

## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
    - .1 ASTM C 208-95(2001), Specification for Cellulosic Fiber Insulating Board.
    - .2 ASTM C 591-01, Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation.
    - .3 ASTM C 612-04, Standard Specification for Mineral Fibre Block and Board Thermal Insulation.
    - .4 ASTM C 726-05, Standard Specification for Mineral Fiber Roof Insulation Board.
    - .5 ASTM C 728-05, Standard Specification for Perlite Thermal Insulation Board.
    - .6 ASTM C 1126-04, Standard Specification for Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation.
    - .7 ASTM C 1289-05a, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
    - .8 ASTM E 96/E 96M-05, Standard Test Methods for Water Vapour Transmission of Materials.
  - .2 Canadian Gas Association (CGA)
    - .1 CAN/CGA-B149.1-05, Natural Gas and Propane Installation Code Handbook.
    - .2 CAN/CGA-B149.2-05, Propane Storage and Handling Code.
  - .3 Canadian General Standards Board (CGSB)
    - .1 CGSB 71-GP-24M-77(R1983), Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.
  - .4 Underwriters Laboratories of Canada (ULC)
    - .1 CAN/ULC-S604-M91, Standard for Type A Chimneys.
    - .2 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
    - .3 CAN/ULC-S702-97, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
    - .4 CAN/ULC-S704-03, Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.
  - .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
    - .1 Material Safety Data Sheets (MSDS).
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## 1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's insulation products and adhesives.
- .2 Manufacturer's Instructions:
  - .1 Submit manufacturer's installation instructions.

## 1.3 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

## 1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 22 - Construction/Demolition Waste Management And Disposal.
  - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
  - .3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site for recycling in accordance with Waste Management Plan.
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## PART 2 - PRODUCTS

### 2.1 INSULATION

- .1 Underslab and foundation:
  - .1 Extruded polystyrene:
    - .1 To CAN/ULC S701
      - .1 Type: 4 rigid closed cell with integral high-density skin.
- .2 Extruded polystyrene:
  - .1 to CAN/ULC-S701-2001
    - .1 Type: 2 rigid, closed cell type with integral high density skins. Thickness as indicated, CFC free and HCFC free without ozone depletion potential greater than zero.

### 2.2 ADHESIVE

- .1 Adhesive (for polystyrene): to CGSB 71-GP-24, as recommended by manufacturer.
  - .1 VOC emission: Low.
- .2 Exterior Walls:
  - .1 Extruded polystyrene:
    - .1 to CAN/ULC-S701-2001
      - .1 Type: 2 rigid, closed cell type with integral high density skins. Thickness as indicated, CFC free and HCFC free without ozone depletion potential greater than zero.

### 2.3 ACCESSORIES

- .1 Insulation clips: impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.
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### PART 3 - EXECUTION

#### 3.1 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.

#### 3.2 WORKMANSHIP

- .1 Install insulation after building substrate materials are dry.
- .2 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .3 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.
- .4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN4-S604 type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 type B and L vents.
- .5 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.
- .6 Offset both vertical and horizontal joints in multiple layer applications.
- .7 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

#### 3.3 EXAMINATION

- .1 Examine substrates and immediately inform Departmental Representative in writing of defects.
  - .2 Prior to commencement of work ensure:
    - .1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.
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#### 3.4 RIGID INSULATION INSTALLATION

- .1 Apply adhesive to insulation board in accordance with manufacturer's recommendations.
- .2 Imbed insulation boards into vapour barrier type adhesive, applied as specified, prior to skinning of adhesive.
- .3 Leave insulation board joints unbonded over line of expansion and control joints. Bond a continuous 150 mm wide 0.15 mm modified bituminous membrane over expansion and control joints using compatible adhesive and primer before application of insulation.

#### 3.5 PERIMETER FOUNDATION INSULATION

- .1 Exterior application: Extend boards to footing. Install on exterior face of perimeter foundation wall with adhesive to manufacturer specifications.
- .2 Under slab application: extend boards in from perimeter foundation wall as indicated. Lay boards on level compacted fill.
- .3 Perimeter heating duct application: compact walls of heating duct trench to form solid backing. Attach insulation boards to perimeter foundation wall extending from underside of finish floor to 100mm below bottom of heating duct. Lay insulation boards in bottom of heating duct trench, extend to 150 mm beyond heating duct 600 mm minimum from inside face of perimeter foundation wall. Secure insulation in place to prevent displacement.

#### 3.6 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C 553-02, Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.
  - .2 ASTM C 665-01e1, Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  - .3 ASTM C 1320-05, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
- .2 Canadian Gas Association (CGA)
  - .1 CAN/CGA-B149.1-05, Natural Gas and Propane Installation Code Handbook.
  - .2 CAN/CGA-B149.2-05, Propane Storage and Handling Code.
- .3 Canadian Standards Association (CSA International)
  - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .4 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S604-M1991, Type A Chimneys.
  - .2 CAN/ULC-S702-1997, Standard for Mineral Fibre Insulation.

### 1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturer's Instructions:
  - .1 Submit manufacturer's installation instructions.

### 1.3 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
  - .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
  - .3 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.
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#### 1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 22 - Construction/Demolition Waste Management And Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site containers for recycling.

### PART 2 - PRODUCTS

#### 2.1 INSULATION

- .1 Thermal Insulation
  - .1 Batt and Blanket mineral fibre: To ASTM C 663-01e1, Type 2, Class 4, with minimum 100% recycled content.
- .2 Acoustic Insulation
  - .1 Batt and blanket mineral fiber, EcoLogo certified with minimum 100% recycled content.

#### 2.2 ACCESSORIES

- .1 Insulation clips:
    - .1 Impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.
  - .2 Nails: galvanized steel, length to suit insulation plus 25 mm, to CSA B111.
  - .3 Staples: 12 mm minimum leg.
  - .4 Tape: as recommended by manufacturer.
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### PART 3 - EXECUTION

#### 3.1 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.

#### 3.2 INSULATION INSTALLATION

- .1 Install insulation to maintain continuity of thermal protection to building elements and spaces and to ASTM C 1320.
- .2 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .3 Do not compress insulation to fit into spaces.
- .4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN/ULC-S604 Type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 Type B and L vents.
- .5 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

#### 3.3 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

## PART 1 - GENERAL

### 1.1 RELATED REQUIREMENTS

- .1 Section 07 50 10 - Concrete Insualted Wall Panels.

