

SECTION 07 60 00**SHEET METAL FLASHING AND TRIM****PART 1 - GENERAL****1.1 DESCRIPTION****A. Formed sheet metal work for flashing and trim:**

1. Metal counterflashing and base flashing
2. Step flashing at vertical surfaces
3. Hip, valley and ridge flashing
4. Fascia and cants.
5. Box gutter liners
6. Hung gutters
7. Rain Water Conductors

1.2 RELATED WORK

- A. Removal and preparation for roofing: Section 07 10 50, PREPARATION FOR REROOFING.
- B. Requirements for slate flashing: Section 07 31 26: SLATE SHINGLES.
- C. Roof Assemblies: Section 07 61 15, SHEET METAL ROOFING.
- D. Sealant compound and installation: Section 07 92 00, JOINT SEALANTS.
- E. Color of factory coated metal: Section 09 06 00, SCHEDULE FOR FINISHES.
- F. Paint materials and application: Section 09 91 00, PAINTING.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data: For each type of product indicated or required for complete installation. Include installation instructions, construction details, materials descriptions, specifications and finishes for each manufactured product and accessory.
- C. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim including plans, elevations, expansion joint locations, and keyed details.
 1. Shop drawings shall be based on manufacturer's recommendations and shall comply with manufacture's details and specifications

- as required to provide fully warranted roof system.
2. Identification of material, thickness, weight, and finish for each item each item.
 3. Forming details including profiles, shapes, seams, and dimensions.
 4. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, slips, and other attachments. Include pattern of seams.
 5. Details of termination points and assemblies including fixed points.
 6. Expansion joints and expansion joint covers.
 7. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets and counterflashing as applicable.
 8. Details of special conditions.
 9. Details of connections to adjoining work.
 10. Detail formed flashing and trim at a scale of full size.
- D. Samples: Submit two representative samples of each material specified indication visual characteristics and finish. Include range samples if variation of finish is anticipated. Samples of size indicated below:
1. Sheet Metal Flashing: 300mm (12 inches) long by actual width of unit, including finished seam and in required profile. Include fasteners and all other required accessories for installation.
 2. Trim, metal enclosures, expansion joints, joint intersections, and miscellaneous fabrications: 300mm (12 inches) long and in required profile. Include fasteners and other exposed accessories.

1.4 APPLICABLE PUBLICATIONS

- A. The publications listed below for a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
1. A167-99(R 2004) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
 2. A653/A653M-07 Steel Sheet Zinc-Coated (Galvanized) or Zinc Alloy Coated (Galvanized) by the Hot- Dip Process
 3. B32-04 Solder Metal
 4. B370-03 Copper Sheet and Strip for Building Construction
 5. D173-03 Bitumen-Saturated Cotton Fabrics Used in Roofing and Waterproofing
 6. D412-06 Vulcanized Rubber and Thermoplastic Elastomers-Tension

7. D1187-97 (R2002) Asphalt Base Emulsions for Use as Protective Coatings for Metal
 8. D1784-07 Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
 9. D3656-07 Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns
 10. D4586-07 Asphalt Roof Cement, Asbestos Free
- C. American National Standards Institute/Single Ply Roofing Institute (ANSI/SPRI):
1. ES-1-2003 Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems
- D. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
1. Architectural Sheet Metal Manual (2003 Edition).
- E. National Association of Architectural Metal Manufacturers (NAAMM):
1. AMP 500-505-88 Metal Finishes Manual
- F. American Architectural Manufacturers Association (AAMA):
1. 605-98 Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions Panels
- G. Federal Specification (Fed. Spec):
1. A-A-1925A Shield, Expansion; (Nail Anchors)
 2. UU-B-790A Building Paper, Vegetable Fiber
- H. International Building Code (IBC):
1. 2007 Edition

1.5 QUALITY ASSURANCE

- A. Fabricator and Installer Qualifications: Submit Qualifications verifying years of experience and roofing manufacturer's approval; include list of completed projects, during the past 5 years, having similar scope of work identified by name, location, date, reference names and phone numbers.
1. Fabricator who employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project.
- B. Sheet Metal Flashing and Trim Standard: Comply with latest edition of "SMACNA's "Architectural Sheet Metal Manual" and Revere Copper's "Copper & Common Sense" unless more stringent requirements are specified or shown on the drawings.

1.6 PRE-INSTALLATION CONFERENCE

- A. Prior to starting the work, meet at site with VA, Installer and installer's of other work that interfaces with or effects sheet metal and trim and review installation procedures and coordination with other work.

