

PART 1 - GENERAL

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| <u>1.1 RELATED Requirements</u>                | .1 | Section 07 21 16 - Batt Insulation.   |
|  | .2 | Section 07 52 00 - Modified Bituminous Membrane Roofing.  |
|  | .3 | Section 23 07 13 - Thermal Insulation for Ducting.  |
| <u>1.2 REFERENCES</u>                          | .1 | Underwriters Laboratories of Canada (ULC).  |
|  | .1 | CAN/ULC-S102-11, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies. |
| <u>1.3 ACTION AND INFORMATIONAL SUBMITTALS</u> | .1 | Submit in accordance with Section 01 33 00 - Submittal Procedures.  |
|  | .2 | Product Data:   |
|  | .1 | Submit manufacturer's printed product literature, specifications and data sheet.                          |

PART 2 - PRODUCTS

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| <u>2.1 INSULATION</u> | .1 | Extruded polystyrene (XPS): to CAN/ULC-S701, Type 4; thickness as indicated.       |
|                       | .1 | Maximum permitted flame spread of 25, when tested in accordance with CAN/ULC-S102. |

PART 3 - EXECUTION

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| <u>3.1 EXAMINATION</u>  | .1 | Examine substrates and immediately inform Departmental Representative in writing of defects.  |
|                         | .2 | Prior to commencement of work ensure that substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris. |
| <u>3.2 Installation</u> | .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 obstructions and protrusions.
- .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 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

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END OF SECTION

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| <u>1.1 RELATED Requirements</u>                | .1 | Section 07 21 13 - Board Insulation.  |
| <u>1.2 REFERENCES</u>                          | .1 | ASTM International (ASTM).<br>.1 ASTM C612-14, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.   |
|  | .2 | Underwriters Laboratories of Canada (ULC)<br>.1 CAN/ULC S702-09, Standard for Mineral Fibre Thermal Insulation for Buildings. |
| <u>1.3 ACTION AND INFORMATIONAL SUBMITTALS</u> | .1 | Submit in accordance with Section 01 33 00 - Submittal Procedures.  |
|  | .2 | Product Data:<br>.1 Submit manufacturer's printed product literature, specifications and data sheet.                          |

PART 2 - PRODUCTS

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| <u>2.1 INSULATION</u> | .1 | Batt insulation:<br>.1 Glass fibre: to CAN/ULC S702; unfaced.<br>.2 Mineral wool: to ASTM C612; unfaced. |
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PART 3 - EXECUTION

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| <u>3.1 MANUFACTURER'S INSTRUCTIONS</u> | .1 | Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets. |
| <u>3.2 INSULATION INSTALLATION</u>     | .1 | Install insulation to maintain continuity of thermal protection to building elements and spaces.  |
|  | .2 | Fit insulation closely around objects in or passing through insulation.   |
|  | .3 | Do not compress insulation to fit into spaces.  |

- .4 Do not enclose insulation until it has been reviewed by Departmental Representative.

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3.3 CLEANING

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

END OF SECTION

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| <u>1.1 Related Requirements</u> | .1 | Section 07 27 11 - Air Barriers.   |
| <u>1.2 References</u>           | .1 | ASTM International (ASTM).   |
|                                 | .1 | ASTM C919-12, Standard Practice for Use of Sealants in Acoustical Applications.                    |
|                                 | .2 | Canadian General Standards Board (CGSB)  |
|                                 | .1 | CAN/CGSB-51.34-M86 AMEND, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.     |
| <u>1.3 Sequencing</u>           | .1 | Sequence work to permit installation of materials in conjunction with related materials and seals. |

PART 2 - PRODUCTS

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| <u>2.1 Sheet Vapour Retarder</u> | .1 | Polyethylene film: to CAN/CGSB-51.34, 0.15 mm thick.   |
| <u>2.2 Accessories</u>           | .1 | Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour retarder manufacturer, 50 mm wide for lap joints and perimeter seals, 25 mm wide elsewhere. |
|                                  | .2 | Provide premanufactured boots for use around electrical boxes.   |
|                                  | .3 | Sealant: acoustical type, to ASTM C919.  |
|                                  | .4 | Spray foam: low-expansion polyurethane.  |

PART 3 - EXECUTION

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| <u>3.1 Installation</u> | .1 | Ensure services are installed and inspected prior to installation of retarder.  |
|                         | .2 | Install sheet vapour retarder on warm side of exterior wall assemblies prior to installation of gypsum board to form continuous retarder. |
|                         | .3 | Use sheets of largest practical size to minimize joints.  |

