

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED SECTIONS

- .1 Section 07 27 26: Fluid Applied Membrane Air Barrier.
- .2 Section 07 54 19: Polyvinyl-Chloride Roofing.
- .3 Section 07 62 00: Metal Flashings and Trim.
- .4 Section 07 92 00: Joint Sealing.

1.3 REFERENCES

- .1 American Association (AA).
 - .1 AA DAF-45-2003 (R2009), Designation System for Aluminum Finishes.
- .2 American Architectural Manufacturers Association (AAMA)
 - .1 AAMA 508-05: Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding.
- .3 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A 653/A653M-15e1, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A 792/A792M-10(2015), Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - .3 ASTM D 523-14, Test Method for Specular Gloss.
 - .4 ASTM D 2832-92(2016), Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
 - .5 ASTM E330/E330M-14 – Structural Performance of Exterior Windows, Curtain Walls and Doors Under Influence of Wind Loads.
 - .6 ASTM E283-04(2012) – Rate of Leakage through Exterior Windows, Curtain Walls and Doors.
- .4 Canadian Standards Association (CSA International)
 - .1 CSA S136-12, North American Specification for the Design of Cold-Formed Steel Structural Members.

1.4 PERFORMANCE REQUIREMENTS

- .1 Design Requirements:
 - .1 Design metal panel wall to provide for thermal movement of component materials without causing buckling, delamination, failure of joint seals, undue stress on fasteners or other detrimental effects.
 - .2 Design members to withstand dead load and wind loads calculated in accordance with National Building Code and Applicable Laws, to maximum allowable deflection of 1/175 of span at the perimeter and 1/60 of the span anywhere in the panel.

1.4 PERFORMANCE REQUIREMENTS (continued)

- .3 For Pressure Equalized Rain Screen Wall System: Provide for positive drainage of condensation occurring within wall construction and water entering at joints, to exterior face of wall in accordance with industry standard Pressure-Equalized Rain Screen Wall principles. Design wall system to allow for movement of air between exterior and interior side of metal cladding. Provide an effective air barrier to prevent infiltration and/or exfiltration of air through wall assembly.
- .4 For Wet-Seal (caulked) System: Provide for water-tight and structurally sound panel system that allows no uncontrolled water penetration on the inside face of the panel system.
- .5 Design metal cladding to allow for thermal movement of component materials caused by variation in ambient temperature range of 130 degrees C without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.
- .7 Design metal cladding assembly to be installed with concealed fasteners.
- .8 Maintain overall dimensions and profiles of component members of wall and roof panel systems as indicated on drawings.
- .9 Maximum deviation from vertical and horizontal alignment of erected panels: 1 to 1000.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-Construction Meeting: Convene pre-installation meeting minimum three weeks prior to beginning work of this Section with Contractor's representative, product manufacturer's representative, product installer's representative, Departmental Representative and any other attendees asked by Departmental Representative to attend.
- .2 Purpose of Pre-Construction meeting will be to:
 - .1 Verify project requirements, project phasing and construction schedule.
 - .2 Verify availability of materials and delivery schedules.
 - .3 Review methods and procedures relating to composite metal panel installation at walls and at barrel vault, and substrate conditions.
 - .4 Co-ordination with work of other building subtrades.
 - .5 Review manufacturer's installation instructions and warranty requirements.
- .3 Pre-Construction Meeting will be held on project site.

1.6 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 – Submittal Procedures.

1.6 SUBMITTALS (continued):

- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, for cladding system materials, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit shop drawings stamped and designed by professional engineer experienced in design of this work of the type described in this section and registered or licensed to practice in the Province of Nova Scotia.
 - .2 Indicate dimensions and thickness of panels, fastening and anchoring methods, detail and location of joints, sealants and gaskets, including joints necessary to accommodate thermal movement provision, wall and roof openings, head, jamb and still details, materials and finish, flashings, closures and accessories, compliance with design criteria and requirements of related work.
 - .3 Indicate exterior elevations, panel layouts for walls and barrel vault roof, show details of supporting structure and indicate drainage paths.
 - .4 Submit panel system engineering calculations to show design of replacement cladding assembly takes into account existing structure and back-up wall.
- .4 Samples:
 - .1 Panel system Assembly:
 - .1 Submit two samples of each type of assembly; 305 mm x 305 mm minimum, representative of materials, finishes and colours.
- .5 Quality assurance submittals: submit following in accordance with Section 01 45 00 – Testing and Quality Control.
 - .1 Certificates: submit certificates signed by manufacturer certifying that composite wall panels comply with specified performance characteristics and physical properties.
 - .2 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

1.7 QUALITY CONTROL

- .1 Manufacturer: company specializing in producing composite wall panels with 10 years experience, and with sufficient capacity to produce and deliver required units without causing delay in work.
- .2 Installer: person specializing in composite wall panel installations with 10 years experience, trained and authorized by manufacturer.
- .3 Single source responsibility:
 - .1 Provide system and components for this Section under responsibility of single metal panel manufacturer.
 - .2 Perform metal panel and related flashing and sheet metal work by or under supervision of single installer.

