated Doors: Comply with the following requirements:

1. Construction: Construction and core specified above for type of face indicated or manufacturer's standard mineral-core construction as required 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 and as follows:
a.As necessary to eliminate need for through-bolting hardware.

3. Edge Construction: At hinge stiles, provide manufacturer's standard laminated-edge construction with improved screw-holding capability and split resistance and with outer stile matching face veneer.

4. Pairs: Furnish formed-steel edges and astragals for pairs of fire-rated doors, unless otherwise indicated.

## 2.4 LIGHT FRAMES

A. Wood Frames for Light Openings: As follows:

1. Wood Species: Same species as door faces.

2. Profile: Manufacturer's standard shape.

3. Frames for Openings in Fire Doors: Wood frames and metal glazing clips approved for use in 20-minute fire-rated wood-core doors.

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. 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 of NFPA 80 for fire-rated doors.

B.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.

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

1. Light Openings: Trim openings with moldings of material and profile indicated.

2.6 SHOP PRIMING

A. Transparent Finish: Shop seal faces and edges of doors for transparent finish as required by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine 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 plumb jambs and level heads.

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 wood 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. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

D. Field-Finished Doors: Refer to the following for finishing requirements:

1. Division 9 Section "Painting."

3.3 ADJUSTING AND PROTECTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Refinish or replace doors damaged during installation.

C. Protect doors as recommended by door manufacturer to ensure that wood doors are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 08211

## SECTION 08410 - ALUMINUM ENTRANCES AND STOREFRONTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

A. This Section includes the following:

1. Exterior and Interior entrance systems.
2. Exterior and Interior storefront systems.
3. Exterior Fixed Glazing Systems

B. Related sections include the following:

1. Division 7 Section "Joint Sealants" for joint sealants installed as part of aluminum entrance and storefront systems.
2. Division 8 Section "All-Glass Entrances."
3. Division 8 Section "Glazing."

#### 1.3 SYSTEM DESCRIPTION

A. General: Provide aluminum entrance and storefront systems capable of withstanding loads and thermal and structural movement requirements indicated without failure, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project. Failure includes the following:

1. Air infiltration and water penetration exceeding specified limits.
2. Framing members transferring stresses, including those caused by thermal and structural movement, to glazing units.

B. Wind Loads: Provide entrance and storefront systems, including anchorage, capable of withstanding wind-load design pressures calculated according to requirements of authorities having jurisdiction or the American Society of Civil Engineers' ASCE 7, "Minimum Design Loads for Buildings and Other Structures," 6.4.2, "Analytical Procedure," whichever are more stringent.

1. Deflection of framing members in a direction normal to wall plane is limited to 1/175 of clear span or 3/4 inch, whichever is smaller, unless otherwise indicated.
2. Static-Pressure Test Performance: Provide entrance and storefront systems that do not evidence material failures, structural distress, failure of operating components to function normally, or permanent deformation of main framing members exceeding 0.2 percent of clear span when tested according to ASTM E 330.

    a. Test Pressure: 150 percent of inward and outward wind-load design pressures.
    b. Duration: As required by design wind velocity; fastest 1 mile of wind for relevant exposure category.

C. Dead Loads: Provide entrance- and storefront-system members that do not deflect an amount which will reduce glazing bite below 75 percent of design dimension when carrying full dead load.

1. Provide a minimum 1/8-inch clearance between members and top of glazing or other fixed part immediately below.

D. Air Infiltration: Provide entrance and storefront systems with permanent resistance to air leakage through fixed glazing and frame areas of not more than 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a static-air-pressure difference of 1.57 lbf/sq. ft..

E. Water Penetration: Provide entrance and storefront systems that do not evidence water leakage through fixed glazing and frame areas when tested according to ASTM E 331 at minimum differential pressure of 20 percent of inward-acting wind-load design pressure as defined by ASCE 7, "Minimum Design Loads for Buildings and Other Structures," but not less than 6.24 lbf/sq. ft. Water leakage is defined as follows:

1. Uncontrolled water infiltrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that is drained back to the exterior and cannot damage adjacent materials or finishes is not water leakage.

F. Thermal Movements: Provide entrance and storefront systems, including anchorage, that accommodate thermal movements of systems and supporting elements resulting from the following maximum change (range) in ambient and surface temperatures without buckling, damaging stresses on glazing, failure of joint sealants, damaging loads on fasteners, failure of doors or other operating units to function properly, and other detrimental effects.

1. Temperature Change (Range): 100 deg F, ambient; 140 deg F, material surfaces.

G. Structural-Support Movement: Provide entrance and storefront systems that accommodate structural movements including, but not limited to, sway and deflection.

H. Dimensional Tolerances: Provide entrance and storefront systems that accommodate dimensional tolerances of building frame and other adjacent construction.

## 1.4 SUBMITTALS

A. Product Data: For each product specified. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes.

B. Shop Drawings: For entrance and storefront systems. Show details of fabrication and installation, including plans, elevations, sections, details of components, provisions for expansion and contraction, and attachments to other work.

1. For entrance systems, include hardware schedule and indicate operating hardware types, quantities, and locations.

C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for units with factory-applied color finishes.

## 1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to assume engineering responsibility and perform work of this Section who has specialized in installing entrance and storefront systems similar to those required for this Project and who is acceptable to manufacturer.

B. Source Limitations: Obtain each type of entrance and storefront system through one source from a single manufacturer.

C. Welding Standards: Comply with applicable provisions of AWS D1.2, "Structural Welding Code--Aluminum."

## 1.6 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

## 1.7 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run

concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Submit a written warranty executed by the manufacturer agreeing to repair or replace components of entrance and storefront systems that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:

1. Structural failures including, but not limited to, excessive deflection.
2. Adhesive sealant failures.
3. Cohesive sealant failures.
4. Failure of system to meet performance requirements.
5. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
6. Failure of operating components to function normally.
7. Water leakage through fixed glazing and frame areas.

C. Warranty Period: 2 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Arch Amarlite.
2. Butler Manufacturing Company; Vistawall Architectural Products.
3. International Aluminum Corporation; U.S. Aluminum.
4. Kawneer Company, Inc.

### 2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with the requirements of standards indicated below.

1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221 (ASTM B 221M).
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Bars, Rods, and Wire: ASTM B 211 (ASTM B 211M).

B. Glazing as specified in Division 8 - Section 08800 Glazing.

C. Glazing Gaskets: Manufacturer's standard pressure-glazing system of black, resilient glazing gaskets, setting blocks, and shims or spacers, fabricated from an elastomer of type and in hardness recommended by system and gasket manufacturer to comply with system performance requirements. Provide gasket assemblies that have corners sealed with sealant recommended by gasket manufacturer.