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|                                      | .4 | Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.   |
|                                      | .5 | Use spray foam insulation where it is impossible or impractical to use sheet vapour retarder. Obtain permission from Departmental Representative before using spray foam.  |
| <u>3.2 Exterior Surface Openings</u> | .1 | Cut sheet vapour retarder to form openings and ensure material is lapped and sealed to frame.  |
| <u>3.3 Perimeter Seals</u>           | .1 | Seal perimeter of sheet vapour retarder as follows:<br>.1 Apply continuous bead of sealant to substrate at perimeter of sheets.<br>.2 Lap sheet over sealant and press into sealant bead.<br>.3 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.   |
| <u>3.4 Lap Joint Seals</u>           | .1 | Seal lap joints of sheet vapour retarder as follows:<br>.1 Attach first sheet to substrate.<br>.2 Apply continuous bead of sealant over solid backing at joint.<br>.3 Lap adjoining sheet minimum 150 mm and press into sealant bead.<br>.4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant. |
| <u>3.5 Electrical Boxes</u>          | .1 | Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:<br>.1 Install premanufactured boot around box.<br>.2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.   |

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| 3.6    Cleaning | .1 | Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment. |
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| <u>1.1 RELATED Requirements</u>           | .1 | 07 26 00 - Vapour Retarders  |
| <br>                                      |    |  |
| <u>1.2 REFERENCES</u>                     | .1 | ASTM International (ASTM).   |
|   | .1 | ASTM D828-16, Standard Test Method for Tensile Properties of Paper and Paperboard Using Constant-Rate-of-Elongation Apparatus. |
|   | .2 | ASTM E84-16, Standard Test Method for Surface Burning Characteristics of Building Materials.                                   |
|   | .3 | ASTM E96/E96M-16, Standard Test Methods for Water Vapor Transmission of Materials.   |
|   | .4 | ASTM E2178-13, Standard Test Method for Air Permeance of Building Materials.   |
| <br>                                      |    |  |
| <u>1.3 SUBMITTALS</u>                     | .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.           |
|   | .1 | Performance criteria.  |
|   | .2 | Limitations.   |
| <br>                                      |    |  |
| <u>1.4 DELIVERY, STORAGE AND HANDLING</u> | .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.                                    |
| <br>                                      |    |  |
| <u>1.5 SEQUENCING</u>                     | .1 | Sequence work to permit installation of materials in conjunction with related materials and seals.                             |

PART 2 - PRODUCTS

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| <u>2.1 MATERIALS</u> | .1 | Sheet membrane:   |
|                      | .1 | Material: self-adhesive membrane consisting of modified polyolefin and two layers nonwoven polyethylene, backed with vapour permeable adhesive. |

- .2 Tensile strength (to ASTM D828):
  - .1 MD: 182 N.
  - .2 CD: 129 N.
- .3 Water vapour permeance (to ASTM E96/E96M): 1658 ng/Pa·m<sup>2</sup>·s (29 perms).
- .4 Air permeability: tested to ASTM E2178.
  - .1 @ 75 Pa pressure: air leakage rate 0.02 L/s·m<sup>2</sup>.
- .5 Surface burning characteristics (to ASTM E84): Class A.
  - .1 Flame spread: 0.
  - .2 Smoke developed: 105.
- .2 Accessories:
  - .1 Primer: polymer emulsion based primer; compatible with membrane.
  - .2 Termination sealant: type as recommended by membrane manufacturer.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- .1 Verify substrate and surface conditions are clean, dry, sound, smooth, free of sharp protrusions and in accordance with air barrier manufacturer's recommended tolerances prior to installation of air barrier and accessories.
- .2 Report unsatisfactory conditions to the Departmental Representative in writing.
- .3 Do not start work until deficiencies have been corrected. Commencement of Work implies acceptance of conditions.

#### 3.2 INSTALLATION

- .1 Install materials in accordance with manufacturer's instructions.
  - .1 Prime surfaces to receive membrane.
  - .2 Apply membrane horizontally, beginning at base of wall.
  - .3 Stagger vertical laps to avoid build-up of membrane at localized areas.
  - .4 Overlap sides 50mm; ends 75mm.
  - .5 Roll entire membrane, including seams, firmly and completely as soon as possible to ensure proper contact.

