Part II
Division 7

Thermal and Moisture Protection

SECTION 07 11 00

APPLIED WATERPROOFING SYSTEMS

1 PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 General Requirements, apply to the work of this section.

1.2 SUMMARY

A. The work of this section includes, but is not limited to, the following:

1. Fluid applied waterproofing system (below grade) with protection board.
2. Spray applied waterproofing system (above grade) on building substrate.

B. Related Sections: Other specification sections which directly relate to the work of this section include, but are not limited to, the following:

1. Section 07210 – Building Insulation
2. Section 07900 – Joint Sealers

1.3 REFERENCE STANDARDS

A. The following standards and publications are applicable to the extent referenced in the text.

B. American Society for Testing and Materials (ASTM)

C 836 Standard Specification for High Solids, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course

C 898 Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane With Separate Wearing Course

D 412 Standard Test Methods for Rubber Properties in Tension

D 903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds

D 1644 Test Methods for Nonvolatile Content of Varnishes

D 3767 Standard Practice for Rubber - Measurements of Dimensions

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product data, installation instructions, use limitations and recommendations.

B. Samples: Submit representative samples of the following for approval:

1. Fluid applied membrane
2. Protection board

1.5 QUALITY ASSURANCE

A. Installer: A firm which has at least 3 years experience in work of the type required by this section.

B. Materials:

1 Fluid applied waterproofing material shall be two part synthetic rubber based system free of isocyanates and bitumen. For each type of material required for the work of this section, provide primary materials which are the products of one manufacturer.

2. Spray applied waterproofing material shall be RD-ELASTOWRAP by RD Coatings USA, 167 Avon Street, Stratford, CT 06615 Phone: 203-380-9477

C. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Agenda for meeting shall include review of special details and flashing.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer's instructions, recommendations and material safety data sheets. Protect from damage from sunlight, weather, excessive temperatures and construction operations. Remove damaged material from the site and dispose of in accordance with applicable regulations.

1. Do not double-stack pallets of waterproofing on the job site. Provide cover on top and all sides, allowing for adequate ventilation.
2. Store drainage composite or protection board flat and off the ground. Provide cover on top and all sides.
3. Protect waterproofing materials from freezing. In cool temperatures, store the material for several hours at room temperature to facilitate mixing and application.

B. Sequence deliveries to avoid delays, but minimize on-site storage.

1.7 PROJECT CONDITIONS

A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.

B. Proceed with installation only when substrate construction and preparation work is complete and in condition to receive membrane waterproofing.

2 PART 2 PRODUCTS

2.1 MATERIALS

A. Fluid Applied Waterproofing Membranes: Procor® fluid applied membranes by Grace Construction Products, or approved equal; a two part, self-curing, synthetic rubber based material. Provide Protection Board (only if prefabricated drainage composite is not used) to be Expanded Polystyrene Protection Board: Refer to Section 07 21 00. Procor® fluid applied membranes meet or exceed the performance requirements of ASTM C 836 and other ASTM standards as shown in the following table:

PHYSICAL PROPERTIES FOR PROCOR® FLUID APPLIED MEMBRANES:

Property	Test Method	Typical Value
Color		terra cotta
Cured Film Thickness	ASTM D 3767 Method A	1.5 mm (0.060 in.) nominal
Solids Content	ASTM D 1644	100%
Flexibility, 180° bend over	ASTM D 1970	Unaffected

25 mm (1 in.) mandrel at 32°C (-25°F)		
Elongation	ASTM D 412	500% minimum
Peel Adhesion to Concrete	ASTM D 903 Modified[1]	880 N/m (5 lbs/in.)

Footnote: 1. Procor waterproofing membrane is applied to concrete and allowed to cure. Peel adhesion of the membrane is measured at a rate of 50 mm (2 in.) per minute with a peel angle of 90° at room temperature.

B. Spray Applied Waterproof Membranes: RD-ELASTOWRAP

1. DESCRIPTION OF THE PRODUCT

USE: Highly Elastic waterproof coating system, which is resistant to the diffusion of vapour and air. Designed to be used as a waterproof membrane, which is an air, and vapour barrier.

FEATURES:

Good chemical resistance.
Excellent resistance against abrasion.
Low-odour.
Resistant to the diffusion of vapour and air through the coating.
Resistant to the formation of mildew on the coating surface.
Can be used with reinforcing as flashing.

SUBSTRATES: Can be applied to a wide variety of surfaces to include, but not limited to, Plywood, Concrete, block, tile, gypsum and other wallboards with use of adhesion primer. Can be applied directly to most metal surfaces, polyurethane and polystyrene insulation boards.

SYSTEM: As a vapour barrier, Waterproof coating.

Primer: Unifix or Multiprim depending on the surface to be coated.
3 coats ELASTOWRAP applied at 12mils DFT each to achieve 36 mils.
Reinforcing fleece can be used with this system for flashing.

2. APPLICATION INSTRUCTIONS

PREPARATION OF THE SUBSTRATE: The substrate has to be clean, dry and free of dust.

APPLICATION CONDITIONS:

Indoor: Provide proper ventilation.
Environmental Conditions (general requirements).
The minimum air and substrate temperatures; 42°F for 24hours.
The maximum surface temperature; 130°F.
The maximum relative humidity: 90%. Understanding that the surface temperature must be at least 5°F above the Dew Point, with no threat of rain for 3hours.

APPLICATION MEANS:

Airless spray is recommended to ensure a consistent film thickness(tip size: 018–026). Brush and roller can be used.

DILUTION: Ready to use.

CLEANING OF TOOLS: Water.

COVERAGE: Theoretical Coverage: 5 gallon container.

To achieve low perm air barrier - 300 sq. ft. at 16mils DFT.
To achieve vapour barrier – 115 sq/ft at 36mils DFT.

3. TECHNICAL DATA

FINISH: Satin mat.

COLORS: White.
SOLIDS CONTENT: By weight: 72%. By volume: 58%. VOC Content 8g/L.
DENSITY: Ca. 1.46.
Water Vapour Diffusion Resistance: ASTM-D1653 9.9grams/24hrs
FLASH POINT: Not flammable.
Permeability: 0.3perms or 0.2metric perms.
VISCOSITY: 185 P – 225 P (Brookfield 20 Rpm)
DRYING TIME: 70°F/50%RH, To touch: 2 hours, To recoat: min. 5 hours, Full cure: min 7 days.
PACKING: 5 Gallon.
STORAGE STABILITY:
12 months minimum provided the original container is sealed and has been stored in a controlled environment. Prevent freezing.

3 PART 3 EXECUTION

3.1 EXAMINATION

A. The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 PREPARATION OF SUBSTRATES

A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods which are acceptable to manufacturer of the fluid applied waterproofing.

