SECTION 07 60 00

FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 DESCRIPTION

Formed sheet metal work for wall and roof flashing, copings, roof edge metal, fasciae, drainage specialties, and formed expansion joint covers are specified in this section.

1.2 RELATED WORK

- A. Flashing components of factory finished roofing and wall systems: Division 07 roofing and wall system sections.
- B. Joint Sealants: Section 07 92 00, JOINT SEALANTS.
- C. Paint materials and application: Section 09 91 00, PAINTING.

1.3 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only. Editions of applicable publications current on date of issue of bidding documents apply unless otherwise indicated.
- B. Aluminum Association (AA):
 - AA-C22A41.....Aluminum Chemically etched medium matte, with clear anodic coating, Class I Architectural, 0.7-mil thick
 - AA-C22A42.....Chemically etched medium matte, with integrally colored anodic coating, Class I Architectural, 0.7 mils thick
 - AA-C22A44.....Chemically etched medium matte with electrolytically deposited metallic compound, integrally colored coating Class I

Architectural, 0.7-mil thick finish

C. American National Standards Institute/Single-Ply Roofing Institute (ANSI/SPRI):

ANSI/SPRI ES-1-03.....Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems

D. American Architectural Manufacturers Association (AAMA): AAMA 620.....Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Aluminum AAMA 621....Voluntary Specification for High Performance

Organic Coatings on Coil Coated Architectural

Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Steel Substrates E. ASTM International (ASTM): A240/A240M-14.....Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications. A653/A653M-11.....Steel Sheet Zinc-Coated (Galvanized) or Zinc Alloy Coated (Galvanized) by the Hot- Dip Process B32-08.....Solder Metal B209-10.....Aluminum and Aluminum-Alloy Sheet and Plate B370-12.....Copper Sheet and Strip for Building Construction D173-03(R2011).....Bitumen-Saturated Cotton Fabrics Used in Roofing and Waterproofing D412-06(R2013).....Vulcanized Rubber and Thermoplastic Elastomers-Tension D1187-97(R2011).....Asphalt Base Emulsions for Use as Protective Coatings for Metal D1784-11......Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds D3656-07.....Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns D4586-07..... Asphalt Roof Cement, Asbestos Free F. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Architectural Sheet Metal Manual. G. National Association of Architectural Metal Manufacturers (NAAMM): AMP 500-06.....Metal Finishes Manual H. Federal Specification (Fed. Spec): A-A-1925A..... Shield, Expansion; (Nail Anchors) UU-B-790A.....Building Paper, Vegetable Fiber I. International Code Commission (ICC): International Building Code, Current Edition **1.4 PERFORMANCE REQUIREMENTS**

A. Wind Uplift Forces: Resist the following forces per FM Approvals 1-49:

 Wind Zone 3: 2.20 to 4.98 kPa (46 to 104 lbf/sq. ft.): 9.96-kPa (208-lbf/sq. ft.) perimeter uplift force, 14.94-kPa (312-lbf/sq. ft.) corner uplift force, and 4.98-kPa (104-lbf/sq. ft.) outward force.

1.5 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: For all specified items, including:
 - 1. Flashings
- C. Manufacturer's Literature and Data: For all specified items, including:
 - 1. Two-piece counterflashing
 - 2. Thru wall flashing
 - 3. Expansion joint cover, each type
 - 4. Nonreinforced, elastomeric sheeting
 - 5. Copper clad stainless steel
 - 6. Polyethylene coated copper
 - 7. Bituminous coated copper
 - 8. Copper covered paper
 - 9. Fascia-cant
- D. Certificates: Indicating compliance with specified finishing requirements, from applicator and contractor.

