Part 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Conform to Sections of Division 1 as applicable.

1.2 RELATED WORK

1. Rough Carpentry - Section 06 10 00
2. Sheet Metal Roofing, Flashing and Ornamental Metal – Section 07 62 00
3. Sealants - Section 07 90 00

1.3 DELIVERY, STORAGE AND HANDLING

1. Contractor is responsible for material delivery, protection, storage, and installation.

1.4 DESCRIPTION OF WORK

1. The extent of sheet metal flashings, roofing, and accessories work is shown on drawings, schedules, and described herein.

2. Types and items of sheet metal work include but are not limited to the following:

    1. Metal cap, counter, base and pan flashings. Sidewall flashings and reglets at mortar joints of masonry walls.

    2. Metal Roof and accessories.

    3. Temporary roofing.

    4. New, Replacement or modification of existing metal eavestrough and rain water leaders as indicated on drawings.

1.5 QUALITY ASSURANCE

1. Standards: Quality of fabrication and installation of all sheet metal work shall comply with recommendations published by Revere Copper Products, Inc., National Slate Association, National Roofing Contractors Association, and Sheet Metal and Air Conditioning Contractors National Association.

1.6 SUBMITTALS

1. Published Recommendations, Sheet Metal: Submit three (3) copies of Copper and Common Sense, Seventh Edition, general specifications and installation instructions as published by Revere Copper Products, Inc.

2. Samples, Sheet Metal: Submit three (3) samples 300 mm^2 (12 sq.in.) of each specified sheet metal for review by the Consultant for colour and texture only. Compliance with other requirements is the exclusive responsibility of Contractor.

3. Shop Drawings: Submit shop drawings showing layout of all seams, connections, and joints of all items of sheet metal work. Shop drawings of not less than half full size shall show all slopes, detail the manner of forming, joining, and securing of each sheet metal item of work, whether or not completely described or delineated on Drawings.

4. Models, Mock-Ups: Submit one (1) mock-up of each of the following:

    1. 915 mm (3'-0") sections of each type of ornamental sheet lead coated copper with typical transverse seam (as applicable) and vertical fully soldered standing seam, side gable, and drip edge, mounted to ¾" plywood.

    2. One sample of each flashing profile.

    3. One sample of all other roof and siding components and fasteners.

1.7 JOB CONDITIONS

1. Proceed with Sheet Metal work only after substrate construction and penetrating work have been completed.

2. Coordinate work with anti-icing, masonry, structural, carpentry, insulating, plumbing contractors, and others necessary to perform work.

3. Weather Conditions: Proceed with sheet metal work only when weather conditions are in compliance with recommended limitations, and when conditions permit the work to proceed in accordance with requirements and the manufacturer's published recommendations.

4. The building site will be occupied throughout construction. Adequate measures shall be taken at all times to protect property and users from dust, debris, and exposure to the weather.

1.8 WARRANTY

1. Extended Warranty

    1. Submit an unconditional written guarantee for material and workmanship covering the repair and replacement of defective work for a period of THREE (3) YEARS from the date of substantial performance of the work.

    2. Notwithstanding the generality of the following, leakage, and failure to stay in place will be judged as defective work.

Part 2 PRODUCTS

2.1 MATERIALS

1. Lead coated copper: lead-coated copper sheet to ASTM B 101 temper HOO, coated both sides with not less than 12 lbs. nor more than 15 lbs. per 100 sq.ft. of copper sheet (½ of the total weight of lead applied each ride) and as follows:

    1. Weight of coated sheet: 737 g (26-oz.)

    2. Minimum weight of base copper sheet: 567 g (20-oz.)

2. Copper Sheet Metal: Minimum 20 oz. (22Ga.) for eaves trough and rain water leaders.

2.2 FASTENERS

1. Cleats shall be 51 mm (2") wide by 76 mm (3") long and shall be made of 454 g (16-oz.) cold rolled sheet copper. One end shall be locked into seams or into folded edge of copper sheets. Other end shall be nailed with two nails and folded back over nail heads.

2. Nails used for fastening copper shall be copper or hardware bronze of Stronghold type, or equal, with large flat head. They shall be not smaller than No. 12 Stubs gauge 2.8 mm (0.109") and of length sufficient to penetrate roof boarding not less than 25 mm (1").

