SECTION 07600

FLASHING AND SHEET METAL

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NOTE TO SPECIFIER: See MDCPS Design Criteria for flashing condition requirements.

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PART 1 GENERAL

1.01 SUMMARY

A. Related Sections:

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NOTE TO SPECIFIER: List related roofing sections being used in the Project requiring flashing and sheet metal work. Flashing for single-ply membrane should be specified in the single-ply membrane specification section.

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1. 06100 - Carpentry.
2. 07900 - Joint Sealers.
3. Division 7 - Thermal and Moisture Protection.

1.02 REFERENCES AND CODES

A. Florida Building Code (FBC), including FBC - Roofing Application Standards (RAS), and FBC - Test Application Standards (TAS).

B. Uplift requirements based on the basic wind velocity pressures for the project according to American Society of Civil Engineers (ASCE) 7-98.

1. Comply with calculations, signed and sealed by a Florida registered professional engineer, establishing wind velocity pressure values for the specific project according to ASCE 7-98 using a wind speed of 146 mph, exposure category "C", and a wind load importance factor of 1.15.

C. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA): Architectural Sheet Metal Manual, latest edition.

D. American Society for Testing and Materials (ASTM):

1. A167-96 Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

2. A240/96a Specification for Heat-resisting Chromium and Chromium-nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.
3. B32-96 Specification for Solder Metal.
4. D4586-93 Specification for Asphalt Roof Cement, Asbestos-Free.

1.03 SUBMITTALS

A. Properly identified product data and descriptive literature before starting work.

B. Shop Drawings on flashing and sheet metal work.

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NOTE TO SPECIFIER: Delete the following paragraph if no control is required on sheet materials by the A/E.

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C. Samples:

1. 8 inch square samples of specified sheet materials to be exposed as finished surfaces.
2. 12 inch long samples of factory fabricated products exposed as finished work. Provide complete with specified factory finish.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements: Flashing and sheet metal shall comply with requirements of SMACNA latest standards.

B. Coordinate application of flashings with application of roofing, protruding material, and roof accessories to provide a complete weathertight installation according to the specified warranty requirements.

C. Pre-Roofing Conference: Attendance to the pre-roofing conference is required. Refer to the roofing sections.

1.05 WARRANTY

A. Furnish the Board a 20 year written warranty from manufacturer for repair and replacement.

B. Furnish the Board a 5 year written warranty covering applicator's quality of work for flashings with warranty of "Roofing System."

1. Warranty shall cover watertight integrity of

flashings for 5 years, including repair and replacement of components or system deemed faulty or in disrepair by A/E during warranty period.

2. Such items deemed faulty or in disrepair shall be repaired at no cost to the Board.

C. Definition of faulty components or system in disrepair includes but is not limited to:

1. Defects in manufacture and installations.
2. Defects in materials.
3. Leaks of any kind.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sheet Metal:

1. Type 302 or 304 stainless steel, 20 and 22 gage, complying with ASTM A167.
2. Flashing for Pipes, Conduits, and Round Equipment Supports: Type 304 stainless steel, 26 gage, 2B, complying with ASTM A240/A.
3. Solder: According to ASTM B32.
4. Fastening Devices: Fasteners shall be compatible with metal and roofing system. Use of powder activated fasteners is prohibited.

a. For Attaching Sheet Metal to Wood with Concealed Fastenings: Hot dip galvanized ring shank roofing nails not less than 1-1/4" long.
b. For Attaching Sheet Metal to Wood with Exposed Fastenings: No.10 x 1-1/4" pan head stainless steel sheet metal screws. Provide neoprene sealant washers and stainless steel washers under screw heads.
c. For Attaching Sheet Metal to Metal Walkway Covers: No.10 x 1/2" pan head stainless steel sheet metal screws. Provide neoprene sealant washers and stainless steel washers under screw heads.
d. For Attaching Sheet Metal to Masonry or Concrete: No.10 x 1-1/4" pan head Tap-Con zinc plated concrete tapping screws. Provide neoprene sealant washers and stainless steel washers under screw heads.

5. Roofing Cement: Plastic roofing cement complying with

the requirements of ASTM D2822 or as appropriate and as recommended by roofing manufacturer.