1.6 QUALITY CONTROL (continued)

- .4 Mock-ups: construct mock-ups in accordance with Section 01 45 00 – Testing and Quality Control and to requirements supplemented as follows:
 - .1 Provide mock-up for evaluation of surface finishes and workmanship.
 - .2 Provide initial production units for job-site assembly with other materials for review.
 - .3 Co-ordinate type and location of mock-ups with project requirements.
 - .4 Accepted units will be used as standard for acceptance of production units.
 - .5 Remove and replace units which are not accepted.
 - .6 Do not proceed with remaining work until workmanship, colour, and finish are reviewed and approved by Departmental Representative.
 - .7 Refinish mock-up area as required to produce acceptable work.
 - .8 When accepted, mock-up will demonstrate minimum standard of quality required for this work.
 - .1 Approved mock-up may remain as part of finished work.
 - .2 Remove mock-up and dispose of materials when no longer required and when directed by Departmental Representative.
 - .9 Provide mock-ups for the following conditions:
 - .1 Wall panels at window sill condition: mock-up to include at a minimum 2 wall panels and to demonstrate installation of new flashing, trim and prefinished window sill at existing windows.
 - .2 Wall panels at head of louvre: mock-up to include at a minimum 2 wall panels and to demonstrate installation of new flashings and trim at existing louvre.
 - .3 Wall panels at exterior corner of building: mock-up to include at a minimum 4 panels – 2 panels on either side of exterior corner in two vertical rows one above the other.
 - .4 Barrel vault roof panels: mock-up to include at a minimum 4 panels at the barrel vault – roof junction. Mock-up to demonstrate installation of curved barrel vault panels, application of sealant at panel joints, and roof membrane flashings at roof panels.

1.8 DELIVERY STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Deliver, store and protect material in accordance with panel manufacturer's recommendations.
- .3 Do not expose panels with strippable film to direct sunlight or extreme heat.

1.9 WARRANTY

- .1 Manufacturer's standard twenty (20) year warranty for metal composite wall and roof panels.
- .2 Manufacturer's standard ten (10) year coastal warranty for fluorocarbon polymer coating finish on metal composite wall and roof panels.

PART 2 - PRODUCTS

2.1 SYSTEM TYPES

- .1 Pressure equalized rain screen system panel system: provide this System at walls and soffit and where shown on drawings.
- .2 Wet seal system panel system: provide this System at barrel vault roof. Sealant type for this System will be as specified in Section 07 92 00 – Joint Sealing.

2.2 MATERIALS

- .1 Aluminum sheet: Coil-coated sheet, ASTM B 209, 1100 alloy, with temper as required to suit forming operations and structural performance required.
 - .1 Surface: smooth, flat.
 - .2 Exposed finish: anodized, or painted as noted.
 - .3 Concealed finish: manufacturer's standard white acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum thickness of 0.013 mm.
- .2 Miscellaneous metal framing: to ASTM A 653/A 653M, Z120 hot-dip galvanized.
 - .1 Subgirts: C or Z-shaped sections 1.63 mm nominal thickness.
 - .2 Clips: Z-shaped, 2.01 mm nominal thickness.
 - .3 Base or sill channels: 2.01 mm nominal thickness.
- .3 Composite metal building panels: factory formed and assembled, consisting of 0.80 mm thick anodized aluminum sheet facings bonded to non-combustible core, including attachment system components and accessories required for weather tight system.
 - .1 Fire-retardant core : non-combustible :
 - .1 Flame-spread index: 25 or less.
 - .2 Smoke-developed index: 450 or less.
 - .2 Panel thickness: 4 mm thick.
 - .3 Exterior finish: anodized finish, or painted as noted.
 - .4 Acceptable material:
 - .1 Alucobond by Alcan Composites USA Inc.
 - .2 Reynobond FR by Alcoa Inc.
 - .3 Alpolic by VicWest
 - .4 or approved equal.