B. Cast-In-Place Concrete Substrates:

1. Waterproofing application may commence as soon as the substrate can accept foot traffic. Surface shall be free of any visible water.
2. Fill form tie rod holes with concrete and finish flush with surrounding surface.
3. Repair bugholes over 13 mm (0.5 in.) in length and 6 mm (0.25 in.) deep and finish flush with surrounding surface.
4. Remove scaling to sound, unaffected concrete and repair exposed area.
5. Grind irregular construction joints to suitable flush surface.

C. Masonry Substrates: Apply waterproofing over concrete block and brick with smooth trowel-cut mortar joints or parge coat.

D. Plywood Substrates: Pretreat all plywood joints with 75mm (3 in.) wide, reinforced self-adhesive tape. Secure all fasteners.

E. Related Materials: Treat joints and install flashing as recommended by waterproofing manufacturer.

3.3 INSTALLATION

A. Refer to manufacturer's literature for recommendations on installation, including but not limited to, the following:

1. Apply minimum 1.5 mm (0.060 in.) in all areas to be waterproofed. Apply minimum 3 mm (0.120 in.) in all detail areas.
2. If area to be waterproofed is in direct sunlight and temperature is rising, apply "scratch coat" (a thin application of fluid applied waterproofing) prior to the full application of the waterproofing membrane.
3. In applications where a minimum slope of 11 mm/m (0.13 in./ft) can not be achieved, a two coat application of Procor membrane is recommended to achieve the total thickness.
4. Apply protection board and related materials in accordance with manufacturer's recommendations.

3.4 CLEANING AND PROTECTION

A. Remove any masking materials after installation. Clean any stains on materials which would be exposed in the completed work.

B. Protect completed membrane waterproofing from subsequent construction activities as recommended by manufacturer.

...END OF SECTION

SECTION 07 21 00

BUILDING INSULATION

1 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 Work of this section.

1.2 SECTION INCLUDES

A. Board thermal insulation at foundation wall perimeter, under plaza deck topping slab and under slabs on grade.

B. Spray form insulation/vapor retarder in exterior wall and roof construction.

C. Acoustical floor mat insulation.

D. Acoustical batt insulation.

1.3 SYSTEM DESCRIPTION

A. System performance to provide continuity of thermal barrier and vapor retarder at building enclosure elements.

1.4 SUBMITTALS

A. Product Data: Submit data on insulation products, including thermal characteristics.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Install insulation adhesives in accordance with manufacturer's instructions.

2 PART 2 PRODUCTS

2.1 INSULATION MATERIALS

A. Extruded Polystyrene Insulation: ASTM C578, cellular type, conforming to the following:

1. Thermal Resistance: R of 5.0 per inch.
2. Thickness: Thickness indicated on drawings.
3. Compressive Strength: Minimum 25 psi.
4. Water Absorption: In accordance with ASTM D2842 0.3 percent by volume maximum.

B. Under Slab Insulation / Moisture Barrier: Insulation Systems "Insul-Tarp", ½" thick closed cell foam and an aluminum reflective material with a protective poly coating.

1. .002 perm rating when tested using ASTM E96, R of 7.54 when tested using ASTM C 518,
2. Temperature Range - -60° to 180° F
3. Fire Rating - Up to Class A-1,
4. Reflectivity - Up to 97%,
5. Perm Rate - 0.002,
6. Tensile Strength - 45.0 lbs/in.,
7. Bursting Strength - 90 psi –
8. Puncture Resistance - 66 lbs per square inch.
9. Overlap and tape all seams to provide a continuous vapor barrier. Seal all penetrations.

C. Low-Expansive Spray Foam Insulation: spray applied high-performance low-expansive foam insulation system:

1. Thermal Resistance: R-3 minimum per inch, provide to seal and fill gaps at all door and window jamb rough openings, between panelized wood framing and where indicated. Provide window and door manufacture acceptance of product.

D. Sill Seal Insulation: Between concrete/wood or concrete/steel structural floor systems and sill plates where indicated, ¼" x 3 ½" or 5 ½" as indicated, Owens Corning FoamSealR Sill Plate Gasket, or equal. Set in bed of sealant top and bottom

E. Acoustical Batt Insulation: Unfaced fiberglass batts, ASTM C 665, Type I; Owens Corning "Sonobatts", or equal.

1. Thickness: Thickness indicated on drawings.

2.2 SPRAY-IN-PLACE FOAM INSULATION MATERIALS

A. Polyurethane: Spray applied polyurethane, ASTM D 1622, closed cell insulation, 2.5 lbs./sf density, R-value of 6.8 per inch, DEMILEC HeatLoc Soy, or equal.

1. Thermal Resistance of insulation: 3" R-19.8 for existing/new exterior wall where indicated.
2. Thermal Resistance of insulation: 3" R-19.8 at eaves/floor cavities where indicated.
3. Thermal Resistance of 6" R-39.6 at cathedral ceilings and where indicated.

2.3 ADHESIVES

A. Adhesive: Type recommended by insulation manufacturer for application.

2.4 ACCESSORIES

A. Vapor Retarder: Clear polyethylene film, 10 mil thick, reinforced.

B. Tape: Polyester self-adhering type.

3 PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive.

3.2 INSTALLATION - FOUNDATION PERIMETER - BOARD INSULATION

A. Apply adhesive and install boards on foundation perimeter. Stagger joints. Butt edges and ends tight to adjacent board and to protrusions.

B. Place insulation boards under slab edge.

3.3 INSTALLATION – SLABS ON GRADE - BOARD INSULATION

A. Place insulation boards under slabs on grade at perimeter.

3.4 INSTALLATION – SLABS ON GRADE – FLEXIBLE INSULATION AND VAPOR BARRIER

A. Place flexible insulation and vapor barrier completely under slabs on grade.

3.5 INSTALLATION - BATT INSULATION

A. Install insulation and vapor retarder in accordance with insulation manufacturer's instructions.

B. Install in exterior walls and ceiling spaces without gaps or voids.

C. Fit insulation tight in spaces. Leave no gaps or voids.

D. Install friction fit insulation tight to framing members, completely filling prepared spaces.

E. Place vapor retarder on warm side of insulation by securing in place. Extend vapor retarder tight to full perimeter of adjacent window and door frames and other items interrupting the plane of membrane. Tape seal in place.

3.6 SCHEDULES

A. Slabs on Grade: R-10 (2") extruded polystyrene boards at perimeter of new slabs on grade, Dow Styrofoam Highload 40, or equal.