PART 2 - PRODUCTS

2.1 FLASHING AND SHEET METAL MATERIALS

A. Copper ASTM B370, cold-rolled temper.

2.2 FLASHING ACCESSORIES

- A. Solder: ASTM B32; flux type and alloy composition as required for use with metals to be soldered.
- B. Rosin Paper: Fed-Spec. UU-B-790, Type I, Grade D, Style 1b, Rosin-sized sheathing paper, weighing approximately 3 Kg/10 m² (6 lbs/100 sf).
- C. Bituminous Paint: ASTM D1187, Type I.
- D. Fasteners:
 - Use copper, copper alloy, bronze, brass, or stainless steel for copper and copper clad stainless steel, and stainless steel for stainless steel and aluminum alloy. Use galvanized steel or stainless steel for galvanized steel.
 - 2. Nails:
 - a. Minimum diameter for copper nails: 3 mm (0.109 inch).
 - b. Minimum diameter for aluminum nails 3 mm (0.105 inch).

- c. Minimum diameter for stainless steel nails: 2 mm (0.095 inch) and annular threaded.
- d. Length to provide not less than 22 mm (7/8 inch) penetration into anchorage.
- 3. Rivets: Not less than 3 mm (1/8 inch) diameter.
- 4. Expansion Shields: Fed Spec A-A-1925A.
- E. Sealant: As specified in Section 07 92 00, JOINT SEALANTS for exterior locations.
- F. Insect Screening: ASTM D3656, 18 by 18 regular mesh.
- G. Roof Cement: ASTM D4586.

2.3 SHEET METAL THICKNESS

- A. Except as otherwise shown or specified use thickness or weight of sheet metal as follows:
- B. Concealed Locations (Built into Construction):
 - 1. Copper: 30g (10 oz) minimum 0.33 mm (0.013 inch thick).
- C. Exposed Locations:
 - 1. Copper: 0.4 Kg (16 oz).

2.4 FABRICATION, GENERAL

- A. Jointing:
 - In general, copper, stainless steel and copper clad stainless steel joints, except expansion and contraction joints, shall be locked and soldered.
 - Jointing of copper over 0.5 Kg (20 oz) weight or stainless steel over 0.45 mm (0.018 inch) thick shall be done by lapping, riveting and soldering.
 - 3. Joints shall conform to following requirements:
 - a. Flat-lock joints shall finish not less than 19 mm (3/4 inch) wide.
 - b. Lap joints subject to stress shall finish not less than 25 mm (one inch) wide and shall be soldered and riveted.
 - c. Unsoldered lap joints shall finish not less than 100 mm (4 inches) wide.
 - 4. Flat and lap joints shall be made in direction of flow.
 - 5. Soldering:
 - a. Pre tin both mating surfaces with solder for a width not less than 38 mm (1 1/2 inches) of uncoated copper, stainless steel, and copper clad stainless steel.

- b. Wire brush to produce a bright surface before soldering lead coated copper.
- c. Treat in accordance with metal producers recommendations other sheet metal required to be soldered.
- d. Completely remove acid and flux after soldering is completed.
- B. Expansion and Contraction Joints:
 - Fabricate in accordance with the Architectural Sheet Metal Manual recommendations for expansion and contraction of sheet metal work in continuous runs.
 - 2. Space joints as shown or as specified.
 - Space expansion and contraction joints for copper, stainless steel, and copper clad stainless steel at intervals not exceeding 7200 mm (24 feet).
 - 4. Space expansion and contraction joints for aluminum at intervals not exceeding 5400 mm (18 feet), except do not exceed 3000 mm (10 feet) for gravel stops and fascia-cant systems.
 - 5. Fabricate slip-type or loose locked joints and fill with sealant unless otherwise specified.
 - Fabricate joint covers of same thickness material as sheet metal served.
- C. Cleats:
 - Fabricate cleats to secure flashings and sheet metal work over 300 mm (12 inches) wide and where specified.
 - Provide cleats for maximum spacing of 300 mm (12 inch) centers unless specified otherwise.
 - 3. Form cleats of same metal and weights or thickness as the sheet metal being installed unless specified otherwise.
 - 4. Fabricate cleats from 50 mm (2 inch) wide strip. Form end with not less than 19 mm (3/4 inch) wide loose lock to item for anchorage. Form other end of length to receive nails free of item to be anchored and end edge to be folded over and cover nail heads.
- D. Edge Strips or Continuous Cleats:
 - Fabricate continuous edge strips where shown and specified to secure loose edges of the sheet metal work.
 - Except as otherwise specified, fabricate edge strips or minimum 0.6
 Kg (24 ounce)copper.
 - Use material compatible with sheet metal to be secured by the edge strip.

