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**Part 1            General**

**1.1                REFERENCES**

- .1     ASTM E96/E96M-10 - Standard Test Methods for Water Vapor Transmission of Materials.
- .2     CAN/ULC-S102-10 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .3     CAN/ULC-S701-11 - Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .4     CAN/ULC-S702-09 - Standard for Mineral Fibre Thermal Insulation for Buildings.
- .5     CAN/ULC-S704-11 - Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

**1.2                SYSTEM DESCRIPTION**

- .1     Materials of This Section: Provide thermal protection to air seal materials at building enclosure elements in conjunction with air barrier materials in Section 07 27 00.02.

**1.3                ADMINISTRATIVE REQUIREMENTS**

- .1     Coordination:
  - .1        Coordinate with other work having a direct bearing on work of this section.
  - .2        Coordinate the work with Section 07 27 00.02 for installation of air seal materials.

**1.4                SUBMITTALS FOR REVIEW**

- .1     Section 01 33 00: Submission procedures.
- .2     Product Data: Provide data on product characteristics, performance criteria, limitations.

**1.5                SUBMITTALS FOR INFORMATION**

- .1     Section 01 33 00: Submission procedures.
- .2     Installation Data: Indicate special environmental conditions required for installation, installation techniques.
- .3     Manufacturer's Certificate: Certify Products meet or exceed specified requirements..

**1.6                ENVIRONMENTAL REQUIREMENTS**

- .1     Section 01 35 43: Environmental conditions affecting products on site.
- .2     Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

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**Part 2            Products**

**2.1                RIGID INSULATION MATERIALS**

- .1    Extruded Polystyrene Insulation (XPS): to CAN/ULC-S701, Type 4; cellular type, conforming to the following:
  - .1        Compressive Strength: high density 275 kPa (40 psi).
  - .2        Thermal Resistance: as indicated on drawings.
  - .3        Board Thickness: as indicated on drawings.
  - .4        Board Edges: Square.
  - .5        Flame/Smoke Properties: to CAN/ULC-S102 .

**2.2                SEMI-RIGID INSULATION MATERIALS**

- .1    Mineral Fibre Insulation: ASTM C612 - 14 Mineral fibre (rock, slag, and glass), semi-rigid board, with the following characteristics:
  - .1        Thermal Resistance: as noted on drawings.
  - .2        Board Thickness: as noted on drawings.
  - .3        Board Edges: Square.
  - .4        Flame/Smoke Properties: to CAN/ULC-S102.

**2.3                ADHESIVE MATERIALS**

- .1    Adhesive: Type recommended by insulation manufacturer for application. Compatible with adjacent water and air barrier products.

**Part 3            Execution**

**3.1                EXAMINATION**

- .1    Section 01 10 10: Verify existing conditions before starting work.
- .2    Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive.
- .3    Verify substrate surface is flat, free of irregularities.

**3.2                INSTALLATION - FOUNDATION PERIMETER**

- .1    Apply manufacture recommended adhesive in three (3) continuous beads per board length.
- .2    Install boards on foundation wall perimeter, vertically.
  - .1        Place boards in a method to maximize contact bedding.
  - .2        Stagger side joints.
  - .3        Butt edges and ends tight to adjacent board and to protrusions.
- .3    Extend boards over expansion joints, unbonded to foundation wall on one (1) side of joint.
- .4    Cut and fit insulation tight to protrusions or interruptions to the insulation plane.

- .5 Immediately following application of board insulation, place protective boards over exposed insulation surfaces. Apply manufacturer recommended adhesive in five (5) continuous beads per board length.

- .1 Install boards vertically from base of foundation to top of insulation.
- .2 Butt board joints tight; stagger from insulation joints.

### **3.3 INSTALLATION - EXTERIOR WALLS**

- .1 Install insulation boards over air barrier membrane starting at base of wall.
- .2 Place boards in a method to maximize contact bedding. Stagger end joints. Butt edges and ends tight to adjacent board and to protrusions.
- .3 Cut and fit insulation tight to protrusions or interruptions to the insulation plane.

### **3.4 INSTALLATION - CAVITY WALLS**

- .1 Secure impale fasteners to substrate at a frequency of six (6) per insulation board.
- .2 Install boards horizontally between wall reinforcement.
- .3 Cut and fit insulation tight to protrusions or interruptions to the insulation plane.

### **3.5 PROTECTION OF FINISHED WORK**

- .1 Do not permit work to be damaged prior to covering insulation.

### **3.6 SCHEDULES**

- .1 Exterior Wall Insulation: Semi Rigid insulation.

**END OF SECTION**

**Part 1            General**

**1.1            REFERENCES**

- .1      CAN/ULC-S102-10 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .2      CAN/ULC-S705.1-01 - Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Material - Specification (including Amendment 3).
- .3      CAN/ULC-S705.2-05 - Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Application.
- .4      CUFCA (The Canadian Urethane Foam Contractors Association).

**1.2            ADMINISTRATIVE REQUIREMENTS**

- .1      Section 01 14 10: Project management and coordination procedures.
- .2      Coordination:
  - .1          Coordinate with other work having a direct bearing on work of this section.
  - .2          Coordinate work to ensure timely placement of insulation within construction spaces.
- .3      Pre-installation Meetings: Convene one (1) week before starting work of this section.

**1.3            SUBMITTALS FOR REVIEW**

- .1      Section 01 33 00: Submission procedures.
- .2      Product Data: Provide product description, insulation properties, preparation requirements and details.

**1.4            QUALITY ASSURANCE**

- .1      Products of This Section: Manufactured to ISO 9000 certification requirements.
- .2      Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section documented experience.
- .3      Installer Qualifications: Individuals specializing in performing the work of this section with documented experience, and licensed and certified by the SPF Quality Assurance Program used by CUFCA.

**1.5            REGULATORY REQUIREMENTS**

- .1      Conform to applicable code for flame and smoke requirements.

**1.6            ENVIRONMENTAL REQUIREMENTS**

- .1      Section 01 35 43: Environmental conditions affecting products on site.
- .2      Do not install insulation when ambient temperature is lower than 21 degrees C.

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**Part 2 Products**

**2.1 MATERIALS**

- .1 Insulation: CAN/ULC-S705.1, spray-applied rigid cellular polyurethane insulation, medium density.

**2.2 ACCESSORIES**

- .1 Primer: As required by insulation manufacturer.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Section 01 10 10 General Requirements: Verify existing conditions before starting work.
- .2 Verify work within construction spaces or crevices is complete prior to insulation application.

**3.2 PREPARATION**

- .1 Mask and protect adjacent surfaces from over spray or dusting.
- .2 Apply primer in accordance with manufacturer's written instructions.