B. Foundation Perimeter Insulation: R-10 (2") Dow Styrofoam Square Edge on face of foundation walls.

C. Exterior Wall Cavities: Spary-In-Foam 3" R-19.8 for existing/new exterior wall as indicated.

D. Acoustical Insulation: 2-1/2" unfaced fiberglass batts in partition and floor/ceiling assemblies where indicated.

...END OF SECTION

SECTION 07 27 00

AIR INFILTRATION BARRIER

1 PART 1 GENERAL

1.1 SUMMARY:

A. Includes but not limited to:

1. Furnish and install over exterior of wall sheathing at all locations regardless of whether or not indicated on drawings to protect exterior sheathing and interior walls.

1.2 REFERENCES:

A. AATCC – 127

B. TAPPI T – 460 (sec/100cc)

C. ASTME 96 (g/m2 –24 hr.)

1.3 SUBMITTALS:

A. General: Submit each item in this Article according to the conditions of the Contract and Division I Specifications Sections.

B. Product Data: Submit product specifications, technical data and installation instructions of manufacturer equaling or exceeding those specified.

2 PART 2 PRODUCTS

2.1 AIR INFILTRATION BARRIER/SECONDARY WEATHER RISISTIVE MEMBRANE:

A. Spun-bonded olefin, None-woven, Non-perforated.

B. Performance Requirements

1. Water Penetration Resistance: AATCC – 127: 280 cm.
2. Air Infiltration: TAPPI T – 460 (sec/100cc): >1500 seconds.
3. Water Vapor Transmission: ASTM E 96 Method B(g/m2 – 24 hr.): 28 perms.
4. Basis Weight: TAPPIT- 410: 2.7 oz/yd$^{2.}$
5. Breaking Strength: ASTM D-882, Method A (lbs/in): 38/35.
6. Tear Resistance: ASTM D-117 (lbs): 12/10.
7. Surface Burning Characteristics: ASTM E-84-97a, Flame Spread: Class A.

C. Membrane shall be free from holes and breaks other than those created by fasteners and construction system due to attachment

D. Approved Manufacturer:

1. DuPont Tyvek® Commercial Wrap® by DuPont Company, Wilmington, Delaware
2. No Alternates or Substitutions

2.2 SEALING TAPE/FASTENERS

A. Approved Tape Manufacturers:

1. DuPont Tyvek Tape, by DuPont Company, Wilmington Delaware

B. Fasteners for Wood Framed construction:

1. DuPont Tyvek Wrap Cap Nails.

C. Fasteners for Steel Framed Construction:

1. DuPont Tyvek Wrap Cap Screws.

D. Recommended Fastening to Masonry:

1. Polyurethane or elastomeric adhesives

2.3. FLASHINGS

A. Elastomeric Flexible Flashing: DuPont FlexWrap.

B. Elastomeric Straight Flashing: DuPont StraightFlash.

3 PART 3 EXECUTION

3.1 AIR INFILTRATION BARRIER

A. Install Air Infiltration Barrier over exterior side of exterior wall sheathing in accordance with manufacturer's instructions.

B. Install Air Infiltration Barrier after sheathing is installed and before windows and doors are installed. Install lower level barrier prior to upper layers to ensure proper shingling of layers.

C. Overlap Air Infiltration Barrier at corners of building by a minimum of 12 inches.

D. Overlap Air Infiltration Barrier vertical seams by a minimum of 6 inches.

E. Ensure barrier is plumb and level with foundation, and unroll extending Air Infiltration Barrier over window and door openings.

F. Attach Air Infiltration Barrier to wood, insulated sheathing board or exterior gypsum with plastic cap nails every 12" to 18" on vertical stud line with wood stud framing, and screws with washers to metal stud framing.

G. Prepare window and door rough openings as follows:

1. Prepare each window rough opening by cutting a modified "I" pattern in the Air Infiltration Barrier. This is done as follows:

    a. Horizontally cut Air Infiltration along bottom of header.
    b. Vertically cut Air Infiltration Barrier down the center of window openings from the top of the window opening down to 2/3 of the way to the bottom of the window openings.
    c. Diagonally cut Air Infiltration Barrier from the bottom of the vertical cut to the left and right corners of opening.
    d. Fold side and bottom flaps into window opening and fasten every 6 inches. Trim off excess.

2. Prepare each rough door opening by cutting a standard "I" pattern in the Air Infiltration Barrier. This is done as follows:

    a. Horizontally cut Air Infiltration Barrier along bottom of door frame header and along top of sill.
    b. Vertically cut Air Infiltration Barrier down the center of door openings from the top of the door opening (header) down to the bottom of the door opening (sill).

    c. Fold side flaps inside around door openings and fasten every 6 inches. Trim off excess.

H. Tape all horizontal and vertical seam of Air Infiltration Barrier.

I. Tape a patch over all tears and cuts in Air Infiltration Barrier.

J. Install 2"x2" square of DuPont StraightFlash beneath all masonry anchors and siding fasteners penetrating Air Infiltration Barrier and sheathing.

K. Install 12" wide strip of flexible flashing (6" wide on each face) at all exterior and interior corners over Air Infiltration Barrier.

...END OF SECTION

SECTION 07 27 10

UNDER-SLAB VAPOR RETARDER

1 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 work of this section.

1. Vapor Retarder, seam tape, and pipe boots.

1.2 SECTION INCLUDES

A. American Society for Testing and Materials (ASTM)

1. ASTM E 1745 Standard for Plaster Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs

2. ASTM E 154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs

3. ASTM 96 Standard Test Methods for Water Vapor Transmission of Materials

4. ASTM E 1643 Standard Practice for Installation of Water Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

B. American Concrete Institute (ACI)

1. ACI 302.1R-6 &7 Section 3.2.3 Vapor Retarder

1.3 SUBMITTALS

A. Testing/Specifications

1. Independent laboratory tests results showing compliance with ASTM & ACI Standards.

2. Manufacturer's samples, literature.

3. Manufacturer's installation instructions for placement and seaming.

2 PART 2 PRODUCTS

2.1 MATERIALS

A. Provide a vapor retarder, which meets ALL criteria for Class A, per ASTM E-1745. Supplied material must be printed with "Meets ASTM E-1745 Class A" a minimum of 1 time per 500 square feet.

B. Equal to Vapor Block 15, by Raven Industries (800) 635-3456.

2.2 ACCESSORIES

A. Seam Tape:

1. Vapor Bond Tape, by Raven Industries (800) 635-3456 or other 4" wide tape approved by vapor retarder manufacturer.

B. Pipe Boots:

1. Raven VaporBoot or other manufacturer's supplied pipe boot.

3 PART 3 EXECUTION

3.1 PREPARATION

A. Ensure that subsoil is approved by architect.

1. Level and tamp or roll aggregate, sand or tamped earth base.

3.2 Installation

A. Install Vapor Retarder:

1. Installation shall be in accordance with manufacturer's instructions and ASTM E 1643.

a. Unroll Vapor Retarder with the longest dimension parallel with the direction of the pour.

b. Lap Vapor Retarder over footings and seal to foundation walls.

c. Overlap joints 6 inches and seal with Vapor Bond Tape or other 4" wide pressure sensitive tape.

d. Seal all penetrations (including pipes) with manufacturer's pipe boot.

e. No penetration of the Vapor Retarder is allowed except for reinforcing steel and permanent utilities.

f. Repair damaged areas by cutting patches of Vapor Retarder, overlapping damaged area 6 inches and taping all four sides with Vapor Bond Tape or other 4" wide pressure sensitive tape.

