SECTION 07600 - FLASHING AND SHEET METAL

City of San Diego, CWP Guidelines

PART 1 -- GENERAL

1.1 WORK OF THIS SECTION

- A. The WORK of this Section includes providing all sheet metal work and appurtenant work, complete.
- B. The principal items of sheet metal work shall include sheet metal flashings, collars, pitch pockets, metal siding, equipment platforms, equipment supports at all roof penetrations, metal wall flashing and expansion joints, and miscellaneous sheet metal accessories.

1.2 RELATED SECTIONS

- A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.
 - 1. Section 07410 Metal Roofing System
 - 2. Section 07720 Roof Accessories
 - 3. Section 07800 Skylights
 - 4. Section 07920 Sealants and Caulking
 - 5. Section 09800 Protective Coating
 - 6. Section 09900 Architectural Paint Finishes
 - 7. Section 15430 Plumbing Specialties
 - 8. Section 15750 Packaged Air Conditioning Equipment
 - 9. Section 15855 Air Handling and Moving Equipment
 - 10 Section 16050 Basic Electrical Materials and Methods

1.3 CODES

- A. The WORK of this Section shall comply with the current editions of the following codes as adopted by the City of San Diego Municipal Code:
 - 1. Uniform Building Code
 - 2. Uniform Mechanical Code
 - 3. Uniform Plumbing Code

1.4 SPECIFICATIONS AND STANDARDS

- A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:
 - 1. Federal Specifications:

QQ-T-201 Terneplate, For Roofing and Roofing Products

TT-P-641 Primer Coating, Zinc Dust-Zinc Oxide (For

Galvanized Surfaces)

UU-B-790 Building Paper, Vegetable Fiber (Kraft, Waterproofed,

Water Repellent and Fire Resistant)

2. Commercial Standards:

ASTM A 176 Stainless and Heat-Resisting Chromium Steel Plate,

Sheet, and Strip

ASTM A 525 Specification for General Requirements for Steel

Sheet, Zinc-Coated (Galvanized) by the Hot-Dip

Process

ASTM A 526 Specification for Steel Sheet, Zinc-Coated

(Galvanized) by the Hot-Dip Process, Commercial

Quality

ASTM B 32 Specification for Solder Metal

ASTM B 209 Specification for Aluminum and Aluminum-Alloy

Sheet and Plate

ASTM D 1187 Test Method for Asphalt-Base Emulsions for Use as

Protective Coatings for Metal

ASTM D 2822 Specification for Asphalt Roof Cement

3. Trade Standards:

Sheet Metal and Air Conditioning Contractors National Association "Architectural Sheet Metal Manual" (ASMM)

The Aluminum Association "Specifications for Aluminum Sheet Metal Work in Building Construction"

American Welding Society (AWS)

1.5 SHOP DRAWINGS AND SAMPLES

- A. The following shall be submitted in compliance with Section 01300:
 - Color samples for color selection by the CONSTRUCTION MANAGER and product samples when requested by the CONSTRUCTION MANAGER for examination.
 - 2. Shop drawings showing materials, gauges, finishes, layout, jointing, profiles, fabrication of special shapes, fasteners, and method of attachment to adjacent construction.
 - 3. Manufacturers' catalogues indicating materials, finish, construction, and method of installation of prefabricated items and sealants.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. **Delivery of Materials:** Manufactured products shall be delivered in original, unbroken packages, containers or bundles bearing the name of the manufacturer in a manner that will prevent damage to the products.
- B. **Storage**: Products shall be carefully stored in a protected area that will prevent damage or marring of the products and their finishes.

PART 2 -- PRODUCTS

2.1 GENERAL

- A. Sheet metal shall be aluminum unless otherwise indicated. Sheet metal work in connection with roofing shall be in accordance with roofing manufacturer's published recommendations and specifications.
- B. All sheet metal flashings necessary to make building weathertight shall be provided, whether or not indicated.