- Fabricate in 3000 mm (10 feet) maximum lengths with not less than 19 mm (3/4 inch) loose lock into metal secured by edge strip.
- 5. Fabricate Strips for fascia anchorage to extend below the supporting wood construction to form a drip and to allow the flashing to be hooked over the lower edge at least 19 mm (3/4-inch).
- Fabricate anchor edge maximum width of 75 mm (3 inches) or of sufficient width to provide adequate bearing area to insure a rigid installation using 1 Kg (32 oz) copper.
- E. Drips:
 - Form drips at lower edge of sheet metal counter-flashings (cap flashings), fascias, gravel stops, wall copings, by folding edge back 13 mm (1/2 inch) and bending out 45 degrees from vertical to carry water away from the wall.
 - 2. Form drip to provide hook to engage cleat or edge strip for fastening for not less than 19 mm (3/4 inch) loose lock where shown.
- F. Edges:
 - Edges of flashings concealed in masonry joints opposite drain side shall be turned up 6 mm (1/4 inch) to form dam, unless otherwise specified or shown otherwise.
 - 2. Finish exposed edges of flashing with a 6 mm (1/4 inch) hem formed by folding edge of flashing back on itself when not hooked to edge strip or cleat. Use 6 mm (1/4 inch) minimum penetration beyond wall face with drip for through-wall flashing exposed edge.
 - 3. All metal roof edges shall meet requirements of IBC, current edition.

2.5 FINISHES

- A. Use same finish on adjacent metal or components and exposed metal surfaces unless specified or shown otherwise.
- B. In accordance with NAAMM Metal Finishes Manual AMP 500, unless otherwise specified.
- C. Finish exposed metal surfaces as follows, unless specified otherwise:1. Copper: Mill finish.

2.6 THROUGH-WALL FLASHINGS

A. Form through-wall flashing to provide a mechanical bond or key against lateral movement in all directions. Install a sheet having 2 mm (1/16 inch) deep transverse channels spaced four to every 25 mm (one inch), or ribbed diagonal pattern, or having other deformation unless specified otherwise.

- Fabricate in not less than 2400 mm (8 feet) lengths; 3000 mm (10 feet) maximum lengths.
- 2. Fabricate so keying nests at overlaps.
- B. For Masonry Work When Concealed Except for Drip:
 - 1. Copper.
 - 2. Form an integral dam at least 5 mm (3/16 inch) high at back edge.
 - Form exposed portions of flashing with drip, approximately 6 mm (1/4 inch) projection beyond wall face.
- C. For Masonry Work When Exposed Edge Forms a Receiver for Counter Flashing:
 - 1. Use same metal and thickness as counter flashing.
 - 2. Form an integral dam at least 5 mm (3/16 inch) high at back edge.
 - 3. Form exposed portion as snap lock receiver for counter flashing upper edge.
- D. Window Sill Flashing and Lintel Flashing:
 - 1. Copper.
 - Fabricate flashing at ends with folded corners to turn up 5 mm (3/16 inch) in first vertical masonry joint beyond masonry opening.
 - 3. Turn up back edge as shown.
 - 4. Form exposed portion with drip as specified or receiver.
- E. Door Sill Flashing:
 - 1. Where concealed, use 0.5 Kg (20 oz) copper.
 - Where shown on drawings as combined counter flashing under threshold, sill plate, door sill, or where subject to foot traffic, use 0.6 Kg (24 ounce) copper.
 - 3. Fabricate flashing at ends to turn up 5 mm (3/16 inch) in first vertical masonry joint beyond masonry opening with folded corners.

