

- 1. General**
- 1.1. SECTION INCLUDES
  - .1 Architectural standing seam metal roofing.
- 1.2. RELATED SECTIONS
  - .1 Section 05 12 00: Structural Steel Framing
  - .2 Section 05 31 00: Metal Decking
  - .3 Section 06 16 00: Sheathing
  - .4 Section 07 21 13: Board Insulation
  - .5 Section 07 27 00: Air/Vapour Barrier
- 1.3. REFERENCES
  - .1 Building Design Codes
    - .1 National Building Code of Canada 2010.
  - .2 Reference Standards
    - .1 American Society for Testing and Materials (ASTM) (Current Edition).
      - .1 ASTM E-1592 Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
      - .2 ASTM E-1680-95 Rate of Air Leakage Through Exterior Metal Roof Panel Systems
      - .3 ASTM E-1646-95 Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference
    - .2 CSA Standards
      - .1 CSA-S136-07 North American Specification for the Design of Cold-Formed Structural Members
    - .3 Factory Mutual Global Group
      - .1 FM 4471, August 1995: Approval Standard for Class 1 Panel Roofs.
- 1.4. REFERENCE LATEST EDITIONS OF PUBLICATIONS AND STANDARDS
  - .1 Build Design Codes - Uplift, Live and Dead Loads
    - .1 ASCE 7-05 Minimum Loads for Buildings and Other Structures (ASCE 7-05) American Society of Civil Engineers.
  - .2 Reference Standards
    - .1 American Iron and Steel Institute (AISI), Specification for the Design of Cold-Formed Steel Structural Members (2001).
    - .2 American Society for Testing and Materials (ASTM) (Current Edition)
      - .1 E1592 Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.

- .2 E1680 Test Rate of Air Leakage through Exterior Windows, Curtain Wall, and Doors by Uniform Static Air Pressure Difference.
- .3 E1646 Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.

1.5. SUBMITTALS

- .1 Submit complete shop drawings, product data and samples in accordance to Section 01 33 00.
- .2 Shop Drawings: Indicate dimensions of parts, fastening and anchoring methods, detail type, location of penetrations and methods to accommodate thermal movement.
- .3 Samples: For each finish product specified, two samples, minimum size 12 inches (305mm) square, representing actual product, color, and patterns; colour permitting.
- .4 Engineering: Ensure all shop drawings submitted are signed and sealed by a qualified Professional Engineer registered in the applicable province.

1.6. QUALITY ASSURANCE

- .1 Installer Qualifications:
  - .1 Installer shall have had at least ten (10) years of experience in the installation of standing seam roof systems.
  - .2 Installer must be approved by the manufacturer.
  - .3 Installer shall have a minimum of five (5) projects completed of similar size and scope.
- .2 Manufacturer Qualifications:
  - .1 Manufacturer shall have had at least ten (10) years documented experience specializing in commercial and industrial roofing systems.
  - .2 Manufacturer must have technical services, engineering services, operations, project management personnel permanently based in North America.

1.7. DELIVERY, STORAGE, AND HANDLING

- .1 Materials stored at a project site shall be covered for moisture protection and tilted to shed moisture, as per manufacturer's recommendations.
- .2 Materials stored on site shall be vented to prevent condensation accumulation on the panels.
- .3 Store products in manufacturer's unopened packaging until ready for installation.

1.8. WARRANTY

- .1 Manufacturer's Warranty: Standard performance warranty provided by the manufacturer to warrant all panels, flashings, sealants, fasteners, and accessories against defective materials and/or workmanship for a period of up to twenty (20) years.

