SECTION 07210
BUILDING INSULATION

SECTION INDEX

PART 1 - GENERAL

1.1 REFERENCES

A. American National Standards Institute, Inc. (ANSI)

1. A135.4 - Basic Hardboard (ANSI/AHA)

B. American Society for Testing and Materials (ASTM)

1. C578 - Specification for Rigid, Cellular Polystyrene Thermal Insulation.
2. C612 - Specification for Mineral Fiber Block and Board Thermal Insulation.
3. C665 - Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
4. D2103 - Specification for Polyethylene Film and Sheeting.
5. E84 - Test Method for Surface Burning Characteristics of Building Materials.
6. E96 - Test Methods for Water Vapor Transmission of Materials.

1.2 SUBMITTALS

A. Warranty

1. Submit a statement of compliance for:
   a. Insulation, including vapor retarder.
   b. Vapor retarder tape.
   c. Protection board.

B. Samples

1. Submit Samples of each type of insulation.

1.3 QUALITY ASSURANCE

A. Sample Construction

1. Install a sample of batt insulation in metal stud furring and vapor retarder, minimum 2.4 meters (8 feet) wide, full height of wall, for approval of workmanship.
2. Approved sample construction shall be a standard of workmanship for the Project and may remain in place.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project site in their original containers or packages or bundles bearing label clearly identifying manufacturer's name, brand, grade, UL listing, and other pertinent information.

B. Store materials under cover, clear of the ground, and protected from the weather.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General

1. Adhesives, vapor retarder tape, mechanical fasteners, and other components required to complete the Work: the product of, or approved by, the manufacturer of mineral fiber insulation.

2. Vapor retarder tape: pressure-sensitive tape of type recommended by manufacturer, having fire hazard classification identical to that specified for insulation vapor retarder.

B. Perimeter Insulation

1. Extruded expanded polystyrene board of thickness and width indicated, and manufacturer's standard length as required to suit job conditions, utilizing proper marking procedures, and complying with ASTM C578, Type IV, except, when tested for thermal resistance, specimens shall be aged 5 years.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection

1. Protect the Work and adjacent construction against damage until completion.

3.2 INSTALLATION

A. Perimeter Insulation

1. Bond perimeter insulation to vertical concrete surface with spot -applied adhesive recommended by the insulation manufacturer.

2. Place horizontal perimeter insulation on vapor barrier specified in Section 03300 and level to finish flush with underside of floor slab.

3. Tightly butt end and side joints.

END OF SECTION

SECTION 07531
ELASTOMERIC MEMBRANE ROOFING

SECTION INDEX

PART 1 - GENERAL

1.1 REFERENCES

A. American Society of Civil Engineers (ASCE)

1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

B. American Society for Testing and Materials (ASTM)

1. C1177 - Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
2. D1668 - Specification for Glass Fabrics (Woven and Treated) for Roofing and Waterproofing.
3. D2823 - Specification for Asphalt Roof Coatings.
4. D4637 - Specification for Vulcanized Rubber Sheet Used in Single-Ply Roof Membrane.

C. American Wood Preservers Association (AWPA)

1. C2 - Lumber, Timbers, Bridge Ties and Mine Ties - Preservative Treatment by Pressure Processes.

D. Factory Mutual System (FM)

1. 4450 - Approval Standard for Class 1 Insulated Steel Deck Roofs.
2. Loss Prevention Data Sheet 1-28 - Insulated Steel Deck.

E. Underwriters Laboratories Inc. (UL)

1. 1256 - Standard for Safety Fire Test of Roof Deck Construction.
2. Roofing Materials and Systems Directory.

1.2 SYSTEM DESCRIPTION

A. Performance Requirements

1. Provide a Class [C] roof system as listed in the UL Roofing Materials and Systems Directory.
2. Design the roof system to resist a wind uplift of 20 (psf) for the field, adjusted for perimeter and corners in accordance with ASCE 7.
3. Provide a roof system over steel deck which complies with FM 4450 and Loss Prevention Data Sheet 1-28 for Class 1 exposure and [I-90] wind uplift resistance.

B. Provide an elastomeric membrane roof system which allows no leakage or moisture into the roof system components or into the building and which positively slopes to drain at all locations.

1.3 SUBMITTALS

A. Shop Drawings

1. Submit complete Shop Drawings showing roof configuration and sheet layout, insulation securement, tapered insulation layout, details at perimeter, and special conditions.
2. Submit wind uplift calculations.

B. Samples

1. Submit Samples of insulation, membrane, [ballast,] fasteners and accessories such as prefabricated flashing and walkway pads.

C. Product Data

1. Submit Product Data for all components of the roof system.
2. Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

A. Qualifications

1. Obtain primary sheet roofing from a single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.
2. Obtain vapor retarder, adhesive and insulation board materials from a single manufacturer of the vapor retarder system.
3. Employ a roof installer with not less than 3 years of successful experience in installation of roofing systems similar to those required for this Project and which is acceptable to or licensed by manufacturer of primary roofing materials.
4. Comply with roof system and vapor retarder system manufacturers' published details and instructions for terminations of roofing and vapor retarder, unless otherwise indicated or directed.

B. Pre-Roofing Conference

1. One week before starting the roof applications, conduct a meeting at the Project site with the installer, manufacturers of roofing, vapor retarder and thermal barrier materials, installers of related Work, and other entities concerned with roofing performance, including (where applicable) Owner's insurer, test agencies, governing authorities, Architect and Owner, to review and clarify as necessary the Contract Documents, details, application requirements, schedule, and responsibilities. Agreements reached in this meeting will be documented and binding.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project site in their original unopened containers bearing labels clearly identifying manufacturer's name and brand. Store materials under cover, clear of the ground and protected from the weather.

B. Store materials other than membrane between 15 and 27 degrees C (60 and 80 degrees F) in a dry area and, if exposed to lower temperature, restore them to proper temperature before using.

C. Store insulation in approved breathable wrappers or coverings. Nonbreathable factory wrappings are not acceptable and must be slit or removed to relieve moisture build-up.

1.6 PROJECT CONDITIONS

A. Proceed with roofing Work only when existing and forecasted weather conditions will permit Work to be performed in accordance with manufacturers' recommendations and warranty requirements.