6. SBS Flashing Cement: Roofing cement according to ASTM D4586.

B. Sanitary vents shall have vandalproof vent covers. Covers may be omitted at inaccessible or steep sloped roofs when accepted by M-DCPS on a per condition basis

C. Vent Stack Flashing:

1. Stainless Steel Flashing for Vent Stacks, Extensions, and Caps by SBC Industries, North Miami, FL.

2. Vandalproof Vent Extension Caps and Flashing by Vent Extensions, Inc., Wellington, FL.

D. Splash Blocks: Approximately 2 foot x 1 foot - 6 inches x 1-1/2" thick reinforced concrete slabs with recess formed in top to deflect water away.

E. Roof Drain Flashing: 16 ounce 30 inches by 30 inches copper flashing.

2.02 FABRICATION

A. Fabricate flashing and sheet metal work according to accepted Shop Drawings.

B. Sanitary Vent Stack Flashings with Vandal Proof Caps:

1. Form tubular stainless steel flashing sleeve not less than 8 inches high with a diameter 1/2" larger than the vent stack:
2. Provide a 4 inch wide flange soldered watertight.
3. Manufacturer's Option:

a. Provide a conical sealant cover, sloped outward and downward between 30 and 45 degrees from the horizontal plane with an inside diameter equal to the vent stack and an outside diameter 1 to 2 inches larger.

4. Provide a vandal proof vent stack cap. The annular space between the cap and vent or the flashing sleeve shall be not less than the cross area of the vent.
5. Manufacturer: SBC Industries or Vent Extensions, Inc.

C. Edge Drips:

1. Fabricate using sheet 22 gage stainless steel to detail indicated, in not over 10 foot sections.
2. Provide a continuous 20 gage stainless steel cleat with punched holes at 6 inches on center. If cleat extends 6 inches or more below top fastener, provide second row of punched holes at 12 inches on center.
3. Provide 4 inch roof flange, and extend bottom drip not less than 1 inch below bottom of wood or plywood roof sheathing, with kick to dispel water 3/4" from finish wall.
4. Comply with RAS 111 - Table 2.

D. Base Flashings at Metal Walkway Covers Abutting Concrete and Masonry:

1. Fabricate using sheet stainless steel to detail indicated, in not over 10 foot sections.
2. Provide 2 inch minimum upturned wall flange behind counterflashing.
3. Where flutes are parallel to abutting wall, provide horizontal roof flange extending 2 inches on nearest flat top on roof decking.
4. Where flutes abut wall, provide 2 inch roof flange.

E. Stucco Stop with Counterflashing (2-piece):

1. Fabricate in approximately 10 foot sections using sheet stainless steel to detail as indicated.
2. Provide receiver with 1-1/2" wall flange, 3/4" sloping stucco stop, 3/4" flange bend downward with 1/2" hem.
3. Shop punch wall flange at 12 inches on center for fastening.
4. Provide shop fabricated corner splices extending 4 inches each way.
5. Provide counterflashing with 1-1/2" 45 degree top flange with 1/4" kick back at top and a 4 inch bottom flange formed inward 3/4" towards wall with a hemmed 1/2" kick at bottom.
6. Provide 1-1/2" x 4" storm cleats.
7. Manufactured by SBC Industries or accepted equivalent.

F. Surface Mounted Flashing (1-piece):

1. Fabricate in approximately 10 foot sections using sheet stainless steel to detail as indicated.
2. Provide flashing with 1-1/2" wall flange with 1/4" kick at top to receive sealant, a 1/2" 135 degree sloping top flange and a 4 inch bottom flange formed

inward 3/4" towards wall with a hemmed 1/2" kick at bottom.
3. Shop punch wall flange at 12 inches on center for fastening.
4. Provide shop fabricated corner splices extending 4 inches.
5. Manufactured by SBC industries or accepted equivalent.

G. Copings:

1. Fabricate in approximately 10 foot sections using sheet 22 gage stainless steel to detail as indicated.
2. Provide a continuous 20 gage stainless steel outer hold-down cleat with punched holes at 6 inches on center and face fasten at inward facing parapet components with removable fasteners as required for sheet metal.
3. Provide 8 inch wide joint covers.
4. Manufactured by SBC Industries or accepted equivalent.
5. Comply with RAS 111 - Table 2.

H. Window Head Flashings:

1. Fabricate using sheet stainless steel to detail and dimension indicated.
2. Extend flashing 3 inches past window at each side.
3. Hem bottom drop edge.
4. Shop punch wall flange for fastenings.