1. Color: Black.
2. Color: As selected by Architect from manufacturer's full range of colors.
3. Use neutral-cure silicone sealant with insulating-glass units.

D. Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint type.

E. Sealants and joint fillers for joints at perimeter of entrance and storefront systems as specified in Division 7 Section "Joint Sealants."

F. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

### 2.3 COMPONENTS

A. Doors: Provide manufacturer's standard 1-3/4-inch- thick glazed doors with minimum 0.125-inch- thick, extruded tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deep

penetration and fillet welded or that incorporate concealed tie-rods.

1. Glazing Stops and Gaskets: Provide manufacturer's standard snap-on extruded-aluminum glazing stops and preformed gaskets.
2. Stile Design: Medium Stiles or as indicated on Drawings.

B. Brackets and Reinforcements: Provide manufacturer's standard brackets and reinforcements that are compatible with adjacent materials. Provide nonstaining, nonferrous shims for aligning system components.

C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Reinforce members as required to retain fastener threads.
2. Do not use exposed fasteners, except for hardware application. For hardware application, use countersunk Phillips flat-head machine screws finished to match framing members or hardware being fastened, unless otherwise indicated.

D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.

E. Weather Stripping: Manufacturer's standard replaceable weather stripping as follows:

1. Compression Weather Stripping: Molded neoprene complying with ASTM D 2000 requirements or molded PVC complying with ASTM D 2287 requirements.

## 2.4 HARDWARE

A. General: All Aluminum Entrance and Strorefront hardware except cylindrical locks by door supplier. Provide heavy-duty hardware units indicated in sizes, number, and type recommended by manufacturer for entrances indicated. Finish exposed parts to match door finish, unless otherwise indicated.

B. Ball-Bearing Butts: ANSI/BHMA A156.1, Grade 1, 5-knuckle, 4-1/2-by-4-inch ball-bearing butts. Provide nonremovable pins at hinges exposed to door outside and provide nonferrous hinges for applications exposed to weather. Provide 3 hinges at each leaf for doors up to 36 inches wide and 80 inches tall; provide 4 hinges at each leaf for taller doors.

C. Closers, General: Comply with manufacturer's recommendations for closer size, depending on door size, exposure to weather, and anticipated frequency of use.

1. Closing Cycle: Comply with requirements of authorities having jurisdiction or the Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," whichever are more stringent.
2. Opening Force: Comply with the following maximum opening-force requirements for locations indicated:

    a. Exterior Doors: 15 lbf (67 N).

D. Surface-Mounted Overhead Closers: ANSI/BHMA A156.4, Grade 1. Provide cover and the following:

1. Mounting: Parallel arm.
2. Hold Open: Automatic, at angle selected by Architect from manufacturer's standard options.
3. Back Check: Adjustable.

E. Cylinders: As specified in Division 8 Section "Door Hardware."

F. Thumb Turns: Manufacturer's standard cast-aluminum-alloy, inside thumb-turn cylinders.

G. Cylinder Guard: Manufacturer's standard hardened-steel security ring with retainer plate for inside stile wall that protects lock cylinder from removal by wrenches, prying, or sawing.

H. Vertical-Rod Exit Devices: Concealed, vertical-rod exit device complying with UL 305 requirements, with 2-point top and bottom latching that is released by a latch-releasing push-panel mechanism recessed into door crossrail or when locked down (dogged) by lock cylinder or retracting screws beneath housing.

I. Pull Handles: As selected by Architect from manufacturer's full range of pull handles and plates.

J. Push Bars: As selected by Architect from manufacturer's full range of full-door-width, single-bar push bars.

1. Provide push plate affixed to push bar.

K. Thresholds: At exterior doors, provide manufacturer's standard threshold with cutouts coordinated for operating hardware, with anchors and jamb clips, and not more than 1/2-inch- (12.7-mm-) high, with beveled edges providing a floor level change with a slope of not more than 1:2, and in the following material:

1. Material: **clear anodized aluminum**.

L. Weather Sweeps: Manufacturer's standard weather sweep for application to exterior door bottoms and with concealed fasteners on mounting strips.

## 2.5 FABRICATION

A. General: Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

1. Fabricate components for screw-spline frame construction.

B. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.

C. Prepare components to receive concealed fasteners and anchor and connection devices.

D. Fabricate components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.

E. Glazing Channels: Provide minimum clearances for thickness and type of glass indicated according to FGMA's "Glazing Manual."

F. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

G. Storefront: Fabricate framing in profiles indicated for flush glazing (without projecting stops). Provide subframes and reinforcing of types indicated or, if not indicated, as required for a complete system. Factory assemble components to greatest extent possible. Disassemble components only as necessary for shipment and installation.

H. Entrances: Fabricate door framing in profiles indicated. Reinforce as required to support imposed loads. Factory assemble door and frame units and factory install hardware to greatest extent possible. Reinforce door and frame units as required for installing hardware indicated. Cut, drill, and tap for factory-installed hardware before finishing components.

1. Exterior Doors: Provide compression weather stripping at fixed stops. At other locations, provide sliding weather stripping retained in adjustable strip mortised into door edge.

## 2.6 ALUMINUM FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

B. 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.

C. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.

D. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

1. Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.

   Color: **clear anodized**

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of entrance and storefront systems. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Comply with manufacturer's written instructions for protecting, handling, and installing entrance and storefront systems. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.

B. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.

D. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction, unless otherwise indicated. Comply with requirements of Division 7 Section "Joint Sealants."

E. Install framing components plumb and true in alignment with established lines and grades without warp or rack of framing members.

F. Install entrances plumb and true in alignment with established lines and grades without warp or rack. Lubricate operating hardware and other moving parts according to hardware manufacturers' written instructions.

1. Install surface-mounted hardware according to manufacturer's written instructions using concealed fasteners to greatest extent possible.

G. Install glazing to comply with requirements of Division 8 Section "Glazing," unless otherwise indicated.

1. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.
2. Install structural silicone sealant according to sealant manufacturer's written instructions.
3. Mechanically fasten glazing in place until structural sealant is cured.
4. Remove excess sealant from component surfaces before sealant has cured.

H. Erection Tolerances: Install entrance and storefront systems to comply with the following maximum

tolerances:

1. Variation from Plane: Limit variation from plane or location shown to 1/8 inch in 12 feet3 mm in; 1/4 inch over total length.
2. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16 inch. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.
3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

## 3.3 ADJUSTING AND CLEANING

A. Adjust doors and hardware to provide tight fit at contact points and weather stripping, smooth operation, and weathertight closure.