2.7 BASE FLASHING

- A. Use metal base flashing at vertical surfaces intersecting built-up roofing without cant strips or where shown.
 - 1. Use copper.
 - When flashing is over 250 mm (10 inches) in vertical height or horizontal width use either 0.5 Kg (20 oz) copper or 0.5 mm (0.018 inch) stainless steel.
 - 4. Use copper at pipe flashings.
- B. Fabricate metal base flashing up vertical surfaces not less than 200 mm (8 inch) nor more than 400 mm (16 inch).

- C. Fabricate roof flange not less than 100 mm (4 inches) wide unless shown otherwise. When base flashing length exceeds 2400 mm (8 feet) form flange edge with 13 mm (1/2 inch) hem to receive cleats.
- D. Form base flashing bent from strip except pipe flashing. Fabricate ends for riveted soldered lap seam joints. Fabricate expansion joint ends as specified.
- E. Pipe Flashing: (Other than engine exhaust or flue stack)
 - Fabricate roof flange not less than 100 mm (4 inches) beyond sleeve on all sides.
 - 2. Extend sleeve up and around pipe and flange out at bottom not less than 13 mm (1/2 inch) and solder to flange and sleeve seam to make watertight.
 - 3. At low pipes 200 mm (8 inch) to 450 mm (18 inch) above roof:
 - a. Form top of sleeve to turn down into the pipe at least 25 mm (one inch).
 - b. Allow for loose fit around and into the pipe.
 - 4. At high pipes and pipes with goosenecks or other obstructions which would prevent turning the flashing down into the pipe:a. Extend sleeve up not less than 300 mm (12 inch) above roofing.b. Allow for loose fit around pipe.

2.8 COUNTERFLASHING (CAP FLASHING OR HOODS)

- A. Copper.
- B. Fabricate to lap base flashing a minimum of 100 mm (4 inches) with drip:
 - Form lock seams for outside corners. Allow for lap joints at ends and inside corners.
 - In general, form flashing in lengths not less than 2400 mm (8 feet) and not more than 3000 mm (10 feet).
 - Two-piece, lock in type flashing may be used in-lieu-of one piece counter-flashing.
 - 4. Manufactured assemblies may be used.
 - 5. Where counterflashing is installed at new work use an integral flange at the top designed to be extended into the masonry joint or reglet in concrete.
 - Where counterflashing is installed at existing work use surface applied type, formed to provide a space for the application of sealant at the top edge.
- C. One-piece Counterflashing:

- 1. Back edge turned up and fabricate to lock into reglet in concrete.
- 2. Upper edge formed to extend full depth of masonry unit in mortar joint with back edge turned up 6 mm (1/4 inch).
- D. Two-Piece Counterflashing:
 - Receiver to extend into masonry wall depth of masonry unit with back edge turned up 6 mm (1/4 inch) and exposed edge designed to receive and lock counterflashing upper edge when inserted.
 - 2. Counterflashing upper edge designed to snap lock into receiver.
- E. Surface Mounted Counterflashing; one or two piece:
 - Use at existing or new surfaces where flashing cannot be inserted in vertical surface.
 - 2. One piece fabricate upper edge folded double for 65 mm (2 1/2 inches) with top 19 mm (3/4 inch) bent out to form "V" joint sealant pocket with vertical surface. Perforate flat double area against vertical surface with horizontally slotted fastener holes at 400 mm (16 inch) centers between end holes. Option: One piece surface mounted counter-flashing (cap flashing) may be used. Fabricate as detailed on Plate 51 of SMACNA Architectural Sheet Metal Manual.
 - 3. Two pieces: Fabricate upper edge to lock into surface mounted receiver. Fabricate receiver joint sealant pocket on upper edge and lower edge to receive counterflashing, with slotted fastener holes at 400 mm (16 inch) centers between upper and lower edge.
- F. Pipe Counterflashing:
 - Form flashing for water-tight umbrella with upper portion against pipe to receive a draw band and upper edge to form a "V" joint sealant receiver approximately 19 mm (3/4 inch) deep.
 - 2. Fabricate 100 mm (4 inch) over lap at end.
 - Fabricate draw band of same metal as counter flashing. Use 0.6 Kg (24 oz) copper or 0.33 mm (0.013 inch) thick stainless steel or copper coated stainless steel.
 - 4. Use stainless steel bolt on draw band tightening assembly.
 - 5. Vent pipe counter flashing may be fabricated to omit draw band and turn down 25 mm (one inch) inside vent pipe.
- G. Where vented edge decks intersect vertical surfaces, form in one piece, shape to slope down to a point level with and in front of edge-set notched plank; then, down vertically, overlapping base flashing.