1.7 SAMPLE INSTALLATION

- A. Prior to commencing Work after the Pre-Installation Conference provide sample installations to demonstrate aesthetic effects, evaluate workmanship and set quality standards for materials, fabrication and installation.
 - 1. Build sample installations of typical roof eave, including gutter, at corner condition, 750mm (30 inches) long each side, including supporting construction, cleats, seams, attachments, and accessories.
 - a. Prepare separate sample installations for hung gutter and box gutter liner conditions. Include outlet tube, gutter hangers, downspout with bracket.
- B. Review: VA will review the sample installation for acceptance of workmanship.
 - 1. Obtain VA's approval of sample installations before proceeding with subsequent work.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store handle and protect products in accordance with manufacturer's instructions.
- B. Do not store materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials way from uncured concrete and masonry.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide metals and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal and slate shingles unless otherwise indicated.
- B. Copper:
 - 1. Type: ASTM B370, temper H00, cold rolled except where soft temper 060 is required for forming where fully concealed and supported for proper performance.
 - 2. Finish: Coated both sides with zinc/tin alloy approximately 0.5 mils thick. Composition of alloy shall be approximately 50-percent zinc and 50-percent tin with trace elements controlled

for durability, corrosion resistance and color. The Z-T alloy shall be applied by the hot-dip process.

3. Minimum Weight: 20oz. (0.027 inch thick).
- C. Solder: For Z-T Alloy coated copper solder shall conform to ASTM Specification B32 and shall be lead-free.
- D. Slip Sheet: 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).
- E. Fasteners:
 1. Use copper, copper alloy, for copper.
 2. Nails:
 - a. Minimum diameter for copper nails: 3 mm (0.109 inch).
 - b. 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.
- F. Cleats: Same metal and gauge as flashing/sheet metal being anchored.
- G. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- H. Sealant: As specified in Section 07 92 00, JOINT SEALANTS for exterior locations.
- I. Insect Screening: Copper, ASTM D3656, 18 by 18 regular mesh.
- J. Roof Cement: ASTM D4586.

2.2 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. Coated Copper: 20 oz. (0.027 inch) thick.
- C. Exposed Locations:
 1. Coated Copper: 20 oz. (0.027 inch).

2.3 FABRICATION

- A. Jointing:
 1. In general, copper, except expansion and contraction joints, shall be locked and soldered.

2. Jointing of copper over 0.5 Kg (20 oz) weight 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 (1 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.
 - b. Wire brush to produce a bright surface before soldering 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:
1. 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.
 3. Space expansion and contraction joints for copper, at intervals not exceeding 7200 mm (24 feet).
 4. Fabricate slip-type or loose locked joints and fill with sealant unless otherwise specified.
 5. Fabricate joint covers of same thickness material as sheet metal served.
- C. Cleats:
1. Fabricate cleats to secure flashings and sheet metal work over 300 mm (12 inches) wide and where specified.
 2. 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:
1. Fabricate continuous edge strips where shown and specified to secure loose edges of the sheet metal work.

2. Except as otherwise specified, fabricate edge strips of minimum 20 ounce copper (0.027 inch).
3. Use material compatible with sheet metal to be secured by the edge strip.
4. 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).
6. 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:

1. 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:

1. 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 2009.

2.4 FINISH

- 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, unless otherwise specified.
- C. Finish exposed metal surfaces as follows, unless specified otherwise:
 1. Coated Copper: Manufacturer's Z-T alloy finish.

2.5 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 (1

inch), or ribbed diagonal pattern, or having other deformation unless specified otherwise.

1. 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. Coated Copper.
2. Form an integral dam at least 5 mm (3/16 inch) high at back edge.
3. 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. Use coated copper.
2. 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.
2. 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.

2.6 BASE FLASHING

- A. Fabricate metal base flashing up vertical surfaces not less than 200 mm (8 inch) nor more than 400 mm (16 inch).
- B. 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.
- C. Form base flashing bent from strip except pipe flashing. Fabricate ends for riveted soldered lap seam joints. Fabricate expansion joint ends as specified.

D. Pipe and vent Flashing:

1. 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 (1 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.

2.7 COUNTERFLASHING (CAP FLASHING))

A. Coated Copper to match roof, unless specified otherwise.

B. Fabricate to lap base flashing a minimum of 100 mm (4 inches) with drip:

1. Form lock seams for outside corners. Allow for lap joints at ends and inside corners.
2. In general, form flashing in lengths not less than 2400 mm (8 feet) and not more than 3000 mm (10 feet).
3. Two-piece, lock in type flashing may be used in-lieu-of one piece counterflashing.
4. 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.
5. 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. Two-Piece Counterflashing:

1. 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.