I. Door Hoods:

1. Fabricate using sheet stainless steel with closed ends to detail dimensions indicated.
2. Lock seam top and side joints.
3. Form 1-1/2" minimum continuous wall flanges at sides and top.
4. Shop punch wall flanges at not over 6 inches on center for fastenings.
5. Form 1-1/2" minimum horizontal inward stiffener flanges with hemmed edges at top bottom of hood.
6. Lap bottom hood lips at corners, solder and secure with 2 stainless steel rivets each.

J. Pitch Pans:

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NOTE TO SPECIFIER: Do not use pitch pans for penetration flashing unless accepted by A/E on a per condition basis and no other flashing detail is suitable.

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1. Fabricate using stainless sheet steel, bottomless, not less than 3 inches high, with 4 inch wide roof flanges.
2. Roof flanges shall have closed corners soldered in.
3. Solder vertical corner joints.
4. Top edges shall be hemmed down 1/4" outside.
5. Pan shall provide 2 inch minimum clearance from item surrounded.
6. Coordinate pan sizes with various other trades.

K. Flashings for Pipes, Conduits, and Round Equipment Supports Penetrating Roofing or Resting on Roofing:

1. Form tubular stainless steel base flashing sleeves not less than 8 inches high to fit pipe, conduit, and round equipment support and with 4 inch wide roof flanges soldered watertight.
2. Form split tubular stainless steel counterflashing to provide slip fit over base flashing, with 2 inch minimum loose edge lap, of 5-1/2" minimum height and with 4 inch lap over base flashings.
3. Provide a conical sealant cover, sloped outward and downward at 30 to 45 degrees from the horizontal plane with an inside diameter equal to the vent stack and an outside diameter 1 to 2 inches larger.
4. Manufacturer: SBC Industries or accepted equivalent.

L. Scuppers:

1. Fabricate using stainless steel with soldered seams to profiles and details shown.
2. Lock seam corners, solder watertight and hem outer exposed edges.
3. Provide 4 inch wide minimum flanges formed to fit cants, decks and vertical wall surface.
4. Shop punch flanges for fastenings at 6 inches on center

M. Gutters, Conductor Heads and Downspouts:

1. Gutters shall be fabricated from stainless steel, minimum 20 gauge, except gutters with a girth exceeding 30" shall be fabricated from minimum 18 gauge stainless steel.

   a. The front edge of the gutter shall be a minimum of 1" below the back edge.
   b. Provide continuous cleats at the back edge of the

gutter.

2. Provide expansion joints in the gutter at a maximum 50'-0" o.c.

   a. Locate downspouts and attach gutter anchors and supports of accommodate and not constrain expansion.
   b. Lap joints in gutters a minimum of 2 inches in direction of flow, and solder.

3. Gutter brackets shall be fabricated of stainless steel, and spaced at a maximum of 30"o.c.

   a. Brackets shall be a minimum of 1/8" thick by 1" wide for gutters with a girth of up to 20", and 2" wide for girths exceeding 20".
   b. Attach to the face of the gutter, in addition to the building structure at the back of the gutter.

4. Provide spacer straps in gutters with a width of 5" or more, spaced at a maximum of 30" o.c., at locations staggered from the gutter brackets. Straps shall be stainless steel, a minimum of 1/16" thick (16 gauge) by 1" wide, and fastened only the front and back of the gutter.
5. Provide conductor heads to collect water from the scuppers to discharge into the downspouts.

   a. Conductor heads shall be fabricated from stainless steel.
   b. The top of the conductor head shall be a minimum of 1" below and a minimum of 2" wider than the scupper. Proportion as recommended in SMACNA Architectural Sheet Metal Manual.

6. Use ductile iron or Schedule 80 PVC plastic pipe instead of stainless steel downspouts within 9 feet of finish grade.

   a. The size of a downspout shall be constant throughout its length.
   b. At joints, the top portion shall fit into the lower.
   c. Provide stainless steel or other corrosion-resistant metal hangers.

N. Curb to Duct Flashing and Counter Flashing:

1. Fabricate from stainless steel to fit duct curbs and

ducts projecting from curbs.