...END OF SECTION

SECTION 07 53 00

ELASTOMERIC SHEET ROOFING

1 PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract including General and Supplementary Conditions and Division 1specification sections, apply to work of this section.

1.2 SECTION INCLUDES

A. Elastomeric Sheet Membrane Conventional Roofing System, insulation, roofing membrane expansion joints, mechanically attached.

1.3 SYSTEM DESCRIPTION

A. Elastomeric sheet membrane roof assembly including structure and ceiling under to conform to requirements for a UL Class A fire rated assembly, and FM I 90 requirements for wind uplift resistance.

1.4 SUBMITTALS

A. Product Data: Provide characteristics on membrane materials, flashing materials, insulation and walkway pads.

B. Roof Inspection Report: Submit inspection report by roofing membrane manufacturer's representative following completion of installation.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with UL 790 (Underwriters Laboratories Inc.) Class A Fire Hazard Classification. FM 4470 (Factory Mutual Engineering Corporation) - Roof assembly Classification wind uplift requirement of I-90, FM Construction Bulletin 1-28, Class 1 A Construction.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Do not install membrane during inclement weather or when air temperature may fall below 40 degrees F.

1.7 WARRANTY

A. Provide fifteen (15) year warranty under provisions of Section 01 00 00 including coverage of materials and installation and resulting damage to building resulting from failure to resist penetration of moisture.

2 PART 2 PRODUCTS

2.1 MEMBRANE MATERIALS

A. Manufacturers:

1. Carlisle Syntec Systems.
2. Celotex Corp.
3. Dunlop Construction Products Co.
4. Firestone Building Products Co.
5. Goodyear Tire and Rubber Co.
6. Schuller Roofing Systems.

B. Membrane: EPDM; 0.060 inch thick, reinforced.

C. Seaming Materials: As recommended by membrane manufacturer.

2.2 MEMBRANE FASTENING

A. Insulation Adhesive: Type recommended by insulation manufacturer.

B. Mechanical Fasteners: Manufacturer's standard type for application intended.

2.3 INSULATION MATERIALS

A. Manufacturers:

1. As approved by manufacturer of roofing membrane.

B. Insulation: ASTM C 1289-95 Type II, polyisocyanurate closed cell foam core with manufacturer's standard facing; thicknesses as indicated, square edges, R value of 6.0 per inch thickness. Provide tapered sections as required to ensure positive drainage to roof drains.

C. Separation Sheet: As recommended by roofing membrane manufacturer for application intended.

D. Insulation Adhesive: As recommended by insulation manufacturer.

2.4 ACCESSORIES

A. Flexible Flashings: Same material as membrane, black color; manufactured by roofing membrane manufacturer.

B Roof Edge/Fascia: two part interlocking aluminum fascia system meeting requirements for wind uplift rating, with Kynar finish, color as selected by Architect; Firestone FM 120, or equal.

C. Prefabricated Control or Expansion Joint Flashing: Sheet EPDM with foam filler, and metal edge flashings: Schuller Expand-O-Flash or equal.

D. Fiber Cant Strips: Asphalt impregnated wood fiberboard.

E. Roofing Fasteners: Galvanized or non-ferrous type as recommended by membrane manufacturer.

F. Sealants: As recommended by membrane manufacturer.

G. Walkway Pads: As recommended by membrane manufacturer

3 PART 3 EXECUTION

3.1 PRE ROOFING CONFERENCE

A. Conduct pre-roofing conference with all trades affected by roofing installation, Owner and Architect. Record discussions and distribute to all parties.

3.2 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work; deck is clean and smooth, free of snow or ice; properly sloped to drains.

B. Verify roof openings, curbs, and protrusions through roof are solidly set; wood cant strips and reglets are in place.

3.3 PREPARATION

A. Fill concrete surface honeycomb and variations with latex filler.

3.4 INSULATION APPLICATION

A. Mechanically fasten insulation to deck in accordance with insulation manufacturer's instructions to meet wind uplift rating.

B. Lay second layer of insulation with joints staggered from first layer and mechanically fasten in accordance with insulation manufacturer's instructions.

C. Minimum Total Insulation Thickness: As required to achieve an average insulation R-value of 24.

D. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

3.5 MEMBRANE APPLICATION

A. Apply membrane and mechanical attachment devices in accordance with manufacturer's instructions.

B. Roll out membrane. Work out air bubbles, wrinkles, and fish mouths.

C. Overlap edges and ends and solvent seal watertight.

D. Install mechanical fasteners in accordance with manufacturer's instructions and UL and FM ratings.

E. Seal membrane to adjoining surfaces.

F. Shingle joints on sloped substrate in direction of drainage. Apply joint sealant.

G. Continue membrane up vertical surfaces minimum 8 inches unless otherwise noted. Reinforce membrane with multiple thickness of membrane material over joints.

H. Seal items penetrating membrane with counter flashing membrane material. Install membrane flashings. Seal watertight to membrane.

I. Place walkway units at locations indicated.

3.6 FLASHINGS AND ACCESSORIES

A. Apply flexible flashings to seal membrane to vertical elements.

B Install roof edge trim/fascia in accordance with manufacturer's instructions. Seal to roof membrane.

C. Install prefabricated roofing expansion control joints to isolate roof into areas as indicated in accordance with manufacturer's instructions.

D. Coordinate installation of roof drains sumps and related flashings.

E. Seal flashings and flanges of items penetrating membrane.

3.7 INSPECTION

A. Conduct inspection of completed installation with representative of roofing membrane manufacturer. Identify any deficiencies and make corrections as directed by representative. Submit reports to Architect/Engineer and Owner.

...END OF SECTION

SECTION 07 61 00

PAINTED ALUMINUM ROOFING AND SIDING

1 PART 1 GENERAL

1.1 SUMMARY

A. Section includes [copper] [pre-finished galvanized steel] roofing and associated flashings, [gutters and downspouts], and [eave (ice dam) protection].

1.2 SYSTEM DESCRIPTION

A. Sheet Metal Roofing and Siding System: Conform to criteria of SMACNA "Architectural Sheet Metal Manual."
   1. Standing seam roofing: SMACNA Details as indicated on Drawings.
   2. Flashings: SMACNA Details as indicated on Drawings.

1.3 SUBMITTALS

A. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, termination, and installation details.