1.7 WARRANTY

A. Special Warranty

1. Upon completion of the roof system and after a final inspection performed by the manufacturer, issue the Roof System Warranty for the elastomeric membrane roof system, effective from the date of final acceptance.

2. Require the final inspection of the roofing system to be performed by a factory representative of the manufacturer. Require a signed copy of their report to be sent to the Owner and Architect.

3. Include in the warranty provisions for twice yearly inspection of the roofing system by the manufacturer and roofing installer for the first 5 years, and yearly inspection for the remaining 5 years. Provide a written report of each inspection to the Owner. Require the warrantor to correct failures and unacceptable conditions within 10 days of discovery. Perform emergency repairs within 24 hours of notice from the Owner of leaks or defects due to failure of any part of the system. Implement permanent repairs at the earliest opportunity allowed by weather conditions.

4. Warrant the Work for 10 years against faulty workmanship, defective materials and leakage. Require the Roof System Warranty for all materials and labor to be executed by the elastomeric membrane manufacturer in the form appearing at the end of this Section, with original to the Owner and a copy to the Architect.

PART 2 - PRODUCTS

2.1 ROOF SYSTEM

A. General

1. Elastomeric membrane roof system includes insulation, vapor retarder, nailers and thermal barrier if required, fasteners, flashing and counterflashing, expansion joints, joint sealers and walkway protection.

2. Provide products which are recommended by manufacturers to be fully compatible with indicated substrates, or provide separation materials as required to eliminate contact between incompatible materials.

B. Manufacturers and Type

1. Insulated, [mechanically fastened] elastomeric membrane EPDM system manufactured by Carlisle SynTec Inc.; Firestone Building Products Co.; GenFlex Roofing Systems; or Johns Manville.

2. Vapor retarder and adhesives manufactured by Laurenco, Inc., or as approved.

3. Thermal barrier: ASTM C1177, Georgia-Pacific "Dens -Deck", or as approved.

2.2 MATERIALS

A. General

1. Provide materials in the elastomeric membrane roof system which are the product of, or approved in writing by, the accepted manufacturer of the elastomeric membrane roof system and comply with the specified requirements.

B. Wood Nailers

1. Impregnated in a closed vessel in accordance with AWPA C-2.

C. Vapor Retarder Materials

1. Membrane: 52-mil-thick, plus or minus 10%, chloroprene-modified asphalt filmed onto a woven glass fabric, ASTM D1668, as manufactured by Laurenco, Inc., or as approved.

2. Rubberized flashing coating: Aliphatic asphalt base mastic with modified synthetic rubbers, combined with gilsonite, lampblack and other stabilizers, compatible with asphaltic and coal tar roofing and waterproofing materials, as manufactured by membrane manufacturer.

3. Adhesive: semi-viscous liquid composed of synthetic rubbers to modify the asphalt in cut -back form, ASTM D2823 by membrane manufacturer.

D. Roof Insulation

1. Approved by the membrane manufacturer, other than expanded polystyrene, and as required to meet the UL classification listed above, of thickness required to provide a minimum aged thermal resistance (R19) of 3.0 K.sq. m/W (17 deg. F.h.sf/Btu), applied in two layers with staggered joints.

2. Provide insulation which complies with FM 4450 or UL 1256, or provide a thermal barrier for foam plastic insulation.

3. Provide tapered insulation with minimum slope of 20 mm per meter (1/4 inch per foot) where required to achieve positive slope to drain of all roof areas.

4. Mechanical fasteners for thermal barrier or insulation: FM-approved threaded fasteners, coated for oxidation resistance and with head design which inhibits damage to the thermal barrier or membrane, and as approved by thermal barrier and membrane manufacturers.

E. Adhesive

1. For securing vapor retarder system to thermal barrier, base insulation to vapor retarder system, and overlay board to vapor retarder system: vapor retarder system adhesive.

2. For securing elastomeric membrane to overlay board: as recommended by membrane manufacturer.

3. For securing insulation layers: vapor retarder system adhesive.

F. Slip Sheet

1. If required, type recommended by roof system manufacturer for protection of membrane from incompatible substances and surfaces.

G. Roofing and Flashing Materials

1. Membrane: EPDM sheet material of manufacturer's standard thickness, black color unless otherwise specified, minimum thickness 1.5 mm (60 mils), reinforced with polyester scrim].
2. Items to be compatible with materials with which they are used and furnished by roof system manufacturer:
    a. Splice wash.
    b. Splicing cement.
    c. Splicing primer.
    d. Lap sealant.
    e. Flashing: uncured EPDM or neoprene, 1.5-mm (60-mil) minimum thickness.
    f. Bonding adhesive for flashing
    g. Pipe flashing: prefabricated or as otherwise indicated.
    h. Flashing accessories such as prefabricated curb corners.
    i. Related materials such as temporary seal and water cut -off mastic.
    j. Battens, including batten strips, fasteners, sealant and cover strips.

H. Walkway Protection Pads
1. Provide roof-top walkway pads as recommended and approved by roofing manufacturer, 910 mm (36 inches) wide minimum.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that deck surface is free of depressions, waves, or projections, and in proper condition to receive the roofing. Verify that penetrations are in place and secured and that roof drains are properly clamped in position.

B. Inspect adjacent surfaces for acceptability of bonding flashing materials and fastener securement.

C. Inspect metal roof deck perimeter support conditions for compliance with requirements of roof system terminations, including vapor retarders.

3.2 PREPARATION

A. Protection
1. Protect this Work and adjacent construction against damage during progress of the Work until completion. Follow manufacturer's precautions.

B. Surface Preparation
1. Clean substrate of dust, debris, and other substances detrimental to roof system work. Remove any sharp projections.
2. Install wood nailers to deck in thickness and rate of securement as recommended by the roof system manufacturers.
3. Install cant strips, if required, and flashings and similar accessory items, as shown and as recommended by manufacturer.
4. Prime substrate where recommended by manufacturer of materials being installed.

5. Prevent compounds from entering and clogging drains and conductors, and from spilling or migrating onto surfaces of other work.