2.2 MATERIALS (continued)

- .4 Attachment system components: formed from extruded aluminum, including manufacturer's standard perimeter extrusions with integral panel stiffeners, clips and anchor channels.
- .5 Fluid Applied Membrane Air Barrier (at wall and soffit panels): as specified in Section 07 27 26 – Fluid Applied Membrane Air Barrier.
- .6 Water barrier roof membrane (at barrel vault panels): high temperature grade, water barrier roof membrane as follows:
 - .1 High density, cross laminated polyethylene film coated on one side with a layer of butyl rubber or high temperature asphalt adhesive. Provide primer where recommended by water barrier manufacturer.
 - .2 Cold applied, self-adhering membrane.
 - .3 Minimum Thickness: 30 mil.
 - .4 Tensile Strength: ASTM D 412 (Die C Modified); 250 psi.
 - .5 Membrane Elongation: ASTM D412 (Die C Modified); 250%.
 - .6 Permeance (Max): ASTM E96; 0.05 Perms.
 - .7 Flame spread: Class A.
 - .8 Acceptable Products:
 - .1 Ultra, W.R. Grace Company.
 - .2 Blueskin PE 200 HT, Henry.
 - .3 Sharkskin Ultra SA, Kirsch Building Products.
 - .4 CCW MiraDRI WIP 300 High Temperature, Carlisle Coatings and Waterproofing.
 - .5 Lastobond Shield HT by Soprema.
- .7 Accessories: provide components required for a complete composite metal panel assembly including trim, copings, clips, gaskets, flashings, sealants, fillers, closure strips and bug/insect screens.
 - .1 Provide stainless steel concealed fasteners.
 - .2 Match material and colour finish of all exposed trim, copings, fillers and closure strips to that of composite panel colours. Refer to drawings for colours and locations where colour changes occur.
- .8 Prefinished metal flashings: as specified in Section 07 62 00 – Metal Flashings and Trim.
- .9 Sealants and caulking materials: as specified in Section 07 92 00 – Joint Sealing.
- .10 Isolation coating: alkali resistant bituminous paint.

2.3 FABRICATION

- .1 Factory fabricate and finish composite wall panels and accessories to the greatest extent possible as necessary to fulfill indicated performance requirements.

2.3 **FABRICATION** (continued)

- .2 Tolerances:
 - .1 Panel bow: maximum 0.8% of panel dimension in width and length.
 - .2 Panel dimensions: where final dimensions cannot be established by field measurement before completion of panel manufacturing, make allowance for field adjustments as recommended by manufacturer.
 - .3 Panel lines, breaks and angles: sharp, true and surface free from warp or buckle.
- .3 Fabricate composite wall and roof panels to eliminate condensation on interior side of panel and with joints between panels / building components to form weathertight seals.
- .4 Form panel lines, breaks and angles to be sharp and true, with surfaces free from warp and buckle.
- .5 Fabricate panels with sharply cut edges, with no displacement of face sheets or protrusion of core material.
- .6 Fabricate corner panels with panel stiffeners, as required to comply with deflection limits, attached to back of panels.
- .7 No field cutting or bending of panels.
- .8 Provide for thermal expansion and contraction in design of wall and roof panel assemblies.
- .9 Curved wall and barrel vault roof panels to be factory-formed to accurate radii in plant of manufacture to ensure quality control of acceptable tolerances.
- .10 Fabricate flashing and trim in accordance with recommendations in SMACNA's "Architectural Sheet Metal Manual".

2.4 **ANODIZED FINISHES**

- .1 Finish exposed surfaces of aluminum components in accordance with AA Designations for Aluminum Finishes.
 - .1 Colour: Clear anodic finish, designation AA-M12, C22A41, Class 2, Minimum coating thickness of 0.7 mils.

2.5 **PAINTED FINISHES**

- .1 Prefinished aluminum sheet with factory applied polyvinylidene fluoride (PVDF) finish.
- .2 Class: F1S.
- .3 Colour: Solid custom colours to match existing:
 - .1 Colour "A" to match existing "Light Green" panels.
 - .2 Colour "B" to match existing "Dark Green" panels.
 - .3 Colour "C" to match existing "Dark Blue" panels.

2.5 PAINTED FINISHES (continued)

- .4 Specular gloss: 30 units +/- in accordance with ASTM D523.
- .5 Coating thickness: not less than 22 micrometres.
- .6 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D822 as follows:
 - .1 Outdoor exposure period 5000 hours.
 - .2 Humidity resistance exposure period 5000 hours.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 EXAMINATION

- .1 Before installation examine alignment of substrate and notify Departmental Representative in writing if substrate does not comply with requirements of panel installer.
- .2 Do not begin installation of composite panels until air barrier, transition membrane and flashings that will be concealed by panels are installed.

