SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 – GENERAL

1.1 PURPOSE

A. This guideline is intended to provide useful information to the Professional Service Provider (PSP) to establish a basis of design. PSP is to apply the principles of this section such that the University of Texas at Arlington (UTA) may achieve a level of quality and consistency in the design and construction of their facilities. Deviations from these guidelines must be approved by UTA and may require justification through Life Cycle Cost (LCC) analysis and submitted to UTA for approval.

1.2 LESSONS LEARNED AND DESIGN CONSIDERATIONS

A. X

1.3 SECTION INCLUDES

A. Sheet metal flashings
B. Gutters and downspouts
C. Collector heads

1.4 RELATED WORK

A. Section 06 10 00 – Rough Carpentry
B. Section 07 41 13 – Metal Roof Panels
C. Section 07 52 00 – Modified Bituminous Roofing
D. Section 07 92 00 – Joint Sealants

1.5 REFERENCE STANDARDS

A. SMACNA - Architectural Sheet Metal Manual; current edition.
B. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate; current edition.
C. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; current edition.
D. ASTM A792 - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; current edition.
E. ASTM B32 - Solder Metal; current edition.
F. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate; current edition.
G. ASTM B370 - Copper Sheet and Strip for Building Construction; current edition.
H. Federal Specification FS 0-F-506 - Flux, Soldering, Paste, and Liquid; current edition.
I. ANSI/SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems; current edition.

1.6 SUBMITTALS

A. Submit under provisions of Division 01.
B. Prior to pre-roofing meeting, submit the following:
    1. Manufacturer's Certification: Letter from manufacturer, on letterhead, and signed by authorized representative, stating:
    2. Product Literature: Submit product literature on sheet metal and accessory components.
    3. Perimeter Flashing Certification: document that certifies roof perimeter edge sheet metal flashing meets ANSI/SPRI ES-1 Design Standard.
C. Shop drawings: Submit shop drawings for approval prior to Pre-roofing Conference and start of Work. Include the following Drawings:
    1. Indicate on Shop Drawings material profiles, jointing patterns, jointing details, fastening methods, and installation instructions.
    2. Indicate location of sealants, tapes and gaskets.
    3. Indicate material type, finish and gage.
D. Product data:
    1. Sheet metal products: Submit manufacturer’s data sheets for each product being installed. Coordinate with roof Specification Section(s).
    2. Material Safety Data Sheets: Provide manufacturer’s MSDS information for all materials proposed for use.
    3. ASTM Compliance Sheet: Submit product material list with corresponding ASTM standard(s) each product

complies with. Include Specification paragraph reference number that relates to each product.

1.7 QUALITY ASSURANCE
- A. Installer: Company specializing in performing the work of this Section and approved by roof manufacturer for installation of specified roof system.
- B. Minimum 5 years documented successful experience with asphalt shingle roofing.

1.8 REGULATORY REQUIREMENTS
- A. Wind Uplift Resistance: Perimeter sheet metal edge to comply with ANSI/SPRI ES-1.

1.9 TOLERANCES
- A. Comply with tolerances listed in this Section.
- B. Where tolerances are not expressly stated in these Specifications, or by the manufacturer, perform Work within tolerances specified in the SMACNA Architectural Sheet Metal Manual.

1.10 PRE-ROOFING CONFERENCE
- A. Schedule meeting to discuss roof Work before start of work onsite.
- B. Comply with requirements of roof Specification Section(s).

1.11 DELIVERY, STORAGE AND HANDLING
- A. Deliver, store, and handle products according to manufacturer's recommendations.
- B. Deliver products in original containers, dry, undamaged, with seals and labels intact.
- C. Storage:
  1. Roof-top storage of weather-sensitive material is not permitted. Material stored overnight on roof-top will be considered defective.
  2. Store weather-sensitive products in enclosed storage trailers. Or if site conditions do not allow storage trailers,
     a) Store weather-sensitive products on pallets, clear of ground, and cover with secure breathable canvas tarps. Or if site conditions do not allow site storage,
     b) Store weather-sensitive products in an enclosed warehouse, or in storage trailers off-site. Deliver products in quantity that can be used each day, without roof-top storage. Products must be returned to warehouse, or storage trailer, each day.
  3. Store roll goods on end. Do not use rolls with damaged ends. Cut and remove portion of roll damaged, and use undamaged portion.
- D. Store related materials, within temperature ranges, recommended by the manufacturer(s) of each product.
- E. Stack sheet metal to prevent twisting, bending, or abrasion, and to provide ventilation.
- F. Do not stack products on roof surfaces without properly securing to prevent blow-off and sliding-off roof.
- G. Slope metal sheets to ensure drainage.

