SECTION 076215

Copper Flashing and Trim

THIS SECTION USES THE TERM "ARCHITECT." CHANGE THIS TERM AS NECESSARY TO MATCH THE ACTUAL TERM USED TO IDENTIFY DESIGN PROFESSIONAL AS DEFINED IN THE GENERAL AND SUPPLEMENTARY CONDITIONS.

1. - GENERAL
	1. SUMMARY

EDIT EXAMPLES BELOW BY DELETING ITEMS NOT REQUIRED, ADDING OTHERS, OR REVISING TEXT TO CLARIFY DESCRIPTIONS.

* + 1. Section Includes shop and field formed copper accessories and trim, such as:
			1. Counterflashing and base flashing.
			2. Wall flashing.
			3. Gravel stops.
			4. Copings.
			5. Valley flashing.
			6. Exposed trim/fascia units.
			7. Miscellaneous accessories.
			8. Laminated flashing.

FOLLOWING ARE EXAMPLES OF SEVERAL POSSIBLE CROSS REFERENCES WHICH MAY BE NECESSARY TO CLARIFY WHAT WORK IS SPECIFIED WHERE.

* + 1. Related Requirements:
			1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to work of this Section.
			2. Integral masonry flashings are specified as masonry work in sections of Division 04.
			3. Roofing accessories installed integral with roofing membrane are specified in roofing system sections as roofing work.
			4. Section 074210 – Copper Wall Cladding.
			5. Section 076110 – Copper Roofing.
			6. Section 076210 – Copper Roofing Specialties: Roof accessory units of premanufactured, set-on type.
			7. Section 076220 - Copper Gutters and Downspouts: Gutters and downspouts associated with roofing.
			8. Section 079514 – Copper Expansion Joint Cover Assemblies: Building expansion joint covers.."
			9. Sealants are generally specified in Division 07 Section, "Joint Sealants."
			10. Coordinate installation with HVAC mechanical equipment specified in Division 23.
	1. COORDINATION
		1. Coordinate work of this section with interfacing and adjacent work for proper sequencing. Ensure weather resistance and durability of work and protection of materials and finishes.
	2. PERFORMANCE REQUIREMENTS

design professional is responsible for designing system, including anchorage, fastener size, and spacing.

* + 1. Installation Requirements: Fabricator is responsible for installing system, including anchorage to substrate and necessary modifications to meet specified and drawn requirements and maintain visual design concepts in accordance with Contract Documents and following installation methods as stipulated in the "Copper in Architecture” handbook published by the Copper Development Association (CDA).
			1. Drawings are diagrammatic and are intended to establish basic dimension of units, sight lines, and profiles of units.
			2. Make modifications only to meet field conditions and to ensure fitting of system components.
			3. Obtain Architect’s approval of modifications.
			4. Provide concealed fastening wherever possible.
			5. Attachment considerations: Account for site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening and fracturing connection between units and building structure or between components themselves.
			6. Obtain Architect’s approval for connections to building elements at locations other than indicated in Drawings.
			7. Accommodate building structure deflections in system connections to structure.
		2. Performance Requirements:
			1. System shall accommodate movement of components without buckling, failure of joint seals, undue stress on fasteners, or other detrimental effects when subjected to seasonal temperature changes and live loads.
			2. Design system capable of withstanding building code requirements for negative wind pressure.
	1. SUBMITTALS
		1. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.
		2. Product data for flashing, metal, and accessories: Manufacturer's technical product data, installation instructions and general recommendations for each specified sheet material and fabricated product.

DELETE BELOW IF NONE OF WORK SUFFICIENTLY COMPLEX TO JUSTIFY SHOP DRAWINGS; EDIT TO DELETE NONAPPLICABLE UNITS. POSSIBLY INSERT PRODUCT-HANDLING ARTICLE WHERE SUBSTANTIAL VOLUME OF HIGHLY FINISHED WORK IS REQUIRED.

* + 1. Shop drawings showing layout, profiles, methods of joining, and anchorage details, including major counterflashings, copings, trim/fascia units, and gravel stops systems. Provide layouts at 1/4 inch (1:50) scale and details at 3-inch (1:4) scale.