B. Remove excess sealant and glazing compounds, and dirt from surfaces.

## 3.4 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure entrance and storefront systems are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 08410

## SECTION 08710 - FINISH HARDWARE

## PART 1 GENERAL

1.01 SECTION INCLUDES

Hardware for swinging, sliding, and folding doors except special types of unique and non-matching hardware specified in other sections.

1.02 RELATED WORK

A. Section 08 11 13 – Hollow Metal Doors and Frames
B. Section 08 21 11 – Flush Wood Doors
C. Section 08 36 13 – Overhead Sectional Doors
D. Section 08 43 13 – Metal Framed Storefronts
E. Section 08 71 13 – Automatic Operators
F. Division 26 – Electrical

1.03 REFERENCES

A. ADA - Americans with Disabilities Act of 1990 including Accessibility Guidelines as amended by the D.O.J. September 15, 2010, as adopted by the Authority Having Jurisdiction (AHJ).
B. ANSI A117.1 - Buildings and Facilities - Providing Accessibility and Usability for Physically Handicapped People.
C. ANSI/BHMA A156 (.1 through .21)
D. ANSI/DHI – A115.IG Installation Guide for Doors and Hardware.
E. FEMA P-361 – Safe Rooms for Tornados and Hurricanes.
F. NFPA 80 - Fire Doors and Windows.
G. NFPA 101 – Life Safety Code
H. IBC - International Building Code, as adopted by public Authority Having Jurisdiction (AHJ).
I. State and local Rules and Regulations for Barrier Free Facilities, as adopted by AHJ.

1.04 DOOR HARDWARE TYPES

A. Types of finish hardware required include, but is not necessarily limited to, the following:
   1. Pivot sets and intermediate pivots.
   2. Hinges.
   3. Lock cylinders.
   4. Keys, keying, and key control.
   5. Locksets, latchsets, and privacy sets.
   6. Exit devices.
   7. Closers.
   8. Mullions.
   9. Overhead, wall, and floor stops.
   10. Protection plates.
   11. Gasketing for exterior and interior doors, as required.
   12. Door holders.
   13. Door bottoms.
   14. Thresholds.
   15. Silencers.
B. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of door hardware is indicated elsewhere in this section or in the Door Hardware Schedule at the end of this section. Refer to Part 2 Products for Manufacturer's identification and allowable substitutions.

1.05 SUBMITTALS

A. Under provisions of Section 01 34 00, submit the following:

1. Product information: Manufacturer's published technical product data for all specified door hardware items indicating compliance with the requirements.
2. Hardware Schedule:
   a. Hardware schedules are intended for the Contractor's coordination of the work. Review and acceptance by the Architect or Owner does not relieve the Contractor of his exclusive responsibility to fulfill the requirements as shown and specified.
   b. Submit hardware schedule in the manner and format as specified, complying with the actual construction progress schedule requirements for each draft. Include the following information:
      1) Explanation of all abbreviations, symbols, codes, at the like, including door handing.
      2) Type, style, function, size, and finish of each hardware item.
      3) Door and frame sizes and materials cross referenced to the Architect's marks in the door schedule.
      4) Room identification (name and number) on each side of door opening as indicated on the drawings.
      5) Product name, model number, description, and name of manufacturer of each item.
      6) Fastenings and other pertinent information.
      7) Locations of hardware cross referenced to architectural floor plans and door schedules.
      8) Mounting heights and locations of each type of hardware.
3. Key Schedule:
   a. Require a qualified representative of the hardware supplier to personally meet with the Owner and Architect to obtain the Owner's written key requirements.
   b. Include a separate key schedule, showing clearly how the Owner's instructions on keying of locks has been fulfilled.
4. Samples: Upon request, submit actual material samples of items indicated as for color selection.
5. Templates: Hardware supplier will furnish hardware templates to the Contractor for each fabricator of doors, frames, and other work to be shop prepared or factory prepared for the installation of hardware. Upon request check shop drawings of such other work, to conform that adequate provisions are made for proper location and installation of hardware.
6. Provide electrical operation technical sheets including product schematics, point to point diagrams, and electrical requirements of all electrified hardware. Completely coordinate with the general contractor, electrical engineer, electrician, security access subcontractor and the installer. Operational descriptions are for demonstration only – verify operational intent with the owner, architect and electrical engineer.

B. Under provisions of Section 01 70 00, submit the following:
1. Product information.
2. Hardware schedule.
3. Manufacturer's published operation and maintenance data. Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
4. Tools and extra materials as required.
5. Manufacturer's warranties, revise to meet criteria as established within this section. Warranty periods shall commence upon acceptance of the building by the owner. Where warranties listed exceed the manufacturer's standard warranty, obtain in writing an extended warranty to meet the requirements above and as noted. If the manufacturer will not meet these requirements, and another approved manufacturer will comply, supply the alternate approved manufacturer.

## 1.06 QUALITY ASSURANCE

A. Acceptable Designs:
1. Items specified in this section are products which are of acceptable design.
2. Do not substitute products without Architect's written prior approval per Section 01 60 00. Requests for approval shall be submitted by factory authorized distributor firms representing

the products proposed for substitution. Items that are noted to allow no substitution are matching existing materials and the owner's material inventory for servicing the facility.

B. Qualifications:
   1. Manufacturer: Manufacturers named in Part 2 of this section with not less than 5 years experience in manufacturing commercial door hardware of the type indicated.
   2. Hardware Supplier:
      a. A recognized architectural finish hardware supplier who has been furnishing hardware in the same state as the project for a period of not less than 5 years.
      b. Hardware supplier's organization shall include an experienced Architectural Hardware Consultant (AHC), certified by the Door and Hardware Institute (DHI), who is physically available, at reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor. Mail or telephone correspondence is not acceptable.
      c. Hardware supplier shall have local warehousing facilities and shall maintain an adequate parts inventory of items supplied for future service to the owner. Supplier will be a factory authorized distributor of all hardware specified.
   3. Installer: Company specializing in installing work of this section with not less than 5 years experience and acceptable to the manufacturers and the hardware supplier. Maintain regular work force of qualified personnel, trained, skilled, and experienced in installing door hardware and constant, competent supervision per the requirements of the General Contractor. The hardware installer shall meet with the representatives of the General Contractor and hardware supplier to jointly inventory all hardware items. Upon satisfactory inventory of products, the hardware installer accepts responsibility for all hardware items inventoried.