**3.3 INSTALLATION**

- .1 Apply insulation to CAN/ULC-S705.2 and manufacturer's written instructions.
- .2 Apply insulation by spray method, to a uniform monolithic density without voids.
- .3 Apply to achieve a thermal resistance R-noted on drawings.
- .4 Coordinate installation of protective covering specified in Section 09 21 16, to achieve fire rating required.
- .5 Patch damaged areas.

**3.4 FIELD QUALITY CONTROL**

- .1 Section 01 45 00: Field inspection.
- .2 Inspection will include verification of insulation thickness and density.

**3.5 PROTECTION OF FINISHED WORK**

- .1 Do not permit subsequent construction work to disturb applied insulation.

**3.6 SCHEDULES**

- .1 Interior wall/roof junction.
- .2 Wall construction abutting differing above ceiling materials.
- .3 Exterior wall insulation in stud cavity.

**END OF SECTION**

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**Part 1            General**

**1.1                REFERENCES**

- .1     ASTM D412-06ae2 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension.
- .2     ASTM D624-00(2007) - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
- .3     ASTM D882-10 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
- .4     ASTM D1004-09 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
- .5     ASTM D2240-05(2010) - Standard Test Method for Rubber Property—Durometer Hardness.
- .6     ASTM D4551-96(2008)e1 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Flexible Concealed Water-Containment Membrane.
- .7     ASTM E96/E96M-10 - Standard Test Methods for Water Vapor Transmission of Materials.
- .8     ASTM E1745-09 - Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
- .9     NRCA (National Roofing Contractors Association) - Waterproofing Manual.

**1.2                PERFORMANCE REQUIREMENTS**

- .1     Membrane: Capable of preventing moisture migration to interior.

**1.3                SUBMITTALS FOR REVIEW**

- .1     Section 01 33 00: Submission procedures.
- .2     Product Data: Provide data for surface conditioner flexible flashings, joint seals, and crack sealants, with temperature range for application of membrane.
- .3     Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.

**1.4                SUBMITTALS FOR INFORMATION**

- .1     Section 01 33 00: Submission procedures.
- .2     Certificates: Certify that Products meet or exceed specified requirements.
- .3     Installation Data: Manufacturer's special installation requirement including special procedures and perimeter conditions requiring special attention.

**1.5                CLOSEOUT SUBMITTALS**

- .1     Section 01 78 00: Submission procedures.
- .2     Warranty Documentation: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

## **1.6 QUALITY ASSURANCE**

- .1 Products of This Section: Manufactured to ISO 9000 certification requirements.
- .2 Perform Work in accordance with: Manufacturer's instructions.

## **1.7 MOCK-UP**

- .1 Section 01 45 00: Requirements for mock-up.
- .2 Provide mock-up 10 m2 mock-up of membrane, with sealed joints, and connections to vent stack piping, to represent finished work including internal and external corners, seam jointing, attachment method, counter flashing cover.
- .3 Locate where directed by Departmental Representative.
- .4 Approved mock-up may remain as part of the Work.

## **1.8 ENVIRONMENTAL REQUIREMENTS**

- .1 Section 01 35 43: Environmental conditions affecting products on site.
- .2 Maintain ambient temperatures above 5 degrees C for twenty-four (24) hours before and during application and until liquid or mastic accessories have cured.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Gas and moisture Barrier Membrane: multi-layer low density polyethylene (LDPE), one (1) layer of reinforcing mesh.
  - .1 Membrane properties conforming to ASTM E 1745 Class A.
  - .2 Membrane lap and seal at joint and penetrations:
    - .1 Typical condition: 100 mm self adhesive polyethylene tape as recommended by membrane manufacturer.
    - .2 Additional conditions where required: Non-hardening, permanently flexible, high performance sealant as recommended by membrane manufacturer.
  - .3 Surface Cleaner: As recommended by membrane manufacturer, compatible with sheet membrane.
- .2 Adhesives, Thinner and Cleaner: As recommended by membrane manufacturer, compatible with sheet membrane.
- .3 Sealant: same type as used for joint seal tape.
- .4 Counter Flashings: bituminous type, where required, as specified in Section 07 62 00.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Section 01 10 10 General Requirements: Verify existing conditions before starting work.

- .2 Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of membrane and related components.

### **3.2 PREPARATION**

- .1 Protect adjacent surfaces not designated to receive protection.
- .2 Clean and prepare surfaces to receive membrane in accordance with manufacturer's written instructions.
- .3 Do not apply membrane or related components to surfaces unacceptable to manufacturer.
- .4 Seal cracks and joints with sealant materials using depth to width ratio as specified in Section 07 92 00.

### **3.3 INSTALLATION - MEMBRANE**

- .1 Install membrane and accessories to manufacturer's written instructions.
- .2 Roll out membrane. Minimize wrinkles and bubbles.
- .3 Overlap edges, ends, and joints minimum 150 mm and seal by contact sealant tape.
- .4 Seal joints and protrusions, permanently air tight and waterproof.
- .5 Reinforce membrane with multiple thicknesses of membrane material over static or moving joints.
- .6 Weather lap joints on sloped substrate in direction of drainage. Seal joints and seams.
- .7 Install flexible flashings and accessories:
  - .1 Seal watertight to membrane.
  - .2 Seal to adjoining surfaces.
- .8 Extend membrane over intersecting surfaces at membrane perimeter minimum 150 mm.
- .9 Seal items protruding or penetrating through membrane.
- .10 Install counter flashing membrane material.

### **3.4 PROTECTION OF FINISHED WORK**

- .1 Section 01 77 00: Protecting installed work.
- .2 Do not permit traffic over unprotected or uncovered membrane.
- .3 Protect membrane from damage by adhering protection boards. Scribe and cut boards around projections and interruptions.

**END OF SECTION**



**Part 1            General**

**1.1            REFERENCE STANDARDS**

- .1    American Society for Testing and Materials International (ASTM)
  - .1    ASTM D 4541-02, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
  - .2    ASTM E 330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls, by Uniform Static Air Pressure Difference.
  - .3    ASTM E 783-02, Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.
  - .4    ASTM E 1186-03, Standard Practices for Air Leakage Site Detection in Building Envelope and Air Retarder Systems.

**1.2            PERFORMANCE REQUIREMENTS**

- .1    Select and install wall and roof components and assemblies to resist air leakage caused by dynamic air pressure across exterior wall , soffits and roof assemblies, including windows, glass, doors, roof hatches and skylights and other interruptions to integrity of wall and roof systems; to maximum air leakage rate of 0.001 l/s.m2 when subjected to hourly wind design loads in accordance with National Building Code of Canada (NBC), using 1 in 10 year probability, as measured in accordance with ASTM E 783 .
- .2    If ongoing testing is required throughout air/vapour barrier system installation, perform qualitative testing methods in accordance with ASTM E 1186.
- .3    Provide continuity of air/vapour barrier materials and assemblies in conjunction with materials described in Section 03 30 00 - Cast-in-Place Concrete, 07 21 13 - Board Insulation, 07 92 00 - Joint Sealants.