### 1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
  - .2 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.

### 1.2 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:
    - .1 Product characteristics.
    - .2 Performance criteria.
    - .3 Limitations.
- .3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).
- .4 Quality assurance submittals:
  - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
  - .2 Instructions: submit manufacturer's installation instructions and comply with written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

### 1.3 QUALITY ASSURANCE

- .1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.
  - .2 Mock-Ups:
    - .1 Submit mock-ups in accordance with Section 01 45 00 - Quality Control.
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- .2 Construct mock-up of sheet vapour barrier installation including one lap joint, one inside corner and at one electrical box. Mock-up may be part of finished work.
  - .3 Mock-up will be used to judge workmanship, substrate preparation, and material application.
  - .4 Locate where directed.
  - .5 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with vapour barrier work.
- .3 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

#### 1.4 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 22 - Construction/Demolition Waste Management and Disposal.

### PART 2 - PRODUCTS

#### 2.1 SHEET VAPOUR BARRIER

- .1 Interior Walls and Roof:
  - .1 Polyethylene film: to CAN/CGSB-51.34, 0.15 mm thick.
- .2 Under Slab:
  - .1 Polyolefin based resin film: to ASTM E96/E96M-05. 0.381 mm thick.
- .3 Windows and Doors:
  - .1 SBS Rubberized Asphalt Flashing: To ASTM E96/E96M-05. Self-adhesive. 1.0mm thick.

#### 2.2 ACCESSORIES

- .1 Joint sealing tape: air resistant pressure sensitive adhesive tape or type recommended by vapour barrier manufacturer, 50 mm wide for lap joints and perimeter seals, 25 mm wide elsewhere.
  - .2 Sealant: compatible with vapour retarder materials, recommended by vapour retarder manufacturer. To Section 07 92 00 - Joint Sealants.
  - .3 Staples: minimum 6 mm leg.
  - .4 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.
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## PART 3 - EXECUTION

### 3.1 INSTALLATION

- .1 Ensure services are installed and inspected prior to installation of retarder.
- .2 Install sheet vapour retarder on warm side of exterior wall ceiling and floor assemblies prior to installation of gypsum board to form continuous retarder.
- .3 Use sheets of largest practical size to minimize joints.
- .4 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.

### 3.2 EXTERIOR SURFACE OPENINGS

- .1 Cut sheet vapour retarder to form openings and ensure material is lapped and sealed to frame.

### 3.3 PERIMETER SEALS

- .1 Seal perimeter of sheet vapour barrier as follows:
  - .1 Apply continuous bead of sealant to substrate at perimeter of sheets.
  - .2 Lap sheet over sealant and press into sealant bead.
  - .3 Install staples through lapped sheets at sealant bead into wood substrate.
  - .4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

### 3.4 LAP JOINT SEALS

- .1 Seal lap joints of sheet vapour barrier as follows:
    - .1 Attach first sheet to substrate.
    - .2 Apply continuous bead of sealant over solid backing at joint.
    - .3 Lap adjoining sheet minimum 150 mm and press into sealant bead.
    - .4 Install staples through lapped sheets at sealant bead into wood substrate.
    - .5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.
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### 3.5 ELECTRICAL BOXES

- .1 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:
  - .1 Install moulded box vapour barrier.
  - .2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

### 3.6 CLEANING

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

## PART 1 - GENERAL

### 1.1 REFERENCES

- .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 static 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 0.02 L/s.m<sup>2</sup> when subjected to pressure differential of 75 Pa as measured in accordance with ASTM E 73.
- .2 Provide continuity of air/vapour barrier materials and assemblies in conjunction with materials described in Section 03 30 00.01 - Cast-in-Place Concrete Short Form, 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.
    - .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
  - .3 Shop Drawings: Submit drawings stamped and signed by professional engineer registered or licenses in the Province of New Brunswick Canada.
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- .4 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-UP

- .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 Locate where directed by Departmental Representative.
- .3 Mock-up may remain as part of Work.
- .4 Allow 24 hours 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 clean up 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 Waste Management and Disposal.
  - .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.
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## 1.7 SEQUENCING

- .1 Sequence work in accordance with Section 01 14 10 - Scheduling and Management of Work.
- .2 Sequence work to permit installation of materials in conjunction with related materials and seals.

## 1.8 WARRANTY

- .1 For sealant and sheet materials the 12 month warranty period prescribed in subsection GC 32.1 of General Conditions "C" is extended to 24 months.
- .2 Provide three year warranty under provisions of Section 01 78 00 - Closeout Submittals and in accordance with General Conditions (GC) CCDC2 GC 12.3.
- .3 Warranty: Include coverage of installed sealant and sheet materials which:
  - .1 Fail to achieve air tight and watertight seal.
  - .2 Exhibit loss of adhesion or cohesion.
  - .3 Do not cure.

## 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.
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### 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.

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

- .1 Preformed Roofing, Trim and accessories for cladding roof.  
Prefinished steel.

### 1.2 REFERENCES

- .1 American Architectural Manufacturer's Association (AAMA)  
1402-86 - Aluminum Siding, Soffit, and Fascia.
  - .2 American Architectural Manufacturer's Association (AAMA)  
1406-86 - Steel Siding, Soffit, and Fascia.
  - .3 American Society for Testing and Materials (ASTM) A653 - Steel  
Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy  
(Galvannealed by the Hot Dip Process).
  - .4 American Society for Testing and Materials (ASTM) B209 -  
Aluminum and Aluminum-Alloy Sheet and Plate.
  - .5 American Society for Testing and Materials (ASTM) D226 -  
Asphalt-Saturated Organic Felt Used in Roofing and  
Waterproofing.
  - .6 American Society for Testing and Materials (ASTM) D256 -  
Determining the Izod Pendulum Impact Resistance of Plastics.
  - .7 American Society for Testing and Materials (ASTM) D635 - Rate  
of Burning and/or Extent and Time of Burning of Self-Supported  
Plastics in a Horizontal Position.
  - .8 American Society for Testing and Materials (ASTM) D638 -  
Tensile Properties of Plastics.
  - .9 American Society for Testing and Materials (ASTM) D648 -  
Deflection Temperature of Plastics Under Flexural Load in the  
Edgewise Position.
  - .10 American Society for Testing and Materials (ASTM) D696 -  
Coefficient of Linear Thermal Expansion of Plastics.
  - .11 American Society for Testing and Materials (ASTM) D790 -  
Flexural Properties of Unreinforced and Reinforced Plastics and  
Electrical Insulating Materials.
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- .12 American Society for Testing and Materials (ASTM) D1929 - Determining Ignition Temperature of Plastics.
- .13 American Society for Testing and Materials (ASTM) D3679 - Rigid Polyvinyl Chloride (PVC) Siding.
- .14 American Society for Testing and Materials (ASTM) D4216 - Rigid Poly (Vinyl Chloride) (PVC) and Related PVC and Chlorinated Poly (Vinyl Chloride) (CPVC) Building Products Compounds.
- .15 American Society for Testing and Materials (ASTM) E84 - Surface Burning Characteristics of Building Materials.
- .16 Underwriters Laboratories (UL) 94 - Test for Flammability of Plastic Materials.

