

**SECTION 00 01 10  
TABLE OF CONTENTS**

**SPECIFICATIONS**

Division 02 -- Existing Conditions

02 41 00 - Selective Demolition

Division 05 -- Metals

05 50 00 - Miscellaneous Metals

Division 06 -- Wood, Plastics, and Composites

06 10 00 - Rough Carpentry

Division 07 -- Thermal and Moisture Protection

07 41 13 - Metal Roof Panels

07 53 00 - Elastomeric Membrane Roofing

Division 09 -- Finishes

09 90 00 - Painting and Coating

Division 22 -- Plumbing

22 10 06 - Plumbing Piping Specialties

22 14 26 - Retrofit Roof Drains

**APPENDICES**

Appendix I - Roof Core Samples

**END OF SECTION**

**SECTION 02 41 00  
SELECTIVE DEMOLITION**

**PART 1 GENERAL**

**1.1 DESCRIPTION**

- A. Work included:
  - 1. Complete demolition of portions of existing building(s) indicated or as required in preparation for alterations and installation of new roofing system.
  - 2. Take all necessary precautions to insure against damage to existing work to remain in place, to be reused, or to remain the property of the Owner, and any damage to such work shall be repaired or replaced as approved at no additional cost to the Owner.
- B. Related Work specified elsewhere:

**1.2 SUBMITTALS**

- A. Obtain, pay for, and submit all permits required for execution of demolition work including the following:
  - 1. Permits and notices authorizing building demolition.
  - 2. Permit for transport and disposal of debris.
  - 3. Demolition procedures and operation sequence.
- B. Submit demolition procedures and operation sequence.
- C. Permits for Disposal of Debris:
  - 1. Arrange for legal disposal of debris and obtain written agreements with the owners of the property where the debris shall be deposited.
  - 2. Provide a certification of disposal (use form attached at the end of this section) that an agreement releasing the Owner from all responsibility in connection with the disposal of the debris was executed.

**1.3 COORDINATION**

- A. Utility Removal: Arrange with utility companies for changes in their equipment, and capping of pipes and wiring as required.
- B. Schedule disruption of utilities or facilities with the Owner a minimum of 48 hours in advance of shut-down.
- C. Maintaining Traffic:
  - 1. Do not close or obstruct public streets, sidewalks, alleys or passageways without permission from authorities having jurisdiction.
  - 2. If required by authorities, provide alternate routes around closed or obstructed traffic ways.

**1.4 JOB CONDITIONS**

- A. Existing Conditions: Survey existing work and examine the Contract Documents to determine extent of demolition work.
- B. Protection:
  - 1. Includes but not limited to erecting barriers, dust partitions, fences, guard rails, enclosures, chutes and shoring as required to protect structures and utilities remaining intact.

2. Protect any trees, plants, grass and other landscaping designated to remain from damage. Replace any trees, plants or other landscaping materials designated to remain that are damaged during the work under this Contract.
3. Protect the interior of the building and all materials and equipment from the weather at all times. Replace materials and equipment damaged by weather at no additional cost to the Owner.
4. Take necessary precautions to insure against damage to existing materials or equipment to remain in place, to be reused, or to remain the property of the Owner. Repair or replace damaged materials and equipment at no additional cost to the Owner.

## **PART 2 PRODUCTS (NOT USED)**

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Preparation:
  1. Verify the extent of demolition work to be performed with the Professional.
  2. Arrange for and verify termination of utility services, including removing meters and capping lines.
  3. Remove items scheduled to be salvaged for Owner and place in designated storage area.

### **3.2 DEMOLITION**

- A. Demolition:
  1. Demolish structures in accordance with demolition procedures submitted.
  2. Maintain area outside in as clean condition as possible during progress of demolition work.
  3. Limit dust to lowest practicable level.
  4. Do not use water to extent of causing flooding, contaminated runoff or icing.
  5. Repair damage to adjacent construction or structures.
  6. Remove all clamps, brackets, supports, hangers, conduits, controls, wire, etc. associated with equipment/pipe indicated to be removed and patch all areas to match adjacent areas.
- B. Owner has the right to salvage any materials or equipment including but not limited to subsection 3.4.

### **3.3 DISPOSAL**

- A. Disposal:
  1. Remove demolition debris to designated disposal area promptly.
  2. Do not store or burn materials on-site.
  3. Disposal areas shall be approved by Department of Environmental Protection and any other authorities having jurisdiction.

**END OF SECTION**

**SECTION 05 50 00**  
**MISCELLANEOUS METALS**

**PART 1 GENERAL**

**1.1 DESCRIPTION**

- A. Scope:
1. Furnish labor, materials, tools, equipment, services, supervision required to complete miscellaneous metalwork including all incidental and complementary work shown, specified, or necessary to complete work as indicated.