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

- .1    Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2    Product Data:
  - .1    Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3    Quality Assurance Submittals: submit following in accordance with Section 01 45 00 - Quality Control.
  - .1    Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

**1.4            MOCK-UPS**

- .1    Construct mock-up in accordance with Section 01 45 00 - Quality Control.

- .2 Construct typical exterior wall panel, 3m long by 3m wide, incorporating window openings with frame and sill installed, insulation, building corner condition, junction with roof system; illustrating materials interface and seals.
- .3 Locate where directed by Departmental Representative.
- .4 Allow 24hours for inspection of mock-up by Departmental Representative before proceeding with air/vapour barrier work.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .3 Avoid spillage, immediately notify Departmental Representative if spillage occurs and start cleanup procedures.
- .4 Clean spills and leave area as it was prior to spill.

#### **1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 22 - Construction Demolition and Waste Management.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.

#### **1.7 SEQUENCING**

- .1 Sequence work to permit installation of materials in conjunction with related materials and seals.

#### **1.8 WARRANTY**

- .1 Provide three year warranty under provisions of Section 01 78 00 - Closeout Submittals and in accordance with General Conditions (GC) CCDC 2 GC 12.3.
- .2 Warranty: include coverage of installed sealant and sheet materials which:
  - .1 Fail to achieve airtight and watertight seal.
  - .2 Exhibit loss of adhesion or cohesion.
  - .3 Do not cure.

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**Part 2            Products**

**2.1                MATERIALS**

- .1        Materials: as required to achieve specified performance criteria; functionally compatible with adjacent materials and components.

**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                GENERAL**

- .1        Perform Work in accordance with Sealant and Waterproofers Institute - Sealant and Caulking Guide Specification requirements for materials and installation.
- .2        Perform Work in accordance with National Air Barrier Association - Professional Contractor Quality Assurance Program and requirements for materials and installation.
- .3        Perform Work in accordance with Canadian Urethane Foam Contractor's Association - Professional Contractor Quality Assurance Program and requirements for materials and installation.

**3.3                PREPARATION**

- .1        Prepare substrate surfaces in accordance with air/vapour barrier material manufacturer's instructions.

**3.4                INSTALLATION**

- .1        Install air/vapour barrier materials in accordance with manufacturer's instructions.
- .2        Install sealant materials in accordance with manufacturer's instructions.
- .3        Apply sealants within recommended application temperature ranges.

**3.5                CLEANING**

- .1        Proceed in accordance with Section 01 74 11 - Cleaning.
- .2        On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**3.6                PROTECTION OF FINISHED WORK**

- .1        Protect finished work in accordance with Section 01 61 00 - Common Product Requirements.

- .2 Do not permit adjacent work to damage work of this section.

**END OF SECTION**

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**Part 1            General**

**1.1                REFERENCES**

- .1     ASME B18.2.2 - Square and Hex Nuts (Inch Series).
- .2     ASTM A653/A653M-09a - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .3     ASTM B209-06, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .4     ASTM B221-06, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- .5     ASTM C297, Standard Test Method for Tensile Strength on Flat Sandwich Constructions in Flatwise Plane.
- .6     ASTM E72-05 - Method for Conducting Strength Tests of Panels for Building Construction.
- .7     ASTM E84-10 - Test Method for Surface Burning Characteristics of Building Materials.
- .8     ASTM E283 - Standard test method for air infiltration.
- .9     ASTM E331 - Standard test method for water infiltration.
- .10    CAN/CGSB-19.13-M87 - Sealing Compound, One-component, Elastomeric, Chemical Curing.
- .11    CGSB-19-GP-14M (June 84) - Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
- .12    CAN/ULC-S102-07 - Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .13    CAN/ULC-S126-06 - Method of Test for Fire Spread Under Roof-Deck Assemblies.
- .14    CAN/ULC-S710.1 - Thermal Insulation - Bead – Applied One Component Polyurethane Air Sealant Foam, Part 1: Material Specification.

**1.2                SYSTEM DESCRIPTION**

- .1     Panel: Metal panel system, including its support and attachments, shall be designed to resist positive and negative wind loads as calculated in the latest edition of the National Building Code of Canada and its supplement, using a 1/30 return period. Adequate stiffening shall be provided to prevent wind induced vibrations and fatigue problems.
- .2     Deflection Movement: Maximum deflection not to exceed L/180. The panel shall exhibit no permanent deformation when subject to these loads. Allowance shall be made in the panel design for movement within the system caused by deflection in the building structure.
- .3     Thermal Movement: Allowance shall be made for expansion and contraction of all parts of the metal panel assembly caused by surface temperatures varying from minus 40 degrees Celsius to plus 40 degrees Celsius. Such variation in temperature shall not cause buckling, stress on enclosed or adjoining materials or fasteners, or in any way impair the performance or appearance of the system.

- .4 Sub system design to incorporate a grid lock to eliminate rocking of the Z-bars on drywall or other support sub-wall systems.
- .5 Weep Drainage: Provide for positive drainage of condensation and water entering at joints to exterior face of wall in accordance with NRC "Rain Screen Principles". Panels to have drainage holes in bottom of each panel measuring 10 mm (3/8") diameter on 16" centres, to AAMA 508.
- .6 Water Tightness: Exterior fascia and wall panels shall be designed to the rain screen principles as published by the National Research Council and prevent water infiltration into the interior systems. No panel joint caulking will be permitted.
- .7 System must have been successfully tested by an accredited testing facility to the ASTM E283 standard test method for air infiltration.
- .8 System must have been successfully tested by an accredited testing facility to the ASTM E331 standard test method for water infiltration.
- .9 No panel joint caulking will be permitted.
- .10 Fastening: Panel assembly shall be fastened to the building structure in a manner, which transmits all loads to the main structure without exceeding the capacity of any fastener.
- .11 Fire Resistance: Aluminum composite panel system shall be tested by an accredited testing facility, to The Standard Method of Fire Test of Exterior Wall Assemblies, CAN4-S134-M92 and be approved for use in non-combustible construction in accordance with the latest edition of the National Building Code of Canada, Article 3.1.5.5, Sentences (1) through (8).

### **1.3 ADMINISTRATIVE REQUIREMENTS**

- .1 Section 01 14 10: Project management and coordination procedures.
- .2 Coordination:
  - .1 Coordinate with other work having a direct bearing on work of this section.
- .3 Pre-installation Meetings: Convene one (1) week before starting work of this section.

### **1.4 SUBMITTALS FOR REVIEW**

- .1 Section 01 33 00: Submission procedures.
- .2 Product Data: Provide electronic copy of product data indicating material physical properties.
- .3 Shop Drawings:
  - .1 Indicate dimensions, panel profile and layout, spans, joints, construction details, methods of anchorage, method and sequence of installation, flashing and accessories.
  - .2 Indicate details and special conditions at half scale.
  - .3 Indicate loads and calculations of maximum deflection at supports.
  - .4 Prepare Shop Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Province where the Project is located.