- .2 Detail work:
  - .1 Cut membrane to fit around penetrations.
  - .2 Apply bead of sealant around penetrations, heads of fasteners and other items extending through membrane.
  - .3 Tie membrane into window and door frame interface sheet, to maintain continuity of air barrier. Position lap seal over firm bearing.
- .3 Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- .4 Seal at penetrations.

### 3.3 INSPECTION AND REPAIR

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- .1 Installer shall visually inspect installation and verify that:
  - .1 Materials and components have been installed in a shingle fashion.
  - .2 Penetrations and terminations have been done correctly and that doors and windows have been properly flashed.
- .2 Repair cuts and tears in accordance with manufacturer's instructions.

END OF SECTION

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<u>1.1 Related Requirements</u>	.1	Section 07 62 00 - Flashing and Sheet Metal.
<u>1.2 References</u>	.1	American Society for Testing and Materials (ASTM) <ul style="list-style-type: none"><li>.1 ASTM D3462/D3462M-16, Standard Specification for Asphalt Shingles Made From Glass Felt and Surfaced with Mineral Granules.</li><li>.2 ASTM F1667-15, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.</li><li>.3 ASTM D1970/D1970M-17a, Standard Specification for Self-adhering Polymer Modified Bituminous Sheet Material Used as Steep Roofing Underlayment for Ice Dam Protection.</li></ul>
	.2	Canadian General Standards Board (CGSB) <ul style="list-style-type: none"><li>.1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.</li></ul>
	.3	Canadian Standards Association (CSA) <ul style="list-style-type: none"><li>.1 CSA A123.1-05, Asphalt Shingles Made From Organic Felt and Surfaced With Mineral Granules.</li><li>.2 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt.</li><li>.3 CSA A123.51-14, Asphalt Shingle Application on Roof Slopes 1:6 and Steeper.</li></ul>
<u>1.3 Quality Assurance</u>	.1	When synthetic underlayment is used, submit letter from shingle manufacturer stating that synthetic underlayment being used is compatible with their shingles.
<u>1.4 Submittals</u>	.1	Submit in accordance with Section 01 33 00 - Submittal Procedures.
	.2	Product Data: <ul style="list-style-type: none"><li>.1 Submit product data for asphalt shingles, roof protection membrane, and underlayment.</li></ul>

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|                                  | .2 | Provide 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 copies of manufacturer's installation instructions.  |
| <u>1.5 Delivery and Storage</u>  | .1 | Deliver and store materials undamaged and in original wrappings, with manufacturer's labels and seals intact. Store materials on a dry floor in a weatherproof enclosure. Store rolled materials on end.           |
| <u>1.6 Job Conditions</u>        | .1 | Examine site conditions and surfaces for defects of work which may adversely affect the quality of workmanship of this section.  |
|                                  | .2 | Commencement of work shall imply acceptance of surfaces.   |
|                                  | .3 | Be responsible for obtaining all required field dimensions.  |
| <u>1.7 Maintenance Materials</u> | .1 | Deliver one (1) bundle of shingles for maintenance purposes. Material shall be from same production run as the material installed.   |
| <u>PART 2 - PRODUCTS</u>         |    |  |
| <u>2.1 Materials</u>             | .1 | Asphalt shingles: to CSA A123.1, manufacturer's 25-year product warranty.<br>.1 Colour as selected later.  |
|                                  | .2 | Underlayment: contractor may use either of the following.<br>.1 Asphalt saturated felt: #15 non-perforated, to CSA A123.3.   |
|                                  | .3 | Roof protection membrane: self-adhering asphalt waterproofing membrane, slip-resistant surface. Performance criteria in accordance to ASTM D1970.  |
|                                  | .4 | Metal drip edge:<br>.1 as specified in Section 07 62 00 Sheet Metal Flashing and Trim.   |

- .5 Vent stack flashing:
  - .1 consisting of neoprene sleeve and aluminum base; to suit roof slope and vent pipe size.
  - .2 to CSA B272, 1.6 mm aluminum, uninsulated, to suit pipe diameter and slope of roof, EPDM grommet seal.
- .6 Ridge vents: shingle-over type, polymer construction, internal baffle and filter design, self-aligning interlocking ends, self-adjusting to suit roof pitch.
- .7 Static vertical ventilator: fabricated from 0.45 mm thick galvanized sheet steel, consisting of flashing/base module and ventilator cap.
  - .1 Deflectors: three (3); storm-proof design.
  - .2 Net free area: minimum 677 cm<sup>2</sup>.
  - .3 Finish: powder coated polyester interior and exterior.
    - .1 Colour as selected from manufacturer's standard colour range by Departmental Representative.
  - .4 Accessories: integral galvanized steel bird/rodent screen.
- .8 Cement: cutback asphalt plastic cement, to CAN/CGSB-37.5-M.
- .9 Nails: to ASTM F1667, of galvanized steel or aluminum, of sufficient length to penetrate 19 mm into deck; or where deck is less than 19 mm thick, to penetrate full thickness of deck.
- .10 All other materials as specified in CSA A123.51.