2.2 ALUMINUM PRODUCTS

A. Aluminum shall be 0.032-inch minimum thickness and shall conform to ASTM B 209, alloy 3003, temper H14, [with dark bronze anodized finish AA-C12-A42] [with clear anodized finish AA-C22-A41] unless otherwise indicated. Thickness of aluminum to be welded shall be as necessary for the welding method used.

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NTS: List any special reglets, vent screeds, etc., required for job.

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- B. Reglets shall be extruded aluminum with protective coating, of type and profile indicated, compatible with flashing indicated, non-corrosive.
- C. Metal vent screeds shall be plaster channel screeds and shall be extruded aluminum with either clear plastic coating, clear anodized coating, or clear acrylic baked-on coating.

2.3 FERROUS METALS

- A. **Zinc-Coated Steel**: Zinc-coated steel shall be commercial quality with 0.20 percent copper, ASTM A 525 except ASTM A 527 for lock-forming, G90 hot-dip galvanized, mill phosphatized where indicated for painting; 0.0359-inch thick (20-gauge) except as otherwise indicated.
- B. Terne metal for roofing and roofing products shall be not less than 40 lb class conforming to Federal Specification QQ-T-201.
- 2.4 LEAD AND SOLDERING MATERIALS

- A. Lead shall be 4 to 6 percent antimony and the remainder shall be lead. Lead sheet shall be soft temper, except hard temper for flanges. Weight shall be not less than 4 lb/sq ft unless otherwise indicated.
- B. Solder shall conform to ASTM B 32 Alloy Sn50, 50 percent tin, 50 percent lead.
- C. Soldering flux shall not be injurious to metal surfaces being treated.

2.5 FASTENERS

A. Fastening devices shall be of the same material as the sheet metal being used or corrosion-resistant metal compatible with sheet metal being used. Fasteners exposed to the weather shall have neoprene washers. Washers shall be 0.04-in minimum thickness. A rubber-type washer shall be used beneath the aluminum washer or fastener head where weathertightness is required.

2.6 PLASTIC CEMENT

A. Plastic cement shall conform to ASTM D 2822.

2.7 SEALING MATERIALS

- A. Sealants shall be as indicated under Section 07920 or shall be of the silicone type. Colors shall be selected by the CONSTRUCTION MANAGER from manufacturer's standard colors.
- B. Sealer tape shall be polyisobutylene sealer tape specifically formulated for setting flanges on bituminous roofing.

2.8 COATING MATERIALS

- A. Primer coat for galvanized steel shall conform to Federal Specification TT-P-641G(1) Type II.
- B. Asphaltic coating compound shall conform to ASTM D 1187.

2.9 BUILDING PAPER OR FELT

- A. Building paper shall conform to [UBC Standard 17-1] Class [B] [D] for Kraft waterproof building paper.
- B. Asphalt or coal tar-saturated felt shall conform to UBC Standard 32-1.

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NTS: This siding section is intended for minor items such as fascias or an equipment screen. If a building or structure is to be sided with metal, write a separate Specification Section.

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2.10 METAL SIDING

A. Metal Siding System for walls shall be as follows: Materials for panels and trim shall be ["Stucco" embossed] [0.032-inch] thick aluminum sheets with [8-inch ribbed] pattern. The metal panelling and trim shall be provided with a ["Fluoropolymer"] coating. The color of coating shall be selected by the CONSTRUCTION MANAGER from manufacturer's standard colors (8 min).