- .4 Samples: Submit one (1) panel samples, 300x300 mm (12x12 inch) in size showing jointing system, flashings, sheet facings with specified finish illustrating finish colour, sheen, and texture, flexible flashings, anchors and fasteners.

## **1.5 SUBMITTALS FOR INFORMATION**

- .1 Section 01 33 00: Submission procedures.
- .2 Design and Performance Data: Indicate panel profile characteristics and dimensions, and structural properties of assembled panels.
- .3 Laboratory Testing: Upon request, submit laboratory tests and methods used.
- .4 Installation Data: Manufacturer's special installation requirements, including special handling criteria, installation sequence, and cleaning procedures.

## **1.6 QUALITY ASSURANCE**

- .1 Manufacturer: Company specializing in manufacturing the Products specified in this Section with a minimum of five (5) years experience.

## **1.7 MOCK-UP**

- .1 Section 01 45 00: Requirements for mock-up.
- .2 Construct 5 m2 (50 ft2) mock-up, including panel system, attachments to building frame, associated air seal materials, sealants and seals, related insulation, and accessories.
- .3 Demonstrate component assembly including panel and glazing materials, attachments, anchors, and perimeter sealant.
- .4 Locate where directed by Departmental Representative.
- .5 Approved mock-up may remain as part of the Work.

## **1.8 DELIVERY, STORAGE, AND PROTECTION**

- .1 Section 01 61 00: Transport, handle, store, and protect products.
- .2 Protect prefinished materials during transportation, site storage and assembly to CSSBI standards.
- .3 Deliver panels and accessories in original wrappings, bearing manufacturer and product names.
- .4 Inspect panels upon delivery at site and immediately inform manufacturer of defects.
- .5 Protect panels from accelerated weathering if stored beyond one (1) month by removing or venting sheet plastic shipping wrap; cover panels with woven fabric tarpaulins.
- .6 Store materials in well ventilated areas, off ground with weather protection. Slope metal sheets to ensure drainage.
- .7 Store materials away from contaminating sources, fertilizers, chemical products or corrosive substances.

## **1.9 WARRANTY**

- .1 Section 01 78 00: Warranties.

- .2 Provide a five (5) year manufacturer's warranty for failure to meet specifications. Provide coverage for failure of finish and panel integrity.
- .3 Performance specification from steel suppliers will cover degradation of panel finish including colour fading caused by exposure to weather, defect in design.

## **Part 2 Products**

### **2.1 MANUFACTURERS**

- .1 Kingspan; Kingzip standing seam insulated metal panel system. PVC coating finish
- .2 Other acceptable manufacturers offering functionally and aesthetically equivalent products.
  - .1 Vicwest; Product: All Weather Insulated Panels Standing Seam SR2. PVC coating finish
- .3 Substitutions: Refer to Section 01 10 10.

### **2.2 PANEL MATERIALS**

- .1 Panel Type:
  - .1 Form modular panels from minimum 4mm prefinished composite galvalumesheet. The composite sheet will consist of two 0.51mm minimum aluminum skins bonded in a continuous process to a low-density polyethylene core.
- .2 Panel Finish:
  - .1 Typical finish, unless noted otherwise:
  - .2 Painted finish with polyvinyl chloride (PVC) and Plasticol resins
- .3 ACCESSORIES
  - .1 Panel Supports and Anchorages: Steel sheet, hot-dip galvanized to ASTM A653/A653M Grade A Zinc coating to Z275 designation, 1.2mm (18 gauge), to dimensions and profiles indicated.
- .4 Fasteners:
  - .1 Fasteners to be stainless steel 316 and concealed at all locations. Sufficient quantities of fasteners of the proper size for fastening of the work shall be provided.
- .5 Flashings:
  - .1 Wherever practical at corners, jambs and abutments, no flashings will be permitted. Panel design to include for these connections. Where flashings are unavoidable, use prefinished material to match composite sheet.
  - .2 Exposed surfaces of aluminum extrusions to match colour and coating of panels.

### **2.3 FABRICATION**

- .1 Shop fabricate panels to sizes and configurations indicated on the drawings, following panel material manufacturer's written instructions and recommendations.
- .2 Fabrication of component profiles on site is not permitted.



- .3 Form sections true to shape, accurate in size, square, and free from distortion or defects.
- .4 Fabricate with sharply cut edges, with no displacement of aluminum sheet or protrusion of core.
- .5 Panel Joints: fabricated for offset joint connections and secured using concealed fasteners.
- .6 Provide drainage holes at base of panels.
- .7 Where final dimensions cannot be established by field measurements, provide allowance for field adjustment as recommended by the fabricator.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Section 01 10 10 General Requirements: Verify existing conditions before starting work.
- .2 Verify that framing members and structural alignment are within recommended tolerances and ready to receive panel system. Advise Departmental Representative if conditions are not acceptable; do not install panels.

#### **3.2 INSTALLATION**

- .1 Install composite metal panel system on walls to manufacturer's written instructions.
- .2 Protect panel surfaces in contact with dissimilar metals cementitious materials with bituminous paint or tape. Allow to dry prior to installation.
- .3 Permanently fasten panel system to structural supports; aligned, level, and plumb, within specified tolerances.
- .4 Attach panels to structure without restricting movement caused by design loads and expansion and contraction of assembly.
- .5 Attach flexible flashings to foundations as indicated.
- .6 Locate panel joints over supports.
- .7 Provide control joints where required, or as indicated.
- .8 Coordinate weathertight seal at roof, floor and at junctions with other wall construction. Maintain complete continuity of building envelope air barrier, vapour retarder, insulation and rain screen.
- .9 Trim panels with flashings, weep holes, transition sheets, flexible flashings and gap-filling insulation to attain specified system performance.
- .10 Provide weep holes and vents at each panel joint to drain water infiltrating system to exterior of building.
- .11 Minimize thermal bridging with insulation and backup to prevent direct conduction through envelope.
- .12 Do not leave metal sheet flanges unfolded or exposed. Minimize site cutting.
- .13 Protect exposed surfaces of cuts with paint to match panel colour. Ensure site cuts are same quality as shop cuts.

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**3.3 ERECTION TOLERANCES**

- .1 Maximum offset from true alignment between adjacent members butting or in line: 1.6 mm (1/16 inch).
- .2 Maximum variation from plane or location indicated on drawings: 1.6 mm (1/16 inch).
- .3 Joint width between panels: 12.7 mm (1/2 inch).
- .4 Vertical alignment of panels: 1.6 mm (1/16 inch).

**3.4 CLEANING**

- .1 Section 01 74 11: Cleaning installed work.
- .2 Remove excess sealant with solvent recommended by manufacturer.
- .3 Clean installation of residue and remove unused materials and products. Remove site cuttings from finish surfaces.
- .4 Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

**3.5 PROTECTION**

- .1 Protect finish of installed panels from damage during construction.

