

SECTION 07620  
ROOF RELATED SHEET METAL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Provide new sheet metal work in connection with roofing as indicated on the drawings and specified herein.
- B. Work includes but is not limited to:
  - 1. Counterflashings & Receivers.
  - 2. Hooded vents and Heater stacks.
  - 3. Penetration pans and hoods.
  - 4. Pitch pans and hoods.
  - 5. Wall penetration hoods.
  - 6. Plumbing vents.
  - 7. Parapet Coping Cap.
  - 8. Conductor Heads and Downspouts.
  - 9. Gutters and Downspouts
  - 10. Metal Edge Flashing
  - 11. Miscellaneous.

1.02 RELATED SECTIONS

- A. Section 02050 - Roof Demolition.
- B. Section 06100 - Rough Carpentry.
- C. Section 07513 – Modified Bitumen Cap Sheet Built-Up Roofing.
- D. Section 07610 – Standing Seam Metal Roofing.

1.03 REFERENCES

- A. *Copper, Brass, and Bronze Handbook: Sheet Copper Applications*, published by the Copper development Associations, Inc., (CAD), New York, NY.
- B. *Factory Mutual Loss Prevention Data Sheet 1-49*.
- C. *Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) Architectural Sheet Metal Manual - Fourth Edition, 1987*.

1.04 SUBMITTALS

- A. As provided in Section 01330 and 01340 and as required by the consultant.
- B. Product samples:
  - 1. Sheet stock: 12 inches by 12 inches
  - 2. Formed shapes: 12 inches long.
  - 3. Seam configurations.
- C. Manufacturer's detail drawings.
- D. Manufacturer's installation instructions.
- E. Shop drawings:
- F. Dimensioned drawings, and details, including gauges, fasteners, and construction data.
- G. Drawing of mock-up for review.
- H. Provide additional submittals as requested by the City.

1.05 QUALITY ASSURANCE

- A. As provided in Section 01450 and the GENERAL CONDITIONS OF THE CONTRACT.
- B. Qualifications of Manufacturer
  - 1. Products used in the work included in this section shall be produced by manufacturers regularly engaged in the manufacturing of similar items and with a history of successful production and product installations.
- C. Qualifications of Installers

1. Installers shall be thoroughly trained and experienced in the necessary crafts. Installers shall be made familiar with any unique requirements specified for proper performance of the work in this section.

D. Rejection

1. In the acceptance or rejection of work under this section, no allowance will be made for lack of skill or specification understanding on the part of the workmen. It shall be incumbent upon the contractor to use adequate numbers of skilled installers and to instruct them in the requirements of the project specifications as well as maintaining a set of the project specifications and drawings on the roof at all times.

E. Replacement

1. In the event inadequate or improper installation is determined, contractor shall make all repairs and replacements required to render the installation compliant with the project specifications. Replacements, due to improper performance shall be at the sole cost of the contractor.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Coordinate delivery with the City of Houston.
- B. Prevent wrappers and packaging materials from inclusion in the roofing system.
- C. Material containers, mixing, and dilution:
  1. Containers shall be closed and sealed except when materials are being removed.
  2. Follow manufacturer's instructions for mixing and stirring.
  3. Cements, adhesives, primers, coatings, and sealants which have been diluted or cut-back, after their manufacture shall not be incorporated into the Work.

1.07 SEQUENCING AND SCHEDULING

- A. Proceed with permanent sheet metal installations concurrently with membrane roofing.
- B. Coordinate and schedule all phases of the Work of the Contract Documents with the City, Subcontractors, Material Suppliers and other parties as necessary to ensure the smooth and orderly transition of separate phases, or portions, of the Work, the timely placement of components and materials, including the complete cooperation between

parties and proper execution of the Work.