2.11 SHOP FABRICATION REQUIREMENTS

- A. The WORK shall be shop-fabricated to greatest extent possible. Fabricator shall comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. WORK shall be fabricated for waterproof and weather-resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the WORK. The WORK shall be formed to fit substrates. Material manufacturer's instructions and recommendations for forming material shall be complied with. Exposed sheet metal work shall be formed without excessive oil-canning, buckling and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
- B. **Seams**: Non-moving seams in sheet metal shall be fabricated with flat-lock seams. For metal other than aluminum, tin the edges, form the seams, and solder them. Aluminum seams shall be formed with epoxy seam sealer; joints shall be riveted for additional strength where required.
- C. **Expansion Provisions**: Where lapped or bayonet-type expansion provisions in WORK cannot be used, or would not be sufficiently water/weatherproof, expansion joints shall be formed of intermeshing hooked flanges, not less than 1-inch deep, filled with mastic sealant within joints.
- D. **Sealant Joints**: Where movable, non-expansion type joints are indicated or required for proper performance of WORK, metal shall be formed to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.
- E. **Separations**: Separation shall be provided of metal from non-compatible metal or corrosive substrate by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.
- F. Gutters and downspouts shall be of sizes as shown with wire basket type strainers of 14-gauge stainless steel wire or cast bronze.
- G. All aluminum shall be welded unless otherwise indicated. Welding shall conform to the standards of the Aluminum Association and ASMM.
- H. Galvanized steel corner joints shall be soldered. Unless indicated otherwise, other joints shall be as required by the Reference Standards.
- I. All WORK and finishes shall be protected from scratches and abrasions.
- J. All flashings, reglets and counter-flashing and associated flashings shall be fabricated by the same manufacturer and be installed as a complete flashing system. All flashings shall be creased longitudinally or otherwise formed with sufficient spring action to hold the bottom edges firmly against the base flashing or similar material.

- K. Intersecting corners of copings shall be accurately fitted and welded. Corners may be shop-assembled, manufactured, or extruded units. Coping shall be per ASMM Plate 68 except modified as indicated, with Alternate 5 seams that allow for 1/4-inch expansion per each 10 ft of length.
- L. Access doors shall be provided as required or as indicated. Sizes and locations shall be as required by governing authorities, codes, and as indicated. Key-locked access doors shall be provided where indicated. Plumbing access doors shall conform to the requirements of Section 15430.
- [M. Dryer vents shall be fabricated of aluminum [clear] [dark bronze] anodized or stainless steel and be provided with rainhood and self closing flap, and interior and exterior escutcheon plates.]
- [N. Flashing required through concrete or clay tile shall be flexible flashing in order to assure against undue separation between tiles on account of rigidity of the flashing material. Flashing around pipes, vents, flues, chimneys, etc., shall be of lead, copper, or other flexible metal flashing material.]

2.12 FABRICATED SHEET METAL WORK

- A. Scuppers in walls shall be constructed of 0.040-inch aluminum designed similar to ASMM Plate 26 with all joints welded. Scuppers without head through top course of masonry or concrete shall be similar to ASMM Plate 29.
- B. Stamped sheet metal vents or louver-type vents (where indicated) shall be designed to provide watertight flush corners and shall be of size indicated. Each vent shall be equipped with 1/4-inch square galvanized or aluminum mesh hardware cloth insect screen. Stamped metal items shall be made of coated aluminum or galvanized sheet metal.
- C. Downspouts with conductor head 1/2-inch below gutter or scupper and hangers shall be designed similar to ASMM Plates 32 Fig. B and G, 25 Fig. C, and 35, Figure E, H or I. Connector shall be per Plate 33 Fig. B, Details 1 and 2 with funnel Fig. E (if possible) and with the joint between gutter and outlet welded or soldered. The downspout and conductor head shall be constructed of 1/16-inch aluminum and shall have all joints welded except the joint between head outlet pipe and downspout.
- D. Built-in gutter, downspout and hangers shall be designed similar to ASMM Plates 4 Gutter (similar), 9 and 10 Gutter Expansion Joint, 32 Fig. B Downspout, and Plate 35, Figure H for hangers. Downspout shall be constructed of 16 gauge metal and shall have all joints welded or soldered except the joint between the gutter outlet pipe and downspout. Gutter and gutter outlet pipe shall be fabricated from [40 lb terne metal] [copper] [stainless steel]. Expansion joints shall be spaced not more than 34-feet on centers, or as indicated. All joints shall be welded. Connector (outlet) shall be designed per Plate 33, Fig. B, detail 1 and 2 with funnel per Figure E if possible.

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	NTS:	List all special screeds and shapes needed on this job.	
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E. All corners of vent screeds, reglets, and trim shall be mitered.