### PART 3 - EXECUTION

#### 3.1 Application

- .1 Do asphalt shingle work in accordance with CSA A123.51 as supplemented below.
- .2 Secure three-TAB shingles using six (6) nails per shingle and adhering with three (3) - 25 mm diameter spots of
- .3 plastic cement placed above the bottom edge of shingle and equally spaced across shingle.

- .4 Install drip edge at eaves before installation of roof protection membrane. Overhang 13 mm; nail at 200 mm to 250 mm o.c.
- .5 Install synthetic underlayment in accordance with manufacturer's written instructions.
- .6 Install drip edge along rake edge, overhanging 13 mm; nail at 200 mm to 250 mm o.c. Install drip edge at rake edge after installation of roof protection membrane/underlay. Nail drip edge at 200 mm to 250 mm o.c.
- .7 Install ridge vent and vent pipe flashing in accordance with manufacturer's written instructions.
- .8 Install accessories in accordance with manufacturer's installation instructions.

END OF SECTION



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| <u>1.1 Related Requirements</u>                | .1 | Section 07 92 10 - Joint Sealing.   |
| <u>1.2 Reference Standards</u>                 | .1 | ASTM International (ASTM).<br>.1 ASTM F1667-15, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.  |
|  | .2 | CSA International<br>.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.<br>.2 CSA O121-08, Douglas Fir Plywood.<br>.3 CSA O151-09, Canadian Softwood Plywood.<br>.4 CAN/CSA-Z809-08, Sustainable Forest Management. |
|  | .3 | Environmental Choice Program (ECP)<br>.1 CCD-045-95, Sealants and Caulking Compounds.   |
|  | .4 | National Lumber Grading Authority (NLGA)<br>.1 NLGA Standard Grading Rules for Canadian Lumber 2010.  |
| <u>1.3 Action and Informational Submittals</u> | .1 | Submit in accordance with Section 01 33 00 - Submittal Procedures.  |
|  | .2 | Product Data:<br>.1 Submit manufacturer's instructions, printed product literature and data sheets for wood siding and include product characteristics, performance criteria, physical size, finish and limitations.      |
|  | .3 | Samples:<br>.1 Submit duplicate 200 mm long pieces of each siding type and trim.  |
| <u>1.4 Delivery, Storage And Handling</u>      | .1 | Deliver, store and handle materials in accordance with Section with manufacturer's written instructions and 01 61 00 - Common Product Requirements.   |
|  | .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 indoors off ground in dry a location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect wood siding from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

## PART 2 - PRODUCTS

### 2.1 Materials

- .1 Siding and trim: western red cedar, kiln-dried, grade; A Clear (NLGA 201b, WCLIB 106a, smooth face, clear finish-stained).
  - .1 Horizontal clapboards: 150 mm rabbetted bevel profile.
  - .2 Vertical: 150 mm Traditional V-Joint profile.
  - .3 Trim: 50 mm x 140 mm.
  - .4 Colours: as selected by Departmental Representative.
- .2 Accessories: exposed trim, closures, cap pieces of manufacturer's standard finish.
- .3 Fasteners: nails to ASTM F1667, stainless steel, sized as required.
- .4 Finish: Natural wood finish, protective one-time treatment with anti-microbial properties. Non-toxic when dried
- .5 Sealants: in accordance with Section 07 92 10 - Joint Sealing.

## PART 3 - EXECUTION

### 3.1 Examination

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

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- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
    - .3 Proceed with installation only after unacceptable conditions have been remedied
  - 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 sill flashings, wood starter strips, inside corner flashings, edgings and flashings over openings.
    - .2 Fasten wood siding in straight, aligned lengths to furring. Use longest practical lengths. Keep intermediate butt joints to a minimum. Stagger butt joints not less than 800 mm and distribute evenly over wall faces. Seal cut surfaces and for vertical siding slope to outside.
  - 3.4 Cleaning
    - .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
      - .1 Leave Work area clean at end of each day.
    - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
  - 3.5 Protection
    - .1 Protect installed products and components from damage during construction.
    - .2 Repair damage to adjacent materials caused by wood siding installation.