**END OF SECTION**

**Part 1            General**

**1.1            REFERENCE STANDARDS**

- .1 American Society of Mechanical Engineers (ASME)
  - .1 ASME B18.6.3-2013, Machine Screws, Tapping Screws, and Metallic Drive Screws (Inch Series).
- .2 ASTM International
  - .1 ASTM A 653/A 653M-15e1, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .2 ASTM D 2369-10-2015e1, Test Method for Volatile Content of Coatings.
  - .3 ASTM D 2832-92(2016), Standard Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
  - .4 ASTM D 5116-10, Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
- .3 CSA Group
  - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .4 ULC Standards
  - .1 CAN/ULC-S706-09, Standard for Wood Fibre Insulating Boards for Buildings.
  - .2 CAN/ULC-S741 08, Standard for Air Barrier Materials - Specification.

**1.2            ADMINISTRATIVE REQUIREMENTS**

- .1 Pre-Installation Meetings:
  - .1 Convene pre-installation meeting 1 week prior to beginning work of this Section, with Departmental Representative in accordance with Section 01 14 10 - Project Meetings to:
    - .1 Verify project requirements.
    - .2 Review installation and substrate conditions.
    - .3 Co-ordination with other construction subtrades.
    - .4 Review manufacturer's written installation instructions and warranty requirements.

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for metal siding and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:

- .1 Submit drawings stamped and signed by professional engineer registered or licensed in Nova Scotia, Canada.
- .2 Indicate dimensions, profiles, attachment methods, schedule of wall elevations, trim and closure pieces, soffits, fascia, furring, and related work.

#### **1.4 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for installed products for incorporation into manual.

#### **1.5 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Installer Qualifications: minimum three years documented experience with products specified.
- .4 Mock-Up:
  - .1 Provide site mock-up for work of this Section indicating methods and materials, and procedures proposed to achieve final results in accordance with Section 01 45 00 - Quality Control, and to comply with following requirements, using materials indicated for completed work:
    - .1 Build mock-ups in location and of size as directed by Departmental Representative.
    - .2 Obtain Departmental Representative's acceptance of mock-ups before starting construction; mock-up used throughout construction period as standard of acceptance for subsequent work.
    - .3 Mock-up may form part of permanent structure when accepted by Departmental Representative; repair or replace unacceptable mock-ups at no additional cost to Owner.

#### **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect steel siding from nicks, scratches, and blemishes.

- .3 Replace defective or damaged materials with new.

## **1.7 SITE CONDITIONS**

- .1 Execute work of this Section within environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer.

## **1.8 WARRANTY**

- .1 Manufacturer's warranty: Submit, for Departmental Representative acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty in addition to and not limit other rights Owner may have under Contract Documents.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Steel siding: Fabricated from commercial grade to ASTM A 652M with Z275 zinc coating:
  - .1 Profile: vertical, 22.4 mm deep, preformed interlocking joints, fastener holes pre-punched.
  - .2 Pattern: smooth surface.
  - .3 Finish coating: factory precoated with fluorocarbon paint finish, two coat system dry paint film thickness of 0.025 mm.
  - .4 Colour: colour selected by Departmental Representative from full colour range.
  - .5 Back coating: ASTM A 653/A 653M, grade A, Z275 coating designation.
  - .6 Gloss: medium.
  - .7 Thickness: 0.607 mm (24 gauge) base metal thickness.
- .2 Fasteners: nails to CSA B111, screws to ASME B18.6.3 galvanized steel, purpose made.
- .3 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
- .4 Flashing: in accordance with Section 07 62 00 - Sheet Metal Flashing and Trim

### **2.2 ACCESSORIES**

- .1 Exposed trim: inside corners, outside corners, cap strip, drip cap, under-sill trim, starter strip and window/door trim of same material, and glossas cladding, with fastener holes pre-punched.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts acceptable in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.

- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions remedied and after receipt of written approval to proceed from Departmental Representative.

### **3.2 PREPARATION**

- .1 Clean surfaces thoroughly prior to installation.
- .2 Repair substrate flaws or defects before applying siding or soffits.
- .3 Fur surfaces to even plane and free from obstructions.
- .4 Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under project conditions.

### **3.3 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

### **3.4 INSTALLATION**

- .1 Install steel siding in accordance with manufacturer's written instructions.
- .2 Install continuous starter strips, inside corners, edgings, soffit, drip, cap, sill and window/door opening flashings as indicated.
- .3 Install outside corners, fillers and closure strips with carefully formed and profiled work.
- .4 Install soffit and fascia cladding as indicated.
- .5 Maintain joints in exterior cladding, true to line, tight fitting, hairline joints.
- .6 Attach components in manner not restricting thermal movement.
- .7 Caulk junctions with adjoining work with sealant. Do work in accordance with Section 07 92 00 - Joint Sealants.

### **3.5 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - 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 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 22 -Construction Demolition and Waste Management.

- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**3.6 PROTECTION**

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

**END OF SECTION**

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**Part 1            General**

**1.1            REFERENCE STANDARDS**

- .1 American National Standards Institute (ANSI)
  - .1 ANSI/SPRI/FM 4435/ES-1, Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems current.
- .2 ASTM International
- .3 ASTM A 653/A 653M-[15e1], Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .1 ASTM A 755/A 755M-[16e1] Standard Specification for Steel Sheet, Metallic coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
  - .2 ASTM D 1970/D 1970M-15a Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
  - .3 ASTM D 4587-11 Standard Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings.
  - .4 ASTM F 1667-15 Standard Specification for Driven Fasteners: Nails, Spikes and Staples.
- .4 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
- .5 Canadian Roofing Contractors Association (CRCA)
  - .1 Roofing Specifications Manual 2012.
- .6 Canadian Sheet Steel Building Institute (CSSBI)
  - .1 CSSBI S8-2008 Quality and Performance Specification for Prefinished Sheet Steel Used for Building Products.
  - .2 CSSBI B17-2002 Barrier Series Prefinished Steel Sheet: Product Performance & Applications.
  - .3 CSSBI Sheet Steel Facts #12 2003 Fastener Guide for Sheet Steel Building Products.
- .7 CSA Group
  - .1 CSA A123.22-08(2013) Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- .8 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (SDS).
- .9 Sheet Metal and Air Conditioning Contractors Association of North America (SMACNA)
  - .1 Architectural Sheet Metal Manual (2012)



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**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
- .3 Submit manufacturer's printed product literature including product specifications and technical data sheets for sheet metal flashing fasteners and accessory materials. Include product characteristics, performance criteria, physical size, finish and limitations.
  - .1 Submit[two copies WHMIS SDS - Material Safety Data Sheets in accordance with Section 01 35 29 - Health and Safety Requirements.
- .4 Shop Drawings:
  - .1 Submit shop drawings only for sheet metal flashing and trim items that differ from those indicated in Contract Documents.
  - .2 Indicate sheet thickness, flashing dimensions and fastenings. Include anchorage, expansion joints and other provisions for thermal movement.
- .5 Submit manufacturer's catalogue cut sheets for manufactured items.
- .6 Samples:
  - .1 Submit 50 x 50 mm samples of each type of sheet metal material, finishes and colour.