- F. [Wall louvers shall be extruded aluminum louvers conforming to ASMM Plate 141, unless otherwise indicated.] [Louvers (formed) shall be designed as indicated and conforming to ASMM Plate 139.] Louvers and screens shall have [clear] [dark bronze] anodized finish. All exterior louvers shall be provided with 1/8-inch by 1/8-inch mesh bird screen and frame. Screen units shall be removable.
- G. Overflow scuppers in walls and parapets shall be constructed of 0.040-inch thick aluminum sheet similar to ASMM Plate 30. All joints shall be welded, and inlet shall be installed no more than 2 inches above roof drain rim (low point of roof).
- H. Access doors shall be of the types necessary to suit job conditions.
- I. Pitch pockets and equipment coping and support flashings shall conform to the reference standards and shall be provided where necessary.
- J. Sheet metal items at roof penetrations shall be provided and coordinated with the roofing system. The design and details shall conform to the standards unless otherwise indicated.
- K. The following flashings shall be provided at roof penetrations:
 - 1. Vent pipes: Lead collars vent pipe flashing with top of lead sleeve flashing bent into vent pipe. (ASMM. Plates 66 Fig. B and 71 Fig.A).
 - 2. Single pipes: Sheet metal or lead collars with sheet metal or lead draw band with sealant or cap top. (ASMM. Plates 65 and 66 Fig. C).
 - 3. Multi-pipes: Lead collars with caps.
 - 4. Multi-pipes w/curb: Sheet metal with sealant and draw bands. (ASMM. Plate 65, Fig. B, or Plate 66, Fig. A).
 - 5. Equipment support: Sheet metal. (ASMM. Plate 68).
 - 6. Roof penetrations: Sheet metal (ASMM Plate 67).
 - 7. Sleeper covers: Sheet metal. (ASMM. Plate 66, Fig. C and D).
 - 8. Pitch pockets for supports: Sheet metal with all joints welded or soldered. (ASMM. Plate 68, Fig. E).
 - 9. Ducts with curb (1): Sheet metal. (ASMM. Plate 148, Fig. B).
 - 10. Equipment platform (1): Sheet metal. (ASMM. Plate 136, Fig. B and Section A.A).
 - Note (1): Prefabricated products, curbs, supports, and platforms which are part of mechanical equipment indicated in other Sections of these Specifications shall be provided in compliance with those Sections.
- L. Work bench covering shall consist of tops, box curbs, splashes, edging, and end enclosures (where visible). Work bench top cover shall be 16-gage galvanized steel sheet metal formed over a solid core. The top, back, and edges shall have all joints

butt welded and ground to provide a smooth finished unit with no sharp edges or corners.

2.13 MANUFACTURERS

- A. Products shall be of the following manufacture and model number (or equal):
 - 1. Reglets: Superior Concrete Accessories; Morrison and Company "Cushion-Lock"; Fry Reglet.
 - 2. Sealer Tape: Morrison and Company CL-50.
 - 3. Metal Siding: Reynolds Aluminum Co.; Smith Construction Products.
 - 4. Metal Vent Screed: Fry Reglet Corp., Model PCS-V-30; H.K. Porter Co.
 - 5. Access Doors: Milcor Division of Inryco, Inc.; Karp Associates, Inc.; Inland Ryerson Steel Corporation.
 - 6. Lead Collar: Stoneman Engineering and Mfg. Co.