RETAIN ABOVE AND INSERT SPECIFIC DATA SUBMITTALS AS DESIRED.

* + 1. Samples of the following flashing, sheet metal, and accessory items:
			1. 6-inch (150 mm) or 12-inch (300 mm) square samples of specified sheet materials to be exposed as finished surfaces.

DELETE ABOVE AND BELOW IF NO CONTROL REQUIRED ON SHEET MATERIALS. DELETE BELOW IF VISUAL CONTROL OF TRIM UNITS, GUTTERS, DOWNSPOUTS, EXPANSION JOINT UNITS, ETC. IS NOT DESIRED.

* + - 1. 6-inch (150 mm) or 12-inch (300 mm) long samples of fabricated products exposed as finished work. Provide complete with specified finish.
	1. CLOSEOUT SUBMITTALS
		1. Provide maintenance data in Operations and Maintenance manual for maintaining applied coatings on copper panels.

POSSIBLY INSERT QUALITY ASSURANCE ARTICLE HERE FOR LIMITATIONS ON FABRICATORS OR INSTALLERS OF COMPLEX SYSTEMS OF FLASHING, RAIN DRAINAGE, EXPANSION JOINTS, ETC.

* 1. QUALITY ASSURANCE
		1. Fabricator’s Qualifications: Company specializing in copper flashing and trim work with three years experience in similar size and type of installations.
		2. Installer: A firm with 3 years of successful experience with installation of copper flashing and trim work of type and scope equivalent to Work of this Section.
		3. Industry Standard: Except as otherwise shown or specified, comply with applicable recommendations and details of the "Copper in Architecture” handbook published by the Copper Development Association (CDA). Conform to dimensions and profiles shown.

DELETE ENTIRE MOCK-UP PROVISION BELOW UNLESS THE EXPENDITURE IS JUSTIFIED BY AN EXTENSIVE, UNUSUAL, OR CRUCIAL APPLICATION OF METAL ROOFING.

* + 1. Mock-Up: Before proceeding with final purchase of materials and fabrication of copper flashing and trim work components, prepare a mock-up of work. Incorporate materials and methods of fabrication and installation identical with project requirements. Install mock-up at location directed by Architect. Retain accepted mock-up as quality standard for acceptance of completed copper work. If accepted, mock-up may be incorporated as part of copper work.
			1. Mock-up area is indicated on Drawings.

DELETE EITHER ABOVE OR BELOW.

* + - 1. Provide mock-up of sufficient size and scope to show typical pattern of seams, fastening details, edge construction, and finish texture and color.
	1. DELIVERY, STORAGE, AND HANDLING
		1. Packing, Shipping, Handling, and Unloading: Protect finish metal faces.
		2. Acceptance at Site: Examine each component and accessory as delivered and confirm that material and finish is undamaged. Do not accept or install damaged materials.
		3. Storage and Protection:
			1. Stack pre-formed material to prevent twisting, bending, and abrasions.
			2. Provide ventilation.
			3. Prevent contact with materials which may cause discoloration or staining.
	2. WARRANTY
		1. Warrant installed flashing, copings, gravel stops, and trim components to be free from defects in material and workmanship for period of 2 years.
		2. Include coverage against leakage and damages to finishes.
1. - PRODUCTS
	1. FLASHING AND TRIM MATERIALS
		1. Copper: ASTM B370; temper H00 (cold-rolled) except where temper 060 is required for forming;
			1. 16 oz. per sq. ft. (0.0216-inch thick) (0.55 mm) except as otherwise indicated.
	2. LAMINATED COMPOSITION SHEET FLASHING
		1. Copper/Fiberglass Laminated Flashing.
			1. Description: Asphalt free copper fabric flashing, 3 [5] [7] ounce minimum weight.
			2. Material: Copper sheet with 060 temper conforming to ASTM B370 bonded with a proprietary rubber based adhesive, between two layers of fiberglass fabric weighing not less than 0.3 oz/sq.ft./layer with a minimum of 20x20 threads per inch.
		2. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

RETAIN ABOVE FOR NONPROPRIETARY OR BELOW FOR SEMIPROPRIETARY SPECIFICATION. REFER TO DIVISION-1 SECTION "MATERIAL AND EQUIPMENT."