- C. Work shall not be performed outside of normal business hours without the prior approval of the Consultant and/or City of Houston's representative.
- D. Work is to be performed on a daily basis, with each section completed before progressing to the next days work.
- E. Completion of work shall be defined as all specified existing roof preparation and the complete installation of all insulation, field membrane, flashings, counterflashings, sheet metal work, sheet metal fasteners and caulking.
- F. Contractor shall complete roofing work on a daily basis unless specifically directed otherwise by the Consultant.

#### 1.08 GUARANTEE AND WARRANTIES

- A. The Contractor shall warrant all Work performed under this Section for a period of 5 years from the date of Substantial Completion. The Contractor shall accept responsibility for the correction of defects in materials and workmanship and shall repair leaks promptly upon notice by the City of Houston or his Representative and at no cost to the City. The Contractor shall reimburse the City of Houston for repairs performed by others should the Contractor not remedy leaks within five working days after written notice of said defects by the City of Houston.

### PART 2 - PRODUCTS

#### 2.01 SHEET METAL MATERIALS

- A. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) recommendations form minimal specifications where not exceeded in this Article.
- B. Lead flashings:
  - 1. Arsenical, antimonial, pig lead alloy.
  - 2. Four (4) pounds per square foot at drains, two and one-half (2½) pounds per square foot at plumbing vents.
  - 3. ASTM B-29.
- C. Pre-finished Metal:

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1. “Kynar 500” fluoropolymer pre-finished 3105-H14 aluminum (.032”).
  2. Color: As selected by the Owner from manufacturers standard color chart.
- D. Zinc-coated (Galvanized) Steel Sheet: Commercial quality G-90 hot-dip galvanized, and mill phosphatized for painting in accordance with ASTM A525 (paint-grip type), 24 gauge minimum.
- E. Stainless Steel: ASTM A167, type 302/304 Soft Temper, No. 4, finish gauge as indicated on the drawings and 24 gauge minimum.

2.02 MATERIALS

- A. Non-Shrink Grout:
1. Quick setting grout such as Sonnogrout 10k as manufactured by Sonneborn Building Products.
- B. Termination Bar:
2. 1/8 inch thick by 1 inch wide, flat aluminum bar with pre-punched holes 6 inches on center, such as the TB 125 manufactured by the TruFast Corporation.
- C. Angle Termination Bar:
1. 1½ inch by 1½ inch by 24 gauge galvanized steel with pre-punched holes 6 inches on center, shop fabricated.
- D. Compressible Batt Insulation:
1. Foil or paper faced compressible fiberglass batt insulation as manufactured by Owens Corning.
- E. Underlayment:
1. As specified in Section 07513, Article 2.06.
- F. Primer:
1. As specified in Section 07513, Article 2.06.
- G. Asphalt Roof Cement:

1. As specified in Section 07513, Article 2.06.

#### 2.03 FABRICATED SHEET METAL SCHEDULE

- A. Coping Caps: Minimum 24 gauge pre-finished aluminum.
- B. Counterflashings: Minimum 24 gauge pre-finished aluminum.
- C. Clips (continuous): Minimum 20 gauge galvanized steel or as indicated on drawings.
- D. Wind Clips: Minimum 20 gauge galvanized steel.
- E. Pitch Pans: Minimum 24 gauge galvanized steel.
- F. Penetration Flashing: Minimum 24 gauge galvanized steel.
- G. Hoods: Minimum 24 gauge galvanized steel.
- H. Counterflashing Receiver: Minimum 24 gauge pre-finished aluminum or as indicated on the detail drawings.
- I. Angle Termination Bar: Minimum 24 gauge galvanized steel.
- J. Gutters and Downspouts: Minimum 24 gauge pre-finished aluminum.
- K. Conductor Heads and Downspouts: Minimum 24 gauge pre-finished aluminum.
- L. Metal Edge; Minimum 24 gauge pre-finished aluminum.
- M. Miscellaneous sheet metal shall be fabricated from type and gauge as indicated on drawings.