3.3 VAPOR RETARDER SYSTEM

A. Vapor Retarder Materials

1. Install vapor retarder materials in accordance with applicable National Roofing Contractors Association published instructions to provide a continuous barrier against the penetration of air by diffusion, and moisture by transmission through the vapor retarder.

B. Vapor Retarder Thermal Barrier

1. Follow manufacturer's printed instructions and install thermal barrier over steel roof deck with lengthwise edges over the top flat surface of the flanges, with the edges of the board in moderate contact with each other.

2. Fasten each board with mechanical fasteners and plates in the number and spacing as required for specified wind resistance.

3. Apply a uniform coating of adhesive to thermal barrier followed by vapor retarder membrane and adhesive. Lap each sheet over the preceding sheet in uniform moppings of adhesive. Extend and adhere all plies to vertical surfaces to a height of 150 mm (6 inches) above top of the insulation.

3.4 INSTALLING INSULATION

A. Extend insulation full thickness in two layers, or in multiple layers over entire surface to be insulated, cutting and fitting tightly around obstructions. Form cant strips, crickets, saddles, and tapered areas with additional material as shown and as required for proper drainage of membrane.

B. Stagger joints in one direction for each course. For multiple layers, stagger joints in both directions between courses with no gaps, to form a complete thermal envelope.

C. Provide tapered units to suit approved drainage pattern.

D. Do not install more insulation in a day than can be covered with membrane before end of day or before start of inclement weather.

E. Secure roof insulation to substrate with adhesive or mechanical anchors.

F. Install insulation on thermal barrier or on steel deck with lengthwise edges over the top flat surface of the deck flanges and so that each of the two opposite sides of any board has a minimum bearing of 38 mm (1-1/2 inches) on the deck flanges.

3.5 INSTALLING MEMBRANE

A. General

1. Install membrane in accordance with membrane manufacturer's printed instructions and recommendations including splicing, perimeter attachment, flashings, penetrations, roof drains and daily seal.

2. Perimeter attachment may be to wood nailers attached to the deck or thru battens attached to vertical surfaces per roof system manufacturer's published details.

B. Fully Adhered Membrane

1. Install membrane by unrolling over prepared substrate, lapping adjoining sheets. Apply adhesive to surfaces to be bonded and roll into place when adhesive has properly cured. Treat seams with special adhesive and apply sealant to exposed sheet edges, tapering application as recommended by manufacturer. Install mechanical fasteners, flashings and counterflashings, and accessories at locations and as recommended by manufacturer.

C. Mechanically Fastened Membrane

1. Install membrane by unrolling over prepared substrate, lapping adjoining sheets, and bonding and sealing seams. Install mechanical fasteners at spacing recommended by manufacturer, covering with adhesive -applied membrane so that no fasteners are exposed; or install batten strips in locations, and with quantity and type of fasteners and with cover strips per manufacturer's printed instructions.

3.6 ROOF VENTS

A. Install roof vents where indicated at a rate of one vent per 46 square meters (500 square feet) or at maximum spacing of 7.6 meters (25 feet) maximum. Cut holes in membrane and insulation, pack loose insulation in holes, set vent in adhesive and install flashing.

3.7 WALKWAY PROTECTION PADS

A. Install pads at locations indicated. Place protection pads carefully to avoid damage to membrane, adhered to roof membrane material with bonding adhesive.

3.8 PROTECTING ROOFING

A. After completing roofing (including associated work), institute appropriate procedures for surveillance and protection of roofing during remainder of construction period. At the end of the construction period, or at a time when remaining construction will in no way affect or endanger roofing, make a final inspection of roofing and prepare a written report to Owner, describing nature and extent of deterioration or damage found.

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

3.9 FIELD QUALITY CONTROL

A. Final Inspection

1. Require a final inspection of the roof installation to be performed by a factory representative of the primary sheet manufacturer and a signed copy of the report indicating the roof installation is acceptable to be sent to the Owner.

END OF SECTION

SECTION 07620
SHEET METAL FLASHING AND TRIM

SECTION INDEX

PART 1 - GENERAL

1.1 REFERENCES

A. Aluminum Association (AA)

1. DAF-45 - Designation System for Aluminum Finishes.
2. SAA-46 - Standards for Anodized Architectural Aluminum.

B. American Architectural Manufacturers Association (AAMA)

1. 809.2 - Non-Drying Sealant.

C. American Society for Testing and Materials (ASTM)

1. A167 - Specification for Stainless and Heat -Resisting Chromium-Nickel-Steel Plate, Sheet, and Strip.
2. A480/A480M - Specification for General Requirements for Flat -Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.
3. A653/A653M - Specification for Steel Sheet, Zinc -Coated (Galvanized) or Zinc -Iron Alloy -Coated (Galvannealed) by the Hot -Dip Process.
4. B32 - Specification for Solder Metal.
5. B101 - Specification for Lead-Coated Copper Sheet and Strip for Building Construction.
6. B209 - Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
7. B209M - Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric].
8. B370 - Specification for Copper Sheet and Strip for Building Construction.
9. D4586 - Specification for Asphalt Roof Cement, Asbestos -Free.

D. American Welding Society (AWS)

1. D1.3 - Structural Welding Code - Sheet Steel.

E. Federal Specifications (Fed. Spec.)

1. FF-S-325 - Shield, Expansion; Nail, Expansion; and Nail, Drive Screw (Devices, Anchoring, Masonry).

2. QQ-L-201F - Lead Sheet.

3. TT-C-494A - Coating Compound, Bituminous, Solvent Type, Acid Resistant.

F. Military Specification

1. DOD-P-21035A - Paint, High Zinc Dust Content, Galvanizing Repair.

1.2 SUBMITTALS

A. Shop Drawings

1. Submit Shop Drawings of each item indicating layout, dimensions, materials, metal gages and other pertinent construction and erection details.

1.3 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the Project site in their original unopened containers, or packages or bundles, bearing label clearly identifying manufacturer's name, brand name, and other pertinent information.

B. Store materials in properly protected and dry storage facilities until ready for use.

1.4 WARRANTY

A. Special Warranty

1. Warrant sheet metal work, except items embedded in built-up roofing and forming an integral part of built-up roof system, for two years against defective materials, workmanship and leaks, except leaks caused by abuse, lightning, hurricane, tornado, hail storm, unusual climatic phenomena or failure of related work installed by other parties.