* + 1. Products: Subject to compliance with requirements, provide one of the following:
			1. Copper Sealtite 2000, Advanced Building Products, Inc.
			2. Multi-Flash 500 Series Asphalt Free, York Manufacturing, Inc.
	1. ACCESSORIES
		1. Solder: ASTM B32; Provide 50-50 tin/lead or lead free alternative of similar or greater strength solder.
		2. Flux: Muriatic acid neutralized with zinc or approved brand of soldering flux.
		3. Fasteners: Same metal as flashing/sheet metal or other non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.
		4. Bituminous Coating: SSPC - Paint 12, Cold-Applied Asphalt Mastic (Extra Thick Film), nominally free of sulfur, compounded for 15-mil dry film thickness per coat.
		5. Joint Sealant: One-part, copper compatible elastomeric polyurethane, polysulfide, butyl or silicone rubber sealant as tested by sealant manufacturer for copper substrates. Refer to Division 07.

POSSIBLY INSERT SPECIFIC PERFORMANCE REQUIREMENTS BELOW OR ACCEPTABLE PRODUCT LISTING FOR CRUCIAL APPLICATIONS OF SEALANTS. (COORDINATE WITH DIV-7 SECTION "JOINT SEALERS.")

* + 1. Adhesives: Type recommended by flashing sheet manufacturer for waterproof/weather-resistant seaming and adhesive application of and compatibility with flashing sheet.
		2. High Temperature Grade Water Barrier Underlayment: Cold applied, self-adhering membrane composed of a high density, cross laminated polyethylene film coated on one side with a layer of butyl rubber or high temperature asphalt adhesive. Provide primer when recommended by water barrier manufacturer.
			1. Minimum Thickness: 30 mil.
			2. Tensile Strength: ASTM D412 (Die C Modified); 250 psi.
			3. Membrane Elongation: ASTM D412 (Die C Modified); 250%
			4. Permeance (Max): ASTM E96; 0.05 Perms.
			5. Acceptable Products:
				1. Blueskin PE 200 HT, Henry.
				2. Ultra, W.R. Grace Company.
				3. CCW MiraDRI WIP 300 High Temperature, Carlisle Coatings and Waterproofing.

DELETE ABOVE and retain below IF ALTERNATIVE UNDERLAYMENT IS USED.

* + 1. Roofing Felt Underlayment: Asphalt saturated felt weighing not less than 30 lbs per 100 square feet.

USE BELOW UNDER COPPER INSTALLED ON roofing felt underlayment.

* + 1. Paper Slip Sheet: Minimum 4-lb. red rosin-sized building paper.
		2. Reglets: Units of type and profile indicated, compatible with copper, noncorrosive.
		3. Metal Accessories: Provide cleats, straps, anchoring devices, and similar accessory units as required for installation of work, noncorrosive, size and gauge required for performance.
		4. Roofing Cement: ASTM D2822, asphaltic.
		5. Rivets:
			1. Pop Rivets: 1/8-inch (3 mm) to 3/16-inch (4.5 mm) diameter, with solid brass mandrels.
			2. Provide solid copper rivet (tinner’s rivets) where structural integrity of seam is required.

INSERT OTHER MATERIALS AS REQUIRED FOR PROJECT.

* 1. FABRICATION
		1. General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of Copper Development Association (CDA) "Copper in Architecture” handbook and other recognized industry practices. Fabricate for waterproof and weather-resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed copper work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
			1. Fabricate to allow for adjustments in field for proper anchoring and joining.
			2. Form sections true to shape, accurate in size, square, free from distortion and defects.
			3. Cleats: Fabricate cleats of same material as sheet, interlockable with sheet in accordance with CDA recommendations.
			4. Fabricate corners from one piece with minimum 18 inch (450 mm) long legs; solder for rigidity if required; seal non-soldered weather joints with sealant.
		2. Seams: Fabricate nonmoving seams with flat-lock seams where possible. Tin edges and cleats to be seamed, form seams, and solder. Where soldered flat-lock seams are not possible, use soldered riveted lap seams joints for additional strength.
		3. Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1-inch (25 mm) deep, filled with mastic sealant (concealed within joints).
		4. Sealant Joints: Where movable, nonexpansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with CDA standards.