### 1.3 SUBMITTALS

- .1 Submit under provisions of Section 01 33 00- Submittal Procedures.
- .2 Product Data: Manufacturer's data sheets on each product to be used, including:
  - .1 Material descriptions, dimensions, and profiles.
  - .2 Preparation instructions and recommendations.
  - .3 Storage and handling requirements and recommendations.
  - .4 Installation methods.
- .3 Shop Drawings: Layout, dimensions, weatherproofing, penetrations, terminations, trim, and installation methods.
- .4 Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- .5 Verification Samples: For each finish product specified, two samples, 4 inches (102 mm) long minimum samples of siding and trim in selected finish and color.

### 1.4 QUALITY ASSURANCE

- .1 Manufacturer Qualifications: Company with a minimum of 10 years' successful experience manufacturing aluminum, steel and vinyl siding.
  - .2 Metal Roof System as designed by the manufacturer shall be a complete system. All components of the system shall be supplied by the same manufacturer.
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- .3 Metal Wall system as designed by the manufacturer shall be a complete system. All components of the system shall be supplied by the same manufacturer.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver panels in manufacturer's protective cartons and clearly labeled as to specific products contained.
- .2 During delivery and storage keep siding cartons flat and supported along entire length.
- .3 Store materials off ground, out of weather, in dry place. Provide ventilation. Protect from falling objects and construction activities.

#### 1.6 WARRANTY

- .1 Upon Completion, provide a Lifetime limited, transferable warranty. In the case of roofing purchased by, or installed upon property owned by or in part by corporations, government entities or agencies, religious organizations, trusts, condominium or corporate housing arrangements, intangible legal entities or any other entity or organization capable of an infinite life, the warranty period will be fifty (50) years following the installation of the siding (prorated as indicated in the Warranty Transfer Schedule).
  - .2 Contact with Dissimilar Materials: Direct contact of aluminum products with certain dissimilar materials, or contact with water runoff from dissimilar materials, is likely to result in corrosion. Accordingly, care should be taken during installation to avoid such contact of aluminum with dissimilar materials, including: dissimilar metals (copper, zinc, steel, etc.), concrete, stucco, asbestos siding, pressure treated/pretreated lumber, masonry, corrosive non-metallic materials, and roofing materials or roofing systems containing metallic granules or strips.
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## PART 2 - PRODUCTS

### 2.1 STEEL ROOFING

- .1 19mm profiled sheet steel. 762mm coverage, 24 gauge. Complete with all mouldings, trims and accessories as required for a complete system. Prefinished colour refer to Finish Schedule Legend.

### 2.2 ACCESSORIES

- .1 Metal Components:
    - .1 Provide accessories and other items essential to a complete roof panel installation including panel clips, trim, closures, fascia, soffit, caps and similar metal components.
    - .2 Metal components fabricated from same gauge and finish as metal panels, unless otherwise noted.
    - .3 Flashing: Provide the same gauge and finish as the exterior panel, unless otherwise noted.
  - .2 Fasteners:
    - .1 Exposed fasteners shall be hex head self-drilling screws with bonded washers and colour matched to panels. Screw may be either plated steel or stainless steel.
  - .3 Closure strips: EPDM rubber to match configuration of the covering.
  - .4 Sealants:
    - .1 Exposed sealants: One components silicone based as recommended by panel manufacturer.
    - .2 Concealed sealants: Non-curing, non-skinning butyl, polyisobutylene or polybutane tape as recommended by panel manufacturer.
  - .5 Ice and Snow Guards:
    - .1 127mm x 127mm x 76mm polycarbonate polymer "L" shaped universal guards mechanically fastened to prefinished metal roofing. Guard finish to match roofing finish.
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### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- .1 Confirm that all critical dimensions are as specified on the drawings.
- .2 Beginning installation indicates installer's acceptance of substrate as suitable to accept siding, roofing and soffits.

#### 3.2 PREPARATION

- .1 Repair substrate flaws or defects before applying siding, roofing or soffits.
- .2 Where necessary, furr surfaces to an even plane and free from obstructions before application.

#### 3.3 ROOFING INSTALLATION

- .1 Install aluminum and steel panel products in accordance with manufacturers printed installation manual.
- .2 Install soffits, roofing and accessories in accordance with best practice, with all joint members plumb and true.
- .3 Ice and snow guard installation:
  - .1 Cover entire bottom surface of guard with 3mm thick layer of adhesive, ensure there are no voids that will cause air pockets.
  - .2 For 6/12 slope roofs. Apply one row of guards for every 3600mm of roof from eave to ridge. Place guards 300mm O.C. in a straight row.
  - .3 Place guard in position on clean metal roof, perpendicular to the roof line. Apply firm even pressure to the guard.
  - .4 Install guards with a minimum of 2 self-tapping screws with neoprene washers. Installer is responsible for determining length, size and quantity required for specific application.
  - .5 Use excess adhesive to create a seal around the perimeter of each guard.

#### 3.4 FIELD QUALITY CONTROL

- .1 After installation of siding, roofing and soffits, check entire surface for obvious flaws or defects.
- .2 Replace and repair any problem areas, paying close attention to the substrate for causes of the problem.

#### 3.5 CLEANING AND PROTECTION

- .1 After application of siding, roofing and soffits, clean as necessary to remove all fingerprints and soiled areas.
- .2 Upon completion of application, clean entire area, removing all scrap, packaging, and unused materials related to this work.

## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM D 5116-97, Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
- .2 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-11.3-M87, Hardboard.
  - .2 CAN/CGSB-11.5-M87, Hardboard, Precoated, Factory Finished, for Exterior Cladding.
  - .3 CAN/CGSB-11.6-M87, Installation of Exterior Hardboard Cladding.
  - .4 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
- .3 Canadian Standards Association (CSA International).
  - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
  - .2 CSA O121-M1978(R1998), Douglas Fir Plywood.
  - .3 CSA O151-M1978(R1998), Canadian Softwood Plywood.
  - .4 CAN/CSA-Z808-96, A Sustainable Forest Management System: Guidance Document.
- .4 Environmental Choice Program (ECP).
  - .1 CCD-045-95, Sealants and Caulking Compounds.
- .5 National Lumber Grades Authority (NLGA).
  - .1 NLGA Standard Grading Rules for Canadian Lumber 2003.