D. Surface Mounted Counterflashing; one or two piece:

1. Use at existing or new surfaces where flashing can not 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.

2.8 HANGING GUTTERS

- A. Fabricate gutters of not less than 20 oz0.6 Kg (24 oz) coated copper.
- B. Fabricate hanging gutters in single sections as shown on drawings.
- C. Gutter Bead: Stiffen outer edge of gutter by folding edge over approximately 19 mm (3/4 inch) toward roof and down approximately 19 mm (3/4 inch) unless shown otherwise.
- D. Gutter Spacers:
 1. Fabricate of same material and thickness as gutter.
 2. Fabricate 25 mm (1 inch) wide strap and fasten to gutters not over 900 mm (36 inches) on center.
 3. Turn back edge up 25 mm (1 inch) and lap front edge over gutter bead.
 4. Rivet and solder to gutter except rivet and seal to aluminum.
- E. Outlet Tubes:
 1. Form outlet tubes to connect gutters to conductors of same metal and thickness as gutters extend into the conductor 75 mm (3 inch). Flange upper end of outlet tube 13 mm (1/2 inch).
 2. Lock and solder longitudinal seam.
 3. Solder tube to gutter.
 4. Fabricate basket strainers of same material as gutters.
- F. Gutter Brackets:
 1. Fabricate of same metal as gutter. Use 1 inch wide strap hanger as indicated. Fabricate to gutter profile.
 2. Drill two 5 mm (3/16 inch) diameter holes in anchor leg for countersunk flat head screws.

2.9 CONDUCTORS (DOWNSPOUTS)

- A. Fabricate round conductors of same metal and thickness as gutters in sections approximately 3000 mm (10 feet) long with 19 mm (3/4 inch) wide flat locked seams.
- B. Fabricate elbows by mitering, riveting, and soldering except seal aluminum in lieu of solder. Lap upper section to the inside of the

lower piece.

- C. Fabricate conductor brackets or hangers of same material as conductor, 2 mm (1/16 inch) thick by 25 mm (1 inch) minimum width. Form to support conductors 25 mm (1 inch) from wall surface in accordance with Architectural Sheet Metal Manual Plate 34, Design C for rectangular shapes and E for round shapes.

2.10 REGLETS

- A. Fabricate reglets from:
 - 1. 16 ounce (0.027 inch) copper.
- B. Fill open-type reglets with fiberboard or other suitable separator, to prevent crushing of the slot during installation.
- C. Bend edges of reglets for setting into concrete to an angle of not less than 45 degrees, and make wide enough to provide firm anchorage in the concrete.
- D. Fabricate reglets for building into horizontal masonry mortar joints not less than 19 mm (3/4 inch) deep, nor more than 25 mm (1 inch) deep.
- E. Fabricate mitered corners, fittings, and special shapes as may be required by details.
- F. Reglets for concrete may be formed to receive flashing and have a 10 mm (3/8 inch), 45 degree snap lock.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. 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.
 - 3. 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.
 - 5. 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.

7. Confine direct nailing of sheet metal to strips 300 mm (12 inch) or less wide. Nail flashing along one edge only. Space nails 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.
10. Nail continuous cleats on 75 mm (3 inch) on centers in two rows in a staggered position.
11. 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 waterproof building paper, or a coat of bituminous paint.

3.2 THROUGH-WALL FLASHING

A. General:

1. 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.
2. 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.
3. Exposed edge of flashing may be formed as a receiver for two piece counter flashing as specified.
4. 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.
6. Terminate interior raised edge in masonry backup unit approximately 38 mm (1-1/2 inch) into unit unless shown otherwise.
7. Under copings terminate both edges beyond face of wall approximately 6 mm (1/4 inch) with drip edge.
8. 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.
12. Turn flashing up not less than 200 mm (8 inch) between masonry or behind exterior veneer or trim boards.
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.

B. Lintel Flashing:

1. Install flashing full length of lintel to nearest vertical joint in masonry over veneer.
2. Turn ends up 25 mm (1 inch) and fold corners to form dam and extend end to face of wall.

C. 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 (1 inch) and fold corners to form dam and extend to face of wall.

D. Flashing at Masonry and Stone Copings:

1. Install flashing with drips on both wall faces unless shown otherwise.
2. Form penetration openings to fit tight against dowel or other item with edge turned up. Seal penetrations with sealant.

3.3 BASE FLASHING

A. Install where roof membrane type base flashing is not used and where shown.

1. Install flashing at intersections of roofs with vertical surfaces or at penetrations through roofs, to provide watertight construction.
2. Install metal flashings and accessories having flanges extending out on top of the built-up roofing before final bituminous coat and roof aggregate is applied.
3. Secure flange by nailing through roofing into wood blocking with nails spaced 75 mm (3 inch) on centers or, when flange over 100 mm (4 inch) wide terminate in a 13 mm (1/2 inch) folded edge

anchored with cleats spaced 200 mm (8 inch) on center. Secure one end of cleat over nail heads. Lock other end into the seam.