**1.2 QUALITY ASSURANCE**

- A. Standards:
1. American Society for Testing and Materials (ASTM):
    - a. Carbon Structural Steel
    - b. Pipe Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
    - c. Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
    - d. Zinc Coating (Hot-Dip) on Iron and Steel Hardware
    - e. Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both
    - f. Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
    - g. Steel, Sheet and Strip, Alloy, Hot-Rolled and Cold-Rolled,
      - 1) Drawing Quality
    - h. Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements
    - i. Commercial Steel (CS) Sheet, Carbon (0.15 Maximum Percent) Cold-Rolled, High Strength Low Alloy
  2. American Institute of Steel Construction (AISC)
  3. American Welding Society (AWS)
  4. OSHA Standards
  5. Steel Structures Painting Council (SSPC)
- B. Welder, Welding Operator and Tacker Qualifications: Each welder, welding operator and tacker shall be qualified in accordance with the applicable requirements of AWS D1.1.

**1.3 SUBMITTALS**

- A. Shop Drawings (Miscellaneous Steel Fabrications and Anchor Bolts):
1. Submit complete, detailed shop and erection drawings of all work for approval before starting fabrication and installation of materials.
  2. Show details of construction and placement including hardware, fittings and fastenings, anchorages, types and gauges of metals being used.
- B. Welder Qualifications: Submit evidence of qualifications for welders, welding operators and tackers.

**1.4 JOB CONDITIONS**

- A. Field paint exposed steel in addition to shop coats and mill finishes.

**1.5 PRODUCT DELIVERY, HANDLING AND STORAGE**

- A. Deliver all materials in good condition. Store in dry place, off ground; keep dry at all times. Handle materials to prevent damage to product or structure.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- A. General: Metals free from defects impairing strength, durability and appearance; best commercial quality for purposes specified, structural properties to safely withstand strains and stresses to which subjected.
- B. Steel Materials:
  - 1. Structural Steel: ASTM A283 or A36, as applicable.
  - 2. Cold Finished Steel: Mild steel, rolled, drawn, ASTM A568.
  - 3. Steel Pipe: Galvanized, Schedule 40 or Schedule 80, ASTM A53 as indicated on the Contract Drawings.
  - 4. Steel Bolts, Nuts, Washers: ASTM A307, Grade A, General Use and Grade B, Flanges galvanized in accordance with ASTM A153.
  - 5. High Tension Bolts: ASTM A325 Type 3 for corrosive locations.

### **2.2 FABRICATION**

- A. General:
  - 1. Form and finish metalwork to shape and size with sharp angles and lines.
  - 2. Metalwork that becomes bent by shearing or punching may be straightened and used if approved by the Architect.
  - 3. Grind exposed edges of work smooth; construct joints exposed to weather to exclude water.
- B. Hardware:
  - 1. Countersink metalwork to receive the required hardware and to provide the proper bevels and clearances.
  - 2. Provide welded backup plates for mounting hardware; drill or punch holes for bolts and screws; conceal fastenings wherever practicable.
  - 3. Provide brackets, lugs, and similar accessories required for installation as a part of the metal item.
- C. Shop and Field Welding:
  - 1. In accordance with recommendations of American Welding Society (AWS) Standard D1.
  - 2. Welds solid and homogeneously a part of metals joined for full area indicated or necessary to develop required strength of joint.
  - 3. Welds free from pits or incorporated slag or scale; surfaces of welds smooth and regular.
- D. Workmanship Class 1:
  - 1. Exposed Surfaces: Sandblast surfaces smooth with pits, mill marks, nicks and scratches filled or ground off. Defects shall not show when painted.
  - 2. Welds: Conceal welds where possible. Where exposed, grind welds to small radius with uniform sized cove. When painted, welds shall be undetectable.
  - 3. Bolts: Use only flat head countersunk bolts in exposed locations.
  - 4. Straightness: Distortions visible to the eye will be rejected.
  - 5. Joints: Fit joints to hairline finish.
- E. Workmanship Class 2:
  - 1. Exposed Surfaces: Moderate irregularities not visible at 30' may remain. Mill marks may remain.
  - 2. Welds: Grind welds to small radius with uniform sized cove.

3. Bolts: Use only flat or oval head countersunk bolts where exposed to view.
  4. Straightness: Minor distortions will be permitted.
  5. Joints: Provide maximum gap of 1/16".
- F. Workmanship Class 3:
1. Exposed Surfaces: No improvement from mill finish required except preparation for galvanizing or priming.
  2. Welds: Grinding not required.
  3. Bolts: Exposed bolts permitted.

### **PART 3 EXECUTION**

#### **3.1 PREPARATION**

- A. Clean dirt, debris, oil, grease and other foreign substances from surfaces to receive metal items.
- B. Where aluminum components contact concrete or lime mortar, paint surfaces with alkaline-resistant coatings such as heavy-bodied bituminous paint.
- C. Dissimilar Materials: Isolate dissimilar materials to prevent electrolytic actions by neoprene gaskets, asphaltum paint or other materials.

