# 1 GENERAL

## 1.01 REFERENCES

.1 American Society for Testing and Materials International (ASTM).
- .1 ASTM E96/E96M-15, Standard Test Methods for Water Vapour Transmission of Materials.
- .2 ASTM E283-04, Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen.

## 1.02 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:
- .1 Provide two copies of most recent technical waterproofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.

## 1.03 DELIVERY, STORAGE, AND HANDLING

.1 Provide and maintain in dry, off-ground weatherproof storage and in accordance with manufacturer’s printed instructions.

## 1.04 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 00 10 – General Instructions.

## 1.05 FIELD CONDITIONS

.1 Do not install waterproofing when temperature remains below -5 degrees C.

.2 Install waterproofing on dry substrates, free of snow and ice. Use only dry materials and apply only during weather that will not introduce moisture into waterproofing system.

# 2 PRODUCTS

## 2.01 PERFORMANCE CRITERIA

.1 System: capable of providing continuity of moisture, air and vapour barrier systems of adjacent materials, components and assemblies.

.2 Compatibility between components of waterproofing system is essential. Provide written declaration to Departmental Representative stating that materials and components, as assembled in system, meet this requirement.

## 2.02 MEMBRANE

.1 All components, products and accessories to be by single manufacturer.

.2 Self Adhered Air/Vapour Membrane:
- .1 Self-adhering membrane consisting of SBS rubberized asphalt compound integrally laminated to cross-laminated polyethylene film.
  - .1 Thickness: nominal 1mm minimum
  - .2 Air leakage: maximum 0.01 L/s.m2 @ 75Pa in accordance with ASTM E283
  - .3 Water vapour transmission: maximum 2 ng/Pa.s.m2 in accordance with ASTM E96/E96M.

.3 Transition and patching membrane:
- .1 Foamed-in-Place Sealant - General Purpose Type: semi-rigid single-component polyurethane sealant, to CAN/ULC-S710.1.
  - .1 Applicator: Gun Applied
  - .2 Thermal Resistance: RSI 0.67 per 25mm thickness.

.4 Weather Barrier:
- .1 Tear resistant breathing (vapour permeable) sheet membrane, with the following minimum characteristics:
  - .1 Air penetration: 0.001 cfm/ftý at 75 Pa, when tested in accordance with ASTM E2178. Type I per ASTM E1677.
  - .2 Water Vapor Transmission: 28 perms, when tested in accordance with ASTM E96, Method B.
  - .3 Water Penetration Resistance: 280 cm when tested in accordance with AATCC Test Method 127.
  - .4 Tensile Strength: 38/35 lbs/in., when tested in accordance with ASTM D882, Method A.
  - .5 Tear Resistance: 12/10 lbs., when tested in accordance with ASTM D1117.
  - .6 Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84. Flame Spread: 10, Smoke Developed: 10.
  - .7 Sealing tape: sealing tape purpose made air pressure resistant tape as recommended by manufacturer, 76mm wide, for commercial applications.

## 2.03 PRIMERS

.1 Primer as recommended by membrane manufacturer.

# 3 EXECUTION

## 3.01 MANUFACTURER'S INSTRUCTIONS

.1 Install all products in accordance with manufacturer's printed literature.

## 3.02 INSTALLATION OF SELF-ADHERED MEMBRANE

.1 All surfaces to be clean of oil, dust and dirt.

.2 Ensure all substrates are free of surface moisture prior to application of self-adhesive

membrane and primer.

.3 Apply self-adhering membrane continuously to properly prepared substrate. Ensure gaps beyond 3mm are covered with reinforcing mesh as recommended by membrane manufacturer.

.4 Overlap all joints and seams minimum 50mm with upper membrane overlapping lower membrane.