#### 2.04 SOLDER

- A. Solder: ASTM B32, composition 50% tin and lead.
- B. Flux: Rosin, muriatic acid neutralized with zinc. Ruby fluid soldering and tinning flux (zinc chloride).

#### 2.05 FASTENERS

- A. Galvanized roofing nail, 12 gauge, 3/8 inch head.
- B. Roofing nail, annular thread, 11 gauge, 3/8 inch head.

- C. Flat head, barbed, wire slating nail: 12 gauge, 1 inch long minimum.
- D. Screw, screw/plate, anchor systems.
- E. HWH Teks Series by Buildex.
- F. Wafer head Teks/3 series by Buildex.
- G. Flat head Teks/4 series by Buildex.
- H. HWH Trupgrip series with EPDM washers by Buildex.
- I. Tapcon series by Buildex.
- J. Red Head Wedge Anchor series by Phillips.
- K. Red Head Non-drilling Anchor series by Phillips.
- L. Red Head Whirl-in Anchor series by Phillips.

### PART 3 - EXECUTION

#### 3.01 PRECONSTRUCTION SITE INSPECTION

- A. Examine site and determine satisfactory conditions for work.
- B. Provide written notice to the City of defects and conditions which may adversely influence performance or completion of Work.
- C. Absence of written notice will constitute the Contractor's acceptance of site.

#### 3.02 FABRICATION - GENERAL

- A. Fabricate work in accordance with SMACNA Architectural Sheet Metal Manual and other recognized industry practices and reviewed shop drawings.
- B. Comply with material manufacturer's instructions and recommendations for installing and forming material.
- C. Shop fabricate inside and outside corners for metal edges, counterflashing, and coping caps.

- D. Fabricate for waterproof and weather resistant performance with expansion provisions. Form work to fit substrates.
- E. Form materials with straight lines, sharp angles, smooth curves, and true levels. Tool marks, buckling, and oil canning will not be accepted.
- F. Fold back edges on concealed side of exposed edge to form hem.
- G. Rivet and solder joints on parts that are to be permanently and rigidly assembled.

### 3.03 SHEET METAL - FABRICATION PROCEDURES

- A. Clips:
  - 1. When applied as an exposed covering, fasten sheet metal to wood nailers with continuous clips as detailed.
- B. Seams:
  - 1. Finish seams neatly with lines trimmed true and sharp. Number of joints shall be as few as is consistent with commercial size of materials.
  - 2. Join parts with rivets or sheet metal screws where necessary for strength and stiffness.
  - 3. Flat seams:
    - a) Not less than ½ inch width.
    - b) Single locked and sweated with solder, or double locked and malleted flat.
  - 4. Loose locked seams:
    - a) Single locked.
  - 5. Cross joints:
    - a) Loose locked and filled with mastic.
- C. Soldering:
  - 1. All joints of non-finished metals shall be soldered, unless shown otherwise on the detailed drawings.
  - 2. Remove foreign materials and surface oxides prior to soldering, and solder as soon as possible after cleaning with degreasing solvents. Type of flux will be compatible with solder used.

- D. Copings
1. Form copings in not less than 10 foot sections.
  2. Join sections with minimum 6-inch cover plates centered and caulked over seam.
  3. Weld or solder all corners. Minimum extension from inside corner dimension: 24 inches.
- E. Counterflashings:
1. Use minimum 8-foot long sheets in lengths not to exceed 24 feet.
  2. Join with flat-locked soldered seams.
  3. Expansion joint:
    - a) Join counterflashing sections together with a 3 inch loose-locked seam filled with sealant.
    - b) Straight runs of less than 24 feet shall have loose-locked seam not more than 8 feet from corners.
- F. Penetration Pans and Pitch Pans:
1. Fully solder joints, connections and laps.
  2. Fabricate with a minimum vertical leg of 4-inches above the finished roof.
  3. Fabricate pan so sides will be a minimum of 2-inches from the penetration.
- G. Heater Stack Bases:
1. Fully solder joints, connections and laps.
  2. Fabricate new base to match size, shape and style of existing base.
  3. Alter size as needed to maintain sufficient room to install pre-formed heat-resistant insulation.
- H. Metal Edge:
1. Turn bottom edge of metal edge ½ inch back under itself.
  2. Metal edge sections shall have a 1-inch drip edge.