INSERT SPECIFIC LISTING (BELOW) OF SEPARATIONS KNOWN TO BE REQUIRED FOR WORK AS DETAILED. ATTEMPT SHOULD BE MADE IN DETAILING TO AVOID THIS NEED.

* + 1. Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.
		2. Solder
			1. Solder and seal metal joints except those indicated or required to be expansive type joints.
			2. Tin edges of copper sheets and cleats at soldered joints.
			3. After soldering, carefully remove flux and other residue from surfaces. Neutralize acid flux by washing with baking soda solution, and then flushing clear water rinse. Wipe and wash solder joints clean.

VERIFY SEAM TYPE DESIRED FOR EACH USE AND MODIFY PARAGRAPH BELOW AS REQUIRED.

* + 1. Seams:
			1. Provide following seam types unless noted or detailed otherwise.
			2. Flat: Drive cleat [Flat lock].
			3. Corner: Double lock corner [Single lock corner].
			4. Standing: Double lock standing [Single lock standing] lap seam.
		2. Copper Thickness: Comply with CDA recommendations for copper size and shape.

select flashing, coping, fascia/gravel stop, scuppers, or conductor heads below as appropriate for project.

* + 1. Flashing and Counter Flashing:
			1. Fabricate as indicated on Drawings and in accordance with the CDA "Copper in Architecture” handbook.
			2. Hem exposed flashings on underside 1/2 inch (13 mm); miter and seam corners.
			3. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.
			4. Fabricate flashings to allow toe to extend minimum 2 inches (50 mm) over wall surfaces.
		2. Coping: As indicated on Drawings and in accordance with the CDA "Copper in Architecture” handbook.
		3. Fascia/Gravel Stop: As indicated on Drawings and in accordance with the CDA "Copper in Architecture” handbook.
		4. Valley Flashing:
			1. Fabricate valley flashing according to details and specified requirements.
			2. Fabricate metal flashings at open valleys with a minimum 1 inch (25 mm) high standing rib at center of valley to break force of water flow.
		5. Masonry Through Wall Flashings: Refer to Division 04 section on masonry.
	1. FINISHES
		1. Natural weathering mill finished copper. No applied finish.

\*\*\*\*\* OR \*\*\*\*\*

REVIEW PAINT SELECTION WITH COATINGS MANUFACTURER, REFER TO DIVISION 09.

* + 1. To retard natural weathering, apply a uniform coating of high grade paraffin oil (brown tone), or a clear lacquer coat (shiny).

clear coatings to retard weathering not recommended due to maintenance requirements.

* + 1. Clear Lacquer Coating
			1. Clear, Organic Coating: Clear, air‑drying, acrylic lacquer specially developed for coating copper alloy products, equivalent to Incralac by StanChem applied by air spray in 2 coats per manufacturer's directions, with interim drying, to total thickness of 1.0 mil.
1. - EXECUTION
	1. EXAMINATION
		1. General: Examine conditions and proceed with work when substrates are ready.
		2. Confirm that substrate system is even, smooth, sound, clean, dry, and free from defects.
	2. INSTALLATION
		1. General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations and with the "Copper in Architecture” handbook published by the Copper Development Association (CDA). Anchor units of work securely in place by methods indicated, providing for thermal expansion of units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weatherproof.
			1. Install units plumb, level, square, and free from warp or twist while maintaining dimensional tolerances and alignment with surrounding construction.
			2. Apply asphalt mastic on copper surfaces of units in contact with dissimilar metals.
			3. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
			4. Miter, lap seam and close corner joints with solder. Seal seams and joints watertight.
			5. Install expansion joints at frequency recommended by CDA. Do not fasten moving seams such that movement is restricted.
			6. Coordinate with installation of roofing system and roof accessories.
		2. Parapet Cap Water Barrier Membrane Underlayment:
			1. Clean substrate of dirt, dust, and materials which may impair adhesion.
			2. Apply primer, when required, in accordance with manufacturer's requirements.
			3. Apply to top of parapet wall under coping and gravel stops.
			4. Turn membrane down exterior wall face and parapet wall face 2 inches (50 mm).
			5. Install without fishmouths and wrinkles.
			6. Press tape into firm contact with substrate.
			7. Lap tape ends minimum of 2 inches (50 mm ).