3.3 WATER BARRIER ROOF MEMBRANE (AT BARREL VAULT)

- .1 Install water barrier over the entire area of barrel vault deck to receive new curved roof panels and flashing, as shown on drawings. Ensure joints lapped in accordance with water barrier manufacturer's recommended installation instructions.
 - .1 Install water barrier membrane on clean, dry roof substrate.
 - .2 Prime deck sheathing as recommended by water barrier membrane manufacturer.
- .3 Install membrane in strict accordance with manufacturer's printed application procedures, precautions, and limitations.
- .4 Handle underlayment carefully to prevent tears and punctures and repair with adhesive tape any damaged areas.
- .5 Install underlayment parallel to eaves with the topside up, maintaining consistent tautness. Start application at low points and lap membrane shingle fashion to prevent water penetration.

3.3 WATER BARRIER ROOF MEMBRANE (AT BARREL VAULT) (continued)

- .6 Membrane Underlayment: Apply horizontally, head (horizontal) lapping preceding layer not less than 100 mm. End lap membrane not less than 150 mm.
 - .1 Laps shall run with the flow of the water in a shingling manner.
 - .2 Maximize adhesion to substrate by brooming or rolling membrane in place after placement.
- .7 Fasten top edge of each strip with 2.77 mm shank diameter, corrosion-resistant stainless steel nails with a minimum 9.5 mm diameter head. Use sufficient nails to hold underlayment in place until roof panels are installed.

3.4 FLUID APPLIED MEMBRANE AIR BARRIER

- .1 At wall and soffit assemblies, apply fluid applied membrane air barrier over existing substrate in accordance with manufacturer's installation instructions and as described in Section 07 27 26 – Fluid Applied Membrane Air Barrier.

3.5 PANEL INSTALLATION

- .1 Install composite panels in accordance with manufacturer's written instructions and shop drawings.
 - .1 Allow for thermal movement (expansion and contraction).
- .2 Maintain following installation tolerances:
 - .1 Maximum variation from plane or location shown on shop drawings: 10 mm/10 m of length and up to 20 mm/100 m.
 - .2 Maximum deviation for vertical member: 3 mm in an 8.5 m run.
 - .3 Maximum deviation for a horizontal member: 3 mm in an 8.5 m run.
 - .4 Maximum offset from true alignment between two adjacent members abutting end to end, in line: 0.75 mm.
- .3 Install attachment system required to support composite metal building panels, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, furring and other miscellaneous wall panel support members and anchorage in accordance with ASTM C 754 and composite metal building panel manufacturer's written instructions.
- .4 Install accessories with positive anchorage to building, weather-tight mounting and provisions for thermal expansion.
 - .1 Install components required for a complete composite panel assembly including trim, copings, corners, flashings, sealants, gaskets and closures.
 - .2 Sealant application as described in Section 07 92 00 – Joint Sealing.

3.5 PANEL INSTALLATION (continued)

- .5 Attach panel clips to support ends of composite panel joint at locations, spacings and with fasteners recommended by manufacturer. Attach routed and returned flanges of composite panels to panel clips with concealed fasteners. Provide alignment bars, brackets, clips, inserts, shims as required to securely and permanently fasten composite panels to building structure.
- .6 Install work true to line and level with watertight and weather resistant laps, joints, and seams. Seal horizontal and vertical joints between panels and building elements to ensure continuity of "pressure equalization" of rain screen principle and drainage to the exterior.
- .7 Install formed aluminum sills and flashings where indicated on drawings and not covered in other sections.
- .8 Remove strippable coating from panels as they are erected.

3.6 CLEANING

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Upon completion of composite metal building panel installation, clean exposed all finished surfaces to remove construction and accumulated environmental dirt as recommended by panel manufacturer.
 - .1 Wash down exposed surfaces using solution of warm water, and appropriate cleaner as recommended by panel manufacturer. Use clean, soft wiping cloths to avoid scratching finishes. Follow panel manufacturer's written cleaning procedures.
- .3 Clean existing windows at the same time as panel cleaning.
 - .1 Wash window frames and glazing with solution of mild domestic detergent in water. Use squeegee method of cleaning glazing. Use of high-pressure washing is not permitted. Wipe window sills dry.
- .4 Remove temporary protective coverings and strippable films and clear weep holes and drainage channels of obstructions, dirt and sealant.
- .5 Remove excess sealant with solvent recommended by panel manufacturer.
- .6 Upon completion of installation, remove surplus materials, rubbish, tools and equipment.
- .7 Leave work areas clean, free from grease, finger marks and stains.

END OF SECTION