3. 3. Crease 3-inches from outer edges of exposed surface longitudinally to produce a spring action that will hold the outer or bottom edge against the substrate.

I. Gutters and Downspouts:

1. Gutters and downspouts shall be formed in not less than 10 foot sections.
2. Front edges of gutters: Minimum one inch lower than the back edge to allow overflow.
3. Fabricated gutters and downspouts as shown on the drawings. Continuously seal with specified caulking and pop-rivet all joints and laps.

J. Conductor Heads and Downspouts:

1. Conductor heads shall be formed of 1 piece of metal with pop-riveted and sealed joints. Downspouts shall be formed in not less than 10 foot sections.
2. Front edges of conductor head shall have an integral overflow.
3. Fabricated gutters and downspouts as shown on the drawings. Continuously seal with specified caulking and pop-rivet all joints and laps.

K. Contact with dissimilar metals:

1. Interpose a coat of bituminous paint or tape between contact surfaces.

3.04 SHEET METAL - INSTALLATION

- A. Continuous Clips: Over properly installed underlayment at coping and metal edge, set continuous clips and nail 3-inches on-center with appropriate fastener.

B. Coping Cap

1. Install wood nailers, underlayment and clips as specified and as shown on the drawings.
2. Install metal coping with 2-inch minimum gap between units.
3. Lock outside edge onto hem of continuous clip and screw fasten on the inside face 12 inches on center. Holes for fasteners shall be pre-drilled larger than the diameter of the fasteners.

4. Install a continuous bead of sealant on the vertical and horizontal leg on both sides of the joint.
5. Install a cover plate centered over the joint, locked onto the hem of the outside face. Install a screw fastener on the inside face centered over the joint without touching either segment of coping cap.
6. Install fully soldered and/or pop-rivet and sealed end closures at all terminations. Each termination shall be fabricated to fit the particular location and shall be installed as approved by the consultant.
7. Contractor shall install integral terminations/closures at all endwalls, risewalls, changes in direction etc. as direct and approved by the consultant.

**C. Counterflashings and Receivers**

1. Install new counterflashings and receivers where indicated on the drawings and where specified.
2. Install new receivers where indicated on the drawings secured 2'-0" on center with the appropriate fastener. Install a continuous bead of sealant and lap adjacent sections a minimum of 4-inches and secure.
3. Install wind clips spaced 2'-0" on center secured through the termination bar with the appropriate fastener.
4. Set counterflashing into new receiver or behind existing metal and secure 12 inches on-center with a screw fastener. Install a continuous bead of sealant and lap adjacent sections a minimum of 4-inches and secure.
5. Fold wind clips over hem of counterflashing and paint to match color of pre-finished counterflashings.
6. Install fully solders and/or pop-rivet and sealed end closures at all terminations. Each termination shall be fabricated to fit the particular location and shall be installed as approved by the consultant.
7. Contractor shall install integral terminations/closures at all endwalls, risewalls, changes in direction etc. as direct and approved by the consultant.

**D. Pitch Pans**

1. Prime top and bottom flanges, allow primer to dry then set in a uniform bed of

plastic cement.

2. Nail with appropriate fastener 3-inches on-center staggered (5 per side minimum).
3. Fill bottom of pan with non-shrink grout leaving 1 inch remaining at the top. Provide temporary polyethylene cover while grout cures.
4. Fill remaining 1-inch with pourable sealer after grout has cured.
5. Install new hood designed to fit penetration. Secure hood with a drawband and install sealant in receiver where required on drawings. Secure hood to pan with appropriate screw fastener, 2 per side minimum.