- 2.9 GRAVEL STOPS: NOT USED
- 2.10 BITUMEN STOPS: NOT USED
- 2.11 HANGING GUTTERS: NOT USED
- 2.12 CONDUCTORS (DOWNSPOUTS): NOT USED
- 2.13 SPLASHPANS: NOT USED
- 2.14 REGLETS: NOT USED
- 2.15 INSULATED EXPANSION JOINT COVERS: NOT USED
- 2.16 ENGINE EXHAUST PIPE OR FLUE OR STACK FLASHING
 - A. Flashing at penetrations through roofing shall consist of a metal collar, sheet metal flashing sleeve and hood.
 - B. Fabricate collar with roof flange of 1.2 mm (0.047 inch) minimum thick black iron or galvanized steel sheet.
 - 1. Fabricate inside diameter of collar 100 mm (4 inches) larger than the outside diameter of the item penetration the roofing.
 - Extend collar height from structural roof deck to not less than 350 mm (14 inches) above roof surface.
 - 3. Fabricate collar roof flange not less than 100 mm (4 inches) wide.
 - 4. Option: Collar may be of steel tubing 3 mm (0.125 inch) minimum wall thickness, with not less than four, 50 mm x 100 mm x 3 mm (2 inch by 4 inch by 0.125 inch) thick tabs bottom edge evenly spaced around tube in lieu of continuous roof flange. Full butt weld joints of collar.
 - C. Fabricate sleeve base flashing with roof flange of either copper, stainless steel, or copper clad stainless steel.
 - 1. Fabricate sleeve roof flange not less than 100 mm (4 inches) wide.
 - 2. Extend sleeve around collar up to top of collar.
 - 3. Flange bottom of sleeve out not less than 13 mm (1/24 inch) and soldered to 100 mm (4 inch) wide flange to make watertight.
 - 4. Fabricate interior diameter 50 mm (2 inch) greater than collar.
 - D. Fabricate hood counter flashing from same material and thickness as sleeve.
 - Fabricate the same as pipe counter flashing except allow not less than 100 mm (4 inch) lap below top of sleeve and to form vent space minimum of 100 mm (4 inch) wide.
 - 2. Hem bottom edge of hood 13 mm (1/2 inch).
 - 3. Provide a 50 mm (2 inch) deep drawband.
 - E. Fabricate insect screen closure between sleeve and hood. Secure screen to sleeve with sheet metal screws.