### 1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
    - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
    - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for caulking materials during application and curing.
  - .2 Samples:
    - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
    - .2 Submit duplicate 152 x 152 mm size profile specified.
  - .3 Manufacturer's Instructions:
    - .1 Submit manufacturer's installation instructions.
-

### 1.3 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

### 1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 22 - Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with local and provincial requirements.
- .4 Divert unused metal materials from landfill to metal recycling facility approved by Departmental Representative .
- .5 Divert unused wood materials from landfill to recycling or composting facility approved by Departmental Representative.
- .6 Divert unused caulking material from landfill to official hazardous material collections site approved by Departmental Representative .
- .7 Do not dispose of unused caulking materials into the sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Lumber siding and soffit: to NLGA Standard Grading Rules for Canadian Lumber.
    - .1 Horizontal V Joint Wood siding. 16mm thick by 136mm high lodge pole pine. Grade A. Factory finishes with translucent stain to be chosen from Manufacturer's complete range of colours.
  - .2 Accessories: exposed trim, closures, cap pieces of manufacturer's standard, finish to match siding.
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- .3 Exterior wall sheathing paper: to CAN/CGSB-51.32 single ply spunbonded olefin type as indicated.
- .4 Fasteners: nails to CSA B111, hot galvanized steel, sized as required, ring thread type with prefinished head to match siding finish.
- .5 Sealants: as per Section 07 92 00 - Joint Sealing.

### PART 3 - EXECUTION

#### 3.1 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.

#### 3.2 INSTALLATION

- .1 Install hardboard to CGSB 11-GP-6M and manufacturers' instructions.
  - .2 Install one layer sheathing paper horizontally by stapling, lapping edges 100 mm. apply pressure sensitive tape to all joints and staple locations.
  - .3 Install sill flashings, wood starter strips, inside corner flashings, edgings and flashings over openings.
  - .4 Fasten wood siding in straight, aligned lengths to furring at 400 mm on centre maximum using two nails at each fixing location. Intermediate butt joints are not permitted. Stagger butt joints not less than 800 mm and distribute evenly over wall faces. Cut butt joints at 45 degrees . Seal cut surfaces.
  - .5 Soffit:
    - .1 Install soffit in accordance with CAN/CSA 086, except where specified otherwise, continuous over two span pattern.
    - .2 Stagger end joints in adjacent boards minimum of 0.5m. Separate joints in same area by at least two intervening courses. Avoid joints in first fifth of end spans. Minimize joints in middle third of span.
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### 3.3 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

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## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S701, Standard for Thermal Insulations, Polystyrene, Boards and Pipe Covering.
  - .2 CAN/ULC-S102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .2 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A123/A123M, Zinc (Hot Dip Galvanized) Coatings on Iron or Steel Products.
  - .2 ASTM C518, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
  - .3 ASTM D1621, Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.
  - .4 ASTM D2842, Standard Test Method for Water Absorption of Rigid Cellular Plastics.
  - .5 ASTM E96, Standard Test Methods for Water Vapor Transmission of Materials.
  - .6 ASTM D696, Standard Test Method for Determining Coefficient of Linear Thermal Expansion of Plastics between -30C and +30C.
  - .7 ASTM C203, Standard Test Method for Breaking Load and Flexural Properties of Block-Type Thermal Insulation.
  - .8 ASTM D2126, Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
- .3 Canadian Standards Association
  - .1 CSA S478-95 (R2007) - Guideline on Durability in Buildings.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .5 Canadian Construction Materials Centre (CCMC) Evaluation Listing, published by the Institute for Research in Construction (IRC) of the National Research Center Canada (NRC/CNRC):
  - .1 Evaluation Listing CCMC 04888-L for STYROFOAM Tech-Crete Blanks.

### 1.2 SYSTEM DESCRIPTION

- .1 Assembly of components includes purpose supplied, preformed panel mounting clips capable of securing factory bonded concrete faced insulated wall panels to structural supporting wall framing.

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- .2 Comply with requirements for continuity of building air barriers, vapour retarders plus wind and suction loads as identified in the National Building Code and applicable local requirements.

### 1.3 PERFORMANCE REQUIREMENTS

- .1 Wall assembly: Design components to withstand flexing and physical distortion due to dead and live loads caused by positive and negative wind pressure acting normal to plane of wall cladding surfaces.
- .2 Maximum Allowable Deflection of Wall Assembly: Determined by supporting structure and imposed weather loads.
- .3 Movement: Accommodate thermal and wind loads within wall assembly without damage to components or deterioration of seals, movement within assembly and between components, when subject to seasonal temperature cycling; dynamic loading and release of loads; deflection of structural support framing.
- .4 Maximum Allowable Deflection of Wall Assembly: 1/280 of span.
- .5 Drainage: Provide positive drainage to water and condensate collectors within wall assembly.
- .6 Products: Provide continuity of thermal barrier at building enclosure elements in conjunction with other thermal insulating materials.
- .7 Vapour Retarder: Provide continuity of vapour retarder at building enclosure elements in conjunction with vapour retarders specified in Section 07 26 00.
- .8 Air Seal: Provide continuity of air barrier seal at building enclosure elements in conjunction with air seal materials specified in Section 07 26 00.

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#### 1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination
  - .1 Coordinate with other work having a direct bearing on work of this section.
  - .2 Coordinate the Work for installation of vapour retarder and air barrier seals.
  - .3 Coordinate the Work with installation of windows, louvres, and components or materials

#### 1.5 SUBMITTALS FOR REVIEW

- .1 Submission procedures as specified in Section 01 33 00.
- .2 Shop Drawings: Indicate dimensions, layout, construction and expansion joints, construction details, methods of anchorage.
- .3 Samples: Submit two (2) samples of full size wall siding, 200 x 200 mm (8 x 8 inch) in size illustrating manner of fitment devices with adjacent panels, with specified finishes and surface texture.

#### 1.6 QUALITY ASSURANCE

- .1 Installer Qualifications: Company specializing in performing the work of this section with training and experience.
- .2 Product Identification: Each pallet of insulated wall panels shall be labelled with product name; manufacturers name or trademark; insulation conforming to ULC S701 Type 4; number of panels per pallet; insulation thickness, and thermal resistance per unit of thickness.
- .3 Insulation must conform to CCMC - Evaluation Listing #04888-L, for NBC compliance.

#### 1.7 MOCK-UP

- .1 Requirements for mock-up as specified in Section 01 45 00.
- .2 Provide 3.6 m long by 1.2 m wide mock-up, which includes structural supports for siding components, panels, attachments to building frame, associated vapour retarder and air seal

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materials, weep drainage system, sealants and seals, related insulation and corner application.

- .3 Locate where directed by Departmental Representative.
- .4 Approved mock-up may remain as part of the Work.