.5 For transitions with adjacent membranes, roof membrane, door and window frames and service penetrations:
- .1 Apply primer to all surfaces for self-adhesive membrane prior to membrane installation.
- .2 Apply membrane to primed surfaces while primer is still tacky and press firmly in place avoiding bubbles, fishmouths and gaps.
- .3 Overlap all joints minimum 50mm.
- .4 Overlap liquid applied membrane onto self-adhesive membrane minimum 50mm. Ensure continuity of entire air and vapour planes.
- .5 The membrane shall be pressed firmly into place by means of a hand roller, thereby ensuring continuous and intimate contact with the substrate.
- .6 All wrinkles and blisters will have to be cut and covered with a strip overlapping 150 mm minimum measured from the cut and in all directions. Apply a bead of mastic at all edges.

## 3.03 INSTALLATION OF WEATHER BARRIER

.1 Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.

.2 Install weather barrier prior to installation of windows and doors.

.3 Start weather barrier installation at a building corner, leaving 150-300mm of weather barrier extended beyond corner to overlap.

.4 Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level.

.5 Extend lower edge of weather barrier over sheathing edge 75-150mm. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.

.6 Window and Door Openings: Extend weather barrier completely over openings. Overlap weather barrier.
- .1 Exterior corners: minimum 300mm.
- .2 Seams: minimum 150mm.

.7 Weather Barrier Attachment: Attach weather barrier to exterior sheathing. Secure using weather barrier manufacturer recommended fasteners, space 300-450mm vertically and 600mm on center, maximum horizontally.

.8 Seaming:
- .1 Seal seams of weather barrier with seam tape at all vertical and horizontal

overlapping seams.

.2 Seal any tears or cuts as recommended by weather barrier manufacturer.

## 3.04 CLEANING

.1 Remove bituminous markings from finished surfaces.

.2 In areas where finished surfaces are soiled caused by work of this section, consult manufacturer of surfaces for cleaning advice and complying with their documented instructions.

.3 Repair or replace defaced or disfigured finishes caused by work of this section.

**END OF SECTION**

# Part 1 General

## 1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C612-14, Standard Specification for Mineral Fibre Block and Board Thermal Insulation.

.2 ASTM C1289-14a, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board

.3 ASTM D1621-10, Standard Test Method for Compressive Properties Of Rigid Cellular Plastics

.2 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Coverings.

.2 CAN/ULC-S704-11, Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.

## 1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures

.2 Product Data: Provide manufacturer's printed product literature, specifications and data sheets.

.3 Provide manufacturer's installation instructions.

.4 Test Reports: Provide certified test reports demonstrating compliance with specified performance characteristics and physical properties.

## 1.3 WASTE MANAGEMENT

.1 Separate waste materials for recycling in accordance with Section 01 00 10 - General Instructions.

# Part 2 Products

## 2.1 INSULATION

.1 Extruded Polystyrene (XPS): to ASTM C518 and CAN/ULC-S701 for exterior wall applications:

.1 Type: 3 to CAN/ULC-S701

.2 Compressive strength: minimum 120 kPa to ASTM D1621

.3 Long term thermal resistance: minimum RSI 0.85 per 25.4mm thickness @ 24 °C

.4 Thickness: as indicated

## 2.2 ADHESIVE

.1 Adhesive: type as recommended by each insulation manufacturer

## 2.3 ACCESSORIES

.1 Insulation screws and washers: self-tapping and self-drilling screw fasteners, length to suit insulation with minimum 38mm diameter washers.

# 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 Z-girts.

.4 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.

.5 Offset both vertical and horizontal joints in multiple layer applications.

## 3.3 EXAMINATION

.1 Examine substrates and immediately inform Departmental Representative in writing of defects.

.2 Prior to commencement of work ensure substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris

## 3.4 EXTERIOR WALL INSTALLATION

.1 Apply adhesive to substrate in accordance with manufacturer's recommendations with notched trowel

.2 Leave insulation board joints unbonded over line of expansion and control joints. Bond a continuous 150 mm wide strip of modified bituminous membrane over expansion and control joints using compatible adhesive and primer before application of insulation.

## 3.5 CLEANING

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

**END OF SECTION**

# 1 GENERAL

## 1.01 REFERENCES

.1 Canadian Urethane Foam Contractors' Association Inc. (CUFCA).

.2 Underwriters' Laboratories of Canada (ULC).
- .1 CAN/ULC-S705.1-01, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification.
- .2 CAN/ULC-S705.2-05, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Application.