PART 3 -- EXECUTION

3.1 GENERAL

- A. Except as otherwise indicated, installer shall comply with manufacturer's installation instructions and recommendations, and with SMACNA "Architectural Sheet Metal Manual." Units of work shall be anchored securely in place by methods indicated, providing for thermal expansion of metal units; fasteners shall be concealed where possible, and units set true to line and level as indicated. WORK shall be installed with laps, joints and seams which will be permanently watertight and weatherproof.
- B. The CONTRACTOR shall coordinate the flashings and sheet metal WORK required with the different trades to make sure all items which penetrate the roof are provided with all necessary sheet metal products. Sheet metal shop manufactured curbs, equipment supports, and equipment platforms shall be provided where prefabricated curbs, supports or platforms are not indicated to be provided in other Sections of these Specifications.
- C. All WORK shall conform to Trade Standards. Flashings shall be coordinated with roofing WORK. Sheet metal and roofing shall provide a weather-tight and watertight assembly.
- D. Sheet metal shall be accurately formed to the dimensions and shapes indicated. WORK shall be fitted snugly, with straight, true lines with exposed faces aligned in proper plane, free from waves and buckles. Arrises and angles shall have true and sharp lines, and surfaces shall be free from waves and buckles. All exposed edges shall be hemmed. Holes for fasteners within sheet metal WORK exposed to temperature changes shall be elongated holes for material expansion and movement.
- E. All sheet metal WORK shall be furnished complete with supports, hangers, bracing, anchors, and other devices as required for reinforcement and proper attachment to adjacent construction. Fastenings shall be concealed wherever possible. Joints,

- fastenings, reinforcements, and supports shall be sized and located as required to preclude distortion or displacement due to thermal expansion and contraction.
- F. All surfaces upon which sheet metal is to be placed shall be dry, smooth, even, and free of any projections and hollows. Sheet metal shall be laid with all joints true and even and firmly attached with all fastener heads flush with the top surface.
- G. The underlayment shall be overlapped at least 2 inches so as to shed water and shall be secured along the lapped edges. Aluminum or stainless steel fasteners shall be used with aluminum sheet metal.
- H. Dissimilar materials shall be isolated with 2 coats of asphaltic paint, asphaltic coating compound, or sealer tape. Only stainless steel fasteners shall be used to connect isolated dissimilar metals.
- I. Joints shall be sized and spaced to permit sheet movement for thermal expansion and contraction of 1/4-inch per 10-ft length, on 100 degree F temperature difference.
- J. Roofing sheet metal items shall be built into the roofing in strict accordance with directions of roofing manufacturer.

3.2 INSTALLATION

- A. Gutters shall be provided with baffle-type expansion joints with expansion caps over 1-1/2-inch baffle flanges at 40-ft centers. A 1-inch gap between the baffles shall be allowed.
- B. Flashings at vertical surfaces shall be installed at intersections of the roof with vertical surfaces and at projections through the roof. Corner units shall be factory-fabricated and shall have mitered soldered or welded corner joints, and shall be installed with 3-inch (min) lap joint over flashings on each side.
- C. Gutters shall be provided to the indicated cross-section, complete with shop-fabricated corners, outlet (nipple) sections, joining plates, concealed hangers and downspouts with standoff brackets.
- D. Gravel stops and copings shall have joints at 10-ft (max) spacing and at 2-1/2 feet from corners. Joints shall be butted with 3/16-inch space centered over matching 8-inch long backing plate with sealer tape in laps. Corner units shall be welded units. All joints shall be provided with cover plates.
- E. Flanges of sheet metal items shall be set on continuous sealer tape on the top edge envelope ply of roofing. Flanges shall be nailed through sealer tape at 3-inch (max) spacing or otherwise securely fastened in an approved manner.
- F. Stainless steel wainscots shall be set in waterproof adhesive and surface screwed into blocking with countersunk flat head stainless steel screws at bottom. Top and sides shall have concealed hemmed edges and be concealed cleat fastened.
- G. Attachment of the metal top of work benches to the wood core shall be done by cementing the materials together under sufficient pressure to assure a complete bond and installation of No. 8 by 1-inch stainless steel flathead wood screws, countersunk at 8-inch centers. Top shall be cleaned of all rust, scale, and foreign substances and finished by oiling.

H. Stamped sheet metal vents or louver-type vents shall be painted with a protective coating complying with Section 09800 after installation.

3.3 CLEANING AND PROTECTION

- A. Exposed metal surfaces shall be cleaned, removing substances which might cause corrosion of metal or deterioration of finishes.
- B. **Protection**: Installer shall advise CONTRACTOR of required procedures for surveillance and protection of flashings and sheet metal work during construction, to ensure that WORK will be without damage or deterioration, other than natural weathering, at time of substantial completion.

** END OF SECTION **