C. Regulatory and Operational Requirements:
   1. Provide hardware for all openings, whether specified or not, in compliance with NFPA Standard No. 80, proper operation and local building code requirements. Where required, provide only hardware which has been tested and listed by UL or FM for types and sizes of doors required and complies with requirements of door and door frame labels. Label hardware, as required, for compliance with pressure testing criteria as dictated in IBC.
   2. Provide hardware which meets or exceeds handicap accessibility per local building code requirements. Conform to the Americans with Disabilities Act (ADA) of 1990 as amended by the D.O.J. September 15, 2010, as adopted by the Authority Having Jurisdiction (AHJ).

## 1.07 DELIVERY, STORAGE, HANDLING, AND PROTECTION

A. Deliver, store, handle, and protect products to project site under provisions of Section 01 60 00 and as specified herein.

B. Require hardware supplier to:
   1. Tag each item or package separately, with identification related to final hardware schedule.
   2. Include manufacturer's basic installation instructions with each item or package.
   3. As material is received by hardware supplier from various manufacturers, sort and repackage in containers with each item clearly marked with appropriate opening numbers to match the approved hardware schedule. Two or more identical items may be packed in the same container.
   4. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.
   5. Inventory hardware jointly with representatives of the General Contractor, hardware supplier and the hardware installer until each is satisfied that count is correct. Refer to paragraph 1.6-B-3.

C. Protect hardware from theft by cataloging and storing in a secure and lockable area. Control the handling and installation of hardware items which are not immediately replaceable, so that the completion of the work will not be delayed by hardware losses, both before and after installation. Replace lost, missing, damaged, or stolen door hardware items at no additional cost to the Owner as required to meet schedule requirements.

## 1.08 SEQUENCING AND SCHEDULING

A. Coordinate work of this section with the work of other sections of work under provisions of Section 01 04 00
B. Furnish hardware templates to each fabricator of doors, frames, and other work to be shop or factory prepared for the installation of hardware.
C. Verify completeness and suitability of door hardware with the hardware supplier and the hardware installer.

1.09 MAINTENANCE MATERIALS

A. Under provisions of Section 01 70 00, furnish to Owner a complete set of special wrenches and tools applicable to each different or special hardware component as needed for Owner's continued adjustment, maintenance, removal, and replacement of door hardware.
B. Special tools and accessories shall be supplied by the hardware component manufacturer.

**PART 2 PRODUCTS**

2.01 MATERIALS AND FABRICATION

A. General:
   1. Provide all door hardware for complete work, in accordance with the drawings and as specified herein.
   2. Quantities listed, in any instance, are for the Contractor's convenience only and are not guaranteed.
   3. Provide items and quantities not specifically mentioned to ensure a proper and complete operational installation. Match the quality and finish of items specified.
   4. Provide miscellaneous hardware as listed in hardware groups.
B. Hand of door: Drawings show direction of slide, swing or hand of each door leaf. Door schedule indicates door and frame sizes, materials, required fire ratings, and other pertinent information. Furnish each item of hardware for proper installation and operation of door movement as indicated.
C. Manufacturer's Name Plate: Do not use manufacturer's products which have manufacturer's name or trade name displayed in a visible location (omit removable name plates), except in conjunction with required UL or FM labels and as otherwise acceptable to the Architect. Manufacturer's identification will be permitted on rim of lock cylinders and latch faceplates only.
D. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI A156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
E. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.
   1. Screws: Furnish screws for installation, with each hardware item. Provide Phillips flat head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finishes of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.
   2. Concealed Fasteners: Provide concealed fasteners for hardware units which are exposed when door is closed, except to extent no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work, except where it is not feasible to adequately reinforce the work. In such cases, provide sleeves for each thru-bolt or use sex screw fasteners.

2.02 HINGES

A. Manufacturer:

1. Listed in Door Hardware Schedule: Stanley
2. Approved Substitutions: Hager, Ives
3. Continuous hinges are as manufactured by Stanley. Acceptable substitutions are ABH and Select.

B. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template produced units.

C. Screws: Furnish Phillips flat head or machine screws for installation of units, except furnish Phillips flat head or wood screws for installation of units into wood. Finish screw heads to match surface of hinges.

D. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
1. Steel Hinges: Steel pins.
2. Non-ferrous Hinges: Stainless steel pins.
3. Exterior doors: Non-removable pins.
4. Reverse bevel interior doors (lockable): Non-removable pins.
5. Interior doors: Non-rising pins.

E. Pin Tips: Flat button and matching plug, finished to match leaves.

F. Number of Hinges: Provide number of hinges indicated, but not less than 3 hinges per door leaf for doors 90" or less in height and one additional hinge for each 30" of additional height.

G. Butt type hinges and continuous hinges are to be warranted for a period of two years.

## 2.03 LOCK CYLINDERS

A. Manufacturer:
1. Listed in Door Hardware Schedule: Schlage Primus
2. Approved Substitutions: None – facility standard

B. Equip locks with 6-pin cylinders for large format interchangeable core pin tumbler inserts, patented security key system, with brass construction cores for use during the construction phases. Plastic construction cores are not allowed. Temporary construction cores shall be removed upon installation of the permanent key system by the owner and returned to the hardware supplier.

C. Construct lock cylinder parts from brass/bronze, stainless steel, or nickel silver.

## 2.04 KEYS, KEYING, AND KEY CONTROL

A. Keys:
1. Material: Provide keys of nickel silver only.
2. Quantities: These quantities are to establish a maximum allowable quantity of cut keys to service the project and may not necessarily be assigned as noted. A lesser quantity of cut keys required will not result in any credits, nor a quantity of uncut keys to be issued unless noted otherwise.
   a. 3 change keys per each cylinder unit.
   b. 5 master keys per master
   b. 2 Construction Control Keys
   c. 2 Permanent Control Keys
   d. 20 construction keys.
3. Deliver keys to the Owner's representative: Send masterkeys to Owner via U.S. registered mail direct from hardware supplier.

B. Keying:
1. Comply with Owner's written instructions for masterkeying and, except as otherwise indicated, provide individual change keys for each lock which is not designated to be keyed alike with a group of related locks.
2. Grandmaster key all cylinder items to coordinate with the Owner's instructions. Permanently inscribe each key with the notation "DO NOT DUPLICATE".

C. Key Control:
1. Provide a key control system including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by the system manufacturer, with capacity for 150% of the number of locks required for the project.

2. Provide a hinged panel type cabinet, for wall mounting, Telkee RWC-75S or equal.
3. Provide cylinder units with concealed key control and keys with visual key control.