B. Samples: Submit two samples, 36x36 inch in size of metal roofing mounted on plywood backing illustrating typical seam, external corner, material, color, and finish.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with referenced state and local code standards/

B. Maintain one copy of each document on site.

1.5 WARRANTY

A. Furnish twenty year manufacturer warranty for finishes.

2 PART 2 PRODUCTS

2.1 SHEET METAL ROOFING AND SIDING

A. Fabricators:
   1. Una-Clad, or equal.
   2. Pac Clad, or equal.
   3. Substitutions: Permitted.

B. Product Description: Metal roofing and siding of brake formed metal sheets; flat and standing; prefinished. Eave (ice dam) protection.

2.2 COMPONENTS

A. Pre-Finished Aluminum Sheet: ASTM B209; alloy and temper as required for application and finish; 0.050 inch thick; plain finish shop pre-coated fluoropolymer (Kynar 500 or equal) top coat; (2) colors to match Benjamin Moore a) Hasbrouck Brown HC-71, and b) Whital Brown HC-69.

2.3 ACCESSORIES

A. Fasteners: Stainless steel, with soft neoprene washers.

B. Underlayment: ASTM D226; Type II, No. 30 unperforated asphalt felt.

C. Slip Sheet: Rosin sized building paper.

D. Protective Backing Paint: FS TT-C-494, bituminous.

E. Sealant: Exterior metal lap joint butyl or polyisobutylene sealant as specified in Section 07 90 00.

F. Plastic Cement: ASTM D4586, Type I.

G. Reglets: Recessed type, galvanized steel.

H. Ice Dam Membrane: ASTM D1970; self adhering polymer modified bituminous sheet material, slip resistant surface, 40 mils thick, 36 inches wide, with strippable release paper to expose adhesive surface; Ice and Water Shield as manufactured by WR Grace.

2.4 FABRICATION

A. Form components to shape indicated on Drawings, accurate in size, square, and free from distortion or defects. Form pieces in longest practical lengths.

B. Fabricate cleats and starter strips of same material as sheet, continuous, to interlock with sheet.

C. Hem exposed edges on underside, miter and seam corners. Fabricate vertical faces with bottom edge formed outward and hemmed to form drip.

D. Fabricate flashings to allow toe to extend 2 inches (50 mm) over roofing [gravel] [paver]. Return and brake edges.

E. Form joints as indicated on Drawings. At moving joints, use sealed lapped, bayonet-type, or interlocking hooked seams.

F. Fabricate corners in one piece, long legs; seam for rigidity, seal with sealant.

G. Form sheet metal pans with upstand, and flanges.

2.5 SHOP FINISHING

A. Fluoropolymer Coating: Multiple coat as specified for sheet metal system, thermally cured, conforming to AAMA 2605.

B. Washcoat: Finish concealed side of metal sheets with washcoat compatible with finish system, as recommended by finish system manufacturer.

3 PART 3 EXECUTION

3.1 EXAMINATION

A. Verify roof openings, roof penetrations, cant strips and reglets in place, and nailing strips are properly located.

B. Verify deck is dry and free of snow or ice. [Verify flutes in steel deck are dry.] [Verify joints in wood deck are solidly supported and fastened.]

3.2 PREPARATION

A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mil (0.4 mm).

B. Prepare wood deck to fill knots before eave protection.

3.3 INSTALLATION

A. Ice Dam Membrane Installation:
1. Place eave edge and gable edge metal flashings tight with facia boards. Weather lap joints minimum 2 inches and seal with plastic cement. Secure flange with nails at maximum 12 inches on center.
2. Install ice dam membrane parallel with eave edge, flush with face of eave edge flashing with edges lapped shingle style and ends lapped and staggered between rows.
3. Apply lap cement at rate of approximately 1-1/4 gal/100 sq ft over starter strip.
4. Starting from lower edge of starter strip, lay additional 36 inch wide strips of ice dam membrane in lap cement, to produce two ply membrane. Weather lap plies minimum 19 inches and nail in place. Lap ends minimum 6 inches . Stagger end joints of each consecutive ply.
5. Extend ice dam membrane minimum 4 ft up-slope beyond interior face of exterior wall.

B. General Roofing Installation Requirements:

1. Apply underlayment over entire roof area. Minimize nail quantity.
2. Apply slip sheet in one layer, laid loose.
3. Cleat and seam joints.
4. Use plastic cement for joints between metal and bitumen and for joints between metal and felts.
5. Install formed metal pans for protrusions through roof. Fill pans watertight with plastic cement.
6. Conform to SMACNA details most replicating details on plans.

C. Flashing Installation:
1. Conform to SMACNA details most replicating details on plans.
2. Secure flashings in place using concealed fasteners.
3. Cleat and seam joints.
4. Apply plastic cement compound between metal flashings and felt flashings.
5. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
6. Seal metal joints watertight.

...END OF SECTION

SECTION 07610

ZINC-TIN COATED COPPER ROOFING & SIDING

1 PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the work of this Section.

B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section.

C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 DESCRIPTION OF WORK

A. The Work of this Section shall include, but not be limited to, the following:

1. Custom fabricated, mechanically attached, painted aluminum and zinc-tin coated copper double lock standing seam roof panels, horizontal flat lock panels, and custom fabricated trim, as indicated on the Drawings, with all required accessories for a weatherproof installation.

3. Snow Guards as indicated on the drawings.

B. Related Sections:

1. Section 05400 – Lightgage Metal Framing

2. Section 06100 – Rough Carpentry

3. Section 07210 – Building Insulation

4. Section 07530 – Elastomeric Sheet Roofing

5. Section 07620 – Sheet Metal Flashing and Trim

6. Section 07920 – Joint Sealants

1.3 REFERENCES

A. Copper Development Association (CDA), Copper in Architecture Manual.

B. SMACNA – Architectural Sheet Metal Manual; 5th Edition; Chapter 6 as a minimum standard or these specification and details where they exceed.

C. Names of the applicable building codes or other authorities having jurisdiction:

IBC 2006, International Building Code, 2006 edition

D. As all documents are intended to be complementary, in the event of contradiction in the references, request clarification from architect.

1.4 SUBMITTALS

A. Provide product data for all materials specified including manufacturer's product specifications, standard details, installation instructions, and general recommendations,

B. Verification Samples: submit representative plywood-mounted samples of each material that is to be exposed in the finished work, showing horizontal and vertical seams at abutting panels, attachment methods, colors, and finish variations. Provide samples having minimum size of 24" square.

C. Shop Drawings: show layouts of panels on all wall elevations and roof plans, details of edge conditions, joints, corners, panel profiles, supports, anchorages, trim, flashings, closures, and special details. Distinguish between factory and field assembly work. Details shall be drawn full scale.