## 1.02 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.

## 1.03 SITE CONDITIONS

.1 Protect adjacent surfaces and equipment from damage by fall-out and dusting of insulation materials.

.2 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

# 2 PRODUCTS

## 2.01 MATERIALS

.1 Insulation: closed cell spray polyurethane to CAN/ULC-S705.1.
- .1 Density: minimum 27 kg/m3 (ASTM D-1622)
- .2 Water absorption: maximum 1% by volume (ASTM D-2842)
- .3 Thermal resistance: minimum RSI 1.1 per 25mm after 180 days (ASTM C-518)
- .4 Air leakage: system result maximum 0.005 l/s/m2 @ 75Pa

# 3 EXECUTION

## 3.01 MANUFACTURER'S INSTRUCTIONS

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

## 3.02 APPLICATION

.1 Apply insulation to clean surfaces in accordance with CAN/ULC-S705.2 and manufacturer's printed instructions.

.2 Apply sprayed foam insulation in thickness to completely fill, when fully expanded, depth and width of complete perimeter voids between framing elements.

.3 Apply to complete perimeters of doors, windows, mechanical, electrical and all other exterior wall penetrations as where located on drawings.

## 3.03 CLEANING

.1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Clean all material fallout immediately following application.

**END OF SECTION**

## Part 1 General

### 1.1 REFERENCES

.1 American Society of Mechanical Engineers (ASME)

.1 ASME B18.6.3-2011, Machine Screws, Tapping Screws, and Metallic Drive Screws (Inch Series).

### 1.2 SUBMITTALS

.1 Provide submittals 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 Province of Quebec, Canada.

.2 Design system comprised of metal profiles, fasteners, sub-framing and accessories to withstand wind and seismic loads. Provide calculations and recommendations.

.4 Samples:

.1 Submit duplicate 50 x 50 mm samples of siding colour on metal substrate.

### 1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance 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.

### 1.4 WASTE MANAGEMENT

.1 Separate and recycle in accordance with Section 01 00 10 – General Instructions.

## Part 2 Products

### 2.1 STEEL CLADDING AND COMPONENTS

.1 Exterior cladding:

.1 Finish coating: manufacturer pre-finished siding

.1 Colour: Tan.

.2 Thickness: minimum 0.6 mm base metal thickness.

.3 Profile: ribbed channel complete with preformed interlocking joints and pre-punched fastener holes.

.1 Hidden fastener system.

.4 Acceptable Products:

.1 VicWest AD300-R

.2 Ideal Roofing Urban Accent UA1200

.3 Agway HF-12F

.5 Contractor to provide multiple colour samples of metal cladding in order to select colour prior to installation. Contractor to confirm final colour selection prior to installation.

**2.2 FASTENERS**

.1 Screws: self-tapping to ASME B18.6.3, purpose made galvanized steel.

**2.3 CAULKING**

.1 Sealants: in accordance with Section 07 92 00 - Joint Sealants.

**2.4 ACCESSORIES**

.1 Exposed trim: inside corners, outside corners, cap strip, drip cap, undersill trim, starter strip of same colour as cladding, with fastener holes pre-punched. Minimum 0.6 mm thickness

**2.5 SUB FRAMING**

.1 Metal framing components: in accordance with Section 05 41 00 - Structural Metal Stud Framing

## Part 3 Execution

**3.1 EXAMINATION**

.1 Verification of Conditions: verify that conditions of substrate complete and acceptable for work of this Section in accordance with manufacturer's requirements

.1 Inform Departmental Representative of unacceptable conditions immediately upon discovery and await written instructions prior to proceeding.

**3.2 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.

**3.3 INSTALLATION**

.1 Install cladding in accordance with manufacturer's written instructions.

.2 Install continuous starter strips, inside and outside 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 Maintain joints in exterior cladding, true to line, tight fitting, hairline joints.

.5 Attach components in manner not restricting thermal movement.

.6 Caulk junctions with adjoining work with sealant in accordance with Section 07 92 00 - Joint Sealants.