2.17 SCUPPERS: - NOT USED

2.18 GOOSENECK ROOF VENTILATORS

- A. Form of 1.3 mm (0.0508 inch) thick sheet aluminum, reinforce as necessary for rigidity, stiffness, and connection to curb, and to be watertight.
 - 1. Form lower-edge to sleeve to curb.
 - 2. Curb:
 - a. Form for 100 mm (4 inch) high sleeve to ventilator.
 - b. Form for concealed anchorage to structural curb and to bear on structural curb.
 - c. Form bottom edge of curb as counterflashing to lap base flashing.
- B. Provide open end with 1.6 mm (16 gage), stainless steel wire guard of 13 mm (1/2 inch) square mesh.
 - 1. Construct suitable aluminum angle frame to retain wire guard.
 - 2. Rivet angle frame to end of gooseneck.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - Install flashing and sheet metal items as shown in Sheet Metal and Air Conditioning Contractors National Association, Inc., publication, ARCHITECTURAL SHEET METAL MANUAL, except as otherwise shown or specified.
 - 2. Apply Sealant as specified in Section 07 92 00, JOINT SEALANTS.
 - Apply sheet metal and other flashing material to surfaces which are smooth, sound, clean, dry and free from defects that might affect the application.
 - 4. Remove projections which would puncture the materials and fill holes and depressions with material compatible with the substrate. Cover holes or cracks in wood wider than 6 mm (1/4 inch) with sheet metal compatible with the roofing and flashing material used.
 - Coordinate with masonry work for the application of a skim coat of mortar to surfaces of unit masonry to receive flashing material before the application of flashing.
 - 6. Apply a layer of 7 Kg (15 pound) saturated felt followed by a layer of rosin paper to wood surfaces to be covered with copper. Lap each ply 50 mm (2 inch) with the slope and nail with large headed copper nails.

- Confine direct nailing of sheet metal to strips 300 mm (12 inch) or less wide. Nail flashing along one edge only. Space nail not over 100 mm (4 inches) on center unless specified otherwise.
- 8. Install bolts, rivets, and screws where indicated, specified, or required in accordance with the SMACNA Sheet Metal Manual. Space rivets at 75 mm (3 inch) on centers in two rows in a staggered position. Use neoprene washers under fastener heads when fastener head is exposed.
- 9. Coordinate with roofing work for the installation of metal base flashings and other metal items having roof flanges for anchorage and watertight installation.
- Nail continuous cleats on 75 mm (3 inch) on centers in two rows in a staggered position.
- Nail individual cleats with two nails and bend end tab over nail heads. Lock other end of cleat into hemmed edge.
- 12. Install flashings in conjunction with other trades so that flashings are inserted in other materials and joined together to provide a water tight installation.
- 13. Where required to prevent galvanic action between dissimilar metal isolate the contact areas of dissimilar metal with sheet lead, waterproof building paper, or a coat of bituminous paint.
- 14. Isolate aluminum in contact with dissimilar metals others than stainless steel, white bronze or other metal compatible with aluminum by:
 - a. Paint dissimilar metal with a prime coat of zinc-chromate or other suitable primer, followed by two coats of aluminum paint.
 - b. Paint dissimilar metal with a coat of bituminous paint.
 - c. Apply an approved caulking material between aluminum and dissimilar metal.
- 15. Paint aluminum in contact with or built into mortar, concrete, plaster, or other masonry materials with a coat of bituminous paint.
- 16. Paint aluminum in contact with absorptive materials that may become repeatedly wet with two coats of bituminous paint or two coats of aluminum paint.
- 17. Bitumen Stops:
 - a. Install bitumen stops for built-up roof opening penetrations through deck and at formed sheet metal gravel stops.

b. Nail leg of bitumen stop at 300 mm (12 inch) intervals to nailing strip at roof edge before roofing material is installed.