2. Provide 4 inch vertical flange to cover top edge of bituminous base flashings. Form flange bottom towards curb, with 1/4" bottom edge bent 1/4" out and hemmed.
3. At top of curbs bend metal 90 degrees and extend horizontally over to duct, then bend upward and extend vertically not less than 3 inches from top edge of flashing out 3/8" to receive sealant.
4. Provide for field soldered lap joints at corners and 1 inch lap joints at horizontal miter splices.

PART 3 EXECUTION

3.01 INSPECTION

A. Do not proceed with the work of this section until conditions detrimental to the proper and timely completion of the work have been corrected in an acceptable manner.

3.02 INSTALLATION

A. Install according to accepted Shop Drawings.

1. Lap, rivet, lock, or seal joints as field conditions require.
2. Provide necessary reinforcement, miscellaneous fittings, and accessories.

B. Apply flashing and sheet metal work including miscellaneous fittings and accessories to even, smooth, sound, thoroughly clean and dry surfaces that are free from defects that might affect application. Prime metal flanges that receive bitumen according to SFBC and manufacturer's requirements.

C. Perform soldering work slowly, with properly heated coppers to thoroughly heat seam material and sweat solder through full width of seam that shall show not less than 1 inch of evenly flowed solder.

1. Start soldering immediately after application of flux.
2. Solder flat locked seam.

D. Isolate dissimilar metals with accepted isolation paint or other accepted materials.

1. Do not place in contact with or in positions where drainage across such paint or other materials will

occur.

E. Make flashing and sheet metal work water and weathertight, with lines, arises and angles sharp and true and plane surfaces free from waves and buckles.

F. Provide sufficient fasteners and related hardware to insure a complete and weathertight system.

G. Flashing fasteners not covered by roofing membrane shall be removable.

H. Vent Stacks:

1. Slip stainless steel flashing over vent stack and set roof flanges in full bed of roofing cement.
2. Wrap backer rod of appropriate size around vent stack and insert it 3/8" below top of flashing.
3. Seal watertight at top edge with a one part urethane sealant and tool to positive runoff.
4. Install conical sealant cover directly above sealant.
5. Install vandal-proof vent stack caps at all vent stacks unless otherwise indicated on drawings.

I. Edge Drips:

1. Install a continuous 20 gage stainless steel cleat.
2. Set 22 gage stainless steel edge drip roof flanges in full bed of roofing cement over completed roofing.
3. Lap splices 4 inches minimum and seal top horizontal surface laps with cold bitumen.
4. Stagger nails at 4 inch flange to roof deck at 4 inches on center
5. Cover roof flanges with 2 ply felt stripping set in full bed of roofing cement.
6. Locate drip bottom not less than 3/4" away from finished vertical surfaces

J. Base Flashings at Aluminum Walkway Covers Abutting Concrete and Masonry:

1. Set flashing tight against wall and with roof flange set on aluminum deck in bed of sealant.
2. Secure roof flanges to metal deck with No.10 x 1/2" stainless steel sheet metal screws at 6 inches on center maximum. Provide sealant washers and stainless steel washers under screw heads.

K. Stucco Stop with Counterflashing (2- piece):

1. Set receiver on masonry and concrete walls where indicated.
2. Lap spices 4 inches minimum and seal laps with sealant.
3. Secure to wall with No.10 x 1-1/4" minimum Tap-Con screws 12 inches on center maximum.
4. Check for membrane/bitumen seal on top of felt flashing before counterflashing installation.
5. Attach storm cleats at 30 inches on center and with one cleat at each joint.
6. Insert counterflashing into receiver, and secure tightly with storm cleats.

L. Surface Mounted Flashing (1-piece):

1. Set on masonry and concrete walls over base flashing where indicated.
2. Lap splices 4 inches minimum and seal laps with sealant.
3. Secure to wall with No.10 x 1-1/4" Tap-Con pan head screws at 12 inches on center maximum. Provide neoprene sealant washers and stainless steel washers.
4. Where corrugated metal wall occurs, place premolded neoprene filler strip on wall immediately above top of metal base flashing.

    a. Set filler strip in sealant and seal abutting edges of filler strip with sealant.
    b. Place counterflashing over filler strip set in sealant and secure flashing to metal wall through filler strip with No.10 x appropriate length stainless steel sheet metal screws at 6 inches on center maximum and centered on wall flutes.
    c. Provide sealant washers and stainless steel washers under screw heads.