## 3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning. Leave Work area clean at end of each day

## 3.5 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**

# Part 1 General

## 1.1 REFERENCES

.1 ASTM International Inc.

- .1 ASTM D41-11, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
- .2 ASTM D3676-13, Standard Specification for Rubber Cellular Cushion Used for Carpet or Rug Underlay
- .3 ASTM D6163-00e1, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.
- .4 ASTM D6164-11, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.

.2 Canadian Roofing Contractors Association (CRCA)

- .1 CRCA Roofing Specifications Manual-2012.

.3 Canadian Standards Association (CSA International)

- .1 CSA A123.21-14, Standard Test Method for the Dynamic Wind Uplift Resistance of Mechanically Attached Membrane-Roofing Systems
- .2 CSA-A123.4-04, Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.
- .3 CSA A231.1-14, Precast Concrete Paving Slabs.

## 1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

- .1 Provide two copies of most recent technical roofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Provide shop drawings:

- .1 Provide layout for tapered insulation.

.4 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.

## 1.3 QUALITY ASSURANCE

.1 Installer qualifications: company or person specializing in application of modified bituminous roofing systems recognized by manufacturer.

### 1.4 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

### 1.5 WASTE MANAGEMENT

.1 Waste products to be disposed or recycled in accordance with Section 01 00 10 - General Instructions

### 1.6 SITE CONDITIONS

.1 Ambient Conditions: Comply with manufacturer's written requirements for each product

.2 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.

## Part 2 Products

### 2.1 PERFORMANCE CRITERIA

.1 Compatibility between components of roofing system is essential. Provide written declaration to Departmental Representative stating that materials and components, as assembled in system, meet this requirement.

.2 All materials and products of this Section to be by single roofing manufacturer.

.3 Roofing System: tested to CSA A123.21 for wind uplift resistance of actual building conditions.

### 2.2 DECK PRIMER

.1 Asphalt primer: to ASTM D41.

### 2.3 VAPOUR RETARDER

.1 Self adhesive: SBS modified bitumen self-adhesive membrane with polyethylene facer, minimum 0.7 mm thickness

### 2.4 MEMBRANE

.1 Base sheet membrane: to CGSB 37-GP-56M.

- .1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer polyester reinforcement, having nominal weight of 180 g/m2.
- .2 Type 2.
- .3 Class C - plain surfaced.
- .4 Grade 1 - standard service.
- .5 Top and bottom surfaces:
  - .1 polyethylene/polyethylene.
- .6 Base sheet membrane properties: to CGSB 37-GP-56M.

.1 Breaking strength (longitudinal/transversal): 17.0/12.5 N/5 cm.
.2 Ultimate elongation (longitudinal/transversal): 60/65 %.
.3 Tear resistance: 60 N.
.4 Cold bending at -30°C : no cracking.
.5 Softening point: □ 110°C.
.6 Static puncture resistance: > 400.
.7 Dimensional Stability: -0.3 / 0.3 %.

.2 Self-Adhesive base sheet membrane flashing: to CGSB 37-GP-56M.

.1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer prefabricated sheet, polyester and glass reinforcement.
.2 Type 2, adhered.
.3 Class C - plain surfaced.
.4 Grade 2 – heavy duty service.
.5 Top and bottom surfaces:
.1 Polyethylene /release paper.
.6 Base sheet membrane properties: to CGSB 37-GP-56M.
.1 Strain energy (longitudinal/transversal): 7.8/7.2 kN/m.
.2 Breaking strength (longitudinal/transversal): 15/13.5 N/5 cm.
.3 Ultimate elongation (longitudinal/transversal): 60/65 %.
.4 Tear resistance: 125 N.
.5 Cold bending at -30°C: no cracking.
.6 Static puncture resistance: > 560.