END OF SECTION

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<u>1.1 RELATED Requirements</u>	.1	Section 06 10 00 - Rough Carpentry.
	.2	Section 07 62 00 - Sheet Metal Flashing and Trim.
<u>1.2 REFERENCES</u>	.1	ASTM International (ASTM).
	.1	ASTM C920-14, Specification for Elastomeric Joint Sealants.
	.2	ASTM D41/D41M-11, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
	.2	Canadian General Standards Board (CGSB)
	.1	CGSB 37-GP-9Ma, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
	.2	CGSB 37-GP-56M-80 (Amend), Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
<u>1.3 ADMINISTRATIVE REQUIREMENTS</u>	.3	Underwriter's Laboratories of Canada (ULC)
	.1	CAN/ULC-S704-11, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced.
	.1	Convene pre-installation meeting no later than one week prior to beginning waterproofing Work, with roofing contractor's representative and Departmental Representative.
	.1	Verify project requirements.
	.2	Review installation and substrate conditions.
	.3	Co-ordination with other building subtrades if required.
	.4	Review manufacturer's installation instructions and requirements.
	.1	Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
	.2	Shop Drawings:
	.1	Indicate control joints, tapered insulation mechanical fasteners and pattern and all related details.
<u>1.4 ACTION AND INFORMATIONAL SUBMITTALS</u>		

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- .2 Provide layout for tapered insulation.
  - .3 Product Data:
    - .1 Provide copies of most recent technical roofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.
    - .2 Provide copies of WHMIS MSDS and indicate VOC content for:
      - .1 Primers.
      - .2 Asphalt.
      - .3 Sealers.
      - .4 Adhesives.
  - .4 When requested by Departmental Representative, submit laboratory test reports certifying compliance of membranes and insulation with specification requirements.
  - .5 Submit copy of work order indicating materials have been ordered and delivery dates.
- 1.5 QUALITY ASSURANCE
- .1 Installer qualifications: company or person specializing in application of modified bituminous roofing systems approved by manufacturer.
- 1.6 FIRE PROTECTION
- .1 Fire Extinguishers: maintain one cartridge operated type or stored pressure rechargeable type with hose and shut-off nozzle, ULC labelled for A, B and C class protection. Size 9 kg on roof per torch applicator, within 10 m of torch applicator.
  - .2 Maintain a minimum fire watch for 1 hour after each day roofing operations cease and as according to Hot Works requirement of the Canadian Fire Code.
    - .1 During work and at completion of days' work monitor for hot spots on roofs with heat detecting devices.
- 1.7 DELIVERY STORAGE AND HANDLING
- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

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- .2 Storage and Handling Requirements:
    - .1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of sealing compounds, primers and caulking materials.
    - .2 Provide and maintain dry, off-ground weatherproof storage.
    - .3 Store rolls of membrane in upright position. Store membrane rolls with selvage edge up.
    - .4 Remove only in quantities required for same day use.
    - .5 Place plywood runways over completed work and existing roofs not under construction to enable movement of material and other traffic.
    - .6 Store sealants at +5°C minimum.
    - .7 Store insulation protected from daylight and weather and deleterious materials.
    - .8 Handle roofing materials in accordance with manufacturer's written directives, to prevent damage or loss of performance.
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- 1.8 ENVIRONMENTAL REQUIREMENTS

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- .1 Ambient conditions:
    - .1 Do not install roofing when temperature remains below -18°C for torch application and in accordance with manufacturers' recommendations for self-adhesive application.
    - .2 Minimum temperature for solvent-based adhesive is -5°C.
  - .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.

1.9 WARRANTY

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- .1 Contractor shall provide a written CRCA warranty stating that the installed roofing membrane is warranted against defects and leakage for a period of two (2)years from date of Substantial Completion of project.

- .2 Provide a written manufacturer's warranty stating the installed roofing assembly is warranty against defects and leakage for a period of fifteen (15) years from date of Substantial Completion of projects.
  - .1 Contractor shall provide written confirmation from manufacturer that the supplied assemblies for the new roofing systems including membranes, insulation, and parts are acceptable to achieve the required warranty duration.
- .3 Contractor shall deliver to the Departmental Representative, prior to Contract signing, a signed and sealed letter stating that he will provide the warranty coverage for his work in accordance with above.
- .4 The warranty shall state that the entire cost, including labour and materials, of replacing or repairing the roofing membrane shall be borne by the warrantor.
- .5 Provide a warranty and CRCA preventative maintenance manual before final acceptance of roofing.