1.12 ENVIRONMENTAL REQUIREMENTS
- A. Comply with manufacturer’s environmental requirements for storage and application of products.
- B. Verify existing and forecasted weather conditions and determine when conditions are acceptable for roof Work within manufacturer’s recommended guidelines:
- C. Do not expose materials sensitive to water, or sunlight, damage in quantities greater than can be weatherproofed during each day.

1.13 COORDINATION
- A. Coordinate Work with installation of associated metal flashings as the Work of this Section proceeds.

1.14 INSPECTION BY MANUFACTURER
- A. Comply with requirements of roof membrane Specification Section(s).
- B. Provide manufacturer's field inspection reports within five days of each site visit.

1.15 MANUFACTURER WARRANTY
- A. Provide manufacturer's roof system warranty according to roof Specification Section(s). Include sheet metal flashings provided by roof manufacturer for incorporation into their roof system.
- B. Provide twenty year material warranty(s) for ASTM A792 and prefinished sheet metal coating(s).

1.16 SUBSTITUTIONS

A. Where specific products are listed in this Specification, the referenced manufacturer's systems are to establish a level of quality.
B. Requests for substitutions to listed products shall be submitted during the bidding phase per requirements of Division 01.
C. Consideration of requests for substitution is at the sole discretion of the A/E and Owner, and approvals shall be issued in writing by the A/E with Owner concurrence.

1.17 INSTALLER WARRANTY
A. Roof Installer Warranty: provide two (2) year installer warranty under provisions of Division 01.
B. Coordinate with requirements of roof membrane Specification Section(s).

PART 2 – PRODUCTS

2.1 SHEET MATERIALS
A. Stainless Steel: ASTM A167; 24 gage sheet steel; Type 304; non-magnetic.
B. Copper Sheet Metal: Sheet copper, ASTM B370, 16 ounce and 20 ounce.
C. Galvanized Sheet Metal: Sheet steel, ASTM A653, G90 coating, in various gages.
D. Galvalume® Sheet Metal: Sheet steel with aluminum-zinc alloy coating, ASTM A792, in various gages.
E. Prefinished Sheet Metal: Sheet steel, Galvalume according to ASTM A792, with full-strength Kynar 500 coating, 24 gage, in color chosen by A/E.
F. Aluminum Sheet and Plate: ASTM B209, anodized color, form alloy, gage and temper appropriate for use, color chosen by A/E.

2.2 FASTENERS
A. Flashing Nails: threaded nails;
   1. Non-Ferrous Metal: non-magnetic stainless steel slater's nails, minimum 3/8 inch head.
   2. Ferrous Metal: hot-dipped galvanized; minimum 3/8 inch head.
B. Screws: thread design to meet application, add minimum 5/8 inch diameter EPDM integral washer where exposed to weather.
   1. Non-Ferrous Metal: #12, non-magnetic stainless-steel screws.
   2. Ferrous Metal: #12, galvanized or polymer coating steel screw, with head designed to meet application.
C. Masonry Screws: 1/4 inch diameter, galvanized, with polymer finish; slotted hex washer head with minimum 5/8 inch EPDM washer; Tapcon by Buildex, or approved substitute.
D. Pop Rivets: full stainless steel, including mandrel; in size to meet application.
E. Fastener lengths as required to penetrate:
   1. Minimum 1 inch, maximum 1-1/2 inch into masonry
   2. Minimum 1-1/4 inch, or through wood receiving members
   3. Minimum 1/2 inch through sheet metal and steel receiving members

2.3 ACCESSORIES
A. Solder: ASTM B32 - 50/50 type
B. Flux: FS 0-F-506
C. Bituminous Products: According to provisions of membrane roofing Specification.
D. Sealants: according to provisions of Section 07 92 00.
E. Sealant Tape: butyl tape, 100 percent solids, in width and thickness to meet application.
F. Roof Penetration Flashing Sealer: ASTM C-920, Type S, Grade P, class 25, use TM; one-part self-leveling polyurethane sealer.
G. Asphalt Primer: ASTM D41, as supplied or specifically approved by insulation manufacturer.