.3 Cap sheet membrane and membrane flashing: to CGSB 37-GP-56M

.1 .1 Styrene-Butadiene-Styrene(SBS) elastomeric polymer, prefabricated sheet, 250 g/m2.
.2 Type 1.
.3 Class A-granule surfaced.
.1 Colour for granular surface: gray.
.4 Grade 1-standard service.
.5 Bottom surface polyethylene.
.6 Cap sheet membrane properties: to CGSB 37-GP-56M.
.1 Strain energy (longitudinal/transversal): 13.0/10.0 kN/m.
.2 Breaking strength (longitudinal/transversal): 25.0/16.0 kN/m.
.3 Ultimate elongation (longitudinal/transversal): 63/93 %.
.4 Tear resistance: 118 N.
.5 Cold bending at -30°C: No cracking.
.6 Softening point: □ 110°C.
.7 Static puncture resistance: > 432.
.8 Dimensional Stability: -0.2 / 0.2 %.

## 2.5 ADHESIVE

.1 Adhesive: .as recommended by membrane manufacturer

## 2.6 OVERLAY BOARD

.1 Overlay Board: 3 mm thick asphalt based recovery board with non-woven glass facers, as recommended by the membrane manufacturer.

## 2.7 POLYISOCYANURATE INSULATION

.1 Polyisocyanurate for roofing applications:

.1 Faced: to ASTM C1289 and CAN/ULC-S704.

.1 Type: 2 Class 1, Grade 1 to ASTM C1289.

.2 Compressive strength: minimum 110 kPa to ASTM D1621.

.3 Long term thermal resistance: minimum RSI 1 per 25.4mm thickness @ 24 °C

.4 Thickness: as indicated.

.1 Sloped surfaces as required for drainage.

## 2.8 EQUIPMENT SUPPORTS

.1 Concrete pavers: to CSA A231.1, precast concrete paving slabs with non-slip finish, nominal 40 mm thickness

.2 Rubber mat: thickness as indicated, minimum 975 kg/m3 density to ASTM D3676, purpose made for roof applications

## 2.9 CARPENTRY

.1 In accordance with Section 06 10 00 - Rough Carpentry.

## 2.10 CANT STRIPS (if required by roofing manufacturer)

.1 Wood, fibreboard or other products as recommended by roofing manufacturer. Profiles and sizes as required

# Part 3 Execution

## 3.1 QUALITY OF WORK

.1 Do examination, preparation and roofing Work in accordance with CRCA Roofing Specification Manual

.2 Do priming in accordance with manufacturers written recommendations.

.3 The interface of the walls and roof assemblies will be fitted with durable rigid material sheet metal providing connection point for continuity of air barrier.

.4 Assembly, component and material connections will be made in consideration of appropriate design loads, with reversible mechanical attachments.

## 3.2 EXAMINATION OF ROOF DECKS

.1 Verification of Conditions:

.1 Inspect deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation outlets to determine readiness to proceed. Immediately inform Departmental Representative of unacceptable conditions and await written instruction prior to proceeding with work

.2 Evaluation and Assessment:

.1 Prior to beginning of work ensure:

.1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris. Do not use calcium or salt for ice or snow removal.

.2 Curbs have been built.

.3 Roof drains have been installed at proper elevations relative to finished roof surface.

.3 Do not install roofing materials during rain or snowfall.

## 3.3 PROTECTION OF IN-PLACE CONDITIONS

.1 Cover walls, walks, slopped roofs and adjacent work where materials hoisted or used.

.2 Use warning signs and barriers. Maintain in good order until completion of Work.

.3 Clean off drips and smears of bituminous material immediately.

.4 Dispose of rain water off roof and away from face of building until roof drains or hoppers installed and connected.

.5 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed Work and materials out of storage.

## 3.4 MEMBRANE PATCHING

.1 Clear away ballast and fabric covering from roof membrane near scupper area as indicated. Cut back existing membrane to permit repair work.

.2 Clean asphalt, sealant and other loose materials between existing membrane and scupper.

.3 Clean and prime edges of existing rubberized asphalt membrane in accordance with roofing manufacturer's printed recommendations.

.4 Adhere base and cap membrane in accordance with roofing manufacturer's printed recommendations. Provide watertight integration with existing roofing assembly and scupper.

.5 Replace fabric and ballast to match existing.