3.2 THROUGH-WALL FLASHING

- A. General:
 - Install continuous through-wall flashing between top of concrete foundation walls and bottom of masonry building walls; at top of concrete floors; under masonry, concrete, or stone copings and elsewhere as shown.
 - Where exposed portions are used as a counterflashings, lap base flashings at least 100 mm (4 inches) and use thickness of metal as specified for exposed locations.
 - Exposed edge of flashing may be formed as a receiver for two piece counter flashing as specified.
 - Terminate exterior edge beyond face of wall approximately 6 mm (1/4 inch) with drip edge where not part of counter flashing.
 - 5. Turn back edge up 6 mm (1/4 inch) unless noted otherwise where flashing terminates in mortar joint or hollow masonry unit joint.
 - Terminate interior raised edge in masonry backup unit approximately 38 mm (1 1/2 inch) into unit unless shown otherwise.
 - Under copings terminate both edges beyond face of wall approximately
 6 mm (1/4 inch) with drip edge.
 - Lap end joints at least two corrugations, but not less than 100 mm (4 inches). Seal laps with sealant.
 - 9. Where dowels, reinforcing bars and fastening devices penetrate flashing, seal penetration with sealing compound. Sealing compound is specified in Section 07 92 00, JOINT SEALANTS.
 - 10. Coordinate with other work to set in a bed of mortar above and below flashing so that total thickness of the two layers of mortar and flashing are same as regular mortar joint.
 - 11. Where ends of flashing terminate turn ends up 25 mm (1 inch) and fold corners to form dam extending to wall face in vertical mortar or veneer joint.
 - Turn flashing up not less than 200 mm (8 inch) between masonry or behind exterior veneer.
 - 13. When flashing terminates in reglet extend flashing full depth into reglet and secure with lead or plastic wedges spaced 150 mm (6 inch) on center.
 - 14. Continue flashing around columns:

- a. Where flashing cannot be inserted in column reglet hold flashing vertical leg against column.
- b. Counterflash top edge with 75 mm (3 inch) wide strip of saturated cotton unless shown otherwise. Secure cotton strip with roof cement to column. Lap base flashing with cotton strip 38 mm (1 1/2 inch).
- B. Flashing at Top of Concrete Foundation Walls Where concrete is exposed. Turn up not less than 200 mm (8 inch) high and into masonry backup mortar joint or reglet in concrete backup as specified.
- C. Flashing at Top of Concrete Floors (except where shelf angles occur): Place flashing in horizontal masonry joint not less than 200 mm (8 inch) below floor slab and extend into backup masonry joint at floor slab 38 mm (1 1/2 inch).
- D. Flashing at Cavity Wall Construction: Where flashing occurs in cavity walls turn vertical portion up against backup under waterproofing, if any, into mortar joint. Turn up over insulation, if any, and horizontally through insulation into mortar joint.
- E. Flashing at Veneer Walls:
 - 1. Install near line of finish floors over shelf angles or where shown.
 - 2. Turn up against sheathing.
 - At stud framing, hem top edge 19 mm (3/4 inch) and secure to each stud with stainless steel fasteners through sheathing.
 - 4. At concrete backing, extend flashing into reglet as specified.
 - 5. Coordinate with installation of waterproofing or asphalt felt for lap over top of flashing.
- F. Lintel Flashing when not part of shelf angle flashing:
 - Install flashing full length of lintel to nearest vertical joint in masonry over veneer.
 - Turn ends up 25 mm (one inch) and fold corners to form dam and extend end to face of wall.
 - Turn back edge up to top of lintel; terminate back edge as specified for back-up wall.
- G. Window Sill Flashing:
 - 1. Install flashing to extend not less than 100 mm (4 inch) beyond ends of sill into vertical joint of masonry or veneer.
 - 2. Turn back edge up to terminate under window frame.
 - 3. Turn ends up 25 mm (one inch) and fold corners to form dam and extend to face of wall.

- H. Door Sill Flashing:
 - Install flashing under bottom of plate sills of doors over curbs opening onto roofs. Extend flashing out to form counter flashing or receiver for counter flashing over base flashing. Set in sealant.
 - Extend sill flashing 200 mm (8 inch) beyond jamb opening. Turn ends up one inch in vertical masonry joint, extend end to face of wall. Join to counter flashing for water tight joint.
 - 3. Where doors thresholds cover over waterproof membranes install sill flashing over water proof membrane under thresholds. Extend beyond opening to cover exposed portion of waterproof membrane and not less than 150 mm (6 inch) beyond door jamb opening at ends. Turn up approximately 6 mm (1/4 inch) under threshold.
- I. Flashing at Masonry, Stone, or Precast Concrete Copings:
 - Install flashing with drips on both wall faces unless shown otherwise.
 - Form penetration openings to fit tight against dowel or other item with edge turned up. Seal penetrations with sealant.