PART 3 – EXECUTION

3.1 GENERAL
A. Work of this Section shall be performed in accordance with standards as defined by SMACNA Architectural Sheet Metal Manual.
B. The roof manufacturer's technical specifications shall be considered a part of this Section and shall be used as a minimum standard in conjunction with this Section.
C. If this Section conflicts with, or exceeds manufacturer's minimum requirements the more rigid standard shall apply and be enforced.

3.2 COORDINATION
A. Coordinate installation of sheet metal components to ensure quality installation.

B. Strip-in metal flanges built into roof membrane daily. Remove, and reinstall flanges left overnight.
C. Coordinate installation of through-wall flashings with masonry, and damp proofing, to achieve required quality.
D. Ensure proper sequencing to allow installation of roof and flashings as detailed, without damage.
E. Coordinate activities to prevent damage to adjacent surfaces.

3.3 EXAMINATION & PREPARATION

A. Do not store, stage activities, or allow construction traffic over roof areas, unless protection plan is approved in advance by A/E.
B. Contractor is responsible for maintaining sheet metal and accessories in good condition during delivery, storage, installation and Final Completion.
C. Verify that surfaces and site conditions are ready to receive Work. Verify that debris has been completely removed from roof area and broom clean immediately prior to sheet metal application.
D. Verify flashing substrate is clean, sound, smooth, and dry enough for covering. Report substrate not serviceable. Do not install finish application sheet metal over unserviceable area(s).
E. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, and wood components are in place.
F. Ensure nailers and blocking are properly attached and ready for application of sheet metal.
G. Construct and install nailers and blocking under provisions of Section 06 10 00.
H. Field-measure site conditions prior to fabricating work. Note variances; adjust dimensions to accommodate site conditions.
I. Pre-prime top surface of metal flanges which will be built-into roof membrane, except where field soldering is required.
J. Provide separation of dissimilar metals by back-painting concealed contact surfaces with asphalt primer, both surfaces.

3.4 TEMPORARY WATERPROOFING

A. Provide water stops and temporary tie-ins daily to prevent moisture penetration into building interior or installed assemblies.
B. Seal roofing temporarily to the deck where leakage could penetrate installed assemblies. Remove upon resumption of Work.
C. Provide permanent, or temporary, counter flashing daily.
D. Install membrane assemblies complete with strip-in plies each day. Use mastic seals only in such a manner that mastic does not remain between finished modified bitumen plies at cant strips and membrane terminations. Provide seal at all terminations, both vertical and horizontal.
E. Provide temporary seals which do not soil finished work surfaces or contaminate surfaces intended to receive sealants.
F. Remove temporary seals from completed Work.

3.5 FABRICATION

A. Fabricate flashings and components true to shape, accurate in size, square, and free from distortion or defect.
B. Ensure symmetrical layout of running lengths of sheet metal.
C. Fabricate corners, intersections and terminations of "running" flashing fixed as components, separate from other lengths of flashings. Fabricate such components with maximum 18 inch legs.
D. Partially assemble sub-components of corner intersections, and termination components; set partially assembled components in place to verify fit and that each seats properly before soldering or joining the finished assembly.
E. Form a slight kick-down to edges of metal flanges to be built into roof membranes, maximum 1/4 inch wide, maximum 10 degree brake.
F. Hem exposed edges 1/2 inch.
G. Obtain prior approval from Engineer to adjust dimensions and configurations of sheet metal flashings, to allow more effective yield of material, or to facilitate fabrication. Ensure that adjustments comply with design intent.

3.6 SOLDERING

A. Solder only fixed components, which have maximum 18 inch legs.
B. Pre-tin both sides of edges to be soldered, using flux and solder to full anticipated width of joint.