1. Details for forming sheet metal components, including seams and dimensions.

2. Details for joining and securing sheet metal components, including layout, number of required fasteners, clips and other attachments. Include pattern of seams and spacing of clips.

3. Details of termination points and assemblies, including fixed points.

4. Details of expansion joints, including showing direction of expansion and contraction.

5. Details of roof penetrations.

6. Details of wall penetrations such as doors, windows, and louvers.

7. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets and counter flashings.

8. Details of special conditions, integrating mechanical, electrical and plumbing conditions.

9. Details of connections to adjoining work

10. Details of the following accessory items, at a scale of not less than 1 ½ inches per 12 inches:

    a. Flashing and Trim
    b. Gutters
    c. Snow Guards
    d. Roof Access Steps
    e. Safety Line Attachments

D. Calculations: Provide positive and negative wind load pressure calculations and certification of the performance of this work prepared and sealed by a locally licensed Professional Structural Engineer Registered. Show how design load requirements and other performance criteria have been satisfied.

E. Certification from the fabricator and installer, certifying that the installed systems meet the specified performance requirements and those of authorities having jurisdiction.

1.5 QUALITY ASSURANCE

A. Fabricator/Installer Qualifications: The fabricator and installer of the material or equipment described in this Section must, within the last five consecutive years, have successfully completed in a timely fashion at least ten projects similar in scope and type to the required work for this Section.

B. Source: Provide panels which are the product of one manufacturer. Provide secondary materials which are acceptable to the manufacturer. Award installation of wall and or roof panels, including underlayment and membrane to a single firm for undivided responsibility.

C. Industry Standard: Except as otherwise shown or specified, comply with applicable recommendations and details of the SMACNA and CDA manuals and details. Conform to dimensions and profiles shown.

D. Field Measurements: Prior to fabrication of panel systems, take field measurements of structure or substrates to receive panel systems.

E. Pre-Installation Conference: Prior to commencement of work, convene an installation conference to include the Architect, General Contractor and Panel Installer in order to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

1. Review methods and procedures for installation including, but not limited to: substrates, drains, curbs, penetrations and other preparatory work

2. Review drawings, specifications and other contract documents

3. Review submittals

4. Review construction schedule verifying availability of all materials, personnel and equipment needed to proceed and avoid delays

5. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including temporary roofing.

F. Mock-Up: Mock-up of exterior horizontal flat lock and standing seam metal panels as required by architect. Incorporate materials and methods of fabrication and installation identical with project requirements. Install mock-up at roof or façade area location directed by Architect. Retain accepted mock-up as quality standard for acceptance of completed metal roofing. If accepted, mock-up may be incorporated as part of metal roofing or wall work.

1. Provide mock-up of sufficient size and scope to show typical pattern of flat lock and standing seams, panel width, edge construction, a sample of soldering (where required) and finish texture and color.

2. Provide mock-up of eave assembly.

4. Obtain Architect's written approval of mock-ups prior to proceeding with installation of mock-up.

G. Soldering: In accordance with manufacturer's instructions.

H. Corrosion Control: Avoid direct contact of incompatible materials.

1.6 PERFORMANCE REQUIREMENTS

A. Design roof assembly to conform to the requirements of the IBC 2006 Building Code.

B. Install sheet metal wall and roof panels capable of withstanding exposure to weather without failure or infiltration of water into the building interior.

C. Wind Load: Design and engineer sheet metal roof and wall assemblies, including size and spacing of attachment devices, meeting requirements of local building codes.

D. Thermal Movement: Provide systems and connections which allow for thermal movement resulting from ambient temperature range of 120 ° F.

E. Structural Performance: Provide metal panels, anchors and attachments which resist loads required by code and loads as indicated on the Structural Drawings without permanent deflection or permanent deformation. Information on Drawings referring to specific design of attachment, panel stiffening, and structural systems is intended for information only. System performance, based on project conditions and compliance with all applicable codes and loading requirements, shall be the responsibility of the panel fabricator and installer.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products in unopened factory labeled packages. Protect from all possible damage. All material to be transported according to manufacturer's recommendations.

B. Store and handle in strict compliance with manufacturer's instructions and recommendations.

1. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weather tight ventilated covering. Slope cover to shed moisture. Allow for free air flow around covered material to exchange outside air.

2. Require all personnel to wear clean white cotton gloves when handling and installing zinc-tin coated copper panels and accessories.

3. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.

4. Store metal wall and roof panels so that they will not accumulate water.

C. Exercise care in unloading, storing, and erecting panels to prevent bending, warping, or surface damage.

D. Sequence deliveries to avoid delays, but minimize on-site storage.

E. Do not permit unnecessary walking on finished roof. Require all personnel to wear uncontaminated, clean, rubber-soled shoes when installing or walking on finished roof.

1.8 WARRANTY

A. Submit 2-part, 5-year, written, signed and sealed warranty:

1. By the material manufacturer for material defects

2. By the manufacturers of other components of the wall or roof assembly for their material defects.

3. By the installer agreeing to repair or replace systems or components as a result of workmanship defects.

2 PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering metal roof or wall panel materials that may be incorporated in the work include:

1. Revere Copper, or equal

B. Zinc-Tin Coated Copper Sheet/Coils:

1. Zinc-Tin Coated Copper, FreedomGray by Revere Copper, or equal.

a. Copper Sheets: Standard ounce weight copper conforming to ASTM Specification B370

b. Zinc-Tin Coating: Coat copper both sides with 50/50 zinc/tin alloy (with trace elements controlled for durability, corrosion resistance and color) approximately .05 mils thick.

c. Pre-Weathered Coating: Temporary, degradable pre-weathered coating to minimize water-stains during transit and storage and provide initial weathered appearance.

d. Temper: H00- cold rolled.

e. Weights Schedule:

i. 16-oz, 0.0216" thick – Horizontal Flat Lock Panels located above the 2nd Finish Floor

ii. 20-oz, 0.027" thick – All building break trim (all floors), flat lock panels at first floor canopy, flat seam soldered roofing, all cleats, flashings.

6. Provide custom shapes, trim, clips, fascias, copings and related sheet components and metal work fabricated from zinc-tin coated copper sheet as indicated.

7. Soldering: Remove and chemically or mechanically clean pre-weathered coating from Z-T alloy coated copper pre manufacturers recommendations to produce a clean, bright alloy before soldering. Solder shall conform to ASTM specification B32 and be pure tin or lead-free, high-tin. A tin-bearing flux may be applied to all surfaces to receive solder.

2.2 FRAMING

A. Design, engineer, and provide complete assembly of framing components, studs, girts and the like. All framing members and components shall be fabricated from ASTM A525 G90 galvanized sheet steel. Provide all primary and secondary framing members not indicated on the structural drawings.

B. Coordinate panel support with cold-formed metal framing, plywood sheathing, exterior gypsum sheathing and furring, for complete structural support for performances indicated. Refer to Section for related requirements.