2. During the warranty period, restore defective Work to the standard of the Contract Documents, including all materials, labor, refinishing and other costs incidental to the Work. Within 24 hours after receipt of notice from the Owner, inspect the Work and immediately repair leaks. Restore Work found to be defective as defined in the Contract Documents within 10 days after receipt of notice from the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum

1. Aluminum sheet - clear anodized: ASTM B209, alloy 3003-H14, with AA-M12C22A31 finish in accordance with AA DAF-45 and AA SAA-46.

2. Aluminum sheet - color anodized: ASTM B209, alloy required to produce the specified finish, temper as recommended by the manufacturer, with AA-M12C22A42 finish in accordance with AA DAF-45 and AA SAA-46 in color equal to Alcoa No. 313 dark bronze.

3. Fastenings: aluminum nails and aluminum or non-magnetic stainless steel screws.

B. Copper

1. Copper sheet: ASTM B370, H00 temper.

2. High strength copper sheet: ASTM B370, H01 temper.

3. Lead coated copper sheet: ASTM B101, Type I or II, Class A, soft temper copper

sheet.

4. Fastenings: copper or bronze nails, copper or bronze screws, and copper cleats.
5. Solder: ASTM B32, alloy grade 60A bar form, (40 percent pig lead and 60 percent pure block tin).
6. Flux: zinc chloride (killed acid), cut muriatic acid, or other approved soldering flux.

C. Stainless Steel

1. Stainless steel sheet: ASTM A167, Type 302 or 304 sheets or strips, dead soft fully annealed, 2D or 2B finish per ASTM A480.
2. Fastenings: stainless steel nails or screws.
3. Solder: ASTM B32, alloy grade 60A bar form, (40 percent pig lead and 60 percent pure block tin).
4. Flux: acid type for pretinning and activated-rosin-alcohol type for soldering, or non-corrosive type such as Gregory Fabricators "Gregory 200".

D. Galvanized Steel

1. Sheet: ASTM A653/A653M, commercial quality, coating designation G90, regular spangle. Thicknesses specified are U.S.S. gage of uncoated sheet; coating is additional.
2. Solder: ASTM B32, alloy grade 50A (50 percent pig lead and 50 percent pure block tin).
3. Flux: acid type.
4. Welding electrodes: complying with the applicable AWS code for the process used.
5. Fastenings: galvanized or cadmium-plated nails and screws, or galvanized rivets.
6. Paint: zinc rich paint complying with DOD-P-21035A.

E. Flexible Flashing

1. 1.4-mm-thick uncured neoprene, American Hydrotech, Inc.; "Flex Flash UN"; Versico Inc. "Wingprene"; or as approved.

F. Reglet

1. Reglet for flashing in concrete wall: Cheney Flashing Company "Type A SnapLock", 6 mm (1/4 inch) deep, formed of 0.38-mm-thick (0.015-inch-thick), dead soft stainless steel, complete with prepunched nail holes at 300 mm (12 inches) on center and required matching nails or screws.

G. Miscellaneous

1. Bituminous paint: Fed. Spec. TT-C-494B, Type II.
2. Mastic: asphalt base mixture complying with ASTM D4586, Type I.
3. Metal joint sealant: a non-drying, non-skinning, non-oxidizing, polybutene sealant complying with AAMA 809.2.
4. Gutter expansion joints: Johns Manville "Expand-O-Flash" or similar metal and neoprene assembly, with metal portions of same metal as gutter.
5. Sealant (aluminum riveted joints): Alcoa "Gutter Seal".
6. Expansion shields: Fed. Spec. FF-S-325, machine bolt type, tubular type, or self-drilling tubular type.

2.2 WORKMANSHIP

A. General

1. Form the Work to details and dimensions indicated, straight and true to line with flat surfaces, free of warping and bulging.

2. As far as practicable, design all Work to be secured with concealed fastenings.

B. Seaming

1. Provide seams which are appropriate for the various conditions encountered in the Work; locked, lapped or cleated, and soldered or sealed watertight with sealant, as indicated or required. Make ample provisions for expansion and contraction. Seams shall conform to the following requirements:

a. Standing seams - finish not less than 25 mm (one inch) high.

b. Flat seams - finish not less than 19 mm (3/4 inch) wide.

c. Soldered lap seams - finish not less than 25 mm (one inch) wide.

d. Unsoldered plain lap seams - lap not less than 75 mm (3 inches).

e. All seams on sloped surfaces - in direction of waterflow.

C. Welding Aluminum

1. Weld aluminum using flux -less method in the shop in strict accordance with recommendations of the aluminum manufacturer. Do all welding prior to finishing.

2. After completion, wash aluminum surfaces with mild solution of non-alkali soap and water. Follow with clean water rinse, and wipe dry with cloth.

D. Soldering Copper

1. Pretin edges of uncoated sheet metal to be soldered before soldering is begun. Solder slowly with well-heated copper so as to thoroughly heat the seam and completely sweat the solder through the full width of seam. Use ample solder and to show not less than 25 mm (one inch) of evenly flowed solder. For all materials, solder immediately after application of the flux. Upon completion of soldering, neutralize acid and thoroughly clean the surfaces.

2. Wipe soldered joints and wash clean to remove traces of the acid from the flux immediately after the joints are made. After completion of copper work, wash surfaces with mild solution of non-alkali soap and water, follow with clean water rinse, and wipe dry with cloth.

E. Soldering Stainless Steel

1. Clean, roughen and pretin edges of sheet metal to be soldered. Remove all flux residue from acid type flux by scrubbing, neutralizing with ammonia or washing soda, and rinsing with water. After pretinning and assembling of parts, solder and thoroughly clean the surfaces as recommended by manufacturer of stainless steel sheet.

2. Clean stainless steel surfaces, using detergent for loose dirt and commercial cleaner containing phosphoric or oxalic acid for stubborn deposits.

F. Soldering and Welding Galvanized Steel

1. Clean and roughen edges of sheet metal to be soldered. Remove all flux residue by scrubbing, neutralizing with ammonia or washing soda, and rinsing with water.