2.05 LOCKSETS, LATCHSETS, AND PRIVACY SETS:

A. Manufacturer:
   1. Listed in Door Hardware Schedule: Schlage ND Primus
   2. Approved Substitutions: None – facility standard
B. Types: Locksets, latchsets, and privacy sets as indicated in Door Hardware Schedule.
C. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt. Provide dust-proof strikes for foot bolts, except where not available. At these locations, provide manufacturer's standard recessed strike. Provide roller type strikes where recommended by lock, latch or bolt manufacturer. If aluminum frames are specified, confirm with the aluminum frame supplier that the standard lock strikes will function. Provide the manufacturer's standard extended lip strikes if required.
D. Lock Throw: Provide 3/4" minimum throw of mortise type latches and deadbolts used. Cylindrical latches will be 1/2" minimum. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.
E. Locks and latches shall be warranted for a period of five years.

2.06 EXIT DEVICES AND MULLIONS

A. Manufacturer:
   1. Listed in Door Hardware Schedule: Precision 2100
   2. Approved Substitutions: Von Duprin 98, Sargent 80
B. Provide risers, as needed, to prevent interference with door glazing kits.
C. Provide spacers as needed for proper application of removable mullions on narrow stop type frames.
D. Devices will be architecturally finished as specified. Powder coat finish will not be allowed.
E. Exit devices and related hardware shall be warranted for a period of five years.

2.07 CLOSERS:

A. Manufacturer:
   1. Listed in Door Hardware Schedule: LCN 4040 XP DEL Series
   2. Approved Substitutions: Stanley QDC100 Series, Norton 7500 DA Series
B. Size of Units: Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit, depending on the size of the door, exposure to weather and anticipated frequency of use.
C. Provide manufacturer's standard through bolt attachment where door construction is not adequate for support.
D. Arms:
   1. Provide parallel arms for all overhead closers, except as otherwise indicated. Provide drop plates as needed to prevent glazing interference.
E. Mount all closers to the maximum allowable degree of opening by the closer manufacturer's template. Where closer arms incorporate dead stop features, mount closers to the maximum degree of opening available before conflict with adjacent structures. If not apparent on the contract documents, verify the use of open space with the Architect or Owner's Representative to determine the maximum allowable degree of opening.
F. Access Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units complying with ANSI A117.1 provisions for door opening force. Fire protection has precedence over handicap compatibility, check with local jurisdiction.
G. Door closers will include the manufacturer's standard delayed action feature.
H. Door closers and related hardware shall be warranted for a period of twenty-five years. Electronic closers shall be warranted for a period of two years.

2.08 OVERHEAD STOPS

A. Manufacturer:
   1. Listed in Door Hardware Schedule: Architectural Builders Hardware (ABH)
   2. Approved Substitutions: Rixson, Dorma
B. Mount stops to the maximum degree of opening available before conflict with adjacent structures, or, if adjacent structures are not considered, to the maximum allowable by stop manufacturer's template.
C. If not apparent on the contract documents, verify the use of open space with the Architect or Owner's Representative to determine the maximum allowable degree of opening.
D. Overhead stops in exterior doors must be manufactured from stainless steel, US32D finish.
E. Overhead stops shall be warranted for a period of two years.

2.09 WALL AND FLOOR STOPS

A. Manufacturers:
   1. Listed in Door Hardware Schedule: Trimco
   2. Approved Substitutions: Burns, Hiawatha
B. General: Except as otherwise indicated, provide stops (wall, floor or overhead) at each leaf of every swinging door leaf.

2.10 PROTECTION PLATES

A. Manufacturers:
   1. Listed in Door Hardware Schedule: Trimco
   2. Approved Substitutions: Burns, Hiawatha
B. Types: Armor Plates, Kick Plates, Mop Plates
C. Fasteners: Provide manufacturer's standard exposed Phillips head fasteners for door trim units; either machine screws or self-tapping sheet metal type screws per manufacturer's recommendations for application to the specified door construction.
D. Sizes: Fabricate protection plates (armor, kick or mop) not more than 2" less than door width on stop side and not more than 1" less than door width on pull side, x the height indicated.
E. Metal Plates: Stainless Steel, 18 gauge (0.050) thick. Satin finish, US32D (630), beveled four edges (B4E).

2.11 GASKETS AND SWEEPS

A. Manufacturer:
   1. Listed in Door Hardware Schedule: National Guard
   2. Approved Substitutions: Reese, Pemko
B. General: Except as otherwise indicated, provide continuous weatherstripping at each edge of every exterior door leaf. Provide type, sizes and profiles indicated as drawn or scheduled.
C. Fasteners: Provide non-corrosive fasteners as recommended by the manufacturer for applications indicated.
D. Replaceable seal strips: Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by the manufacturer.
E. Perimeter weatherstripping: Flexible, hollow neoprene bulb or loop insert, conforming to MIL R 6055, Class II, Grade 40.
F. Weatherstripping at Door Bottoms: Provide door bottoms consisting of contact type resilient insert and metal housing of design and size indicated.
G. Hot smoke seal, if required by IBC and subsequent UL testing procedures, will be supplied as an integral part of the door assembly by the door manufacturer.
H. Gaskets and sweeps shall be warranted for a period of three years.

2.12 THRESHOLDS

A. Manufacturer:
   1. Listed in Door Hardware Schedule: National Guard
   2. Approved Substitutions: Reese, Pemko

B. Except as otherwise indicated provide standard metal threshold unit of type, size and profile as detailed or scheduled.
C. Where there is conflict between scheduled thresholds and details, details shall have precedence. Revise details only if necessary to comply with handicap accessibility requirements. Notify the Architect of such required modifications.
D. Verify all existing conditions and revise if necessary. All thresholds must be within ADA parameters. Notify the Architect of required revisions if applicable.
E. Thresholds and related items shall be warranted for a period of three years, abrasive coatings shall be warranted for a period of ten years.

2.13 SILENCERS

A. Manufacturers:
   1. Listed in Door Hardware Schedule: Trimco
   2. Approved Substitutions: Ives, Rockwood

2.14 FINISHES

A. Exposed surfaces of hardware shall be Brushed Aluminum (US26D, 626, 652), unless otherwise indicated. Items specified in satin stainless steel (US32D, 630) will be stainless steel with no exceptions. Antimicrobial finish where specified.
B. The designations used in the schedule and elsewhere to indicate hardware finishes are the industry recognized standard commercial finishes common to the product's manufacturer listed.