**2. PRODUCTS**

2.1 MANUFACTURERS

- .1 Acceptable Manufacturer:
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- .1 Bemo USA Inc., 3062 N. Maple Street, Mesa, Arizona USA 85215-1115
- .2 Certified Erector:
  - .1 Thermal Systems KWC Ltd., 2780 24 Avenue N.E., Calgary, AB T1Y 6V7  
Phone: (403) 250-5507 Fax: (403) 250-6891  
sales@thermalsystems.ca
- 2.2 SHEET METAL ROOFING
  - .1 Performance Requirements:
    - .1 The standing seam roof system shall be designed to safely resist the positive and negative loads as required for the location and type of project designed.
    - .2 Structural-uniform uplift load capacity of the panel system shall be determined in accordance with the principles of ASTM E1592, "Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
    - .3 The Factor of Safety on the test results shall be 1.65 for the panel and clip/halter ultimate loads with no increase for wind.
      - .1 The Factor of Safety for fasteners shall be 3.0 for single fastener in each connection, 2.25 for 2 or more fasteners in each connection and 4.0 in masonry.
      - .2 Design uplift capacity for condition of gage, span or loading other than those tested may be determined by interpolation of test results.
      - .3 Deflection shall be  $l/180$  for positive loading.
    - .4 Water penetration of the panel assembly at 20psf pressure for 15 minutes shall have "no uncontrollable leakage" when tested in accordance with ASTM E1646.
    - .5 Air infiltration of panel assembly at 20psf pressure shall be no more than 0.02 cfm/sf of panel when tested in accordance with ASTM E1680.
    - .6 The panel system shall have a CAN/ULC S107 (Method of Fire Tests of Roof Coverings) rating.
    - .7 Fasten the roofing panels to the structure through the use of concealed halters/clips which are designed to allow for up to and including a full 3-3/4" of panel movement without impeding the performance of the panel.
    - .8 Roll Forming Equipment to have a minimum of 12 hardened tooling roll forming stations with a profiled shear. Pre-shearing and portable roll forming equipment is strictly prohibited.
  - 2. Standing Seam Roof Panels: Standing seam panels are to be Bemo USA Bemo-Roof and manufactured, designed, and installed by BEMO USA's trained and certified contractors.
    - .1 Panels shall be 305mm (12") or 400mm (15 3/4") or 500mm (19 3/4") wide with a minimum vertical standing leg height of 65mm (2 1/2").
    - .2 Material
      - .1 0.040" (1.02mm) or 0.050" (1.27mm) thick aluminum, alloy 3004-H-14

- clad, plain mill finish or stucco embossed.
- .2 22 gauge (0.030") or 20 gauge (0.036") AZ180 coated steel Grade 50B, plain mill finish, or stucco embossed.
- .3 Stainless Steel - please contact Thermal Systems (403) 250-5507 for specifics.
- .4 Zinc - please contact Thermal Systems (403) 250-5507 for specifics.
- .5 Copper - please contact Thermal Systems (403) 250-5507 for specifics.
- .3 Finish:
  - .1 Exterior Surface of Panels: Consisting of a nominal .2 mil primer and nominal .8 mil 70% polyvinylidene topcoat. The color shall be selected from Bemo USA's standard color chart.
  - .2 The coating system must have been tested to and must exhibit the minimum characteristics of the following ASTM test criteria:
    - .1 Specular Gloss (ASTM D-523 @ 60 degrees), Standard gloss of 20-30.
    - .2 Pencil Hardness (ASTM D-3363), HB-H.
    - .3 Flexibility, T-Bend (ASTM D-4145), No cracking or tape removal of film at 1-T on painted aluminum and at 2-T on paint steel.
    - .4 Adhesion/Reverse Impact, (ASTM D-3359, D-2794), 1.5 times metal thickness with no loss of adhesion. No cracking or loss of adhesion.
    - .5 Abrasion/Falling Sand, (ASTM D-968), Liters to expose 5/32" of substrate-50.
    - .6 Acid Pollutants, (ASTM D-1308) 10% muriatic acid (15 min) no effect, 20% Sulfuric acid (15 min) no effect.
    - .7 Salt Spray Resistance 5% @ 95 degrees F (ASTM B-117). Passes 3,000 hrs on alum. And 1,000 hrs on coated steel.
    - .8 Humidity Resistance 100% @ 95 degrees F (ASTM D-2247). Passes 3,000 hrs on alum. And 1,000 hrs on coated steel.
    - .9 Weathering Tests (ASTM D-2244 South Florida Exposure, D-822 Color Retention, D-659 Chalk Resistance), Less than 5NBS units change, Passes 5,000 hrs., Rating of 8 min.
  - .3 Concealed Clips:
    - .1 Fasten standing seam roofing to structure with specially designed and tested clips/halters manufactured exclusively for the roofing system.
    - .2 Clips/halters must be designed to allow the roofing materials free movement in either direction parallel to the standing leg of the panel.