2. Wipe and wash soldered or welded joints clean immediately after the joints are made, to remove traces of acid from the flux. Wash surfaces with a mild solution of non-alkali soap and water, follow with a clean water rinse, and wipe dry with cloth.

3. Weld joints in accordance with AWS D1.3. Finish exposed welds flush and

smooth, and touch up with the specified paint.

G. Protection

1. Paint exterior aluminum in contact with wood and all aluminum in contact with concrete or masonry with zinc chromate primer and aluminum paint or heavy - bodied bituminous paint.

2.3 METAL FLASHING

A. Refer to Section [04810, “Unit Masonry Assemblies.”] [04811, “Concrete Unit Masonry.”]

2.4 CAP FLASHING

A. Fabrication - General

1. Fabricate cap flashing of No. 22 gage galvanized steel sheet.

2. Provide two-piece metal cap flashing, consisting of an upper receiver portion and a lower portion extending over the composition flashing, unless otherwise specified.

B. Fabrication - Two-Piece

1. Fabricate the receiver portion with outer edge formed into a double fold turned down 25 mm (one inch), unless otherwise indicated, and as follows:

a. At new masonry walls, extend the receiver portion into the wall as indicated, terminated with 6-mm (1/4-inch) upstand edge, unless indicated to be higher.

b. At walls faced with metal siding or preformed metal panels, extend the receiver portion into the wall as indicated, and terminated with edge folded over support.

c. At concrete and existing masonry walls, extend the receiver portion into saw cut or form the receiver portion to retain sealant as indicated, using a 5 by 25-mm (3/16 by one-inch) stainless steel clamping bar.

d. At parapet, extend the receiver portion over wood blocking as indicated.

2. Form the upper edge of the lower portion of metal cap flashing to engage in the double fold of receiver portion, bent to provide spring action against the base flashing, fold the lower edge folded back 13 mm (1/2 inch) and lap composition base flashing not less than 100 mm (4 inches).

3. Lap ends of each length of both portions of metal cap flashing not less than 75 mm (3 inches). Weld or solder corner joints. Return ends at roof edge into reglet or wall.

C. Fabrication - One-Piece

1. Provide one-piece cap flashing at roof curbs, with top edge formed to retain metal joint sealant and bottom edge folded 13 mm (1/2 inch) to provide drip.

2.5 FASCIA

A. Fabricate fascia of aluminum sheets of the following thicknesses:

1. Up to and including 125-mm (5-inch) vertical face dimension - 0.81 mm (0.032 inch).

2. 125- to 175-mm (5- to 7-inch) vertical face dimension - 1.0 mm (0.040 inch).

3. Over 175-mm (7-inch) vertical face dimension - 1.3 mm (0.051 inch).

B. Fabricate cleat of 1.3-mm-thick (0.051-inch-thick) aluminum strips.

C. Fabricate fascia of 0.46-mm-thick (0.018-inch-thick) stainless steel sheets.

D. Fabricate cleat of 0.91-mm-thick (0.036-inch-thick) stainless steel strip.

2.6 COPING

A. Fabricate coping and accessories of aluminum sheets of the following thicknesses:

1. Coping - 1.3 mm (0.051 inch).

2. Splice plates - 0.81 mm (0.032 inch).

3. Cleat - 1.3 mm (0.051 inch).

B. Provide continuous cleat, 44 mm (1-3/4 inches) wide unless otherwise indicated, with 25-mm (one-inch) vertical leg and 19-mm (3/4-inch) leg bent out at 30 degrees, in sections of maximum practical length.

2.7 ROOF PENETRATION FLASHING

A. Fabrication

1. Fabricate flashing sections of No. 24 gage galvanized steel sheet, with 3 by 25-mm (1/8 by 1-inch) galvanized clamping bar or stainless steel draw-band (hose-clamp type tightened with screw).

2. Fabricate flashing in two sections as indicated, with lower section of height indicated and a minimum 100-mm-wide (4-inch-wide) flange onto roof.

B. Delivery

1. Provide flashing assembly for all roof penetrations, such as vent stacks, piping, equipment supports. Deliver to site in ample time to avoid delays in other work. Installation is specified as part of the built-up bituminous roofing work.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that contact surfaces of masonry or concrete are dry, smooth and free of loose materials and projections which might puncture flashing.

3.2 PREPARATION

A. Protection

1. Protect this Work and adjacent construction against damage during progress of Work until completion. Take precautions to prevent damage to Work from traffic or placement of heavy materials thereon.

2. Paint exterior aluminum in contact with wood and all aluminum in contact with concrete or masonry with zinc chromate primer and aluminum paint or heavy - bodied bituminous paint.

3.3 INSTALLATION

A. General

1. Surfaces to be flashed or covered with sheet metal shall be clean and free from defects. Clean foreign matter from surfaces. Drive projecting nails flush.

2. Metal flashings shall be weathertight.

B. Cap Flashing

1. Install metal cap flashing over composition base flashing which turns up onto vertical surfaces.

2. In new masonry work, set flashing in a bed of mortar both above and below the metal.

3. At concrete and existing masonry walls, wedge the receiver portion into a saw-cut with coiled metal plugs compatible with the receiver or neoprene wedges, 300 to 400 mm (12 to 16 inches) on center, unless otherwise indicated, or anchor clamping bar to wall with screws and expansion shields, as indicated.

4. At concrete walls in cavity construction, insert the receiver portion into the reglet.

5. Insert lower portion into receiver portion and fasten with screws at 300-mm (12-inch) spacing and of length required to join the metal but not project into substrate behind flashing.

6. At roof curbs, apply metal joint sealant and install one-piece cap flashing as indicated.

7. Lap section ends a minimum of 75 mm (three inches) and seal watertight with mastic.

C. Fascia

1. Fasten continuous cleat to supporting construction with screws evenly spaced not over 300 mm (12 inches) on centers. Where construction is concrete or masonry, drive screws into lead expansion shields set into concrete or masonry. Install strip to extend over the supporting construction to form a drip and to allow the metal fascia to be hooked over the lower edge 19 mm (3/4 inch).

2. Install fascia with horizontal flange over roofing plies, set in mastic and with lower edge hooked to metal edge strip. Nail horizontal flange to wood blocking at maximum spacing of 75 mm (3 inches), staggered.