**PART 3 EXECUTION**

3.01 EXAMINATION

A. Under provisions of Section 01 04 00, examine and verify that substrates and project site conditions are ready to receive work of this section.
B. Do not begin installation until finishes indicated to be field applied have been applied to doors, frames, and similar items requiring project site finishing and are thoroughly dry and cured.
C. Do not begin installation until unsatisfactory conditions are corrected in a manner acceptable to the installer. Beginning installation means installer accepts project site conditions and substrates as ready to receive work of this section.

3.02 INSTALLATION

A. General: The types and approximate quantities of door hardware required for this project are indicated at the end of this section.
B. Key Cabinet: Install in location as indicated on drawings or as directed by the Architect.
C. Heights: Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for /standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by the Architect.
D. Substrates: Adjust and reinforce attachment substrates as necessary for proper installation and operation of hardware.
E. Installation:
   1. Install each hardware item in compliance with the manufacturer's instructions, requirements of NFPA 80, NFPA 101, IBC, ADA, State Rules and Regulations for Barrier Free Facilities and recommendations of the DHI.
   2. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
   3. Drill and countersink units which are not factory prepared for fasteners. Space fasteners and anchors in accordance with industry standards.
   4. Where not factory machined, machine cut for hardware per template, as required.
   5. Cut and fit thresholds and floor covers to profile of door frames. Join units with concealed welds. Cut smooth openings for spindles, bolts, or similar items. Screw thresholds to

substrate with the manufacturer's standard flat head sleeve anchor (FHSL), 1/4-20 x 2" unless otherwise noted. Fill cavities of thresholds at sound rated openings with 1 inch thick (uncompressed thickness) low density fiberglass sill sealer insulation full width and length of the threshold. In addition to fastening requirements, set thresholds for exterior doors in a full bed of butyl-rubber or polyisobutylene mastic sealant.

6. Do not install hardware which is incomplete or apparently improper for application. Notify the hardware supplier immediately of any such deficiencies. Failure to comply with this requirement indicates the hardware installer's acceptance of responsibility for proper application and performance.

F. Cutting and Patching:
Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified in the Division-9 sections.

## 3.03 ADJUSTING

A. Initial Adjustment:
1. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Adjust resilient faced sound stops for continuous contact with door and threshold. Adjust weatherstripping and sweeps to completely seal doors with frames and to adjacent structures.
2. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

B. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

## 3.04 DEMONSTRATION

Instruct Owner's personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

## 3.05 CLEANING AND DEBRIS

A. Cleaning:
1. Clean work under provisions of Section 01 70 00
2. Clean adjacent surfaces soiled by work of this section.

B. Debris: Under provisions of Section 01 50 00, remove debris from project site and legally dispose of off-site.

## 3.06 MAINTENANCE

A. Approximately six months after the acceptance of hardware in each area, the hardware installer shall:
1. Return to the project and re-adjust every item of hardware to restore proper function of doors and hardware.
2. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures.
3. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units.
4. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware and submit to the Architect.

## 3.07 PROTECTION

Under provisions of Section 01 50 00, protect work of this section as required so that work will be without damage or deterioration at the time of completion and acceptance by the Owner.

3.08 DOOR HARDWARE SCHEDULE

**List of Manufacturers**

| | | |
|---|---|---|
| AB | ABH Manufacturing | Overhead Stops |
| DM | Dorma USA | Door Position Switches |
| LC | LCN | Door Closers |
| NA | National Guard | Thresholds, Weatherstrip |
| PR | Precision | Exit Devices |
| SC | Schlage | Locks, Cylinders |
| ST | Stanley | Hinges |
| TK | Telkee | Key Cabinet |
| TR | Trimco | Stops, Push/Pulls, Flat Goods |

**Finish Codes**

| Code | Description |
|---|---|
| 628 | Anodized Aluminum |
| 626, 652 | Satin Chrome Plated |
| 626AM | Satin Chrome – Antimicrobial Coating |
| 630 | Satin Stainless Steel |
| 630AM | Satin Stainless Steel – Antimicrobial Coating |
| 689 | Aluminum Painted |
| 710CU | CuVerro Steralloy (Trimco) |
| GREY | Grey |

**Option List**

| Code | Description |
|---|---|
| CD | Cylinder Dogging (Precision) |
| LD | Less Dogging (Precision) |
| HT | Hospital Tip (Stanley) |
| LL | Lead Lined (Schlage) |
| B4E | Beveled 4 Edges – Armor, Kick and Mop Plates (Trimco) |
| CS | Counter Sinking of Armor, Kick and Mop Plates (Trimco) |
| MS/EA | Machine Screws/Expansion Anchors (NGP) |

**Miscellaneous Hardware**

| | | | | |
|---|---|---|---|---|
| 1 | Key Cabinet | RWC-75S | | TK |
| 4 | Cores | 80-037 | 626 | SC |

**SET #1 - Entry**

Doors: 100.1A, 100.1B, 104A, 105A, 116A, 185

| | | | | |
|---|---|---|---|---|
| 1 | Continuous Hinge | 661HD | 628 | ST |
| 1 | Exit Device | 2403 CD | 630AM | PR |
| 1 | Rim Cylinder | 20-757 | 626 | SC |
| 1 | Mortise Cylinder | 20-763 | 626 | SC |
| 1 | Door Pull | 1191-4 | 710CU | TR |
| 1 | Door Closer/Drop Plate | 4040 XP EDA DEL x 4040-18 | 689 | LC |
| 1 | Door Sweep | 200 NA | | NA |
| 1 | Saddle Threshold | 426 E MS/EA | | NA |
| *1 | Door Position Switch | MC4 | | DM |

Gaskets by door manufacturer. Verify threshold application.