#### **3.2 WORKMANSHIP**

- A. General: Refer to the Drawings for items required; items require the following workmanship classes and finishes.
  1. Steel Items Subject to Contact with Moisture: Galvanized finish.
- B. Details and connections shall be carefully made and fitted, with special care exercised to produce a thoroughly neat appearance; make pieces in accordance with detail shop drawings; members shall be true to length so assembling may be done without fillers, except where required by details; allow no projecting edges or corners where different members are assembled; do mitering and blocking precisely.
- C. Set built-up parts true to line and without sharp bends, twists or kinks.
- D. Provide caulking as required to set, seal and secure metal items; refer to Section 07 90 00 - Caulking and Sealant Work.

#### **3.3 BURNING AND WELDING**

- A. Burning: Burning of holes in field shall not be permitted without consent; if consent is given, burned members shall be finished to an appearance equal to sheared finish; burning shapes to length with standard flame-cutting machine will be permitted.
- B. Perform both shop and field welding in accordance with recommendations of American Welding Society. Welds shall be solid and homogeneously a part of metals joined, free from pits or incorporated slag or scale; surfaces of welds shall be smooth and regular, of full area indicated or necessary to develop required strength of joint.

#### **3.4 INSTALLATION**

- A. Erect work to lines and levels, plumb and true, in correct relation to adjoining work; secure parts in rigid, durable manner. Provide concealed connections wherever possible.
- B. Provide anchors and inserts in sufficient number for proper fastening of metal items; embed anchors in concrete so as to accurately align metalwork at proper level.

- C. Where necessary to secure miscellaneous metalwork to structure by means of expansion bolts, cinch anchors and similar connections, do work of laying out, installing such connections, installing miscellaneous work, and bolting up.
- D. Throughout work, provide anchors, inserts wherever possible for building adjoining work; where lugs are shown or specified for building into adjoining masonry, erect parts having lugs before masonry is built; elsewhere, bring work to building in as large pieces as practicable, attach to anchors or inserts during erection.
- E. Connections made to sleeve inserts, except where noted removable, install members into sleeves, wedged tight with metal wedges; pour surrounding space full of expanding grout; caulk to finish flush with adjoining surface.

### **3.5 CONNECTIONS**

- A. Unless otherwise specified, all shop connections shall be welded or riveted; framing connections made in field shall be made with high tension steel bolts; other connections may be made by any of the above methods, or with standard strength bolts.
- B. All connections shall develop strength required for members involved; in no case less than AISC standard.
- C. Provide lugs, clips, connections, rivets, bolts, necessary for complete fabrication, erection; bolts remaining in finished, exposed work shall be hexagon head bolts with hexagon nuts; bolts shall be of proper length to permit full thread in nut, but not project more than 1/4" beyond face of nut. Rivets, both shop and field, power driven; shall provide 100 lbs. per sq. in. at hammer minimum.

### **3.6 FIELD PAINTING**

- A. Where shop coat is abraded or burned by welding, clean and touch-up.
- B. Repair surfaces of zinc coating that have been damaged during delivery, storage or installation by thoroughly wire brushing the damaged areas and removing all loose and cracked zinc coating, then paint the cleaned areas with 2 coats of zinc-dust, zinc-oxide primer; touch-up zinc-dust coated surfaces with the same material as the coating.
- C. Field paint in accordance with the requirements of Section 09 90 00.

### **3.7 CLEAN UP**

- A. All work shall be left in clean condition, and all debris and rubbish cleaned up and removed from site by Contractor.

**END OF SECTION**

**SECTION 06 10 00  
ROUGH CARPENTRY**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Non-structural dimension lumber framing.
- B. Roofing nailers.
- C. Preservative treated wood materials.

**1.2 RELATED REQUIREMENTS**

- A. Section 07 53 00 - Elastomeric Membrane Roofing.

**1.3 REFERENCE STANDARDS**

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- B. AWPA U1 - Use Category System: User Specification for Treated Wood; 2012.
- C. PS 20 - American Softwood Lumber Standard; 2010.
- D. SPIB (GR) - Grading Rules; 2014.

**1.4 SUBMITTALS**

- A. Product Data: Provide technical data on wood preservative materials.
- B. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

**PART 2 PRODUCTS**

**2.1 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
  - 2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee ([www.alsc.org](http://www.alsc.org)) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Lumber fabricated from old growth timber is not permitted.

**2.2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.

**2.3 ACCESSORIES**

- A. Fasteners and Anchors:



1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
- B. Water-Resistive Barrier: No. 15 asphalt felt.

## **2.4 FACTORY WOOD TREATMENT**

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
  1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
- B. Preservative Treatment:
  1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
    - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
    - b. Treat lumber in contact with roofing, flashing, or waterproofing.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

### **3.2 ROOF-RELATED CARPENTRY**

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at all roof openings except where specifically indicated otherwise. Form corners by alternating lapping side members.

### **3.3 TOLERANCES**

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

### **3.4 CLEANING**

- A. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- B. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION**

**SECTION 07 41 13**  
**METAL ROOF PANELS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Metal roof panel system of preformed steel panels.
- B. Roof panel underlayment.
- C. Accessories.

