

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

- .1 Materials and installation for sheet metal roofing including mansard roofs.

### 1.2 REFERENCE STANDARDS

- .1 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM A653/A653M-20, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .2 ASTM D523-14, Standard Test Method for Specular Gloss.
  - .3 ASTM D822/D822M-13(R2018), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
  - ~~.4 ASTM D1970/D1970M-20, Standard Specification for Self Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.~~
- .2 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement. (Withdrawn)
  - .2 CAN/CGSB-37.29-M89, Rubber-Asphalt Sealing Compound. (Withdrawn)
- .3 Department of Justice Canada (Jus).
  - .1 Canadian Environmental Protection Act (CEPA), 1999.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Safety Data Sheets (SDS).
- .5 National Research Council Canada (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC).
  - .1 CCMC-2020, Registry of Product Evaluations.

### 1.3 SUBMITTALS

- .1 Submit proof of manufacturer's CCMC Listing and listing number to Departmental Representative.
- .2 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, and cleaning procedures.
- .3 Submit product data in accordance with Section 01 33 00.
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for sheet metal roofing and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit 2 copies of WHMIS SDS in accordance with Section 01 35 29.
- .4 Submit shop drawings in accordance with Section 01 33 00.
- .5 Indicate arrangements of sheets and joints, types and locations of fasteners and special shapes and relationship of panels to structural frame.

- .6 Submit samples in accordance with Section 01 33 00.
- .7 Submit duplicate 300 x 300 mm samples of each sheet metal material.

#### 1.4 QUALITY ASSURANCE

- .1 Submit mock-ups in accordance with Section 01 45 00.
- .2 Fabricate 1200 x 1800 mm sample roofing panel using identical project materials and methods to include typical seam.
- .3 Mock-up will be used:
  - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
- .4 Locate where directed.
- .5 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with sheet metal flashing work.
- .6 When accepted, mock-up will demonstrate minimum standard of quality required for this Work. Approved mock-up may remain as part of finished Work.
- .7 Approved mock-up may remain as part of finished Work.
- .8 Remove mock-up and dispose of materials when no longer required and when directed by Departmental Representative.

### PART 2 - PRODUCTS

#### 2.1 SHEET METAL MATERIALS

- .1 Zinc coated steel sheet: to ASTM A653/A653M, commercial quality, with Z275 coating, regular spangle surface, prefinish as specified in 2.2, ~~0.43~~ **0.34** mm minimum base metal thickness.

#### 2.2 PREFINISHED STEEL SHEET

- .1 Prefinished steel with factory applied polyvinylidene fluoride.
  - .1 Class F1S.
  - .2 Colour selected by Departmental Representative from manufacturer's standard range.
  - .3 Specular gloss: 30 units +/-5 to ASTM D523.
  - .4 Coating thickness: not less than 22 micrometres.
  - .5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20% to ASTM D822/D822M as follows:
    - .1 Outdoor exposure period 2500 hours.
    - .2 Humidity resistance exposure period 5000 hours.

#### 2.3 ACCESSORIES

- .1 Plastic cement: to CAN/CGSB-37.5.

- .2 ~~Plywood roof sheathing~~ **Wood strapping**: In accordance with Section 06 10 00.
- ~~.3 Underlayment: To ASTM D1970/D1970M, 1 mm thick composite underlayment comprised of SBS rubberized asphalt compound with high temperature softening point integrally laminated to high density cross laminated polyethylene film. Self adhering with siliconized kraft paper bottom surface and non slip coating on exposed surface.~~
- .4 Sealant: Asbestos-free sealant, compatible with systems materials, recommended by system manufacturer.
- .5 Rubber-asphalt sealing compound: to CAN/CGSB-37.29.
- .6 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
- .7 Fasteners: stainless steel screws, exposed with coloured heads to match metal roofing, **and integrated neoprene washer**.
- .8 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .9 Touch-up paint: as recommended by sheet metal roofing manufacturer.