C. Join sub-components together before soldering. For flat seams, and whenever possible, form flat-lock seams, binding sheets tightly. Where flat-lock seams are impractical, provide tabs, partially interlocked, if possible, and join with pop-rivets at 1 inch on center.
D. Do not solder over nail heads.
E. Apply flux to surface of joint, and solder slowly with well heated irons. Heat sheets as necessary to sweat solder to full width of seam, or minimum 3/4 inch. Ensure an even flow of solder without excess build-up.
F. Solder joints in a horizontal position whenever possible. When soldering on slopes steeper than 45˚, apply a second bead, neatly laced.
G. Neutralize flux from surfaces immediately after soldering, using cloth saturated with 10% solution of washing soda and water, and wipe again using separate cloth and clean water.

3.7 JOINTING

A. Form joints in running flashings to accommodate thermal movement equally throughout all joints.
B. Provide "slip"-type joints each side of soldered or joined components, except where total length of intersecting lengths is less than 5 feet.
C. Provide joints aligned with joints in walls. Overlap, notch, and loosely interlock adjoining sections at lower hem. Fasten only one side of joint.
D. Form rigid, fixed joints only when constructing fixed components. Provide minimum 3/4 inch tabs, interlocked where possible. Join sections with tabs concealed.
E. Solder fixed joints in galvanized and stainless steel. Rivet and seal fixed joints in prefinished sheet metal.
F. Expansion Joint Covers: apply two beads of concealed sealant, 6 inch lap, shingle fashion.
G. Counter Flashing:
    1. Form minimum 3 inch lap joint. Apply single bead of sealant, concealed inside lap. Notch and interlock lower hem, allowing for 1/4 inch movement. Do not fasten through lap.
    2. Tab corners, seal between tabs with sealant (or solder corner) and rivet 1 inch on center.
    3. Align, or add joints, to counter flashing at wall panel joints.
H. Concealed Continuous Cleats: Leave 1/2 inch space between lengths.
I. Exposed Cleats:
    1. Form minimum 3 inch lap joint. Apply single bead of sealant, concealed inside lap. Notch and interlock lower hem, allowing 1/4 inch movement. Do not fasten through lap.
    2. Tab corners, seal between tabs with sealant (or solder corner), and rivet 1 inch on center.

3.8 INSTALLATION

A. Comply generally with recommendations in the "Architectural Sheet Metal Manual", by SMACNA, except where otherwise specified.
B. Provide uniform, symmetrical layout of flashing sections, seams, joints, and fasteners.
C. Prime, and embed, sheet metal flanges built-into roof membrane in solid 1/8 inch bed of plastic cement. Fasten to wood nailer 3 inches on center, in staggered pattern. Apply strip-in plies on the same day.
D. Roughen prefinished paint finish on metal flanges built into roof membrane, and apply primer.
E. Ensure proper fit and positioning of flashings. Make adjustments necessary to accommodate variances and imperfections in receiving surfaces.
F. Install flashings free of warp or distortion, and without stress on fixed components.
G. Stagger joints between components.

3.9 GUTTER

A. Fabricate from 10 foot lengths, except maximum 5 foot lengths at corners.
B. Install gutter straps 18 inches on center. Fasten with rivets.
C. Rivet 1 inch on center between double beads at front, back and bottom.
D. Solder joints together. Install gutter expansion joint maximum 40 feet on center.
E. Miter, tab, rivet, and solder corners.

3.10 DOWNSPOUTS

A. Fabricate downspout drops with minimum ¾ inch tabs and 4 inch long vertical section. Solder drops together as a single unit.
B. Insert drops through properly sized opening in floor of gutter. Rivet and solder to floor of gutter. Locate drops away from gutter joints. Connect downspout to drop with rivets 2 inches on center.
C. Fabricate downspouts to 5 inch by 4 inch, with double-lock concealed seam.

D. Connect downspout sections together with 4 inch overlap and rivet sections together.
E. Fasten downspout to wall with 1 inch, wide straps spaced 5 feet on center.
F. Fasten straps to wall and to downspout. Locate straps to conceal downspout joints.
G. Install splash pan diverters where downspouts empty onto asphalt shingle roofing.

3.11 PROTECTION

A. Protect stored sheet metal and accessories prior to installation according to provisions of this Section. Do not install improperly stored materials into the Work.
B. Remove and replace sheet metal that has been water-stained, damaged or is otherwise unserviceable.