2.3 ACCESSORIES

A. Provide all components necessary for a complete, functional, weatherproof assembly including, but not limited to, trims, copings, fascias, sills, flashings, counter flashings, door frame trim, corner units, clips, wall caps, copings, sealants, closures and fillers. Metal materials shall match panels and be zinc-tin alloy coated copper compatible.

B. Clips & Fasteners: Provide stainless steel or zinc-tin alloy coated copper, corrosion free; supplied in accordance with manufacturer's recommendations and to meet the load requirements as specified by Engineer and maintain a weather-tight installation. For slopes less than 2:12 and when backside coated materials is specified, use only stainless steel clips and fasteners. Attachment clips shall permit expansion and contraction of the panel system throughout the specified temperature range. Provide fasteners with watertight washer gaskets.

D. Non-Permeable Underlayment and Ice Dam Protection: self-adhering, high-temperature composite, butyl rubber-based, polyethylene-backed membrane such as Vycor Ultra as manufactured by Grace Construction Products.

E. Sealants:

1. Seam Sealing Tape: pressure-sensitive 100 per cent solids polyisobutylene coumpound sealing tape with release paper backing. Provide permanently elastic, non-sag, non-toxic non-staining tape.

2. Joint Sealant: DOW 795; backer rod shall be extruded polyethylene foam as DOW ETHAFOAM SB or equal.

F. Snow Guards: bar type, stainless steel, snow retention system equal to

2 Heule

3. S-5! ColorGard

4. Other Manufacturer

2.4 PANEL FABRICATION

A. General: Custom fabricated sheet metal roof and wall panels to comply with details shown and recommendations in SMACNA's "Architectural Sheet Metal Manual" and CDA's "Copper in Architecture" that apply to the design, dimensions (pan width and seam height), geometry, metal thickness, and other characteristics of installation indicated. Shop fabricate sheet metal roof and wall panels and accessories to greatest extent possible.

1. Horizontal Flat Lock Wall Panels: Form horizontal flat lock panels from continuous sheets as per CDA Copper in Architecture plate 4.6.7.
2. Soldered Flat Lock Seam Roof System: Form soldered flat lock seam roof panels from continuous sheets as per CDA Copper in Architecture plate 4.1.1. Provide expansion control batten seam where indicated as per CDA Copper in Architecture plate 4.2.E.

B. Apply bituminous coating or other permanent separation materials on concealed panel surfaces where panels would otherwise be indirect contact with substrate materials that are noncompatible or could result in corrosion or deterioration of either material or finishes.

C. Fabricate sheet metal wall and roof panels to allow for expansion in running work sufficient to prevent leakage, damage, and deterioration of the Work. Form exposed sheet metal work to fit substrates without excessive oil canning, buckling, and tool marks, true to line and levels indicated, and with exposed edges folded back to form hems.

1. Lay out sheet metal roofing or wall panels so cross seams, when required, are made in direction of flow with higher pans overlapping lower pans. Stagger cross seams.

2. Form and fabricate sheets, seams, strips, cleats, edge treatments, integral flashing, and other components of metal roofing to profiles, patterns, and drainage arrangements shown and as required for leak proof construction.

D. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with non-acidic sealant (concealed within joints).

E. Sealant Joints: Where movable, nonexpansion-type joints are indicated or required to produce weather tight seams, form metal to provide for proper installation of elastomeric sealant in compliance with SMACNA standards.

3 PART 3 EXECUTION

3.1 INSPECTION

A. Contractor shall inspect all surfaces, areas and other contingent construction in or to which his work is to be installed and insure himself that they are in proper condition to receive the work to be performed under this Section.

B. Verify that sheathing surfaces are sound, dry, properly secured and that provision has been made for flashings, anchorage, and all other interface items attaching to or penetrating through the Work of this Section.

C. The Contractor shall notify the Architect in writing, before any work is installed, of any condition requiring correction. Failure to make such a report shall be construed as acceptance of the existing conditions and the responsibility to provide an acceptable installation.

3.2 PREPARATION

A. Verify field dimensions before fabrication. Notify Architect of any discrepancies between field measurements and dimensions indicated in Construction Documents.

B. Place membrane on substrate surfaces to receive metal panels; comply with manufacturer's instructions.

1. Coordinate wall and roof cladding with rain drainage work, flashing, trim and construction of parapets, walls, and other adjoining work to provide a weatherproof, secure and non-corrosive installation.

2. For end and side laps, see W.R. Grace's or equivalent manufacturer's recommendations.

3.3 INSTALLATION

A. Manufacturer's Recommendations: Except as otherwise shown or specified, comply with recommendations and instructions of manufacturer of sheet metal being fabricated and installed.

1. Do not install in inclement weather

2. Do not install over a damp substrate

3. Do not install when inclement weather is threatening.

4. If covering of panels is required, provide free air flow around the material to manufacturer's requirement to prevent corrosion and discoloration.

B. Install work to be truly straight and square or conform to curvilinear geometry indicated on drawings.

1. Fabricate and install work with lines and corners of exposed units true and accurate.

2. Form exposed faces free of buckles, excessive waves, and avoidable tool marks considering temper and reflectivity of metal.

3. Shim and align panel units within installed tolerance of ¼ inch in 20' –0"

4. All seams shall be of uniform appearance and dimensions, straight and level with minimum exposure of solder and sealant.

5. Except as otherwise shown, fold back sheet metal to form a hem on concealed side of exposed edges.

6. Form all seams to be weatherproof, leaving room for expansion and contraction with specified and required tolerances. Provide sealing tape to seams in areas prone to ice dams and continuously on roof slopes less than 10 degrees (2:12).

7. Comply with CDA's Copper in Architecture and SMACNA Architectural Sheet Metal Manual for flashings and sheet metal work.

C. Conceal fasteners and expansion provision where possible in exposed work, and locate so as to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

D. Provide work as indicated on approved shop drawings

1. Form and fabricate sheets, seams, strips, cleats, valleys, ridges, edge treatments, integral flashings, and other components of metal roofing to profiles, patterns, and drainage arrangements shown and as required for rainproof construction.

E. Separate non-compatible materials with a rubberized asphalt underlayment.

F. Install work to meet specified performance requirements.

3.4 CLEANING AND PROTECTION

B. Clean exposed metal surfaces of substances that would interfere with uniform oxidation and weathering and as recommended by panel manufacturer and maintain in a clean condition during construction.

C. Ensure that cleaning by other trades working in proximity to Z-T alloy coated copper installation is in accordance with the recommendations of the manufacturer.

D. Damaged units: Replace panels and other components of the work that have been damaged or have deteriorated beyond successful repair by means of finish touch-up or similar minor repair.