**1.3 PRE-INSTALLATION MEETING**

- .1 Include sheet metal flashing and trim on agenda of pre-installation meetings of affected sections.

**1.4 MOCK-UPS**

- .1 Include flashings in mock-ups as specified for work of other affected sections.

**1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Handle and store flashing materials to prevent creasing, buckling, scratching, or other damage.
- .3 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 22 - Construction Demolition and Waste Management.

**Part 2 Products**

**2.1 BASE SHEET METAL MATERIALS**

- .1 Provide sheet metal in base metal thickness specified. Where no thickness specified, provide base sheet metal in thickness recommended in SMACNA Architectural Sheet Metal Manual for type

of item being fabricated, but not less than the thickness required by the authority having jurisdiction.

- .2 Zinc coated steel sheet: 0.607 mm (24 Gauge) thickness, commercial quality to ASTM A 653/A 653M, with Z275 designation zinc coating.

## **2.2 PREFINISHED STEEL SHEET**

- .1 Prefinished steel with factory applied primer and polyvinyl chloride heat-cured topcoat.
  - .1 Class F1S.
  - .2 Barrier Series colour selected by Departmental Representative from manufacturer's full range.
  - .3 Specular gloss: 30units +/- 5 in accordance with ASTM D 523.
  - .4 Coating thickness: not less than 200micrometres.
  - .5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20% to ASTM D 45878 as follows:
  - .6 Cycle #4 General Metal Coatings.
  - .7 Exposure period: 2000hours.

## **2.3 ACCESSORIES**

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Pourable sealer: proprietary two-part polyurethane pourable sealer designed for sealing penetration pockets.
- .3 Self-adhesive membrane underlay and tie-in membrane for metal flashings: To CSA A12 or ASTM D 1970, minimum 1 mm (40 mil) thickness.
- .4 Sealants: In accordance with Section 07 92 00, in colour to match flashing finish colour.
- .5 Cleats and hook strips: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
- .6 Provide continuous hook strip at outside of parapets.
- .7 Nails: of same material as sheet metal, [ring thread] flat head roofing nails of length and thickness suitable for metal flashing application.
- .8 Screws: of same material as sheet metal, Suitable for substrate and material being fastened, galvanized coloured nylon head, neoprene washer.
- .9 Touch-up paint: as recommended by prefinished material manufacturer.

## **2.4 FABRICATION**

- .1 Fabricate sheet steel flashings and other sheet steel work and SMACNA architectural details or as indicated.

- .2 Form pieces in 2400 mm maximum lengths.
  - .1 Make allowance for expansion at joints.
- .3 Hem exposed edges on underside 12 mm.
  - .1 Mitre and seal corners with sealant.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

## **2.5 METAL FLASHINGS**

- .1 Form flashings, copings and fascias to profiles indicated of 0.76 mm (22 Gauge) thick galvanized prefinished steel.

## **2.6 PANS**

- .1 Form pans to receive roofing plastic from 0.76 mm (22 gauge) , galvanized , prefinished steel sheet metal with minimum 75 mm upstand above finished roof and 100mm continuous flanges with no open corners.
- .2 Rivet joints.
  - .1 Make pans minimum 50 mm wider than member passing through roof membrane.

## **Part 3 Execution**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

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

### **3.2 INSTALLATION**

- .1 Install sheet metal work in accordance with CRCA FL series details or as detailed.
- .2 Use concealed fastenings except where approved before installation.
- .3 Provide underlay under sheet metal.
  - .1 Secure in place and lap joints 100 mm.
- .4 Provide self-adhesive membrane to tie into adjacent assemblies.
- .5 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs.
  - .1 Flash joints using S-lock forming tight fit over hook strips, as detailed.
- .6 Lock end joints and caulk with sealant.

- .7 Caulk flashing at cap flashing with sealant.
- .8 Install pans, where shown around items projecting through roof membrane.
- .9 Where flashing installed with mechanical fasteners, install fasteners in slots or oversize holes to allow expansion and contraction of flashings.
- .10 Provide isolation coating or impervious self-adhesive membrane to separate aluminum items from concrete and masonry.

### **3.3 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Leave work areas clean, free from grease, finger marks and stains.

**END OF SECTION**

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**Part 1            General**

**1.1                REFERENCES**

- .1      CAN/ULC-S101-07 - Standard Methods of Fire Endurance Tests of Building Construction and Materials.
- .2      CAN/ULC-S102-10 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .3      CAN/ULC-S115m-05 - Standard Method of Fire Tests of Firestop Systems.
- .4      ULC - Building Materials Directory.

**1.2                DEFINITIONS**

- .1      Firestopping (Fire-safing): A sealing or stuffing material or assembly placed in spaces between building materials to arrest the movement of smoke, heat, gases, or fire through wall or floor openings.

**1.3                SYSTEM DESCRIPTION**

- .1      Firestopping systems installed to resist spread of fire and passage of smoke and other gases at penetrations through fire resistance rated wall floor assemblies, materials and components.

**1.4                PERFORMANCE REQUIREMENTS**

- .1      Materials, accessories and application procedures listed by ULC, or tested to CAN/ULC-S115m to comply with building code requirements.
- .2      Firestopping Materials: CAN/ULC-S101 to achieve a fire rating as noted on Drawings

**1.5                ADMINISTRATIVE REQUIREMENTS**

- .1      Section 01 14 10: Project management and coordination procedures.
- .2      Coordination: Coordinate with other work having a direct bearing on work of this section.
- .3      Pre-installation Meetings: Convene one (1) week before starting work of this section.

**1.6                SUBMITTALS FOR REVIEW**

- .1      Section 01 33 00: Submission procedures.
- .2      Product Data: Provide data on product characteristics, performance and limitation criteria, as specified..
- .3      System Design Listings: Submit system design listings, including illustrations from a qualified testing and inspection agency that is applicable for each firestop configuration.

**1.7                SUBMITTALS FOR INFORMATION**

- .1      Section 01 33 00: Submission procedures.
- .2      Installation Data: Manufacturer's special preparation and installation requirements.

- .3 Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

## **1.8 CLOSEOUT SUBMITTALS**

- .1 Section 01 78 00: Submission procedures.