#### 1.8 DELIVERY, STORAGE, AND PROTECTION

- .1 Transport, handle, store, and protect delivered products as specified in Section 01 61 00.
- .2 Store concrete faced insulated wall panels under cover, and in original packaging until ready to install. Store opened packages under cover until installed. Schedule installation to minimize open package time
- .3 Store prefinished material off ground protected from weather, to prevent twisting, bending, or abrasion, and to provide ventilation.
- .4 Prevent contact with materials which may cause electrolysis, discolouration or staining.

#### 1.9 WARRANTY

- .1 Provide warranties as specified in Section 01 78 00: Closeout Procedures.
- .2 Provide manufacturers five (5) year limited warranty to include panel replacement for delamination of concrete facing.

### PART 2 - PRODUCTS

#### 2.1 WALL PANEL ATTACHMENT

- .1 Galvanized Steel: ASTM A123/A123M-08 - Zinc-Coated (Galvanized), Z275 to G90 coating designation, preformed as supplied by manufacturer, complete with corrosion proof masonry fasteners.

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## 2.2 INSULATION

- .1 Extruded polystyrene, conforming to code requirements, in accordance with CAN/ULC S701 type 4.
- .2 Thermal resistance: RSI 0.87/25mm to ASTM C518.
- .3 Foam Compressive Strength: 240 kPa (35 PSI) in accordance with ASTM D1621.
- .4 Water Absorption: ASTM D2842: <0.7 % by volume.
- .5 Water Vapour Permeance: 0.8 perms in accordance with ASTM E96.
- .6 Insulation Thickness: 2 inches (51 mm).

## 2.3 CONCRETE FACED INSULATED WALL PANELS

- .1 Concrete: Latex modified concrete mix, 8 mm (5/16") thick, with control joint score at mid-length.
- .2 Edge Treatment: Tongue and groove along longitudinal foam edges, butt joints on lateral edges.
- .3 Surface Finish: Textured Broom finish; may be coated, colour to be selected by Consultant from manufacturer's standard colours.

## 2.4 ACCESSORIES

- .1 Gaskets to Adjacent Substrates: Standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant; colour to match adjacent colour.
- .2 Sealants to Adjacent Substrates: Standard type suitable for use with installation of system; non-staining, non-skinning, non-shrinking and non-sagging; ultraviolet and ozone resistant; colour as selected.
- .3 Clips and Fasteners: Manufacturer's standard type to suit application; as supplied.
- .4 Field Repair and Touch-up: As recommended by panel manufacturer.
- .5 Wall panel coloured coating (if required): Exterior grade, latex based, concrete or masonry paint or stain.

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- .6 Building Paper Over Surface of Supporting Wall Structure:  
Cellulose fibre building paper, water repellent breather type.
- .7 Perimeter Insulation Flashings 24 gauge minimum: Coordinate supply of end closures and flashings for perimeter insulation system with Section 07 62 00.

## 2.5 COMPONENTS

- .1 Exterior concrete faced insulated wall panel sizes:
  - .1 Width: 610 mm (24 inches).
  - .2 Length: 1220 mm (48 inches).
  - .3 Thickness: 50 mm (2 inches)
- .2 Internal and External Corners:
  - .1 Metal profiles to suit assembly, brake formed to required profiles
  - .2 Trim, Closure Pieces, Caps, Flashings, Facias, Soffits and Infills: Brake formed to required profiles.

## 2.6 FABRICATION

- .1 Form sections true to shape, accurate in size, square, and free from distortion or defects.
- .2 Form custom pieces in longest practicable lengths.
- .3 Fabricate corners in one continuous piece.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- .1 Verify existing conditions and substrates before starting work.
  - .2 Verify that building framing members are ready to receive panel assembly.
  - .3 Remove substrate surface irregularities before installing wall panels. Sweep and clear debris clear of surfaces to receive panels.
  - .4 Ensure existing damp proofing and water proofing below grade is cured and dry.
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- .5 If the lowest substrate surface is not level to receive panels, create a level surface with a galvanized steel ledger angle, and secure level.

### 3.2 INSTALLATION

- .1 Install concrete faced panels on exposed concrete to minimum 300mm below finished grade.
- .2 Butt snugly to board insulation on concrete below grade.
- .3 Ensure snug fit between panel tongue and grooves, and lateral butt joints.
- .4 Fasten concrete faced insulated panels to structural supports; aligned level and plumb.
- .5 Install panels with vertical joints and panel control joints in alignment.
- .6 Use manufacturer's fasteners. Maintain neat appearance.
- .7 Cover exposed insulation at corners and top of perimeter insulation with prefinished flashing as specified in Section 07 62 00.
- .8 Where concrete flatwork or asphalt is to be laid adjacent to CFI Wall Panels, an isolation joint should be provided to protect the CFI mortar surface from differential movement

### 3.3 CLEANING

- .1 Clean installed work as specified in Section 01 74 11 - Cleaning.
- .2 Remove and collect site cuttings, foam bits and packaging for re-cycling.

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## PART 1 - GENERAL

### 1.1 RELATED REQUIREMENTS

- .1 Section 07 46 13 - Preformed Metal Roofing.
- .2 Section 07 50 10 - Concrete Faced Insulated Wall Panels.
- .3 Section 07 71 23 - Manufactured Gutters and Downspouts.
- .4 Section 08 62 10 - Skylights.

### 1.2 REFERENCES

- .1 The Aluminum Association Inc. (AAI)
  - .1 AAI-Aluminum Sheet Metal Work in Building Construction-2002.
  - .2 AAI DAF45-03, Designation System for Aluminum Finishes.
- .2 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A 167-99(2004), Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - .2 ASTM A 606-04, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
  - .3 ASTM A 653/A 653M-07, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .4 ASTM A 792/A 792M-06a, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
  - .5 ASTM B 32-04, Standard Specification for Solder Metal.
  - .6 ASTM D 523-89(1999), Standard Test Method for Specular Gloss.
  - .7 ASTM D 822-01(2006), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .3 Canadian Roofing Contractors Association (CRCA)
  - .1 Roofing Specifications Manual 1997.
- .4 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
  - .2 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.
- .5 Canadian Standards Association (CSA International)
  - .1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt.
  - .2 AAMA/WDMA/CSA 101/I.S.2/A440-2008, Standard/Specification for Windows, Doors, and Unit Skylights.
  - .3 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

- .6 Green Seal Environmental Standards
  - .1 Standard GS-03-93, Anti-Corrosive Paints.
  - .2 Standard GS-11-97, Architectural Paints.
  - .3 Standard GS-36-00, Commercial Adhesives.
- .7 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

### 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 for sheet metal flashing systems materials, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit two copies WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 29 - Health and Safety Requirements 01 35 43 - Environmental Procedures.
- .3 Shop Drawings:
  - .1 Shop drawings: submit drawings in accordance with section 01 33 00 - Submittal Procedures.
- .4 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.
  - .2 Manufacturer's Field Reports: submit to manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3, FIELD QUALITY CONTROL.