3.5 CLEAN-UP

A. During the progress of the work, keep premises clear of debris resulting from this operations and remove surplus and waste materials from the site as soon as possible.

B. Upon completion of the work, Contractor shall remove from the site all equipment and materials used on the work as well as any debris resulting from the operations.

...END OF SECTION

SECTION 07 84 00

FIRESTOPPING

1 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 work of this section.

1.2 SECTION INCLUDES

A. Firestopping materials and accessories.

1.3 SYSTEM DESCRIPTION

A. Firestopping Materials: Complete systems of materials tested under ASTM E119, ASTM E814, UL 263, UL 1479 to achieve a fire rating as noted on Drawings.

B. Surface Burning: ASTM E84, UL 723 with a flame spread / smoke developed rating of 0/0

C. Firestop all interruptions to fire rated assemblies, materials and components.

1.4 SUBMITTALS

A. Product Data: Provide data on product characteristics, performance and limitation criteria.

B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

C. Schedule: Provide a schedule of openings and penetrations requiring firestopping and firesafing. Correlate with products submitted, fire ratings, and testing agency test results.

2 PART 2 PRODUCTS

2.1 FIRESTOPPING MATERIALS

A. Manufacturers:

1. Hilti USA
2. Isolatek International (Cafco Products).
3. Specified Technologies Inc.
4. 3M Fire Protection Products.
5. United States Gypsum Co.
6. Substitutions permitted.

B. Firestopping Material: Mineral fiber stuffing insulation.

1. USG Thermafiber Safing Insulation.

a. Density: 4.0 lb/cu ft.

C. Firestopping Material: Single component mortar compound.

1. Hilti CP 637 Firestop Mortar

2. Cafco TPS Mortar.

3. SpecSeal Fire Rated Mortar SSM

4. USG Firecode Compound.

D. Firestopping Material: Single component elastomeric compound.

1. Cafco TPS Type C.

2. Hilti FS-One High Performance Sealant

3. SpecSeal Latex Sealant LC150

4. 3M Fire Barrier CP 25WB+ Caulk.

5. USG Smoke-Seal Compound.

2.2 ACCESSORIES

A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces.

B. Dam Material: Permanent:

1. As required by manufacturer to meet system listing.

C. Installation Accessories: Clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

3 PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify openings are ready to receive the work of this section.

B. Clean substrate surfaces of matter which may effect bond of firestopping material.

C. Install backing materials to arrest liquid material leakage.

3.2 APPLICATION

A. Apply primer and materials in accordance with manufacturer's instructions.

B. Apply firestopping material in sufficient thickness to achieve rating, in manner consistent with tested and listed assemblies.

C. Install material at openings and edge of floor slabs requiring firestopping.

D. Install material at walls or partition openings which contain penetrating sleeves, piping, duct work, conduit and other items, requiring firestopping.

E. Protect installed firestopping from damage during construction operations.

...END OF SECTION

SECTION 07 90 00

JOINT SEALERS

1 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 Work of this section.

1.2 SECTION INCLUDES

A. Sealants and joint backing.

B. Provide only materials that comply with the following VOC limits in grams per liter per South Coast Rule #1168 by the South Coast Air Quality Management District:

1.	Architectural Sealants	250
2.	Other Sealants	420
3.	Architectural Primers – nonporous	250
4.	Architectural Primers – porous	775
5.	Other Primers	750

1.3 SUBMITTALS

A. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, color availability.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

2 PART 2 PRODUCTS

2.1 SEALANTS

A. Type A - General Purpose Exterior Sealant: Polyurethane; ASTM C 920, Grade NS, Class 25, Uses NT, M, G, A and O; single component; Sonneborn Sonolastic NP 1, or equal.

1. Color as selected from manufacturer's standard range.
2. Applications: Use for:

   a. Joints between concrete and other materials.
   b. Joints between brick and other materials.
   c. Joints between metal frames and other materials.
   d. Joints between siding and other materials.

e. Joints between exterior wall wood framing members, including studs, plates, band joists.
f. Other exterior joints for which no other sealant is indicated.

B. Type B - Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, ASTM C 1311, nondrying, non-skinning, non-curing; DAP Butyl-Flex, or equal.

1. Applications: Use for:

a. Concealed sealant bead in sheet metal work.
b. Bedding for door thresholds.

C. Type C - General Purpose Interior Sealant: Siliconized Acrylic emulsion latex; ASTM C834, single component, paintable; DAP Alex Plus, or equal.

1. Color as selected from manufacturer's standard range.
2. Applications: Use for:

a. Interior wall and ceiling control joints.
b. Interior joints between door and window frames and wall surfaces.
c. Other interior joints for which no other type of sealant is indicated.

D. Type D - Bathtub/Tile Sealant: White silicone; ASTM C920, Uses NT, G and A; single component, mildew resistant; Sonneborn Sonolastic Omniplus, or equal.

1. Applications: Use for:

a. Joints between plumbing fixtures and floor and wall surfaces.
b. Joints between kitchen and bath countertops and wall surfaces.

E. Type E - Acoustical Sealant: Butyl or acrylic sealant; ASTM C920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, non-skinning.

1. Applications: Use for concealed locations only:

a. Sealant bead between top stud plate and structure and between bottom stud plate and floor.

F. Type F - Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C920, Grade P, Class 25, Uses T, M and A; single component; Sonneborn Sonolastic SL1, or equal.

1. Color as selected from manufacturer's standard range.
2. Applications: Use for:

a. Expansion joints in floors.

G. Type G - Concrete Paving Joint Sealant: Polyurethane, self-leveling; ASTM C920, Class 25, Uses T, M and A; single component; Sonneborn Sonolastic SL1, or equal.

1. Color as selected from manufacturer's standard range.
2. Applications: Use for:

a. Joints in sidewalks and vehicular paving.

H. Type H – Insulating Foam Sealant: Latex foam sealant, non expanding, paintable; DAPtex Plus, or equal.

1. Applications: Use for concealed locations only:

a. Joints around windows and doors in exterior walls.

I. Type I – Elastomeric Latex Sealant: Acrylic polymer sealant, ASTM C 920, Type S, Grade NS, Class 25, low odor, mildew resistant, paintable; DAP Dynaflex 230, or equal.

1. Applications: Use for concealed locations only:

a. Joints between exterior extruded polystyrene insulation boards.

2.2 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant, ASTM C 1330, Type C, closed cell polyethylene foam oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

3 PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify that substrate surfaces and joint openings are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

C. Remove loose materials and foreign matter which might impair adhesion of sealant.

D. Clean and prime joints in accordance with manufacturer's instructions.

E. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

3.2 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Perform acoustical sealant application work in accordance with ASTM C919.

D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

E. Install bond breaker where joint backing is not used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

H. Tool joints concave.

...END OF SECTION 07 90 00