3. Lap joints 75 mm (3 inches) minimum, hold together by concealed clips welded or soldered to underside, and fill with metal joint sealant.

4. Do not use exposed nails and other fastenings on face of metal fascia.

D. Coping

1. Install flexible flashing with adhesive recommended by flashing manufacturer. Lap joints 75 mm (3 inches).

2. Fasten continuous cleat to supporting construction with screws evenly spaced not over 300 mm (12 inches) on centers. Where construction is concrete or masonry, drive screws into lead expansion shields set into concrete or masonry. Install strip to extend over the supporting construction to form a drip and to allow the metal coping to be hooked over the lower edge at least 19 mm (3/4 inch).

3. Install coping with joints butted and backed up by concealed splice plate. Fill joints with metal joint sealant.

E. Gutters, Conductors and Splash Pans

1. Gutters

a. Nail horizontal flange of continuous sheet metal cleat to nailer.

b. Secure gutter brackets to nailer with two screws or nails.

c. Nail horizontal flange of apron piece to wood nailer at 75 mm (3 inches) on center.

d. Hook top rear edge of gutter over cleats.

e. Rivet or solder metal portions of expansion joint assemblies to galvanized or stainless steel gutters, or rivet and seal water tight if gutters are aluminum.

2. Conductors

   a. Install conductor straps at even spacing not exceeding 1200 mm (48 inches) on centers on each conductor run, so as to prevent downward slippage of conductor while allowing conductor to expand and contract.

3. Splash pans

   a. Before pans are stripped in, insert top edge of rear end of pan into receiver section of cap flashing built into wall, and tightly mallet down the projecting fold.

END OF SECTION

SECTION 07720
ROOF ACCESSORIES

SECTION INDEX

PART 1 - GENERAL

1.1 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. A653/A653M - Specification for Steel Sheet, Zinc -Coated (Galvanized) or Zinc - Iron Alloy -Coated (Galvannealed) by the Hot -Dip Process.

B. American Wood-Preservers' Association (AWPA)

1. C2 - Lumber, Timbers, Bridge Ties and Mine Ties - Preservative Treatment by Pressure Processes.

C. Underwriters Laboratories Inc. (UL)

1. Building Materials Directory.

1.2 SUBMITTALS

A. Shop Drawings

1. Submit Shop Drawings of each item, showing layout and details of fabrication and installation.

B. Maintenance Instructions

1. Submit operating and maintenance instructions for each item.

1.3 PROJECT CONDITIONS

A. Field Measurements

1. Take field measurements to verify or supplement dimensions indicated. Be responsible for accurate fit of the Work.

PART 2 - PRODUCTS

2.1 ROOF HATCHES

A. Type and Manufacturers

1. Single leaf type for ladder access as manufactured by Babcock-Davis Hatchways, Inc.; Bilco Co.; Milcor, Inc.; or as approved.

B. Materials and Fabrication

1. Cover, curb, and counterflashing: 14 gage galvanized steel.
2. Insulation: 25-mm-thick (1-inch-thick) glass fiber.
3. Cover liner: 22 gage galvanized steel.
4. Fit cover with neoprene gasket. Continuously weld corners.
5. Hardware: zinc - or cadmium-plated and consisting of the following:
   a. Spring operators and pintle hinges.
   b. 90-degree hold-open arm with one-hand release.
   c. Spring snap latch with inside and outside handle and padlock hasp.

2.2 PREFABRICATED METAL ROOF CURBS

A. Manufacturers

1. Custom Curb, Inc.; The Pate Co.; Roof Products & Systems Corp.; Thycurb Div. of Thybar Corp.; or as approved.

B. Materials and Fabrication

1. Fabricate curbs of 14 gage steel sheet, all welded construction, fitted with 50 x 100-mm (2 x 4-inch) treated wood nailer and 38-mm (1-1/2-inch) rigid glass fiber insulation. Provide 22 gage steel liner.
2. Verify size of curbed opening with equipment supplier.
3. Prime paint or hot -dip galvanize curbs and liners after fabrication.

2.3 PREFABRICATED EQUIPMENT SUPPORTS

A. Manufacturers

1. Model for insulated roof decks, as manufactured by Custom Curb, Inc.; The Pate Co.; Roof Products & Systems Corp.; Thycurb Div. of Thybar Corp.; or as approved.

B. Materials and Fabrication

1. Fabricate shell, base plate and counterflashing of 18 gage galvanized steel sheet complying with ASTM A653/A653M, commercial quality, G90 coating designation, welded with mitered ends, welded areas coated with zinc rich paint.
2. Wood nailer: pressure treated in accordance with AWPA standard C-2.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General

1. Install each item in accordance with manufacturer's instructions, approved Shop Drawings, and specified requirements. Furnish each item with required fasteners.

B. Roof Hatches

1. Bolt curb to roof construction through each pre-drilled hole with 10-mm (3/8-inch) galvanized steel bolts.

C. Prefabricated Metal Roof Curbs

1. Attach prefabricated curbs to wood nailer on roof deck with wood screws.

2. Weld prefabricated curbs to metal roof deck.
3. Bolt prefabricated curbs to concrete roof deck.

D. Prefabricated Equipment Supports
1. Bolt supports to concrete roof deck.
2. Weld supports to metal deck.
3. Anchor counterflashing to wood nailer with lag screws and lead washers.

3.2 PROTECTION

A. Protect this Work and adjacent construction against damage.

3.3 CLEANING

A. Clean completed Work in accordance with manufacturer's instructions.

END OF SECTION

SECTION 07920 - JOINT SEALANTS

SECTION INDEX

PART 1 - GENERAL

1.1 RELATE DOCUMENTS

A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.2 SUMMARY

A. Section Includes:
   1. The sealing of joints indicated on schedule at the end of this section.
   2. The sealing of exterior joints, including:
      a. Exterior face of building expansion joints.
      b. Wall joints.
      c. Coping joints.
      d. Joints around perimeter of frames.
   3. The sealing of joints in floors and pedestrian paving.
   4. The sealing of other joints indicated on drawings.

B. Joints of a nature similar to that of joints indicated on the schedule shall be sealed with same sealer, whether indicated on drawings to be sealed or not.