- .3 Absolutely zero wear of the panel will be allowed during the 100,000 cycle clip tests with a 10 lb load at each clip point (using the hook clip). Any clip attachment that causes any direct wear on the panel itself will not be approved or allowed on this project.
- .4 Flashing: All trim materials to be same thickness and finish as specified for the panel system.
- .5 Continuous applied weather seal to be installed during the manufacturing process of the panel system.

2.3 ACCESSORIES

.1 Snow Retention System

- .1 Acceptable Product: Bemo Xtreme Snow retention system as supplied by the Standing Seam Metal Roof System manufacturer, BEMO-USA, Mesa, AZ.
  - .1 The snow retention system will not be allowed to penetrate the standing seam metal roofing system. All attachments to the roof will be made to the standing seam and not hinder the thermal movement of the roof panels.
  - .2 All components to be aluminum or stainless steel.
- .2 Components:
  - .1 Standing seam roof panel seam clamp: Aluminum
- .3 Performance:
  - .1 The Snow Retention System will perform to the following:
    - .1 The ultimate connection load of the seam clamp shall be min. 1,300 lbs. parallel (longitudinal) to the standing seam roof system.

.2 Fall Arrest/Restraint System

- .1 Acceptable Product: Bemo Xtreme – Uniline Safety Systems as supplied by the Standing Seam Metal Roof System manufacturer, BEMO-USA, Mesa, AZ.
  - .1 The fall arrest/restraint system will not be allowed to penetrate the standing seam metal roofing system. All attachments to the roof will be made to the standing seam and not hinder the thermal movement of the roof panels.
- .2 Components:
  - .1 H brackets universal standing seam roof anchor for end and corner attachment
    - .1 Bracket Framework: 316-grade stainless steel.
  - .2 Intermediate anchor for attachment between H Brackets
    - .1 Bracket Framework: 316-grade stainless steel.
  - .3 Unieye End Anchorage Connector.

- .1 Unieye: 316-grade stainless steel.
- .4 Unigrip Swage
  - .1 Unigrip Swage: 316-grade stainless steel.
- .5 Unigrip Tensioner
  - .1 Unigrip Tensioner: 316-grade stainless steel.
- .6 Uniline Cable.
  - .1 Cover and Core yarn: Polyester.
  - .2 Red neoprene Membrane: Proprietary polychloroprene formula.
  - .3 Compounds: Proprietary latex formula.
- .7 Unibend Fixed Corner Unit.
  - .1 Unibend Corner: 316-grade stainless steel.
- .3 Performance:
  - .1 The Fall Arrest/Restraint System will perform to the following:
    - .1 The system will withstand 4,136 LBS (18.4 kN) of force parallel (longitudinal) to the standing seam roof system.
    - .2 The system will withstand 3,227 LBS (14.8 kN) of force 90° (transverse) to the standing seam roof system.
- .3 Fasteners:
  - .1 Manufacturer's standard non-corrosive type to suit application.
  - .2 Concealed in visible locations.

### **3 EXECUTION**

#### **3.1 INSPECTION**

- .1 Inspect delivered materials upon receipt to ensure that no damage has occurred during shipment.
- .2 Inspect substrate and verify substrate for tolerance. Do not begin installation until substrates have been properly prepared.

#### **3.2 STANDING SEAM INSTALLATION**

- .1 Install in accordance with manufacturer's instructions and Thermal Systems' approved shop drawings.
- .2 Do not permit unnecessary walking on the finished roof. All personnel shall wear rubber-soled footwear when installing or walking on a finished roof. If walking on the finished roof is required, walking on the seams is recommended.
- .3 All attachments (other than the Engineered fixed points) shall allow for thermal expansion and contraction. Properly align clips to prevent damage from thermal expansion and contraction.
- .4 Metal roofing to be installed per approved drawings with fixed points determined by direction of expansion.

- .5 Complete seaming of standing seam panel by automatic seaming machine designed to obtain the proper seam dimension and height.
- 3.3 ACCEPTANCE AND CLEANUP:
- .1 Replace any materials or components that are damaged beyond repair prior to completion.
  - .2 Remove and properly dispose of all foreign material and debris from roof and gutters. Be sure no dissimilar metal or other materials are left on roof surface.
  - .3 Clean off any excess dirt or debris as per manufacturer's instructions.

**END OF SECTION**