#### 2.4 FABRICATION

- .1 Form individual pieces in 2400 mm maximum lengths. Make allowances for expansion at joints.
- .2 **Fabricate panels roll formed, 914 mm wide, with major corrugations 17.8 mm high, 228.6 mm on centre, and minor corrugations 57 mm on centre between major corrugations.**
- .3 Hem exposed edges on underside 12 mm, mitre and seal.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Apply minimum 0.2 mm dry film thickness coat of plastic cement to both faces of dissimilar metals in contact.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- ~~.1 Use concealed fastenings except where approved by Departmental Representative before installation.~~
- .1 Install ~~plywood roof sheathing~~ **wood strapping** in accordance with Section 06 10 00.
- ~~.3 Provide underlay under sheet metal roofing where indicated. Secure in place with manufacturer's recommended fasteners and lap joints 100 mm minimum.~~

- ~~.4 Install sheet metal roof panels using cleats spaced at 600 mm on centre.~~
- ~~.5 Secure cleats with two fasteners each and cover with cleat tabs.~~
- ~~.6 Stagger transverse seams in adjacent panels.~~
- ~~.7 Flash roof penetrations with material matching roof panels, and make watertight.~~
- ~~.8 Form seams in direction of water flow and make watertight.~~
- .2 Install metal roofing in accordance with reviewed shop drawings and manufacturer's written instructions.*
- .3 Install metal roofing beginning at eaves. Loose lock pans to valley flashing and edge strips at eaves and gable rakes.*
- .4 Install metal roofing panels in one piece, for entire slope, except as indicated otherwise. In locations that roof panels cannot be installed in one piece, provide 100 mm starter strip to join the panels together. Provide a continuous sealant bead under starter strip.*
- .5 Install overlap joints shingled to shed water, true to line, tight fitting, hairline, and lapped away from prevailing winds. Align transverse overlap joints in adjacent panels.*
- .6 Metal roof panels terminating at eaves or valleys shall not have a raw metal edge or exposed fasteners. Fold panel ends and install in accordance with reviewed shop drawings.*
- .7 Insert metal roof panels terminating at hips or ridges into concealed metal closures. Metal closures shall allow for expansion of the metal roof panel and also act as a starter strip for hip or ridge flashings.*
- .8 Install valley sheets not exceeding 3 m in length. Shingle lap joints 150 mm in direction of flow. Extend valley sheet minimum 150 mm under roofing sheets. Double fold valley and roofing sheets and secure at 450 mm o.c.*
- .9 Install exposed fasteners in alignment and neatly spaced. Pre-drill sheets where possible.*
- .10 Apply isolation coating to metal surfaces in contact with concrete or mortar.*
- .11 Seal where necessary to form weathertight seal between flashing and adjoining surfaces and between flashing and other work. Sealing work consists of bedding between members where possible. Tool sealant to concave profile where exposed*
- .12 Remove and replace damaged metal roofing. Do not touch-up damaged panels.*

### 3.2 STANDING SEAM ROOFING

- ~~.1 Use 0.34 **0.43** mm thick prefinished steel, panel size as indicated, to make roofing with standing seams without straight run of standing seam exceeding 10 m.~~
  
- ~~.2 Fold lower end of each pan under 20 mm.
  - ~~.1 Slit fold 25 mm away from corner to form tab where pan turns up to make standing seam.~~
  - ~~.2 Fold upper end of each pan over 50 mm.~~
  - ~~.3 Hook 20 mm fold on lower end of upper pan into 50 mm fold on upper end of underlying pan.~~~~
  
- ~~.3 Apply sheet metal roofing beginning at eaves. Loose lock pans to valley flashing and edge strips at eaves and gable rakes.~~
  
- ~~.4 Finish standing seams 25 mm high on flat surfaces. Bend up one side edge 40 mm and other 45 mm.
  - ~~.1 Make first fold 6 mm wide single fold and second fold 12 mm wide, providing locked portion of standing seam with 5 plies in thickness.~~
  - ~~.2 Fold lower ends of seams at eaves over at 45 degrees angle.~~
  - ~~.3 Terminate standing seams at ridge and hips by turning down in tapered fold.~~~~
  
- ~~.5 Form valleys of sheets not exceeding 3 m in length. Lap joints 150 mm in direction of flow.
  - ~~.1 Extend valley sheet minimum 150 mm under roofing sheets.~~
  - ~~.2 At valley line, double fold valley and roofing sheets and secure with cleats spaced 450 mm on centre.~~~~

### 3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
  - .1 Leave Work area clean at end of each day.
  - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

### 3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by sheet metal roofing installation.