- B. For long runs of base flashings install in lengths of not less than 2400 mm (8 feet) nor more than 3000 mm (10 feet). Install a 75 mm (3 inch) wide slip type, loose lock expansion joint filled with sealant in joints of base flashing sections over 2400 mm (8 feet) in length. Lock and solder corner joints at corners.
- C. Extend base flashing up under counter flashing of roof specialties and accessories or equipment not less than 75 mm (3 inch).

3.4 COUNTERFLASHING (CAP FLASHING)

A. General:

- 1. Install counterflashing over and in conjunction with installation of base flashings, except as otherwise specified or shown.
- 2. Install counterflashing to lap base flashings not less than 100 mm (4 inch).
- 3. 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 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:

- 1. Where flashing is installed at new masonry, coordinate to insure proper height, embed in mortar, and end lap.
- 2. 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 manufacturers instructions.
 - b. Completely fill space at the top edge of receiver with sealant.
3. Insert counterflashing 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 counterflashing is a component of other flashing install as shown.

3.5 REGLETS

- A. Install reglets in a manner to provide a watertight installation.
- B. Locate reglets not less than 225 mm (9 inch) nor more than 400 mm (16 inch) above roofing, and not less than 125 mm (5 inch) nor more than 325 mm (13 inch) above cant strip.
- C. Butt and align end joints on each section of reglet and securely hold in position until mortar is hardened:
 1. Coordinate reglets for masonry to locate horizontally into mortar joints.
 2. Anchor mechanically as recommended by manufacturer of flashing and reglet devices.

3.6 COPINGS

A. General:

1. On walls topped with a wood plank, install a continuous edge strip on the front and rear edge of the plank. Lock the coping to the edge strip with a 19 mm (3/4 inch) loose lock seam.
2. Where shown turn down roof side of coping and extend down over base flashing as specified for counter-flashing. Secure counter-flashing to lock strip in coping at continuous cleat.
3. Install ends adjoining existing construction so as to form space for installation of sealants. Sealant is specified in Section 07 92 00, JOINT SEALANTS.

B. Coated Copper Copings:

1. Join ends of sheets by a 19 mm (3/4 inch) locked and soldered seam, except at intervals of 9600 mm (32 feet), provide a 38 mm (1 1/2 inch) loose locked expansion joint filled with sealant or

mastic.

2. At straight runs between 7200 mm (24 feet) and 19200 mm (64 feet) locate expansion joint at center.
3. At straight runs that exceed 9600 mm (32 feet) and form the leg of a corner locate the expansion joint not more than 4800 mm (16 feet) from the corner.

C. HANGING GUTTERS

- D. Hang gutters with high points and slope as indicated on drawings.
- E. Lap joints, except for expansion joints, at least 25 mm (1 inch) in the direction of flow. Rivet and seal or solder lapped joints.
- F. Support gutters in brackets spaced not more than 600 mm (24 inch) on centers, brackets attached to facial or wood nailer by at least two screws or nails.

1. For copper gutters use brass or bronze brackets.

- G. Secure brackets to gutters in such a manner as to allow free movement of gutter due to expansion and contraction.

H. Gutter Expansion Joint:

1. Locate expansion joints as indicated on drawings.
2. Provide at least a 25 mm (1 inch) expansion joint space between end baffles of gutters.
3. Install a cover plate over the space at expansion joint.
4. Fasten cover plates to gutter section on one side of expansion joint only.
5. Secure loose end of cover plate to gutter section on other side of expansion joint by a loose-locked slip joint.

- I. Outlet Tubes: Set bracket strainers loosely into gutter outlet tubes.

3.7 CONDUCTORS (DOWNSPOUTS)

- A. Sleeve conductors to gutter outlet tubes and fasten joint and joints between sections.
- B. Set conductors plumb and clear of wall, and anchor to wall with two anchor straps, located near top and bottom of each section of conductor. Strap at top shall be fixed to downspout, intermediate straps and strap at bottom shall be slotted to allow not less than 13 mm (1/2 inch) movement for each 3000 mm (10 feet) of downspout.
- C. Install elbows, offsets and shoes where shown and required. Slope not less than 45 degrees.

3.8 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances which might cause corrosion

of metal or deterioration of finishes or interfere with uniform oxidation and weathering.

- B. Protect flashings and sheet metal during construction, to ensure that Work will be without damage or deterioration, other than natural weathering, at time of acceptance.
- 1. Replace sheet metal that has been damaged by construction operations during the course of the Work.

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