**SET #2 - Reception**

Door: 100.2

| | | | | |
|---|---|---|---|---|
| 3 | Hinges | CB179 4 1/2 X 4 1/2 | 652 | ST |
| 1 | Passage Set | ND10S Spa | 626AM | SC |
| 1 | Door Closer | 4040 XP EDA DEL | 689 | LC |
| 1 | Kick Plate | K0050 10" x 2" LDW B4E CS | 630 | TR |
| 1 | Wall Stop | 1270WV | 630 | TR |
| 3 | Door Silencers | 1229A | GREY | TR |

**SET #3 - Shared Workstation**

Doors: 101, 170

| | | | | |
|---|---|---|---|---|
| 3 | Hinges | CB179 4 1/2 X 4 1/2 | 652 | ST |
| 1 | Lockset | ND51JD Spa | 626AM | SC |
| 1 | Core | 20-740 | 626 | SC |
| 1 | Door Closer | 4040 XP RA DEL | 689 | LC |
| 1 | Kick Plate | K0050 10" x 2" LDW B4E CS | 630 | TR |
| 1 | Door Stop | 1215CKU | 626 | TR |
| 3 | Door Silencers | 1229A | GREY | TR |

**SET #4 - Pocket Door**

Door: 172B

| | | | | |
|---|---|---|---|---|
| 1 | Pocket Door Set | PDFC150N | | ST |
| 1 | Pocket Door Pull | 1064 | 626 | TR |

**SET #5 - Corridor**

Doors: 104B, 105B, 116B, 116C, 116D, 162, 169, 177, 181

| | | | | |
|---|---|---|---|---|
| 3 | Hinges | CB179 4 1/2 X 4 1/2 NRP | 652 | ST |
| 1 | Lockset | ND70JD Spa | 626AM | SC |
| 1 | Core | 20-740 | 626 | SC |
| 1 | Door Closer | 4040 XP EDA DEL | 689 | LC |
| 1 | Kick Plate | K0050 10" x 2" LDW B4E CS | 630 | TR |
| 1 | Wall Stop | 1270WV | 630 | TR |
| 3 | Door Silencers | 1229A | GREY | TR |

**SET #6 - Restroom**

Doors: 102, 103, 106, 110

| | | | | |
|---|---|---|---|---|
| 3 | Hinges | CB179 4 1/2 X 4 1/2 | 652 | ST |
| 1 | Pull Plate | 1018-3 | 710CU | TR |
| 1 | Push Plate | 1001-9 | 710CU | TR |
| 1 | Door Closer | 4040 XP RA DEL | 689 | LC |
| 1 | Kick Plate | K0050 10" x 2" LDW B4E CS | 630 | TR |
| 1 | Mop Plate | KM050 6" x 1" LDW B4E CS | 630 | TR |
| 1 | Wall Stop | 1270WV | 630 | TR |
| 1 | Gasketing | 5040 B | | NA |

**SET #7 - Office**

Doors: 107, 115, 117, 119, 183, 184, 188, 188B, 199

| | | | | |
|---|---|---|---|---|
| 3 | Hinges | CB179 4 1/2 X 4 1/2 | US26D | ST |
| 1 | Lockset | ND51JD Spa | 626AM | SC |
| 1 | Core | 20-740 | 626 | SC |
| 1 | Wall Stop | 1270WV | 630 | TR |
| 3 | Door Silencers | 1229A | GREY | TR |

**SET #8 - Exam/Lounge**

Doors: 109, 111, 112, 114, 121, 122, 123, 124, 125, 129, 130, 136, 137, 142, 143, 144, 145, 146, 147, 148, 149, 157, 164, 165, 171, 172, 173, 178, 179, 180, 182, 189, 192, 193, 194, 196, 197, 201, 202

| | | | | |
|---|---|---|---|---|
| 3 | Hinges | CB179 4 1/2 X 4 1/2 | 652 | ST |
| 1 | Passage Set | ND10S Spa | 626AM | SC |
| 1 | Wall Stop | 1270WV | 630 | TR |
| 3 | Door Silencers | 1229A | GREY | TR |

**SET #9 - Exit**

Doors: 126, 141, 174

| | | | | |
|---|---|---|---|---|
| 3 | Hinges | CB199 4 1/2 X 4 1/2 NRP | 630 | ST |
| 1 | Exit Device | 2108 X V4908D CD | 630AM | PR |
| 1 | Rim Cylinder | 20-757 | 626 | SC |
| 1 | Mortise Cylinder | 20-763 | 626 | SC |
| 1 | Closer/Stop | 4040 XP S-Cush DEL | 689 | LC |
| 1 | Kick Plate | K0050 10" x 2" LDW B4E CS | 630 | TR |
| 1 | Gasketing | 5040 B | | NA |
| 1 | Drip Cap | 16 A FHW | | NA |
| 1 | Door Sweep | 200 NA | | NA |
| 1 | Saddle Threshold | 426 E MS/EA | | NA |
| *1 | Door Position Switch | MC4 | | DM |

Verify threshold application.

**SET #10 - Restroom**

Doors: 127, 128, 150, 152, 161, 168, 191

| | | | | |
|---|---|---|---|---|
| 3 | Hinges | CB179 4 1/2 X 4 1/2 | 652 | ST |
| 1 | Privacy Set | ND44S Rho | 626AM | SC |
| 1 | Door Closer | 4040 XP RA DEL | 689 | LC |
| 1 | Kick Plate | K0050 10" x 2" LDW B4E CS | 630 | TR |
| 1 | Mop Plate | KM050 6" x 1" LDW B4E CS | 630 | TR |
| 1 | Wall Stop | 1270WV | 630 | TR |
| 1 | Gasketing | 5040 B | | NA |

**SET #11 - Meds**

Doors: 131, 159, 160

| | | | | |
|---|---|---|---|---|
| 3 | Hinges | CB179 4 1/2 X 4 1/2 | 652 | ST |
| 1 | Lockset | ND80JD Spa | 626AM | SC |
| 1 | Core | 20-740 | 626 | SC |
| 1 | Door Closer | 4040 XP RA DEL | 689 | LC |
| 1 | Kick Plate | K0050 10" x 2" LDW B4E CS | 630 | TR |
| 1 | Wall Stop | 1270WV | 630 | TR |
| 3 | Door Silencers | 1229A | GREY | TR |

**SET #12 - Lab**

Doors: 133

| | | | | |
|---|---|---|---|---|
| 3 | Hinges | CB179 4 1/2 X 4 1/2 | 652 | ST |
| 1 | Lockset | ND51JD Spa | 626AM | SC |
| 1 | Core | 20-740 | 626 | SC |
| 1 | Door Closer | 4040 XP RA DEL | 689 | LC |
| 1 | Kick Plate | K0050 10" x 2" LDW B4E CS | 630 | TR |
| 1 | Wall Stop | 1270WV | 630 | TR |
| 3 | Door Silencers | 1229A | GREY | TR |

**SET #13 - Custodian/Storage**

Doors: 134, 138, 153, 154, 166

| | | | | |
|---|---|---|---|---|
| 3 | Hinges | CB179 4 1/2 X 4 1/2 | 652 | ST |
| 1 | Lockset | ND80JD Spa | 626AM | SC |
| 1 | Core | 20-740 | 626 | SC |
| 1 | Wall Stop | 1270WV | 630 | TR |
| 3 | Door Silencers | 1229A | GREY | TR |