3.3 BASE FLASHING: - NOT USED

3.4 COUNTERFLASHING (CAP FLASHING OR HOODS)

- A. General:
 - 1. Install counterflashing over and in conjunction with installation of base flashings, except as otherwise specified or shown.
 - Install counterflashing to lap base flashings not less than 100 mm (4 inch).
 - Install upper edge or top of counterflashing not less than 225 mm (9 inch) above top of the roofing.
 - 4. Lap joints not less than 100 mm (4 inch). Stagger joints with relation to metal base flashing joints.
 - 5. Use surface applied counterflashing on existing surfaces and new work where not possible to integrate into item.
 - 6. When fastening to concrete or masonry, use screws driven in expansion shields set in concrete or masonry. Use screws to wood and sheet metal. Set fasteners in mortar joints of masonry work.
- B. One Piece Counterflashing:
 - Where flashing is installed at new masonry, coordinate to insure proper height, embed in mortar, and end lap.

- Where flashing is installed in reglet in concrete insert upper edge into reglet. Hold flashing in place with lead wedges spaced not more than 200 mm (8 inch) apart. Fill joint with sealant.
- 3. Where flashing is surface mounted on flat surfaces.
 - a. When top edge is double folded anchor flat portion below sealant
 "V" joint with fasteners spaced not over 400 mm (16 inch) on center:
 - 1) Locate fasteners in masonry mortar joints.
 - 2) Use screws to sheet metal or wood.
 - b. Fill joint at top with sealant.
- 4. Where flashing or hood is mounted on pipe.
 - a. Secure with draw band tight against pipe.
 - b. Set hood and secure to pipe with a one by 25 mm x 3 mm (1 x 1/8 inch) bolt on stainless steel draw band type clamp, or a stainless worm gear type clamp.
 - c. Completely fill joint at top with sealant.
- C. Two-Piece Counterflashing:
 - 1. Where receiver is installed at new masonry coordinate to insure proper height, embed in mortar, and lap.
 - 2. Surface applied type receiver:
 - a. Secure to face construction in accordance, with manufacturer's instructions.
 - b. Completely fill space at the top edge of receiver with sealant.
 - Insert counter flashing in receiver in accordance with fabricator or manufacturer's instructions and to fit tight against base flashing.
- D. Where vented edge occur install so lower edge of counterflashing is against base flashing.
- E. When counter flashing is a component of other flashing install as shown.
- 3.5 REGLETS: NOT USED

3.6 GRAVEL STOPS: - NOT USED

- 3.7 COPINGS: NOT USED
- 3.8 EXPANSION JOINT COVERS, INSULATED: NOT USED

3.9 ENGINE EXHAUST PIPE OR STACK FLASHING

- A. Set collar where shown and secure roof tabs or flange of collar to structural deck with 13 mm (1/2 inch) diameter bolts.
- B. Set flange of sleeve base flashing not less than 100 mm (4 inch) beyond collar on all sides as specified for base flashing.

- C. Install hood to above the top of the sleeve 50 mm (2 inch) and to extend from sleeve same distance as space between collar and sleeve beyond edge - not sleeve:
 - Install insect screen to fit between bottom edge of hood and side of sleeve.
 - Set collar of hood in high temperature sealant and secure with one by 3 mm (1/8 inch) bolt on stainless steel draw band type, or stainless steel worm gear type clamp. Install sealant at top of head.
- 3.10 HANGING GUTTERS: NOT USED
- 3.11 CONDUCTORS (DOWNSPOUTS): NOT USED
- 3.12 SPLASH PANS: NOT USED
- 3.13 GOOSENECK ROOF VENTILATORS
 - A. Install on structural curb not less than 200 mm (8 inch) high above roof surface.
 - B. Securely anchor ventilator curb to structural curb with fasteners spaced not over 300 mm (12 inch) on center.
 - C. Anchor gooseneck to curb with screws having nonprene washers at 150 mm (6 inch) on center.

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