3. Rivets shall be of hard copper, brass, or bronze.

4. Screws and bolts used for fastening copper shall be copper, silicone bronze, brass, or stainless steel (passive).

5. Screws and bolts used for fastening galvanized sheet metal shall be ‘climaseal’, ‘C2’ or ‘Oxyseal’ coated steel.

2.3 UNDERLAYMENT

1. High temperature roof underlayment for metal roofing shall be Blueskin PE200HT 40 mil thickness by Henry / Bakor or LASTOBOND Shield HT by Soprema.

2.4 BITUMINOUS MEMBRANE

1. Bituminous Membrane shall be "Bituthene 3000" 1.5 mm (60 mils), as manufactured by W. R. Grace & Co. or approved alternative.

2.5 BITUMINOUS MEMBRANE PRIMER

1. Primer to be compatible with membrane and substrate; manufactured by W.R. Grace and Company, Henry / Bakor, or Soprema.

2.6 SOLDER

1. Solder shall comply with ASTM specification B32, 50-50.

2. Flux shall be muriatic acid killed with zinc or approved brand of soldering flux. Acid shall be thoroughly washed off after soldering is completed.

Part 3 EXECUTION

3.1 GENERAL

1. Within this Section the term "sheet metal" refers to cold rolled sheet copper of thicknesses noted.

2. Sheet metal shall be furnished in minimum 2440 mm (8'-0") lengths unless otherwise shown or approved in specific locations noted on shop drawings.

3. Preparation of Substrate

    1. Surfaces to be covered with sheet metal shall be smooth and free of defects of every description. All such surfaces shall be cleaned free of dirt, rubbish, and other foreign materials before the work is started. All projecting nails shall be driven flush with the roof boarding.

3.2 Installation, General

1. Comply with details and profiles as shown. Comply with applicable standards referenced in this Section.

2. Fabricate and install sheet metal work with lines and corners true and accurate. Form exposed faces flat and free of buckles, waves, and avoidable tool marks. Provide uniform, neatly formed seams with minimum exposure of solder and sealants. Except where noted expressly to the contrary, fold back edges of sheet metal to form a hem on the concealed side of all exposed edges.

3. Conceal fasteners and provide for thermal expansion movement throughout the work. Locate all fasteners so as to preclude leakage. Provide cleat-type anchorage throughout all sheet metal work of this Section.

4. Do not tin edges of lead coated copper. Wire brush lead coating before soldering.

5. Soldering shall be done slowly with well-heated irons to heat the sheet thoroughly and to sweat solder completely through full width of seam. Ample solder shall be used and seam shall show at least one full inch of evenly flowed solder. Wherever possible, all soldering shall be done in flat position. Seams on slopes steeper than 45 degrees shall be soldered a second time.

6. Provide fire-proof blankets surrounding work area when soldering, to protect adjacent materials.

3.3 FLASHINGS, GENERAL

1. Cap flashing (counter flashing) shall be provided in connection with all base flashings. Cap flashing shall turn down at least 100 mm (4") over all base flashing. Where cap flashings are required on existing masonry walls, the horizontal masonry joints to receive the flashing shall be raked to a depth of 1" (25 mm). The cap flashing shall be bent to extend into the raked joint with the rear edge bent back on itself where it shall be made secure with lead wedges spaced not more than 200 mm (8") apart. All raked joints with cap flashings shall be filled with sealant.

2. Base Flashing (pan flashing) shall be provided where roofing abuts vertical surfaces and comprise sections of metal 2440 mm (8'-0") in length joined together with 19 mm (3/4") locked and soldered seams to form overall sections not greater in length than 7300 mm (24'-0") or as shown. Where base flashings are required on existing masonry walls, the horizontal masonry joints to receive the flashing shall be raked to a depth of 1" (25 mm). The base flashing shall be bent to extend into the raked joint with the rear edge bent back on itself where it shall be made secure with lead wedges spaced not more than 200 mm (8") apart. All raked joints with base flashings shall be filled with sealant.

3. Loose lock (cross folded loose seams or slip joints) shall be formed between sections of metal flashings where indicated by folding the underlying section to form a pocket to receive the outer, overlying section. Straight runs of metal flashing longer than 6100 mm (20'-0") shall include loose lock joints not more than 2440 mm (8'-0") from any internal or external corner. Straight runs exceeding 12,200 mm (40'-0") shall include loose lock seams at midpoints.