## **1.9 QUALITY ASSURANCE**

- .1 Products of This Section: Manufactured to ISO 9000 certification requirements.
- .2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five (5) years documented experience.
- .3 Contractor Qualifications: Company specializing in performing the work of this section, as follows:
  - .1 Licensed by the province or local authority where applicable.
  - .2 Installers who have successfully completed not less than five (5) comparable scale projects.
  - .3 Contractor to submit the name and experience profile for each installer working on site.
- .4 Single Source Responsibility: Obtain firestop systems for each type of penetration and construction situation from a single primary firestop systems manufacturer.

## **1.10 MOCK-UP**

- .1 Section 01 45 00: Requirements for mock-up.
- .2 Provide mock-up of applied firestopping assemblies.
- .3 Apply firestop material to a representative penetrated masonry, stud wall, and concrete substrate surface.
- .4 Obtain Departmental Representative's acceptance of mock-up before start of Work.
- .5 Retain and maintain accepted mock-ups during construction in undisturbed condition as a standard for judging completed work.
- .6 Locate where directed by Departmental Representative.
- .7 Approved mock-up may remain as part of the Work.

## **1.11 REGULATORY REQUIREMENTS**

- .1 Conform to applicable code for fire resistance ratings and surface burning characteristics.

## **1.12 DELIVERY, STORAGE, AND PROTECTION**

- .1 Section 01 61 00: Transport, handle, store, and protect products.
- .2 Deliver firestopping products in original, unopened containers with labels intact and legible, identifying product and manufacturer.
- .3 Store and handle firestopping materials to manufacturer's instructions.

## **1.13 ENVIRONMENTAL REQUIREMENTS**

- .1 Section 01 35 43: Environmental conditions affecting products on site.

- .2 Do not apply materials when temperature of substrate material and ambient air is below manufacturer's recommendations.
- .3 Maintain this minimum temperature before, during, and for three (3) days after installation of materials.
- .4 Provide ventilation to manufacturer's instructions in areas to receive solvent cured materials.

## **Part 2 Products**

### **2.1 MANUFACTURERS**

- .1 Provide firestopping and smoke seal systems only from manufacturers publishing ULC Listed or UL Certified for Use in Canada System Designs tested in accordance with CAN/ULC-S115m:
  - .1 Acceptable Manufacturers: A/D Fire, Grace, Hilti, and 3M.

### **2.2 ACCEPTABLE PRODUCTS**

- .1 Selection of appropriate system to maintain required fire resistance rating is the responsibility of the Installer. All systems or EJs are to be submitted for review. Systems must be asbestos-free.
- .2 Selection to be based on specified performance requirements and is limited to ULC Listed or UL Certified for Use in Canada System Designs tested in accordance with CAN/ULC S115m.
- .3 Substitution of products, components or accessories forming part of a System Design is not acceptable, unless accompanied by an EJ (Engineering Judgement) or EFRRA from the system manufacturer.

### **2.3 ACCESSORIES**

- .1 Primer: Type recommended by firestopping manufacturer for specific substrate surfaces.
- .2 Dam Material: Permanent.
  - .1 Sheet metal.
- .3 Installation Accessories: Clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.
- .4 Premanufactured fire-safing products for servicing bundled data cabling are supplied and installed under Division 26 – Electrical.

### **2.4 FINISHES**

- .1 Colour: Red, typical; Dark grey, for visible finished areas.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Section 01 10 00 General Requirements: Verify existing conditions before starting work.

- .2 Verify opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping are ready to receive the work of this section.
- .3 Do not proceed with installation until unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- .1 Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.
- .2 Remove incompatible materials which may affect bond.
- .3 Install damming materials to arrest liquid material leakage.

### **3.3 APPLICATION**

- .1 Apply primer and firestopping materials to manufacturer's written instructions.
- .2 Install material at walls or partition openings which contain penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping.
- .3 Apply firestopping material in sufficient thickness to achieve rating, and to uniform density and texture.
- .4 Compress fibred material to achieve a density of 40% of its uncompressed density.
- .5 Place foamed material in layers to ensure homogenous density, filling cavities and spaces. Place sealant to completely seal junctions with adjacent dissimilar materials.
- .6 Dam Material: Dam material to remain.

### **3.4 CLEANING**

- .1 Section 01 74 11: Cleaning installed work.
- .2 Clean adjacent surfaces of firestopping materials.

### **3.5 PROTECTION OF FINISHED WORK**

- .1 Section 01 77 00: Protecting installed work.
- .2 Protect adjacent surfaces from damage by material installation.

**END OF SECTION**



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**Part 1            General**

**1.1                REFERENCES**

- .1     ASTM C509-06 - Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material.
- .2     ASTM C834-10 - Standard Specification for Latex Sealants.
- .3     ASTM C919-08 - Standard Practice for Use of Sealants in Acoustical Applications.
- .4     ASTM C920-11 - Standard Specification for Elastomeric Joint Sealants.
- .5     ASTM C1184-05 - Standard Specification for Structural Silicone Sealants.
- .6     ASTM C1193-09 - Standard Guide for Use of Joint Sealants.
- .7     ASTM C1311-10 - Standard Specification for Solvent Release Sealants.
- .8     ASTM C1330-02(2007) - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
- .9     ASTM C1401-09a - Standard Guide for Structural Sealant Glazing.
- .10    ASTM E330-02(2010) - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .11    CGSB 19-GP-5M-84 - Sealing Compound, One Component, Acrylic Base, Solvent Curing.
- .12    CGSB-19-GP-14M-1984 - Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.

**1.2                PERFORMANCE REQUIREMENTS**

- .1     Sealant Design: Design structural sealant to withstand specified loads without breakage, loss, failure of seals, product deterioration, and other defects.

**1.3                ADMINISTRATIVE REQUIREMENTS**

- .1     Coordination:
  - .1        Coordinate with other work having a direct bearing on work of this section.
  - .2        Coordinate the work with all sections referencing this section.

**1.4                SUBMITTALS FOR REVIEW**

- .1     Section 01 33 00: Submission Procedures.
- .2     Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, colour availability.
- .3     Shop Drawings: Indicate sealant joints and dimensions, materials, structural bite, glue-line thickness, joint profile, and support framing.

**1.5                SUBMITTALS FOR INFORMATION**

- .1     Section 01 33 00: Submission Procedures.
- .2     Installation Data: Manufacturer's special installation requirements.

- .1 Indicate special procedures, surface preparation, perimeter conditions requiring special attention, field quality control testing.

## **1.6 QUALITY ASSURANCE**

- .1 Products of This Section: Manufactured to ISO 9000 certification requirements.
- .2 Perform work to sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- .3 Perform sealant application work to ASTM C1481 and ASTM C1193.
- .4 Perform acoustical sealant application work to ASTM C919.
- .5 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with documented experience.
- .6 Applicator Qualifications: Installer specializing in performing the work of this section with documented experience.

## **1.7 ENVIRONMENTAL REQUIREMENTS**

- .1 Section 01 35 43: Environmental Procedures.
- .2 Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.
- .3 VOC Limitations: for all materials supplied by this Section, the total VOC content must be less than or equal to 250 g/L, less water, when tested to ASTM D2369.
- .4 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada.