### 1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
  - .2 Waste Management and Disposal:
    - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 22 - Construction/Demolition Waste Management and Disposal.
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## PART 2 - PRODUCTS

### 2.1 SHEET METAL MATERIALS

- .1 Zinc coated steel sheet: .65 mm thickness, commercial quality to ASTM A 653/A 653M, with Z275 designation zinc coating.
- .2 Electrolytic zinc coated, chromate treated, steel sheet: to ASTM A 591/A 591M, commercial quality, Grade, Type, copper bearing with proprietary coating comprised of 31.1 kg/m<sup>2</sup> zinc total mass both sides, painted unpainted finish.
- .3 Aluminum sheet: proprietary utility sheet plain pattern, 1.2 mm minimum thickness.

### 2.2 PREFINISHED ALUMINUM SHEET

- .1 Finish: factory applied coating to CAN/CGSB-93.1 supplemented and amended as follows:
  - .1 Type 1 .
  - .2 Class F1S.
  - .3 Colour selected by Consultant from manufacturer's standard range.
- .2 Thickness specified for prefinished aluminum sheet applies to base metal.

### 2.3 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CAN/CGSB 37.5.
- .3 Underlay for metal flashing: asphalt laminated 3.6 to 4.5 kg kraft paper.
- .4 Sealants: In accordance with Section 07 92 00 - Joint Sealants.
- .5 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
- .6 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.
- .7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .8 Solder: to ASTM B 32, as required by manufacturer.

- .9 Flux: rosin, cut hydrochloric acid, or commercial preparation suitable for materials to be soldered.
- .10 Touch-up paint: as recommended by prefinished material manufacturer.

#### 2.4 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details as indicated.
- .2 Fabricate aluminum flashings and other sheet aluminum work in accordance with AAI-Aluminum Sheet Metal Work in Building Construction.
- .3 Form pieces in 2400 mm maximum lengths.
  - .1 Make allowance for expansion at joints.
- .4 Hem exposed edges on underside 12 mm.
  - .1 Mitre and seal corners with sealant.
- .5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .6 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 prefinished steel or prefinished aluminum.

#### 2.6 ALUMINUM FINISHES

- .1 Finish exposed surfaces of aluminum components in accordance with AA DAF45.
    - .1 As fabricated or mill finish: designation AA- M10C10A10.
    - .2 Clear anodic finish: designation AA- DAF-45-M12-C22.
  - .2 Appearance and properties of anodized finishes designated by Aluminum Association as Architectural Class 1, Architectural Class 2, and Protective and Decorative: to AAMA/WDMA/CSA-101/I.S.2/A440, for coating Classes 1, 2 and 3 respectively.
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## 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, AAI-Aluminum Sheet Metal Work in Building Construction 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 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs.
  - .1 Flash joints using S-lock standing seams forming tight fit over hook strips, as detailed.
- .5 Lock end joints and caulk with sealant.

### 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.

## PART 1 - GENERAL

### 1.1 RELATED REQUIREMENTS

- .1 Fascia Hanger
- .2 Section 07 46 13 - Preformed Metal Roofing.
- .3 Section 07 62 00 - Sheet Metal Flashing and Trim.

### 1.2 DESIGN REQUIREMENTS

- .1 Conform to SMACNA - Architectural Sheet Metal Manual: 7th Edition for sizing components for rainfall intensity determined by a storm occurrence of 1 in 50 years and as required by local building code.

### 1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings: Indicate perimeter drain upstand locations, plug-in outlet and downspout locations, configurations, jointing methods, fastening methods, special component locations and installation details.
- .3 Samples:
  - .1 Submit one fascia bracket, one gutter, and one downspout sample, each 300mm long where applicable, illustrating component design, finish, colour, size and configuration.

### 1.4 DELIVERY, STORAGE AND PROTECTION

- .1 Stack material restrained vertically. Prevent twisting, bending, or abrasion. Keep dry and provide ventilation.
- .2 Prevent contact with materials during storage and installation which may cause discolouration, staining or damage.

### 1.5 PROJECT CONDITIONS

- .1 Coordinate the work with perimeter drain tile upstand pipe location.
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## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- .1 Reinzink 125mm Preweathered Half-round Gutter System with zinc sheathed gutter hangers.
- .2 80mm round downspouts. Standard downspout profile to be smooth (without corrugations) with expanded hub ends for clean, tight, friction fit connections.
- .3 Titanium Zinc Alloy: 99.995% pure electrolytic high-grade zinc alloyed with titanium and copper in accordance with ASTM B69-13-Type 1 and Type 2.
- .4 Surface: standard Preweathered or Graphite Gray "Pro" coated material for gutters, downspouts and prefabricated accessories unless noted otherwise.

### 2.2 COMPONENTS

- .1 Gutters: 125mm half-round profile.
  - .2 Downspouts: 80mm smooth plain round profile to fit corresponding gutter size. All downspouts, elbows, offsets and downspout accessories must be high frequency welded.
  - .3 Plug in Outlets: Funnel inlets at transition between half-round gutter and downspouts.
  - .4 Smooth Round Elbows (60 degrees or 72 degrees) without corrugations.
  - .5 Prefabricated roof drainage accessories:
    - .1 Leaf Collector and Rainwater Diverter 80mm.
    - .2 90 degree Miters: Preformed seamless, inside corner and outside corner 125mm.
    - .3 Half-round Leaf Guard 125mm.
    - .4 Half-round gutter expansion joint 125mm.
    - .5 Leader Head 80mm round outlet.
    - .6 Gutter End Caps 125mm.
    - .7 Drain Tile Extension (3-1/8" or 4")
    - .8 Offset as required.
    - .9 Wire strainer.
  - .6 Anchors and Supports: Sized to suit gutters and downspouts.
    - .1 Anchoring Devices: In accordance with SMACNA requirements.
    - .2 Gutter Supports: Galvanized steel fascia brackets.
    - .3 Downspout Supports: Prefabricated two piece Downspout Brackets.
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- .7 Fasteners:
  - .1 Galvanized steel or stainless steel wood screws for attaching fascia bracket.

## 2.3 ACCESSORIES

- .1 Solder: 50-50 lead-tin low antimony solder.
- .2 Soldering Flux: ZD-pro by Felder.

## PART 3 - EXECUTION

### 3.1 INSPECTION

- .1 Verify existing conditions before starting work. Notify General Contractor of any conditions unsuitable for gutter installation.
- .2 Examine fascia board to ensure that substrate alignment is straight, level, and plumb and adequate for fastening to transfer structural loads. Determine if sloped gutter installation is required. Otherwise, provide level or minimal pitch to drain 1.5mm per 300mm.