## 3.5 PRIMING CONCRETE SUBSTRATE

.1 Apply deck primer to concrete roofing substrate at rate recommended by roofing manufacturer.

## 3.6 VAPOUR RETARDER

.1 Adhere vapour retarder using solvent based primer as per manufacturer's instructions.

## 3.7 EXPOSED MEMBRANE ROOFING APPLICATION

.1 Insulation application:

- .1 Embed insulation in adhesive in accordance with manufacturer's printed instructions.
- .2 Place boards in parallel rows with ends staggered, and in firm contact with one another.

.2 Tapered insulation application:

- .1 Adhere tapered insulation to base insulation with adhesive in accordance with roofing manufacturer's recommendations

.3 Overlay Board application:

- .1 Adhere overlay board to insulation with adhesive in accordance with roofing manufacturer's recommendations.
- .2 Place boards in parallel rows with end joints staggered. Cap joints approximately 25 mm.

.4 Cants:

- .1 Secure cants as required by roofing membrane manufacturer.

.5 Base sheet application:

- .1 Starting at low point of roof, perpendicular to slope, unroll base sheet, align and reroll from both ends.
- .2 Prime base sheet.
- .3 Unroll and adhere base sheet in accordance with roofing manufacturer.
- .4 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.
- .5 Application to be free of blisters, wrinkles and fishmouths.

.6 Cap sheet application:

- .1 Starting at low point on roof, perpendicular to slope, unroll cap sheet, align and reroll from both ends.
- .2 Prime base sheet.
- .3 Unroll and adhere cap sheet in accordance with roofing manufacturer.
- .4 Lap sheets 75 mm minimum for side laps and 150 mm minimum for end laps. Offset joints in cap sheet 300 mm minimum from those in base sheet.
- .5 Application to be free of blisters, fishmouths and wrinkles.

.6 Do membrane application in accordance with manufacturer's recommendations.

.7 Flashings:

.1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.

.2 Adhere sheets onto primed substrates in 1 metre wide strips.

.3 Lap flashing base sheet to membrane base sheet minimum 150 mm and adhere.

.4 Lap flashing cap sheet to membrane cap sheet 250 mm minimum adhere.

.5 Provide 75 mm minimum side lap and seal.

.6 Properly secure flashings to their support, without sags, blisters, fishmouths or wrinkles.

**END OF SECTION**

# Part 1 General

## 1.1 REFERENCES

.1 The Aluminum Association:

.1 Aluminum Design Manual, 2015

.2 DAF45-03, Designation System for Aluminum Finishes.

.2 American Society for Testing and Materials International (ASTM)

.1 ASTM B209-14, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

.2 ASTM A653/A653M-13, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

.3 Canadian Roofing Contractors Association (CRCA)

.1 Roofing Specifications Manual 2012.

## 1.2 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.

.3 Samples:

.1 Submit duplicate 50 x 50 mm samples of each type of sheet metal colour finishes.

## 1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

## 1.4 WASTE MANAGEMENT

.1 Separate waste materials in accordance with Section 01 00 10 - General Instructions.

# Part 2 Products

## 2.1 SHEET METAL MATERIALS

.1 Sheet Metal: Minimum 0.61 mm base metal thickness, grade 33 steel, galvanized sheet steel to ASTM A653, Z275 coating designation, pre-painted colour to preformed metal siding product in section 07 46 13 – Preformed Metal Siding.

## 2.2 ACCESSORIES

.1 Sealants: in accordance with Section 07 92 00 - Sealants.

.2 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

.3 Fasteners: screw fasteners of same material as sheet metal, length and thickness suitable for ring thread application metal flashing

.4 Touch-up paint: as recommended by prefinished material manufacturer.

## 2.3 FABRICATION

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details.

.2 Fabricate aluminum flashings and other sheet aluminum work in accordance with Aluminum Design Manual.

.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.

.7 Overlap pieces by minimum 50mm and seal with sealant in accordance with Section 07 92 00 - Sealants

## 2.4 METAL FLASHINGS

.1 Form flashings, caps, copings and fascias to profiles indicated.