5. Check for membrane/bitumen seal on top of felt flashing before flashing installation.

M. Copings:

1. Secure outer hold-down cleat to wood block at 6 inches on center with ring shank roofing nails.
2. Install coping over cleat. Allow 1/8" space between each coping section.
3. Secure inside face of coping with removable grommet type fasteners.
4. Provide 1"/1' slope at coping to inner parapet wall.
5. Install joint covers in full bed of sealant.

N. Window Head Flashings:

1. Set wall flange in full bed of sealant over windows.
2. Secure to prefinished wall panels with No.10 x 3/4" pan head stainless steel sheet metal screws at 10 inches on center
3. Provide sealant washers and stainless steel washers under screw heads.

O. Door Hoods:

1. Set hoods level over doors where required with wall flanges bedded in full bed of sealant.
2. Secure hood wall flanges to prefinished wall panels with No.10 x 3/4" stainless steel sheet metal screws at 6 inches on center
3. Provide sealant washers and stainless steel washers under screw heads.

P. Provide pitch pans as approved by A/E.
1. Set pitch pan roof flange in a full bed of plastic roofing cement.
2. Cover pan flanges with 2 layers of roofing felt stripping set in solid coats of hot bitumen or roofing cement.
3. Fill pitch pan 1 inch deep with mixture of plastic roofing cement and Portland cement and top out with hot asphalt bitumen or roofing cement.

    a. Allow hot asphalt bitumen or roofing cement to fill to top edge of hem.
    b. Do not nip top edge of hem to allow for drainage of water.
    c. Use cold bitumen to cone from penetration to edge of pan to avoid standing water

Q. Provide sheet metal base and counterflashing at pipes, conduits and round equipment supports.

1. Mate shop fabricated half sections around pipe or conduit and solder vertical and horizontal seams watertight.
2. Set flashing roof flanges in full bed of roofing cement.
3. Cover flashing flanges with 2 layers of roofing felt stripping set in solid coats of hot bitumen or roofing cement.
4. Wrap pipe, conduit and round equipment support with 1 or more layers of 3/8" by 1 inch wide neoprene foam tape, with tight fitting butt joints.

5. Install counterflashing over base flashing and solder vertical seam.
6. Seal watertight at top edge with a one part urethane sealant and tool for positive runoff.
7. After preliminary inspection, install conical sealant cover with sealant.

R. Installation of Curb to Duct Flashing and Counterflashing:

1. Install flashings after ducts through curbs are in place and after bituminous base flashings are completed.
2. Place flashings in place on curbs and solder corners and corner miter laps watertight.
3. Secure counterflashings to vertical edge of curb nailers with No.10 stainless steel sheet metal screws through sealant washers at not over 12 inches on center
4. Secure vertical upturned duct flashing to duct with No.10 stainless steel sheet metal screws through sealants washers at not over 6 inches on center
5. Seal joint between flashings and ducts with sealant as specified in Section 07920.

S. Installation of Scuppers:

1. Set scuppers in full bed of roofing cement over completed base flashing and roof membrane.
2. Secure to masonry walls and concrete decks with stainless sheet metal fasteners and anchors at 6 inches on center
3. Secure to wood nailers with stainless steel sheet metal screws at 6 inches on center.
4. Seal exterior wall at scupper perimeter.

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NOTE TO SPECIFIER: Use ductile iron or PVC Schedule 80 instead of stainless steel downspouts within 9 feet of finish grade.

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T. Installation of Downspouts:

1. Provide where indicated according to Shop Drawings.
2. Provide downspout straps near top and bottom of each section, located approximately 10 feet on center
3. Secure each end of straps to masonry walls with stainless steel sheet metal screws and anchors or with drive pins.
4. Secure each section of downspout to top strap with at least 2 stainless steel sheet metal screws.

5. Do not secure bottom end of each downspout section to strap to allow for thermal movement.

U. Installation of Splash Blocks:

1. Where downspouts or scuppers empty on grade or lower roofs that are of surfaces other than concrete, provide precast concrete splash blocks. Slope grade to maintain positive drainage.

V. Installation of Roof Drains:

1. Prime roof drain flanges before applying roof felts.
2. Set copper in full bed of cold bitumen over intermediate plies or cap sheet.
3. Strip copper cover with 2 layers of roofing felts in solid coats of hot bitumen.

END OF SECTION