**SET #14 - Clean/Soiled Utility**

Doors: 139, 140

| | | | | |
|---|---|---|---|---|
| 3 | Hinges | CB179 4 1/2 X 4 1/2 | 652 | ST |
| 1 | Lockset | ND80JD Spa | 626AM | SC |
| 1 | Core | 20-740 | 626 | SC |
| 1 | Closer/Holder | 4040 XP H DEL | 689 | LC |
| 1 | Kick Plate | K0050 10" x 2" LDW B4E CS | 630 | TR |
| 1 | Wall Stop | 1270WV | 630 | TR |
| 1 | Gasketing | 5040 B | | NA |

**SET #15 - Riser**

Door: 155

| | | | | |
|---|---|---|---|---|
| 3 | Hinges | CB191 4 1/2 X 4 1/2 NRP | 630 | ST |
| 1 | Lockset | ND80JD Spa | 626AM | SC |
| 1 | Core | 20-740 | 626 | SC |
| 1 | Lock Guard | 5002 | 630 | TR |
| 1 | Overhead Stop | 9020A Series | 630 | AB |
| 1 | Drip Cap | 16 A FHW | | NA |
| 1 | Weatherstrip | 160 SA | | NA |
| 1 | Door Sweep | 200 NA | | NA |
| 1 | Saddle Threshold | 426 E MS/EA | | NA |
| *1 | Door Position Switch | MC4 | | DM |
| | Verify threshold application. | | | |

**SET #16 - Conference**

Door: 156

| | | | | |
|---|---|---|---|---|
| 3 | Hinges | CB179 4 1/2 X 4 1/2 | 652 | ST |
| 1 | Lockset | ND70JD Spa | 626AM | SC |
| 1 | Core | 20-740 | 626 | SC |
| 1 | Door Closer | 4040 XP RA DEL | 689 | LC |
| 1 | Kick Plate | K0050 10" x 2" LDW B4E CS | 630 | TR |
| 1 | Wall Stop | 1270WV | 630 | TR |
| 1 | Gasketing | 5040 B | | NA |

**SET #17 - Electrical EXT**

Door: 167A

| | | | | |
|---|---|---|---|---|
| 3 | Hinges | CB199 4 1/2 X 4 1/2 NRP | 630 | ST |
| 1 | Exit Device | 2103 X 1703C LD | 630 | PR |
| 1 | Rim Cylinder | 20-757 | 626 | SC |
| 1 | Closer/Stop | 4040 XP S-Cush DEL | 689 | LC |
| 1 | Kick Plate | K0050 10" x 2" LDW B4E CS | 630 | TR |
| 1 | Gasketing | 5040 B | | NA |
| 1 | Drip Cap | 16 A FHW | | NA |
| 1 | Door Sweep | 200 NA | | NA |
| 1 | Saddle Threshold | 426 E MS/EA | | NA |
| *1 | Door Position Switch | MC4 | | DM |
| | Verify threshold application. | | | |

**SET #18 - Electrical INT**

Door: 167B

| | | | | |
|---|---|---|---|---|
| 3 | Hinges | CB179 4 1/2 X 4 1/2 NRP | 652 | ST |
| 1 | Exit Device | 2103 X 1703C LD | 630 | PR |
| 1 | Rim Cylinder | 20-757 | 626 | SC |
| 1 | Door Closer | 4040 XP RA DEL | 689 | LC |
| 1 | Kick Plate | K0050 10" x 2" LDW B4E CS | 630 | TR |
| 1 | Wall Stop | 1270WV | 630 | TR |
| 1 | Gasketing | 5040 B | | |
| NA | | | | |

**SET #19 - X-ray**

Door: 120

| | | | | |
|---|---|---|---|---|
| 1 | Continuous Hinge | 652HD | 630 | ST |
| 1 | Passage Set | ND10S Spa LL | 626AM | SC |
| 1 | Wall Stop | 1270WV | 630 | TR |
| 1 | Gasketing | 5040 B | | NA |
| | Lead lined door and frame. | | | |

* Requires electronic coordination

End of Section

**SECTION 08800 - GLAZING**

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 glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Doors.
2. Glazed entrances.
3. Interior vision lites.
4. Storefront framing.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thicknesses indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:

a. Minimum Glass Thickness for Exterior Lites: Not less than ¼ inch..
b. Thickness of Tinted and Heat-Absorbing Glass: Provide the same thickness for each tint color indicated throughout Project.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 100 deg F, ambient; 150 deg F, material surfaces.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites ¼ inch thick.

1.4 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

C. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

## 1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations for Clear Glass: Obtain clear float glass from one primary-glass manufacturer.

C. Source Limitations for Tinted Glass: Obtain tinted, heat-absorbing, and light-reducing float glass from one primary-glass manufacturer for each tint color indicated.

D. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

E. 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 ratings indicated, based on testing according to NFPA 252.

F. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 257.

G. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1.

1. Subject to compliance with requirements, permanently mark safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.

H. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: GANA'S "Glazing Manual"
2. SIGMA Publications: SIGMA TM-3000, "Vertical Glazing Guidelines"

## 1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

## 1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1.8 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. Manufacturer's Special Warranty on Coated-Glass Products: Written warranty, made out to Owner and signed by coated-glass manufacturer agreeing to furnish replacements for those coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following.

2.2 PRIMARY FLOAT GLASS

A. Float Glass: ASTM C 1036, Type I (transparent glass, flat), Quality q3 (glazing select)

2.3 COATED FLOAT GLASS

A. General: Provide coated glass complying with requirements indicated in this Article

1. Provide Kind HS (heat-strengthened) coated float glass in place of coated annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in "Performance Requirements" Article. Provide Kind FT (fully tempered) where safety glass is indicated.

2.4 ELASTOMERIC GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:

1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range for this characteristic.

B. Elastomeric Glazing Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied, chemically curing sealant, including those referencing ASTM C 920 classifications for type, grade, class, and uses.

1. Additional Movement Capability: Where additional movement capability is specified, provide

products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at time of installation and remain in compliance with other requirements in ASTM C 920 for uses indicated.

C. Glazing Sealant for Fire-Resistive Glazing Products: Identical to product used in test assembly to obtain fire-protection rating.

## 2.5 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tape: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800.

## 2.6 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistance rating.

## 2.7 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Examine framing glazing, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep system.
3. Minimum required face or edge clearances.
4. Effective sealing between joints of glass-framing members.

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

## 3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

## 3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where the length plus width is larger than 50 inches as follows:

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

## 3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

## 3.5 PROTECTION AND CLEANING

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

END OF SECTION 08800

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