C. Related Sections:
   1. Unit Masonry: Division 4.

1.3 REFERENCES

A. AAMA 800-92 -- Voluntary Specifications and Test Methods for Sealants; American Architectural

Manufacturers Association; 1992.

B. ASTM C 719-93 -- Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle); 1993.

C. ASTM C 920-95 -- Standard Specification for Elastomeric Joint Sealants; 1995.

D. ASTM C 1193-91 -- Standard Guide for Use of Joint Sealants; 1991.

E. FS A-A-272 -- Caulking Compounds; 1980.

1.4 DEFINITIONS

A. Substrates:
1. M-type substrates: Concrete, concrete masonry units, brick, mortar, natural stone. The term "masonry" means brick, stone, and concrete masonry work.
2. G-type substrates: Glass and transparent plastic glazing sheets.
3. A-type substrates: Metals, porcelain, glazed tile, and smooth plastics.
4. O-type substrates: Wood, unglazed tile; substrates not included under other categories.

1.5 SUBMITTALS

A. Product Data: Manufacturer's data on each joint sealer, with instructions for substrate preparation and installation.

B. Samples for Color Selection: Cured samples of actual products showing manufacturer's full range of colors. (Products exposed to view only.)

C. Samples for Color Verification: Cured samples of each color of each product used, prepared to simulate actual joints minimum 6 inches long; use substrates similar in appearance to actual substrates. (Products exposed to view only.)

D. Substrate Test Report for Each Sealer.

E. Certified Product Test Reports: Independent testing agency reports showing compliance with all specified requirements.
1. Reports may be on tests conducted up to 24 months before submission, provided the products tested were aged specimens of the same formulation as that to be used.

F. Field Installation Test Reports.

G. Certificates: For each sealer, provide manufacturer's certificate stating that the product complies with the specifications and is appropriate for the use it is being put to.

1.6 QUALITY ASSURANCE

A. Substrate Tests: Have samples of actual substrate materials tested by manufacturer(s) of sealer products.
1. Test to determine what preparation procedures (if any) are necessary to make sealers adhere properly under environmental conditions that may occur during installation.
2. Test to determine compatibility with substrates, backers, and secondary seals, if any.
3. Use manufacturer's standard test methods.
4. Report the sealer manufacturer's recommendations for substrate preparation and sealer installation and identify specific primer(s) required.
5. The requirement for testing for this project will be waived if test reports based on previous

testing of the products and substrates to be used are acceptable to the architect.

B. Field Installation Tests: Before installation, test the adhesion of all sealers to actual substrates.
   1. Seal at least 5-foot lengths of joints and cure properly. Try to pull sealer out of joint by hand, by method recommended by sealer manufacturer.
   2. Select test joints representative of joints to be sealed by the product to be tested.
   3. Perform tests for each type of sealer used on exterior.
   4. Do tests in the presence of the architect.
   5. Report acceptable results only.

C. Preinstallation Meeting: Have the installer, sealer manufacturers' representatives, and other affected installers meet to review sealer installation and protection procedures and sequencing with other work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original containers or bundles with labels showing manufacturer, product name or designation, color, shelf life, and installation instructions.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install sealers if any of the following conditions exist:
   1. Air or substrate temperature exceeds the range recommended by sealer manufacturer or is below 40 degrees F (4.4 degrees C).
   2. Substrate is wet, damp, or covered with snow, ice, or frost.

B. Dimensional Limitations: Do not install sealers if joint dimensions are less than or greater than that recommended by sealer manufacturer; notify the architect and get sealer manufacturer's recommendations for alternative procedures.

1.9 WARRANTY

A. Submit a written warranty signed by installer guaranteeing to correct failures in sealer work that occur within 5 years after substantial completion, without reducing or otherwise limiting any other rights to correction which the owner may have under the contract documents. Failure is defined as failure to remain weathertight due to faulty materials or workmanship. Correction is limited to replacement of sealers.

PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

A. General: Provide only products which are recommended and approved by their manufacturer for the specific use to which they are put and which comply with all requirements of the contract documents.
   1. For each generic product, use only materials from one manufacturer.
   2. Provide only materials which are compatible with each other and with joint substrates.
   3. Colors of exposed sealers: To match architect's samples.

B. Manufacturers: Products of the manufacturers listed, provided they comply with requirements of the contract documents will be among those considered acceptable.
   1. Polysulfide sealants:
      a. A. C. Horn, Inc.
      b. W. R. Meadows, Inc.
      c. Pecora Corporation.
      d. Products Research & Chemical Corporation.
      e. Sonneborn Building Products Division/ChemRex, Inc
   2. Silicone sealants:
      a. Bostik Inc.
      b. Dow Corning Corporation.
      c. Pecora Corporation.
      d. Tremco, Inc.
      e. GE Silicones.
      f. Rhone-Poulenc, Inc.

   3. Urethane sealants:
      a. Bostik Inc.

b. Mameco International, Inc.
c. Pecora Corporation.
d. Products Research & Chemical Corporation.
e. Sika Corporation.
f. Sonneborn Building Products Division/ChemRex, Inc.
g. Tremco, Inc.
h. W. R. Meadows, Inc.

4. Acrylic solvent-release sealants:
   a. Pecora Corporation.
   b. Koch Protective Treatments, Inc.
   c. Tremco, Inc.
   d. Sonneborn Building Products Division/ChemRex, Inc

5. Butyl sealants:
   a. Pecora Corporation.
   b. Koch Protective Treatments, Inc.
   c. Tremco, Inc.
   d. Sonneborn Building Products Division/ChemRex, Inc

2.2 ELASTOMERIC SEALANTS

A. Elastomeric Sealants - General: Chemically curing elastomeric sealants of types indicated, complying with ASTM C 920, including specific Type, Grade, Class, and Uses indicated, as well as all other requirements specified.
   1. Where movement capability exceeding that measured by ASTM C 920 is specified, sealant shall withstand the total movement indicated while remaining in compliance with the other requirements specified, when tested in accord with ASTM C 719, with base joint width measured at the time of application.
   2. For M-type substrates: Comply with requirements for Use M.
   3. For G-type substrates: Comply with requirements for Use G.
   4. For A-type substrates: Comply with requirements for Use A.
   5. For O-type substrates: Comply with requirements for Use M (minimum) and Use O for the particular substrate.