## **1.8 WARRANTY**

- .1 Section 01 77 00: Warranties.
- .2 Provide a four (4) year extended warranty to include coverage for failure to meet specified requirements.
- .3 Warranty: Include coverage for replacements parts and labour.

## **Part 2 Products**

### **2.1 SEALANTS**

- .1 Siliconized Interior Acrylic Latex Sealant (Type S1): ASTM C9834, Type OP, Grade NT; single component, non-staining, non-bleeding, non-sagging; colour as selected.
  - .1 Use: General purpose interior and exterior caulking and as a back-bedding glazing compound. Acoustical seal in the construction of interior walls, ceilings and floors. Suitable for use on vinyl, aluminum and wood siding as well as on bathroom and kitchen fixtures.
  - .2 Elongation Capability +/- 25%.
  - .3 Product: Tremflex 834, manufactured by Tremco.

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- .4 Acceptable Alternate Product: PECORA AC-20+silicone; or similar by DowDuPont, or 3M
  - .2 High-modulus Silicone Sealant (Type S2): ASTM C920-14 - Standard Specification for Elastomeric Joint Sealants., Type S, Grade NS, Class Class 50, Use NT, M, G, A, O; single component, moisture curing, non-staining, non-bleeding, non-sagging; colour: as selected
    - .1 Product: Spectrem 1, manufactured by Tremco.
    - .2 Acceptable Alternate Product: PECORA 890NST; or similar by DowDuPont, or 3M.
  - .3 Medium-modulus Silicone Sealant (Type S3): ASTM C920-14 - Standard Specification for Elastomeric Joint Sealants.; Type S, Grade NS; Class 50; Use NT, M, G, A, and O; single component, non-sagging, non-staining, non-bleeding, paintable; colour: as selected
    - .1 Use: Two-sided structural glazing; Perimeter and weather seals; Cap, heel and toe beads; Curtain wall or window joints. Used on substrates such as aluminum, glass, steel, painted metal, plastic, stone, concrete and brick. All structural glazing applications must be reviewed and approved by manufacturer prior to application.
    - .2 Product: Spectrem 2, manufactured by Tremco.
    - .3 Acceptable Alternate Product: PECORA 895NST; or similar by DowDuPont, or 3M.
  - .4 Single Component Urethane Sealant (Type S4): ASTM C920, Type S, Grade NS, Class 50, Uses T, NT and I; Immersible, single-component, non-sag, traffic-and nontraffic-use, urethane joint sealant.
    - .1 Use: Expansion and control joints, precast concrete panel joints, perimeter caulking (windows, door, panels), aluminum, masonry and vinyl siding.
    - .2 Product: Dymonic 100, manufactured by Tremco. ; or similar by DowDuPont, or 3M.
  - .5 Single Component Urethane Sealant (Type S5): ASTM C920 Type S, Grade NS, Class 25, Uses NT, M, A, O; single component, moisture curing, nonstaining, non-bleeding, color as selected.
    - .1 Uses: Expansion and control joints in pre-cast tilt-up concrete, curtain wall joints and perimeter caulking around windows and doors.
    - .2 Product: Dymonic, manufactured by Tremco.
    - .3 Acceptable Alternate Product: PECORA Dynatrol I-XL; or similar by DowDuPont, or 3M.
  - .6 Multi-Component Urethane Sealant (Type S6): ASTM C920 Type M, Grade P, Class 25, Uses T; self leveling, multi-component, chemical curing, non-staining, nonbleeding, color as selected.
    - .1 Uses: A self-leveling joint sealant for use in any traffic rated horizontal expansion or control joint. Used in parking garages, plazas, terrace decks, floors and sidewalk joints.
    - .2 Product: THC 900/901, manufactured by Tremco; or similar by DowDuPont, or 3M.
  - .7 Synthetic Rubber Sealant (Type S7): single component, non-skinning, non-hardening synthetic rubber sealant.
    - .1 Uses: Acoustical sealing of drywall partitions, corridors and party walls. This sealant also is used as a lap joint and perimeter sealant for polyethylene vapor

barriers over fiberglass batt or other insulations and may be used in contact with polystyrene.

.2 Product: Acoustical Sealant, manufactured by Tremco.

.3 Acceptable Alternate Product: PECORA AIS-919; or similar by DowDuPont, or 3M.

.8 Sanitary Silicone Sealant (Type M): ASTM C920, Type S, Grade NS, use NT, G, A, and O; single component, acetoxy curing, non-sagging, non-staining, mildew resistant; colour as selected.

.1 Uses: A weathertight seal to glass, metal, porcelain, ceramic and most painted surfaces. Clear with fungicide for use in bathrooms, spas and similar applications where joints need protection against fungi and bacteria.

## **2.2 ACCESSORIES**

.1 Primer: Non-staining type, recommended by sealant manufacturer to suit application.

.2 Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

.3 Joint Backing: ASTM C1330; round, closed cell polyethylene foam rod; oversized 30 to 50% larger than joint width.

.4 Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

.5 Masking tape: Non-staining, non-absorbent type compatible with sealant and adjacent surfaces.

.6 Setting Blocks and Spacers: Compatible with silicone sealant and recommended by sealant manufacturer.

## **2.3 COLOURS**

.1 Unless indicated otherwise, in respective technical specification sections, colour selection is to be by DCC Representative, from standard range.

## **Part 3 Execution**

### **3.1 EXAMINATION**

.1 Section 01 10 10 General Requirements: Examination and Preparation. Verify existing conditions before starting work.

.2 Verify that joint openings and substrate surfaces are clean, dry, and free of frost and ready to receive work.

.3 Verify that joint backing and release tapes are compatible with sealant.

### **3.2 PREPARATION**

.1 Remove loose materials and foreign matter which might impair adhesion of sealant.

.2 Clean and prime joints to sealant manufacturer's written instructions.

.3 Perform preparation to sealant manufacturer's written instructions.

- .4 Protect elements surrounding the work of this section from damage or disfiguration.

### **3.3 INSTALLATION**

- .1 Install sealant to sealant manufacturer's written instructions.
- .2 Measure joint dimensions and size materials to achieve 2:1 width/depth ratios.
- .3 Install joint backing to achieve a neck dimension no greater than 1/3 of the joint width.
- .4 Install bond breaker where joint backing is not used.
- .5 Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- .6 Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- .7 Tool joints as detailed concave.

### **3.4 CLEANING**

- .1 Section 01 74 11: Cleaning.
- .2 Clean adjacent soiled surfaces.

### **3.5 PROTECTION OF FINISHED WORK**

- .1 Section 01 78 00: Protecting installed work.
- .2 Remove masking tape and excess sealant.
- .3 Protect sealants until cured, remove temporary glass supports.

**END OF SECTION**