**1.2 RELATED REQUIREMENTS**

- A. Section 07 92 00 - Joint Sealants: Sealing joints between metal roof panel system and adjacent construction.

**1.3 REFERENCE STANDARDS**

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- B. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection 2021.
- C. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference 2005 (Reapproved 2017).
- D. ASTM E1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference 1995 (Reapproved 2018).
- E. ASTM E1680 - Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems 2016 (Reapproved 2022).
- F. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies Current Edition, Including All Revisions.

**1.4 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Storage and handling requirements and recommendations.
  - 2. Installation methods.
  - 3. Specimen warranty.
- C. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
  - 1. Show work to be field-fabricated or field-assembled.
- D. Selection Samples: For each roofing system specified, submit color chips representing manufacturer's full range of available colors and patterns.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.
- G. Test Reports: Indicate compliance of metal roofing system to specified requirements.
- H. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

## **1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section and with at least three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

## **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Provide strippable plastic protection on prefinished roofing panels for removal after installation.
- B. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.

## **1.7 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Finish Warranty: Provide 20-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with warrantor.
- C. Special Warranty: Provide 2-year warranty for weathertightness of roofing system, including agreement to repair or replace metal roof panels that fail to keep out water commencing on the Date of Substantial Completion. Complete forms in Owner's name and register with warrantor.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Architectural Metal Roof Panel Manufacturers:
  - 1. Berridge Manufacturing Company: [www.berridge.com](http://www.berridge.com).
  - 2. Centria, a Nucor Company: [www.centria.com](http://www.centria.com).
  - 3. Englert, Inc: [www.englertinc.com](http://www.englertinc.com).
  - 4. Petersen Aluminum Corporation: [www.pac-clad.com](http://www.pac-clad.com).
- B. Metal Soffit Panels Manufacturers:
  - 1. Berridge Manufacturing Company: [www.berridge.com](http://www.berridge.com).
  - 2. Centria, a Nucor Company: [www.centria.com](http://www.centria.com).
  - 3. Englert, Inc: [www.englertinc.com](http://www.englertinc.com).
  - 4. Petersen Aluminum Corporation: [www.pac-clad.com](http://www.pac-clad.com).

### **2.2 PERFORMANCE REQUIREMENTS**

- A. Metal Roof Panels: Provide complete roofing assemblies, including roof panels, clips, fasteners, connectors, and miscellaneous accessories, tested for compliance with the following minimum standards:
  - 1. Structural Design Criteria: Provide panel assemblies designed to safely support design loads at support spacing indicated, with deflection not to exceed  $L/180$  of span length(L) when tested in accordance with ASTM E1592.
  - 2. Overall: Complete weathertight system tested and approved in accordance with ASTM E1592.
  - 3. Wind Uplift: Class 90 wind uplift resistance of UL 580.
  - 4. Air Infiltration: Maximum 0.06 cfm/sq ft at air pressure differential of 6.24 lbf/sq ft, when tested according to ASTM E1680.

5. Water Penetration: No water penetration when tested in accordance with procedures and recommended test pressures of ASTM E1646; perform test immediately following air infiltration test.
6. Thermal Movement: Design system to accommodate without deformation anticipated thermal movement over ambient temperature range of 100 degrees F.

### **2.3 METAL ROOF PANELS**

- A. Metal Roof Panels: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstanding anticipated movement of substrate and thermally induced movement of roofing system.
- B. Metal Panels: Factory-formed panels with factory-applied finish, with factory or field formed radius to match existing. Contractor to field verify existing radius.
  1. Steel Panels:
    - a. Zinc-coated steel complying with ASTM A653/A653M; minimum G60 galvanizing.
    - b. Steel Thickness: Minimum 22 gauge, 0.0299 inch.
  2. Profile: Standing seam, with minimum 1-1/2-inch seam height; concealed fastener system for field seaming with special tool.
  3. Texture: Smooth.
  4. Length: Full length of roof slope, without lapped horizontal joints.
  5. Width: Maximum panel coverage of manufacturer's standard between 12 inches and 16 inches.
- C. Metal Soffit Panels: Same manufacturer as standing seam roof panel.
  1. Profile: To be selected from manufacturer's standard, with venting not provided.
  2. Material: Precoated steel sheet, 22 gauge, 0.0299 inch minimum thickness.
  3. Color: To match standing seam roof panel.

### **2.4 ATTACHMENT SYSTEM**

- A. Concealed System: Provide manufacturer's standard stainless steel or nylon-coated aluminum concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement.

### **2.5 FABRICATION**

- A. Panels: Provide factory or field fabricated radiused panels with applied finish and accessory items, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.
- B. Joints: Provide captive gaskets, sealants, or separator strips at panel joints to ensure weathertight seals, eliminate metal-to-metal contact, and minimize noise from panel movements.