### 3.2 GUTTER AND OUTLET INSTALLATION

- .1 Fascia Hanger System
    - .1 Assemble gutter and bracket to mock-up installation. Adjust gutter height to locate bracket so top of gutter bead aligns with the extension of top of sheathing (projected roof plane) so that snow (where applicable) will slide past the installed gutter system.
    - .2 Adequately screw fascia bracket through fascia board and similarly attach subsequent brackets at spacing not to exceed 32" O.C. or lesser spacing as determined by Departmental Representative.
    - .3 Place half-round gutter into bracket supports and snap gutter bead into place. Shingle lap adjacent gutter sections 3/8" (10mm) to drain and solder additional sections of half-round gutter up to a maximum of 49' of straight unrestrained runs. Provide expansion capability within 25' of any fixed end using expansion joints or sliding joint centered over plug-in outlet locations.
    - .4 Solder prefabricated gutter corners as required by roof geometry and drawings. Conceal gutter joints at gutter brackets.
    - .5 Mark plug-in outlet locations of downspouts. Cut elongated oval hole in gutter at gutter low point, slightly smaller than required funnel opening. Bend cut zinc outlet edges down with mallet to provide drip edge transition from
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gutter to plug-in-outlet. Allow space for gutter to move relative to outlet top due to thermal changes.

.6 Fit prefabricated gutter plug-in outlet onto gutter at round cut opening. Bend back flanges over watercheck to fit half-round gutter and support plug-in unit. Friction fit installation suggested.

### 3.3 DOWNSPOUT INSTALLATION

- .1 Attach elbows beginning at gutter plug-in-outlet. friction fit connection without use of rivets, screws, solder, sealant or adhesive. Install hanger at offset elbow at wall if concealed hanger is used, otherwise shim clamp below expanded portion of topmost downspout run using half bead. Use continuous long lengths. For partial downspout sections, utilize downspout expanding tool attachment with electric drill to form female hub connection.
- .2 Connect downspouts to perimeter drains and storm sewer system where applicable.
- .3 For surface drainage, install prefabricated elbow 150mm above finish grade for splash block installation by landscape contractor.

### 3.4 ACCESSORIES INSTALLATION

- .1 Provide leaf guard accessories to gutter systems as loose fit installations.
- .2 Provide leaf collector to downspouts on main runs connected to perimeter drains with clean-out height at 1200mm above grade or to fit rain barrel height.
- .3 Provide Rainwater diverter to accommodate remote rain barrel location where specified.

### 3.5 RECYCLING

- .1 Collect, store and return scraps to local metal recycler.

## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .2 Underwriter's Laboratories of Canada (ULC)
  - .1 ULC-S115-1995, Fire Tests of Fire stop Systems.

### 1.2 DEFINITIONS

- .1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.
- .2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.
- .3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.
- .4 Tightly Fitted; (ref: NBC Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of noncombustible construction or have "0" annular space in buildings of combustible construction.
  - .1 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

### 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.
    - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
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- .3 Shop Drawings:
  - .1 Submit shop drawings to show location, proposed material, reinforcement, anchorage, fastenings and method of installation.
  - .2 Construction details should accurately reflect actual job conditions.
- .4 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
  - .1 Test reports: in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics.
    - .1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.
  - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
  - .3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

#### 1.4 QUALITY ASSURANCE

- .1 Qualifications:
  - .1 Installer: company specializing in fire stopping installations with 5 years documented experience and as approved by manufacturer.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
    - .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 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.
  - .2 Storage and Protection:
    - .1 Store materials indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
    - .2 Replace defective or damaged materials with new.
  - .3 Waste Management and Disposal:
    - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 22 - Construction/Demolition Waste Management and Disposal.
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## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Fire stopping and smoke seal systems: in accordance with CAN-ULC-S115.
    - .1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN- ULC-S115 and not to exceed opening sizes for which they are intended and conforming to specified special requirements described in PART 3.
  - .2 Service penetration assemblies: systems tested to CAN-ULC-S115.
  - .3 Service penetration fire stop components: certified by test laboratory to CAN-ULC-S115.
  - .4 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.
  - .5 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.
  - .6 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.
  - .7 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
  - .8 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
  - .9 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
  - .10 Sealants for vertical joints: non-sagging.
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## 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 PREPARATION

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
  - .1 Ensure that substrates and surfaces are clean, dry and frost free.
- .2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.
- .4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

### 3.3 INSTALLATION

- .1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.
  - .2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
  - .3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
  - .4 Tool or trowel exposed surfaces to neat finish.
  - .5 Remove excess compound promptly as work progresses and upon completion.
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#### 3.4 SEQUENCES OF OPERATION

- .1 Proceed with installation only when submittals have been reviewed by Departmental Representative.
- .2 Install floor fire stopping before interior partition erections.
- .3 Metal deck bonding: fire stopping to precede spray applied fireproofing to ensure required bonding.
- .4 Mechanical pipe insulation: certified fire stop system component.
  - .1 Ensure pipe insulation installation precedes fire stopping.

#### 3.5 FIELD QUALITY CONTROL

- .1 Inspections: notify Departmental Representative when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

#### 3.6 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 Remove temporary dams after initial set of fire stopping and smoke seal materials.

#### 3.7 SCHEDULE

- .1 Fire stop and smoke seal at:
    - .1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.
    - .2 Edge of floor slabs at curtain wall and precast concrete panels.
    - .3 Top of fire-resistance rated masonry and gypsum board partitions.
    - .4 Intersection of fire-resistance rated masonry and gypsum board partitions.
    - .5 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
    - .6 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
    - .7 Openings and sleeves installed for future use through fire separations.
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- .8 Around mechanical and electrical assemblies penetrating fire separations.
- .9 Rigid ducts: greater than 129 cm<sup>2</sup>: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

## PART 1 - GENERAL

### 1.1 RELATED REQUIREMENTS

- .1 Section 02 81 01 - Hazardous Materials.
- .2 Section 03 10 00 - Concrete Forming and Accessories.
- .3 Section 06 10 00 - Rough Carpentry.
- .4 Section 06 15 00 - Wood Decking.
- .5 Section 06 20 00 - Finish Carpentry.
- .6 Section 06 40 00 - Architectural Woodwork.
- .7 Section 07 26 00 - Vapour Retarders.
- .8 Section 07 46 23 - Wood Siding.
- .9 Section 07 62 00 - Sheet Metal Flashing and Trim.
- .10 Section 08 11 00 - Metal Doors and Frames.
- .11 Section 08 33 36 - Side Coiling Grills.
- .12 Section 08 54 13 - Fibreglass Awning and Fixed Windows.
- .13 Section 08 62 10 - Skylight.
- .14 Section 08 80 50 - Glazing.
- .15 Section 09 21 16 - Gypsum Board Assemblies.
- .16 Section 09 91 99 - Painting for Minor Works.