.1 Provide slotted fixing holes and steel washer fasteners

.2 Recessed vertical flashings at joints between panels to suit vertical gap sizes as indicated.

# Part 3 Execution

## 3.1 INSTALLATION

.1 Install sheet metal work in accordance with CRCA FL Series.

.2 Use concealed fastenings except where approved before installation.

.3 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.

.4 Lock end joints and caulk with sealant.

.5 Install surface mounted reglets true and level, and caulk top of reglet with sealant.

.6 Insert metal flashing under cap flashing to form weather tight junction.

.7 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25 mm. Lead wedge flashing securely into joint.

.8 Caulk flashing at cap flashing with sealant.

.9 Mechanically fasten recessed vertical flashing to wood block at perimeter of new infill panel at panel joints and caulk edges with a sealant.

## 3.2 CLEANING

.1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Leave work areas clean, free from grease, finger marks and stains.

**END OF SECTION**

## PART 1 GENERAL

### 1.1 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)
- .1 ASTM E605-93 (R2015e1), Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members
- .2 ASTM E736-00(2015)E1, Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members

.2 Underwriter's Laboratories of Canada (ULC)
- .1 CAN/ULC S101-07, Standard Methods of fire Endurance Tests of Building Construction and Materials.
- .2 CAN/ULC S102-10, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

### 1.2 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.

### 1.3 QUALITY ASSURANCE

.1 Qualifications:
- .1 Installer: company specializing in sprayed-on fireproofing and intumescent painting application recognized by manufacturer.

.2 Inspection:
- .1 Arrange for inspection by Departmental Representative prior to covering Work.

### 1.4 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:
- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Deliver packaged materials in original unopened containers, marked to indicate brand name, manufacturer and ULC or CUL markings.

.2 Storage and Protection:
- .1 Store materials indoors in dry location.
- .2 Store and protect materials from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
- .3 Damaged or opened containers will be rejected.
- .4 Packaging to indicate shelf-life and materials to be applied prior to expiration of shelf-life.

.5 Provide temporary enclosures to prevent spray from contaminating air beyond application area.
.6 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of fireproofing materials.

## 1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 00 10 – General Instructions.

## 1.6 AMBIENT CONDITIONS

.1 Maintain relative humidity and temperature within limits recommended by fireproofing manufacturer.

.2 Ensure that ventilation to properly dry fireproofing during and subsequent to its application is provided.

# PART 2 PRODUCTS

## 2.1 SUSTAINABLE REQUIREMENTS

.1 All products must conform to stipulated VOC requirements

## 2.2 MATERIALS

.1 Intumescent coating
.1 Single component, water based, factory mixed, asbestos free, intumescent material blended for uniform texture.
.2 Primer: type recommended by intumescent paint manufacturer to adhere to structural steel.
.3 System type recommended by fireproofing manufacturer for 1 and 2 hour rated assemblies.

# 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 Substrate: free of material which would impair bond. Where primed steel surfaces are present, install reinforcing mesh in accordance with fireproofing manufacturer’s instructions.

.2 Verify that painted substrates are compatible and have suitable bonding characteristics to receive fireproofing.

.3 Ensure that items required to penetrate fireproofing are placed before installation of

fireproofing.

.4 Ensure that ducts, piping, equipment, or other items which would interfere with application of fireproofing are not positioned until fireproofing work is completed.

## 3.3 APPLICATION

.1 Apply fireproofing to correspond with tested assemblies.

.2 Apply fireproofing over substrate, building up to required thickness to cover substrate with monolithic coating of uniform density and texture.

.3 Apply fireproofing to correspond with tested assemblies, or acceptable calculation procedures to provide following fire resistance ratings.

.1 Floor assemblies: **2 hours**

.2 Supporting elements for floors, exterior cladding system and occupied roof areas: **2 hours**

.4 Apply fireproofing over substrate, building up to required thickness to cover substrate with monolithic coating of uniform density and texture.

.5 Where exposed, finish intumescent fireproofing for finished painting applications in accordance with Section 09 91 99 - Painting

## 3.4 SCHEDULE

.1 Install intumescent coating at all interior structural connections as indicated in drawings.