### **2.6 FINISHES**

- A. Fluoropolymer Coil Coating System: Manufacturer's standard multi-coat metal coil coating system complying with AAMA 2605, including at least 70 percent polyvinylidene fluoride (PVDF) resin, and at least 80 percent of coil coated metal surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch; color and gloss as selected from manufacturer's standards.

### **2.7 UNDERLAYMENT**

- A. Self-Adhered Underlayment: Rubberized sheet waterproof membrane complying with ASTM D1970/D1970M, self-adhering.

1. Basis of Design: Carlisle WIP 300 HT High Temperature Protection Self Adhering Roofing Underlayment, or one of the following:
  - a. W.R Grace - "Ice & water Shield".
  - b. Interwrap - Titanium PSU-30.
  - c. Tamko - TW Tile and Metal Underlayment.
  - d. Firestone Building Products - Clad-Gard SA.
2. Minimum High Temperature Resistance: 230 degrees F.
3. Water Vapor Permeance: 0.1 perm, maximum.
4. Install beneath roof panel on existing substrate per manufacturer's recommendations and requirements.

## **2.8 ACCESSORIES**

- A. Miscellaneous Sheet Metal Items: Provide flashings, trim, moldings, closure strips, and similar sheet metal items of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.
- B. Sealants:
  1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.
  2. Concealed Sealant: Non-curing butyl sealant or tape sealant.
  3. Seam Sealant: Factory-applied, non-skinning, non-drying type.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Do not begin installation of preformed metal roof panels until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### **3.2 PREPARATION**

- A. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to ensure that completed roof will be free of leaks.
- B. Remove protective film from surface of roof panels immediately prior to installation; strip film carefully to avoid damage to prefinished surfaces.
- C. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by metal roof panel manufacturer.
- D. At locations where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

### **3.3 INSTALLATION**

- A. Overall: Install roofing system in accordance with approved shop drawings and metal roof panel manufacturer's instructions and recommendations, as applicable to specific project conditions; securely anchor components of roofing system in place allowing for thermal and structural movement.
  1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
  2. Minimize field cutting of panels. Where field cutting is required, use methods that will not distort panel profiles. Use of torches for field cutting is prohibited.

- B. Accessories: Install necessary components that are required for complete roofing assembly, including flashings, trim, moldings, closure strips, and similar roof accessory items.
- C. Roof Panels: Install metal roof panels in accordance with manufacturer's installation instructions, minimizing transverse joints except at junction with penetrations.
  - 1. Form weathertight standing seams incorporating concealed clips, using an automatic mechanical seaming device approved by panel manufacturer.
  - 2. OR
  - 3. Provide concealed clips at panel joints, and apply snap-on battens to provide weathertight joints.
  - 4. Provide sealant tape or other approved joint sealer at panel joints.

### **3.4 CLEANING**

- A. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

### **3.5 PROTECTION**

- A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.
- B. Touch-up, repair, or replace damaged roof panels or accessories before Date of Substantial Completion.

**END OF SECTION**

**SECTION 07 53 00**  
**ELASTOMERIC MEMBRANE ROOFING**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Elastomeric roofing membrane, fully adhered application as indicated on drawings.
- B. Tapered insulation used for crickets.
- C. Insulation for deck infills.
- D. Roof edge metals.
- E. Flashings.
- F. Roofing cant strips, stack boots, roofing expansion joints, and walkway pads.

**1.2 RELATED REQUIREMENTS**

- A. Section 05 3100 - Steel Decking:
- B. Section 06 10 00 - Rough Carpentry: Wood nailers and curbs.
- C. Section 07 62 00 - Sheet Metal Flashing and Trim.
- D. Section 07 92 00 - Joint Sealant.
- E. Section 22 10 06 - Plumbing Piping Specialties: Roof drains.
- F. Section 22 14 26 - Retrofit Roof Drains.

**1.3 REFERENCE STANDARDS**

- A. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.
- B. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2013.
- C. ANSI/SPRI FX-1: Standard Field Test Procedure for Determining the Withdrawl Resistance of Roofing Fasteners; 2016.
- D. FM DS 1-28 - Wind Design; Factory Mutual Research Corporation; 2007.
- E. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim updates.

**1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate with installation of associated counterflashings installed under other sections.
- B. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers; review preparation and installation procedures and coordination and scheduling necessary for related work.

**1.5 SUBMITTALS**

- A. Product Data: Provide data indicating membrane materials, flashing materials, insulation, and fasteners.
- B. Shop Drawings: Indicate joint or termination detail conditions and conditions of interface with other materials.
- C. Test Reports: Provide test reports from testing of existing gypsum roof deck for pull tests as per ANSI/SPRI FX-1: Standard Field Test Procedure for Determining the Withdrawl Resistance of Roofing Fasteners; 2016 for installation of mechanically fastened cover board where existing roof decks are identified as gypsum roof decks.

- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.
- F. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.
- G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

**1.6 QUALITY ASSURANCE**

- A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience, and approved by manufacturer.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.
- B. Store products in weather protected environment, clear of ground and moisture.
- C. Protect foam insulation from direct exposure to sunlight.

**1.8 FIELD CONDITIONS**

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane when ambient temperature is below 40 degrees F or above 120 degrees F.
- C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

**1.9 WARRANTY**

- A. Provide 30 year manufacturer's material and labor warranty to cover failure to prevent penetration of water.
  - 1. Provide 30 year installers warranty to cover failure to prevent penetration of water.

**PART 2 PRODUCTS**

**2.1 EPDM MEMBRANE MATERIALS:**

- A. Basis of Design Manufacturer: Carlisle Syntec Systems, Inc; Sure-Seal EPDM with enhanced details: [www.carlisle-syntec.com](http://www.carlisle-syntec.com).
- B. Acceptable Manufacturers: Subject to compliance with requirements, provide one of the following adhered EPDM roofing systems, with indicated and necessary enhancements:
  - 1. RubberGard®; Firestone Building Products Co.
  - 2. GenFlex; GenFlex Roofing Systems, GenCorp Polymer Products.
  - 3. JM EPDM NR 90 MIL; Johns Manville Co.
  - 4. Versigard™; Versico, Inc.



## **2.2 ROOFING**

- A. Elastomeric Membrane Roofing: One ply membrane, fully adhered, over cover board.
- B. Acceptable Insulation Types - Constant Thickness Application: Any type that meets requirements and is approved by membrane manufacturer for application.
- C. Acceptable Insulation Types - Tapered Application: Any type that meets requirements and is approved by membrane manufacturer for application.

## **2.3 ROOFING MEMBRANE AND ASSOCIATED MATERIALS**

- A. Membrane: Ethylene-propylene-diene-terpolymer (EPDM); Type I non-reinforced; complying with minimum properties of ASTM D4637.
  - 1. Thickness: 0.090 inch.
  - 2. Color: Black.
  - 3. Seaming Materials: As recommended by membrane manufacturer.
  - 4. Membrane Adhesive: As recommended by and approved by membrane manufacturer.
  - 5. Flexible Flashing Material: Same material as membrane.
  - 6. Vapor Barrier: Carlisle SynTec Inc. VapAir Seal MD (Self-adhered).
    - a. To be placed on crete deck prior to insulation installation.
- B. Insulation Cover Board: Basis of Design Manufacturer: Carlisle Syntec Systems, Inc; SecurShield HD Plus Polyiso, 1/2 inch thick, glass-mat faced, high density polyiso insulation:
  - 1. Type II, Class 4, Grade 1 meeting ASTM C1289.
  - 2. Or equal: As approved by roofing membrane manufacturer.

## **2.4 INSULATION**

- A. Polyisocyanurate Board Insulation: Basis of Design Manufacturer: Carlisle Syntec Systems, Inc; SecurShield; rigid cellular foam, complying with ASTM C1289, Type II, Class 2, cellulose felt or glass fiber mat both faces; Grade 1 and with the following characteristics:
  - 1. Compressive Strength: 25 psi.
  - 2. Board Size: 48 by 48 inch or 48 by 96 inch.
  - 3. Tapered Board for Crickets: Slope as indicated; minimum thickness, 1/2 inch; fabricate of fewest layers possible.
  - 4. Manufacturer: As approved by roofing membrane manufacturer.

## **2.5 ACCESSORIES**

- A. Prefabricated Roofing Expansion Joint Flashing: Sheet butyl over closed-cell foam backing seamed to galvanized steel flanges.
- B. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.
- C. Cant and Edge Strips: Wood fiberboard, compatible with roofing materials; cants formed to 45 degree angle.
- D. Termination Bars: Stainless steel surface mounted type with flanged top for caulking as approved by roofing manufacturer.
- E. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches wide; self adhering.

- F. Insulation and Cover Board Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
- G. Membrane Adhesive: As recommended by membrane manufacturer.
- H. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.
- I. Thinners and Cleaners: As recommended by adhesive manufacturer, compatible with membrane.
- J. Insulation Adhesive: As recommended by insulation manufacturer.
- K. Sealants: As recommended by membrane manufacturer.
- L. Mechanical Fasteners for Insulation Cover Board: As recommended by insulation cover board and roofing manufacturers for type of roof deck indicated on the drawings and pull out resistance required to meet warranty specified.
- M. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
  - 1. Composition: Asphaltic with mineral granule surface or Roofing membrane manufacturer's standard.
  - 2. Locations: As indicated on drawings.