3.12 SCHEDULE

ITEM	FINISH	GAGE	FASTENER	PATTERN
Asphalt Shingle Roof Flashings				
Headwall Flashing	Prefinished	24	Neoprene-Head Screw	12 inches on center
Step Shingles	Galvanized	24	Threaded Nail	1 each
Counter Flashing	Prefinished	24	Neoprene-Head Screw	12 inches on center
Soldered Curb Flashing	Galvanized	24	Screws	4 each
Cleat	Galvanized	22	Threaded Nail	12 inches on center
Metal Roof and Siding Flashings				
Counter Flashing	Prefinished	24	Screw	12 inches on center
Pocket Receiver	Prefinished	24	Screw	12 inches on center
Ridge	Prefinished	24	Neoprene-Head Screw	6 inches on center
Ridge Closure	Galvanized	16	Neoprene-Head Screw	6 inches on center
Ridge Plate	Galvanized (Prime & Paint)	16	Screw	24 inches on center
Gutter	Prefinished	24	Wood Screw & Washer	16 inches on center
Gutter Strap	Galvanized	18	Rivets	3 each strap
Outlet Tube	Stainless Steel	24	Pop Rivets	2 inches on center
Downspouts	Prefinished	24	Straps	5 feet on center
Straps	Prefinished	24 (x2)	Wall: Screw Downspout: Rivet	one each side one each side
Zee Purlin at Eave	Galvanized	16	Screws	12 inches on center
Eave Closure	Galvanized	16	Screws	4 each
Eave Support Angle	Galvanized	16	Screws	12 inches on center

Wall Panel Closure	Galvanized	22	Screws	12 inches on center
Rake Flashing	Prefinished	24	Neoprene-Head Screw	12 inches on center
Concealed Rake Support	Galvanized	16	Screws	12 inches on center
Asphalt Built-Up Roof & Modified Bituminous Roof Flashings				
Counter Flashing	Prefinished	24	Screw	12 inches on center
Pocket Receiver	Prefinished	24	Screw	12 inches on center
Roof Drain Flashing	Sheet Lead	4 lb.	Set in Plastic Cement	Full bed
Overflow Scupper Liner	Copper	16 oz	Threaded Nail Hem to Collectorhead	3 inches on center Continuous
Scupper Face Plate	Copper	16 oz	Hem to Scupper	Continuous
Scupper Counter Flashing	Copper	16 oz	Screws	16 inches on center or one each stud
Termination Bar	Alum.	3/16”	Screw	12 inches on center
Soldered Sheet Metal Hood	Galvanized	24	Neoprene-Head Screw	2 each
Louver Counter Flashing	Copper	16 oz	Clips	12 inches on center
Louver Counter Flashing Clips	Copper	20 oz	Screws	One each
Louver Cover Plates (Alternate No. 3)	Copper	16 oz	Neoprene-Head Screw	12 inches on center
Clay Roof Tile Flashings				
Metal Edge	Copper	16 oz	Threaded Nail Hem to Cleat	12 inches on center Continuous
Metal Edge Cleat	Copper	20 oz	Threaded Nail	12 inches on center
Expansion Joint Cover	Copper	16 oz	Neoprene-Head Screw Cleat	16 inches on center Continuous
Expansion Joint Cleat	Copper	20 oz	Neoprene-Head Screw	16 inches on center
Sheet Lead Flashing	Lead (Prime & Paint)	2.5 lb.	Threaded Nail Embed in Mastic	12 inches on center Continuous
Sidewall Flashing	Copper	16 oz	Cleat	12 inches on center
Sidewall Cleat	Copper	20 oz	Threaded Nail	One each

Valley Flashing	Copper	20 oz	Cleat	12 inches on center
Valley Cleat	Copper	20 oz	Threaded Nail	One each
Headwall Flashing	Copper	16 oz	Cleat	12 inches on center
Headwall Clip	Copper	20 oz	Screw	One each
Gutter	Copper	20 oz	Wood Screw & Washer	16 inches on center
Gutter Strap	Copper Bar	1/8”	Rivets	3 each strap
Outlet Tube	Copper	20 oz	Rivets	2 inches on center
Downspouts	Copper	16 oz	Straps	5 feet on center
Straps	Copper Bar	1/8”	Wall: Screw Downspout: Rivet	one each side one each side

END OF SECTION