**END OF SECTION**

# 1 GENERAL

## 1.01 REFERENCES

.1 Underwriter's Laboratories of Canada (ULC).
- .1 CAN/ULC S101-07, Standard Method of Fire Endurance Tests of Building Construction and Materials.
- .2 CAN/ULC 102-07, Standard Method of Test for Burning Characteristics of Building Materials and Assemblies.
- .3 ULC S115-05, Fire Tests of Fire stop Systems.

## 1.02 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 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:
- .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 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

## 1.03 QUALITY ASSURANCE

.1 All firestopping to be performed by a single company experienced in the installation of firestopping.

.2 Inspection by Departmental Representative:
- .1 Upon completion of Work, prior to installation of interior gypsum board coverings and wall base.

## 1.04 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:
- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 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.

## 2 PRODUCTS

### 2.01 MATERIALS

.1 All firestopping components, systems and assemblies to be by a single manufacturer for this Project.

.2 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 Firestop system rating: to meet or exceed fire resistance rating of assembly.

.3 Service penetration assemblies: systems tested to CAN/ULC S115.

.4 Service penetration fire stop components: certified by test laboratory to CAN/ULC S115.

.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 Fire Stopping and smoke seals at slab edge between interior spaces: elastomeric seal.

.8 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

.9 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

.10 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.

.11 Sealants for vertical joints: non-sagging.

## 3 EXECUTION

### 3.01 MANUFACTURER'S INSTRUCTIONS

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

## 3.02 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

.4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

.5 Install firestopping to correspond with tested assemblies, or acceptable calculation procedures to provide the following fire resistance ratings:
  .1 Floor assemblies: **2 hours**

## 3.03 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.

## 3.04 SEQUENCES OF OPERATION

.1 Proceed with installation only when submittals have been reviewed by Departmental Representative.

.2 Install slab edge fire stopping after installation of new infill panel.

.3 Arrange for inspection by Departmental Representative before covering work.

## 3.05 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.

.2 Manufacturer's Field Services:
  .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
  .2 Provide manufacturer's field services consisting of product use recommendations

and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

## 3.06 CLEANING

.1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

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

## 3.07 SCHEDULE

.1 Fire stop and smoke seal at:

.1 Gaps at slab edge between interior spaces.

**END OF SECTION**

# Part 1 General

## 1.1 REFERENCES

.1 ASTM

.1 ASTM C 920-14a, Standard Specification for Elastomeric Joint Sealants

## 1.2 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 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.

## 1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 033 00 - Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.

## 1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

## 1.5 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.

.3 Joint-Substrate Conditions:

.1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.

## Part 2 Products

### 2.1 SEALANT MATERIALS

.1 Where sealants are qualified with primers use only these primers.

### 2.2 SEALANT MATERIAL DESIGNATIONS

.1 Caulking:

.1 One component polyurethane-based elastomeric joint sealant:

.1 Meets ASTM C920 Type S Grade NS Class 35

.2 $\pm$ 35% joint movement

.3 Non-sag, low VOC

.4 Minimum service temperature range: -40 to +70 degrees C

.5 Primer: as recommended by sealant manufacturer

.6 Colour: Tan.

.2 Preformed compressible back-up materials:

.1 Polyethylene, urethane, neoprene or vinyl foam:

.1 Extruded open cell foam backer rod.

.2 Size: oversize 30 to 50 %.

.2 Bond breaker tape:

.1 Polyethylene bond breaker tape which will not bond to sealant.

### 2.3 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 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.2 Proceed with installation only after unacceptable conditions have been remedied.

### 3.2 SURFACE PREPARATION

.1 Completely remove all existing caulking and existing residue on all precast joint surfaces

.2 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants

.3 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.

.4 Apply primer to existing substrate surfaces to receiving sealant. Do not prime compressible back-up materials

.5 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.

.6 Ensure joint surfaces are dry and frost free.

.7 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.

.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 00 10 - General Instructions.

.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.

## 3.8 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by joint sealants installation.

**END OF SECTION**