## **2.6 METAL FASCIA**

- A. Basis of Design: SecurEdge 200 Fascia by Carlisle Syntec; [www.carlisle-syntec.com](http://www.carlisle-syntec.com) or approved equal by Carlisle Syntec as required to provide warranty.
  - 1. Material: .050 inch thick aluminum
  - 2. Concealed splice plates: 8" wide. Finish to match finish of coping cap with factory applied dual non-curing sealant strips.
  - 3. Water Dam/Support Cleat: Continuous 24 ga. prepunched galvanized cleat mechanically fastened as indicated and detailed.
  - 4. Fasteners: #12 x 1-5/8" corrosion resistant fasteners provided with drivers. No exposed fasteners shall be permitted. Fasteners shall be electrolytically compatible.
  - 5. Size and profile: As required to match existing roof edge condition.
  - 6. Fascia Extenders: As required to match existing conditions. Material thickness and finish to match fascia.
  - 7. Finish: Kynar 500 finish system from manufacturer's standard color to match existing as close as possible and approved by Owner. Separate color selection per school.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

### **3.2 INSULATION - UNDER MEMBRANE**

- A. Attachment of Insulation:

1. Base Layer for Fully Adhered method for roof locations as indicated on drawings: Fully adhere first layer of insulation to deck in accordance with roofing manufacturer's instructions and Factory Mutual requirements.
2. Additional Layers for Fully Adhered Method: Embed each subsequent layer of insulation in full bed of adhesive in accordance with roofing and insulation manufacturers' instructions.
3. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
4. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
5. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.
6. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 24 inches.
7. Do not apply more insulation than can be covered with membrane in same day.

### **3.3 COVER BOARD INSTALLATION**

- A. Fully adhere cover board to top layer of insulation where indicated on drawings, in accordance with Factory Mutual recommendations and roofing manufacturer's instructions.

### **3.4 MEMBRANE APPLICATION**

- A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- B. Shingle joints on sloped substrate in direction of drainage.
- C. Fully Adhered Application: Apply adhesive to substrate at rate required by membrane manufacturer. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.
- D. At intersections with vertical surfaces:
  1. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.
  2. Fully adhere flexible flashing over membrane and up to nailing strips.
  3. Around roof penetrations, seal flanges and flashings with flexible flashing.
  4. Install roofing expansion joints where indicated. Make joints watertight.
    - a. Install prefabricated joint components in accordance with manufacturer's instructions.
  5. Coordinate installation of roof drains and sumps and related flashings.

### **3.5 CLEANING**

- A. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.
- B. Repair or replace defaced or damaged finishes caused by work of this section.

### **3.6 PROTECTION**

- A. Protect installed roofing and flashings from construction operations.
- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

**END OF SECTION**

**SECTION 22 10 06**  
**PLUMBING PIPING SPECIALTIES**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Roof drains.

**1.2 RELATED REQUIREMENTS**

- A. See Bid Form for Unit Pricing for New Roof Drains.
- B. Division 07 53 00 - Elastomeric Membrane Roofing.

**1.3 REFERENCE STANDARDS**

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ASME A112.6.4 - Roof, Deck, and Balcony Drains; 2003.

**1.4 SUBMITTALS**

- A. See Section 013300 - Submittal Procedures.
- B. Listed manufacturers and series are for reference only and do not promote any single product. Series are provided for reference, and should not be used as an ordering model number. Accessories and options may be custom components purchased separately.
- C. Product Data: Provide manufacturer's most current catalog data sheet for equipment indicating rough-in size, finish, and accessories. Manufacturer's data sheets on each item of equipment and device, shall be clearly marked up to identify the items, accessories and options to be used on the project.
  - 1. Provide component sizes, rough-in requirements, service sizes, and finishes. Indicate dimensions, weights, and placement of openings and holes.
  - 2. Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.
  - 3. Roof Drains. (22 10 06 - 001 -A)
- D. Project Record Documents: Record actual locations of equipment, cleanouts, backflow preventers, water hammer arrestors.
  - 1. Refer to Section 017700 - Closeout Submittals.
  - 2. (20 00 00 - 005 - A)
- E. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.
  - 1. Refer to Section 017700 - Closeout Submittals.
  - 2. (20 00 00 - 006 - A)
  - 3. (20 00 00 - 007 - A)
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements, for additional provisions.
  - 2. 2 additional dome covers for each type of roof drain.

**PART 2 PRODUCTS**

**2.1 ROOF DRAINS**

- A. Roof Drains:
  - 1. Assembly: ASME A112.6.4.
  - 2. Body: Lacquered cast iron with sump with deck clamp.

3. Strainer: Removable polyethylene dome with vandal proof screws.
4. Accessories: Coordinate with roofing type, refer to Division 07:
  - a. Under deck clamp.
  - b. Drain receiver.
5. Size: To match existing drain indicated to be replaced, field verify.
6. Manufacturers:
  - a. Jay R. Smith Manufacturing Company; Series 1015: [www.jrsmith.com/#sle](http://www.jrsmith.com/#sle).
  - b. OMG Roofing Products: [www.omgroofing.com/#sle](http://www.omgroofing.com/#sle).

### **PART 3 EXECUTION**

#### **3.1 INSTALLATION**

- A. Install in accordance with the following:
  1. Federal, State and Local Codes.
  2. 36 CFR 1191
  3. NSF 61
- B. Roof Drains:
  1. Install roof drain within roofing system. Refer to Division 075300 - Elastomeric Membrane Roofing for roof systems.