**E. Penetration Pan:**

1. Prime top and bottom flanges, allow primer to dry and set in a uniform bed of plastic cement.
2. Nail with appropriate fastener 3-inches on center staggered (5 per side minimum).
3. Fill pan with fiberglass batt insulation.
4. Install new hood with closure plates cut to fit penetrations. Secure hood with appropriate screw fastener, 2 per side minimum.

**F. Plumbing Vent:**

1. Prime top and bottom flange of pre-manufactured lead flashing and allow to dry.
2. Set flange in a uniform bed of plastic cement.
3. Turn top of flange down inside vent pipe a minimum of 1 inch.

**G. Hooded Vent Heater Stack:**

1. Prime top and bottom flange of new metal base and allow to dry.
2. Set flange in a uniform bed of plastic cement.
3. Nail flange 3 inches on center staggered.
4. Insert heat-resistant insulation between the base and flue stack on heater stacks.

5. Install new stack and hood.

H. Gutters and Downspouts:

1. Install wood nailers, underlayment and gutter hangers as specified and as shown on the drawings.
2. Install new gutter sections in new gutter hangers providing positive slope with no drainage.
3. Screw fasten on the inside face 12 inches on center. Holes for fasteners shall be pre-drilled larger than the diameter of the fasteners.
4. Provide and install expansion joints in accordance with SMACNA guidelines.
5. Install gutter straps, pop-riveting to the top flange of the gutter and the back face.
6. Downspout necks to be pop-riveted and sealed to gutter prior to gutter installation.
7. Install new downspouts as shown on the drawings. Secure downspouts to the gutter neck and attached to vertical wall surfaces with a minimum of 3-gutter straps per downspout. Attach straps to wall with appropriate fasteners.
8. Provide a pre-formed concrete splash block at the bottom of each downspout on non-concrete areas.
9. Contractor shall install integral terminations/closures at all endwalls, risewalls, changes in direction etc. as direct and approved by the consultant.

I. Metal Edge

1. Install wood nailers, underlayment and clips as specified and shown on the drawings.
2. Apply a continuous uniform layer of plastic cement on the roof membrane to receive the metal edge.
3. Prime the top and bottom sides of the metal edge flange.
4. Install metal edge with ¼ inch minimum gap between units.
5. Lock outside edge onto hem of continuous clip and nail flange 3-inches on center staggered.

6. Apply a continuous vertical bead of sealant to the fascia at the joint and apply a uniform layer of plastic cement to the flange at the joint.
7. Install a joint cover locking on to the hem of the metal edge on the outside face and nail the flange at the center of the joint.  
flashing and allow to dry.
8. Contractor shall install integral terminations/closures at all endwalls, risewalls, changes in direction etc. as direct and approved by the consultant.

**J. Conductor Heads**

1. Top leading edges to be covered with new edge flashing as shown on the detail drawings.
2. Install pre-finished faceplates on the exterior or outside face of the scupper. Mechanically fasten face plates and install a continuous bead of sealant on all sides in the sealant receiver.
3. Install conductor heads and downspouts in accordance with the detail drawings. Conductor heads shall be attached to the structure.
4. Downspout necks to be pop-riveted and sealed to conductor head.
5. Install new downspouts as shown on the drawings. Secure downspouts to the gutter neck and attached to vertical wall surfaces with a minimum of 3-gutter straps per downspout. Attach straps to wall with appropriate fasteners.

**3.05 PROTECTION**

- A. Roof surfaces shall be adequately protected to prevent damage. Keep all scrap metal off of roof surface at all times.

**3.06 CLEAN UP**

- A. Debris from sheet metal work shall be frequently removed from building site as it accumulates.
- B. Leave job site absolutely clean at completion of work and properly dispose of all construction debris.

**END OF SECTION**