B. Two-Part Pourable Polysulfide Sealant: Type M, Grade P, Class 12-1/2, Use T.

C. High Movement Silicone Sealant: One- or two-part, non-acid-curing, Grade NS, Class 25, Use NT, plus movement capability of at least 50 percent in both extension and compression.

D. Medium Movement Silicone Sealant: One- or two-part non-acid-curing, Grade NS, Class 25, Use NT, plus movement capability of more than 25 percent but less than 50 percent in both extension and compression.

E. Two-Part Nonsag Low-Modulus Urethane Sealant: Type M, Grade NS, Class 25, Use NT, plus movement capability of 50 percent in both extension and compression.

F. Multipart Pourable Urethane Sealant: Type M, Grade P, Class 25, Use T.

G. Nonsag Urethane Sealant for Use T: Type S or M, Grade NS, Class 25, Use T.

H. One-Part Nonsag Urethane Sealant: Type S, Grade NS, Class 25, Use NT.

I. One-Part Nonsag Low-Modulus Urethane Sealant: Type S, Grade NS, Class 25, Use NT, plus movement capability of 50 percent in both extension and compression.

J. One-Part Pourable Urethane Sealant: Type S, Grade P, Class 25, Use T.

2.3 SOLVENT-RELEASE-CURING SEALANTS

A. Acrylic Sealant: Nonsag, one-part, solvent-release-curing; complying with ASTM C 920, Type S, Grade NS, Use NT, with the following exceptions:
1. Weight loss: 15 percent, maximum.
2. Movement capability: 7-1/2 percent in both extension and compression, minimum.

B. Butyl Sealant: Nonsag, one part, solvent-release-curing; complying with FS A-A-272, Type III; nonstaining; paintable.

2.4 NONCURING SEALERS

A. Butyl Polyisobutylene Sealant: Noncuring, nondrying, solvent-release; complying with 809.2, as described in AAMA 800.

2.5 SEALANT BACKERS

A. Backers - General: Nonstaining; recommended or approved by sealant manufacturer for specific use.

B. Backer Rods: Flexible, nonabsorbent, compressible polyurethane foam, either open-cell or non-gassing closed-cell, unless otherwise restricted by sealant manufacturer; preformed to appropriate size and shape.

2.6 MISCELLANEOUS MATERIALS

A. Primers: Use primers determined to be required by substrate tests.

B. Cleaners: As recommended by sealer manufacturer and not damaging to substrates.

C. Masking Tape: Nonabsorbent, nonstaining.

D. Tooling Agents: Approved by sealant manufacturer; nonstaining to sealant and substrate.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints for characteristics that may affect sealer performance, including configuration and dimensions.

B. Do not begin joint sealer work until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Cleaning: Just before starting sealer installation, clean out joints in accord with recommendations of sealer manufacturers and as follows:
1. Remove all material that could impair adhesion, including dust, dirt, coatings, paint, oil, and grease. Exception: Materials tested to show acceptable adhesion and compatibility.
2. Dry out damp and wet substrates thoroughly.
3. Clean M-type and O-type substrates by suitable mechanical or chemical methods.

4. Remove loose particles by vacuuming or by blowing with oil-free compressed air.
5. Concrete: Remove laitance and form-release coatings.
6. Clean A-type and G-type substrates by chemical or other methods which will not damage the substrate.
7. Use methods which will not leave residues that will impair adhesion.

B. Priming: Prime substrates as recommended by sealer manufacturer.

C. Masking Tape: Use masking tape to keep primers and sealers off of adjacent surfaces which would be damaged by contact or by cleanup. Remove tape as soon as practical.

D. Install fillers where needed to provide proper joint depth or support for sealant backers.

3.3 INSTALLATION

A. Comply with sealer manufacturers' installation instructions and recommendations, except where more restrictive requirements are specified.

B. Gunnable and Pourable Sealants: Comply with recommendations of ASTM C 1193.

C. Backers:
1. Install backers at depth required to result in shape and depth of installed sealant which allows the most joint movement without failure.
   a. Make backers continuous, without gaps, tears, or punctures.
   b. Do not stretch or twist backers.
2. If backers become wet or damp before installation of sealant, dry out thoroughly before proceeding.

D. Sealants: Use methods recommended by manufacturer; completely fill the joint; make full contact with bond surfaces; tool nonsag sealants to smooth surface eliminating air pockets.
1. Use concave joint shape shown in Figure 5A in ASTM C 1193, where not otherwise indicated.

3.4 PROTECTION AND CLEANING

A. Clean surfaces adjacent to joints as work progresses and before sealants set using methods and materials approved by manufacturers of sealers and of surfaces to be cleaned.

B. Protect joint sealers from contamination and damage.

C. Remove and replace damaged sealers.

3.5 SCHEDULE OF JOINT SEALERS

A. General: Unless otherwise indicated, joints around perimeter of frames, where indicated to be sealed, are to be sealed using sealer specified for the substrate adjacent to the frame.

B. Exterior Joints for Which No Other Sealer Is Indicated:
1. Use one of the following sealants:
   a. High movement silicone sealant.
   b. Medium movement silicone sealant.
   c. Two-part nonsag low-modulus urethane sealant.
   d. One-part nonsag urethane sealant.
   e. One-part nonsag low-modulus urethane sealant.
2. Backer: Backer rod.

3. Joint shape: Concave joint configuration.

C. Exterior Joints Well Protected from Weather and Not Subject to Movement:
   1. Use one of the following sealants:
      a. Acrylic sealant.
      b. Butyl sealant.
   2. Backer: Backer rod.

D. Interior Floor Joints and Pedestrian Paving Joints, Less than 1-1/2 Percent Slope:
   1. Use one of the following sealants:
      a. Two-part pourable polysulfide sealant.
      b. Two-part pourable urethane sealant.
      c. Two-part nonsag urethane sealant for Use T.
      d. One-part pourable urethane sealant.
   2. Backer: Backer rod.
   3. Joint shape: Concave joint configuration.
   4. Use one of the following sealants:

END OF SECTION