### 1.2 REFERENCES

- .1 ASTM International
    - .1 ASTM C 919-08, Standard Practice for Use of Sealants in Acoustical Applications.
  - .2 Canadian General Standards Board (CGSB)
    - .1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
    - .2 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
    - .3 CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
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- .4 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
- .5 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.
- .3 General Services Administration (GSA) - Federal Specifications (FS)
  - .1 FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

### 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 joint sealants and include product characteristics, performance criteria, physical size, finish and limitations.
    - .2 Manufacturer's product to describe:
      - .1 Caulking compound.
      - .2 Primers.
      - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
    - .3 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29 - Health and Safety Requirements 01 35 43 - Environmental Procedures.
  - .3 Samples:
    - .1 Submit 2 samples of each type of material and colour.
    - .2 Cured samples of exposed sealants for each colour where required to match adjacent material.
  - .4 Manufacturer's Instructions:
    - .1 Submit instructions to include installation instructions for each product used.
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#### 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 incorporation into manual.

#### 1.5 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, indoors and in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect joint sealants from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in accordance with Section 01 74 22 - Construction/Demolition Waste Management and Disposal.

#### 1.6 SITE CONDITIONS

- .1 Ambient Conditions:
    - .1 Proceed with installation of joint sealants only when:
      - .1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 degrees C.
      - .2 Joint substrates are dry.
      - .3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
  - .2 Joint-Width Conditions:
    - .1 Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.
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- .3 Joint-Substrate Conditions:
  - .1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.

## 1.7 ENVIRONMENTAL REQUIREMENTS

- .1 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 (MSDS) acceptable to Health Canada.

## PART 2 - PRODUCTS

### 2.1 SEALANT MATERIALS

- .1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.
- .2 When low toxicity caulks are not possible, confine usage to areas which off gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.
- .3 Where sealants are qualified with primers use only these primers.

### 2.2 SEALANT MATERIAL DESIGNATIONS

- .1 Type ES#1
    - .1 One part low modulus, neutral cure, SILYL-terminated non-sag elastomeric sealant conforming to ASTM C920.
    - .2 Type: S
    - .3 Grade: NS
    - .4 Class: 25
    - .5 Use Nt, M, A, G and O.
    - .6 Additional movement capability of +100 to -50.
  - .2 Type ES#2
    - .1 Two component, self leveling and slope grade elastomeric polyurethane for horizontal joints (vehicular and pedestrian traffic bearing) conforming to ASTM C920.
    - .2 Type: M
    - .3 Grade: D
    - .4 Class: 25
    - .5 Use: T and M
    - .6 Movement Capability of +/- 25%
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- .3 Type ES#3
  - .1 One part, medium modulus, neutral cure silicone sealant conforming to ASTM 920.
  - .2 Type: S
  - .3 Grade NS
  - .4 Class: 25
  - .5 Use NT, M, G, A, and O
  - .6 Movement capability of +/- 25%
- .4 Type ES#4
  - .1 Two part, neutral cure, medium modulus silicone sealant conforming to ASTM C920. Non-staining to porous surfaces per ASTM C1248.
  - .2 Type: M
  - .3 Grade: NS
  - .4 Class: 25
  - .5 Use NT, M, G, A and O.
  - .6 Additional Movement capability of +/- 50%
- .5 Type ES#5
  - .1 One part mildew-resistant silicone sealant conforming to ASTM C920. Meeting requirements of FDA Regulation No. 21 CFR 177.2600.
  - .2 Type: S
  - .3 Grade: NS
  - .4 class: 25
  - .5 Use G, A and O
  - .6 Additional Movement capability of +/- 50%
- .6 Type ES#6
  - .1 One part acrylic-based acoustical sealant conforming to ASTM C920.
  - .2 Class: 25
- .7 Type ES#7
  - .1 One-part paintable silicone sealant (water-based).
- .8 Type ES#8
  - .1 One part clear silicone sealant.

## 2.3 SEALANT SELECTION

- .1 Type ES#1
    - .1 Use: Vertical expansion and control joints.
    - .2 Substrate: Masonry, concrete and pre-cast.
  - .2 Type ES#2
    - .1 Use: Perimeter joints and non-structural weatherseals.
    - .2 Substrate: Aluminum, Plastics, Masonry, Concrete.
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- .3 Type ES#3
  - .1 Use: Structural curtain wall adhesive sealant
  - .2 Substrate: glass, Aluminum, Spandrel materials.
- .4 Type ES#4
  - .1 Use: Weatherseals
  - .2 Substrate: Metal Panels, Natural Stone Panels.
- .5 Type ES#5
  - .1 Use: Plumbing fixtures in washrooms and bathrooms.
  - .2 Substrate: Ceramic Tile, sinks and Bath fixtures.
- .6 Type ES #6
  - .1 Use: Acoustical sealant around partitions.
  - .2 Substrate: Gypsum board, Steel, Aluminum.
- .7 Type ES #7
  - .1 Use: Interior Joints to be painted.
  - .2 Substrate: Metal, Gypsum Board.
- .8 Type ES#8
  - .1 Use: Interior Joints.
  - .2 Substrate: Wood, Solid Surfacing, Gypsum Board.

#### 2.4 JOINT CLEANER

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's written recommendations.
- .2 Primer: in accordance with sealant manufacturer's written recommendations.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for joint sealants installation 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 have been remedied and after receipt of written approval to proceed from Departmental Representative.
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### 3.2 SURFACE PREPARATION

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.
- .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Ensure joint surfaces are dry and frost free.
- .5 Prepare surfaces in accordance with manufacturer's directions.

### 3.3 PRIMING

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

### 3.4 BACKUP MATERIAL

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

### 3.5 MIXING

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

### 3.6 APPLICATION

- .1 Sealant:
    - .1 Apply sealant in accordance with manufacturer's written instructions.
    - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
    - .3 Apply sealant in continuous beads.
    - .4 Apply sealant using gun with proper size nozzle.
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- .5 Use sufficient pressure to fill voids and joints solid.
- .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
- .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
- .8 Remove excess compound promptly as work progresses and upon completion.

- .2 Curing:
  - .1 Cure sealants in accordance with sealant manufacturer's instructions.
  - .2 Do not cover up sealants until proper curing has taken place.

### 3.7 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
  - .2 Clean adjacent surfaces immediately.
  - .3 Remove excess and droppings, using recommended cleaners as work progresses.
  - .4 Remove masking tape after initial set of sealant.
- .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 Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### 3.8 PROTECTION

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