DELETE ABOVE and retain below IF ALTERNATIVE UNDERLAYMENT IS USED.

* + 1. Underlayment: Where installation is to be directly on cementitious or wood substrates, install red rosin paper slip sheet over layer of asphalt saturated felt.
		2. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.
		3. Install reglets to receive counterflashing in manner and by methods indicated. Where shown in concrete, furnish reglets to trades of concrete work for installation as work of Division 03 sections. Where shown in masonry, furnish reglets to trades of masonry work, for installation as work of Division 04 sections.

DELETE ABOVE IF NO REGLETS REQUIRED. ADJUST PROVISIONS OF TEXT TO CONFORM WITH LOCAL PRACTICE AND TRADE JURISDICTIONS.

* + 1. Counterflashing and Reglets:
			1. Fabricate counterflashings and reglets as 2 piece assemblies to permit installation of counterflashing after base flashings are in place.
			2. Fabricate reglets of same metal and thickness as counterflashings.
			3. Overlap roof base flashing 4 inches (100 mm) minimum.
			4. Install bottom edge tight against base flashing.
			5. Lap seam vertical joints 3 inches (75 mm) minimum and apply sealant.
		2. Install counterflashing in reglets, either by snap-in seal arrangement, lock seal in accordance with the "Copper in Architecture” handbook published by the Copper Development Association (CDA), or by soldering in place for anchorage and filling reglet with mastic or elastomeric sealant, as indicated and depending on degree of sealant exposure.
		3. Install laminated flashing in accordance with manufacturer's recommendations. Where required, provide for movement at joints by forming loops or bellows in width of flashing. Locate cover or filler strips at joints to facilitate complete drainage of water from flashing. Seam adjacent flashing sheets with adhesive, seal and anchor edges in accordance with manufacturer's recommendations.
		4. Fasten flashing to curb nailers at maximum spacing of 3 inches (75 mm) O.C. Fabricate seams at joints between units with minimum 4-inch (100 mm) overlap, to form continuous, waterproof system in accordance with the "Copper in Architecture” handbook published by the Copper Development Association (CDA).
		5. Coping, and Fascia/Gravel Stops:
			1. Space seams: 10’-0" (3000 mm) o.c. maximum.
			2. Lock exterior edges over continuous cleats to secure to substrate.
			3. Slope towards inside of parapet, 1/2 inch (13 mm) minimum, unless indicated otherwise.
			4. Lock interior edges to substrate with cleats spaced at 12 inch (300) mm centers.
			5. Provide drainage system at seams to prevent water infiltration.
		6. Valley Flashing:
			1. Extend metal flashing a minimum of 12 inches (300 mm) onto roof deck on each side of valley.
			2. If valley length exceeds 12 feet (3600 mm), increase width of valley flashing by 1 inch (25 mm) on each side per 96 inches (2400 mm) of valley length.

INSERT OTHER SPECIFIC INSTALLATION REQUIREMENTS FOR OTHER SYSTEMS AND SHEET METAL ACCESSORY ITEMS SPECIFIED AS WORK OF THIS SECTION.

* 1. CLEANING
		1. Remove protective film (if any) from exposed surfaces of copper promptly upon installation. Strip with care to avoid damage to finishes.
		2. Clean exposed copper surfaces, removing substances that might cause abnormal discoloration of metal.
		3. Upon completion of each area of soldering, carefully remove flux and other residue from surfaces. Neutralize acid flux by washing with baking soda solution, and then flushing with clear water rinse. Use special care to neutralize and clean crevices.
		4. Clean exposed metal surfaces of substances that would interfere with normal oxidation and weathering.
	2. PROTECTION
		1. 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