3.4 INSTALLATION OF BITUMINOUS MEMBRANE

1. Contractor shall install Bituminous Membrane as per manufacturer's recommendations and as indicated on drawings.

3.5 INSTALLATION OF UNDERLAYMENT

1. Install minimum one ply of underlayment lapped to the weather prior to application of sheet metal flashing.

2. Install and fasten underlayment as recommended by manufacturer.

3.6 STANDING SEAM ROOFING, GENERAL

1. Standing seam roofing pans shall be formed of 737 g. (26 oz.) lead coated, cold rolled copper in sheets 2440 mm (8'-0") or 3050 mm (10'-0") long and not more than 460 mm (18") wide.

2. Alternate pans shall begin at eaves or base of wall with half length sheets staggering transverse seams. Cleats shall be placed 300 mm (12") apart in each standing seam. Each cleat shall be secured with two copper or bronze nails. Pans shall be formed to allow 3.2 mm (1/8") minimum space at the base of each standing seam.

3. For slopes 150 mm (6") or more per foot, lower end of each pan shall be folded under 19 mm (3/4"). Folds shall be slit 25 mm (1") away from corner to form tab where pan turns up to make standing seam. Upper end of each pan shall be folded over 51 mm (2"). The 19 mm (3/4") fold on the lower end of upper pan is hooked on 51 mm (2") fold on upper end of underlying pan.

4. Standing seams shall finish 25 mm (1") high, except on curved surfaces 19 mm (3/4") high. One side edge shall be bent up 38 mm (1-1/2") and the other 44.5 mm (1-3/4"). First fold shall be single fold 6.4 mm (1/4") wide; second fold shall be 12.7 mm (1/2") wide. Locked portion of standing seam shall be 5 plies in thickness. Lower ends of standing seams shall be folded over 45 degrees. Standing seams shall be laid flat approximately 150 mm (6") away from becoming folded into and terminating at ridge or hip standing seams.

5. Ridges and hips shall be provided with standing seams, constructed as specified for seams of main roof.

6. Valleys shall be constructed of 737 g. (26 oz.) lead coated, cold rolled copper sheets, not exceeding 3050 mm (10'-0") in length. Each sheet shall lap lower sheet at least 150 mm (6") in direction of flow. Valley sheets shall extend under roofing sheet on both sides at least 150 mm (6"). At valley line adjacent to the lower edge of the roofing sheets, 19 mm (3/4") double fold shall be made to engage a 19 mm (3/4") single lock at lower ends of the roofing sheets; or a continuous strip of 737 g. (26 oz.) lead coated, cold rolled copper shall be soldered to the valley sheet to form a lock for the lower ends of the roofing sheets. The outer edge of the valley sheet should be folded 12.7 (1/2") for cleating; in these folds, copper cleats shall be installed 460 mm (18") apart.

7. Ends of roofing pans shall be loose locked into gutter as specified under gutters. Roof pans shall be loose locked to valley flashing and edge strip at eaves.

8. Standing seam pans against gable rakes shall turn up vertically 38 mm (1-1/2") and lock into a separate 567 g. (20 oz.) cold rolled copper fascia strip to form a seam 25 mm (1") high. Lower edge of fascia shall be hooked a minimum of 19 mm (3/4") over continuous 567 g. (20 oz.) cold rolled copper edge strip attached with bronze or copper nails spaced 76 mm (3") apart.

3.7 PROTECTION, GENERAL

1. Contractor shall be responsible for the protection of the existing building, facilities, and improvements within the areas where his work is being performed. Any disturbance or damage to the work, the existing building and improvements or any impairments of facilities resulting from the work of this Section shall be properly restored, repaired, or replaced to the satisfaction of and at no additional cost to Owner.

3.8 CLEAN UP

1. Do not allow the accumulation of scraps and debris arising from the work of this Section but maintain the premises in a neat and orderly condition at all times.

2. Remove from roof areas and scaffold all debris, rubbish, and other material resulting from operations in bins provided by Contractor and transport bins to grade by the man and material scaffold hoist where bins will be picked up by the Contractor and removed from the site.

End of Section 07 62 00