**END OF SECTION**

**SECTION 22 14 26**  
**RETROFIT ROOF DRAINS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Retrofit roof drains.

**1.2 RELATED REQUIREMENTS**

- A. See Bid Form for Unit Pricing for New Retrofit Roof Drains.
- B. Section 07 53 00 – Elastomeric Membrane Roofing.

**1.3 REFERENCE STANDARDS**

- A. International Association of Plumbing and Mechanical Officials (IAPMO):
- B. PS 97-96 – Mechanical Cast Iron Closet Flanges – Pressure Test
- C. Single Ply Roofing Industry (SPRI):
- D. ANSI/SPRI RD-1 – Performance Standard for Retrofit Drains.

**1.4 SUBMITTALS**

- A. Product Data: Submit manufacturer’s product data, including installation instructions.
- B. Shop Drawings: Submit manufacturer’s shop drawings, including plans, elevations, sections, and details, indicating dimensions, materials, hardware, and installation layout including sizes and spacing.
- C. Samples: Submit manufacturer’s sample of retrofit roof drains.
- D. Manufacturer’s Certification: Submit manufacturer’s certification that materials comply with specified requirements and are suitable for intended application.
- E. Warranty Documentation: Submit manufacturer’s standard warranty.

**1.5 QUALITY ASSURANCE**

- A. Manufacturer’s Qualifications: Manufacturer regularly engaged, for past 5 years, in manufacture of retrofit roof drains of similar type to that specified.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements:
  - 1. Store and handle materials in accordance with manufacturer’s instructions.
  - 2. Keep materials in manufacturer’s original, unopened containers and packaging until installation.
  - 3. Store materials in clean, dry area indoors.
  - 4. Protect materials during storage, handling, and installation to prevent damage.

**PART2 PRODUCTS**

**2.1 MANUFACTURER**

- A. Basis of Design - Retrofit Drains: RAC Deluxe Retrofit Drain by OMG, Inc.; [www.olyfast.com](http://www.olyfast.com) or comparable product meeting project requirements.

**2.2 RETROFIT ROOF DRAINS**

- A. Retrofit Roof Drains: “RAC Deluxe RetroDrain”.

1. Size: 3 inches to 6 inches to be field verified.
2. Compliance:
  - a. ANSI/SPRI RD-1.
  - b. IAPMO PS 97-96.
3. Drain Body:
  - a. Material: 0.080-inch aluminum.
  - b. Flange: 18-inch square.
  - c. Drain Stem Length: To be field verified.
  - d. Flange Includes:
    - 1) Six 1-1/8-inch-long stainless steel studs.
    - 2) 12 pre-punched holes to secure flange.
  - e. Sump Area: Depressed.
4. Strainer Dome:
  - a. Material: 0.080-inch aluminum.
  - b. Height: 4 inches.
  - c. Outside Base Diameter: 14 inches.
  - d. Inlet Area: 125 square inches.
5. Clamping Ring:
  - a. Material: 0.125-inch aluminum.
  - b. Low profile.
  - c. Strainer Brackets: 2, to 5-1/2 inches high to secure strainer.
  - d. Bosses: 6, to accept studs on flange.
6. Backflow Seal:
  - a. Compression Seal: Watertight, "RAC Seal" mechanical seal.
  - b. Material: Urethane and cast aluminum.
  - c. Required for Activation: 7/16-inch wrench.
7. Hardware:
  - a. Nuts: 6, stainless steel kep nuts, for studs.

### **2.3 ACCESSORIES**

- A. Drain Guard: "DrainGuard".
  1. [3-foot by 3-foot] [4-foot by 4-foot] aluminum fixture, 4-inches high with drainage slots.
  2. Adhere to roof system.
  3. Surround retrofit roof drains to prevent blockage of drain strainer. EXECUTION

## **PART 3 EXAMINATION**

### **3.1 EXAMINATION**

- A. Examine existing roof drains to receive retrofit roof drains.
- B. Notify Architect of conditions that would adversely affect installation or subsequent use.
- C. Do not begin installation until unacceptable conditions are corrected.

### **3.2 PREPARATION**

- A. Remove clamping ring, strainer dome, and bolts from existing roof drain assembly and discard.
- B. Clean existing drain leader pipe of bitumen, dirt, and debris.

### **3.3 INSTALLATION**

- A. Install retrofit roof drains in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Install retrofit roof drains into existing drain leaders in accordance with manufacturer's instructions.
- C. Install flashing in accordance with membrane roofing manufacturer's instructions.
- D. Install retrofit roof drains to provide watertight connection to existing plumbing and membrane roofing systems.

**3.4 PROTECTION**

- A. Protect installed retrofit roof drains to ensure that, except for normal weathering, retrofit roof drains will be without damage or deterioration at time of Substantial Completion.

**END OF SECTION**