## 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.

### 2.2 PRIMERS

- .1 Primer recommended by manufacturer to suit substrate in accordance to CGSB 37-GP-9Ma and ASTM D41.

### 2.3 MEMBRANES

- .1 Modified bituminous membrane: SBS modified membrane; to CGSB 37-GP-56M.



- .2 Base sheet:
  - .1 Self-adhered: Type 2, Class C, Grade 1, release film on bottom, high-density polyethylene on top surface, glass reinforced, minimum thickness 1.3 mm.
- .3 Base Flashing:
  - .1 Self-adhesive: Type 2, Class C, Grade 2, release film on bottom, polyethylene on top surface, minimum 180 g non-woven polyester reinforcing, minimum thickness 3.0 mm.
- .4 Cap Sheet and Cap Flashing:
  - .1 Self-adhesive: Type 1, Class A, Grade 2 granules on top surface, release film on bottom, woven glass/polyester reinforcement, minimum thickness 3.0 mm.
- .5 Reinforcing sheet: same as base flashing.

#### 2.4 SEALERS

- .1 Sealants: to ASTM C920; Type M, Grade NS, Class 25.

### PART 3 - EXECUTION

#### 3.1 WORKMANSHIP

- .1 Do examination, preparation and roofing work in accordance with applicable standard in Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual and manufacturer's written instructions.
- .2 Prepare surface for self-adhered roofing in accordance with manufacturers written instructions.
- .3 The interface of the walls and roof assemblies will be fitted with durable rigid material, sheet metal or plywood, providing connection point for continuity of air barrier.

#### 3.2 PROTECTION

- .1 Cover walls and adjacent work where materials hoisted or used.

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- .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 installed and connected.
  - .5 Protect all roof areas from traffic and damage. Comply with precautions deemed necessary by Departmental Representative.
  - .6 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.
- 3.3 EXAMINATION ROOF DECKS
- 
- .1 Inspect roof deck conditions with Departmental Representative. Report in writing any defects in structure or differences from details.
  - .2 Prior to commencement of work ensure:
    - .1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris.
    - .2 Cants, curbs, dividers and blocking are installed and secure using galvanized fasteners.
    - .3 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.
    - .4 Members true to line, levels and elevations, square and plumb.
  - .3 Do not install roofing materials during rain or snowfall.
- 3.4 PRIMING DECK
- 
- .1 Apply deck primer to roofing substrate at the rate recommended by manufacturer or 2.5 L per 10 m<sup>2</sup>.
- 3.5 MEMBRANE APPLICATION - GENERAL
- 
- .1 Install membranes in accordance with manufacturer's application manual.
  - .2 After installation of sheets, check all seams for proper adhesion.

3.6 BASE SHEET  
APPLICATION

- .1 Starting at low point and parallel to slope, unroll base sheet and align along centreline of roof.
- .2 Remove release film and adhere to substrate in accordance with manufacturer's printed instructions.
- .3 Lap sides and ends 65 mm.
- .4 Application to be free of blisters, wrinkles and fishmouths.
- .5 At gravel stop flashings, extend base sheet over roof edge and turn down fascia.

3.7 CAP SHEET  
APPLICATION

- .1 Starting at low point and parallel to slope, unroll base sheet and align along centreline of roof.
- .2 Lap sides 75 mm, ends 150 mm. Extend 50 mm above top of roof/cant.
- .3 Offset cap sheet laps from base sheet laps as follows:
  - .1 Side laps: 300 mm.
  - .2 End laps: 450 mm
- .4 At end and head laps where "T" joint occur:
  - .1 cut corner of membrane to be overlapped, at a 45E angle.
  - .2 Apply sealing compound to cover granules at overlap area and fill the step where the membrane overlaps at "T" joints.
- .5 Walkway and warning strip: set granules into cap sheet at walkway areas. Prime surface and torch-apply sheet.

3.8 MEMBRANE  
FLASHING

- .1 Flash roof perimeter and penetrations in accordance with manufacturer's application manual.
- .2 Membrane flashings shall be 1000 mm wide x length to suit. Side laps shall be 100 mm and staggered minimum 300 mm from side and end laps in respective roof membrane layers.

- .3 Nail top of flashing using discs at 200 mm o.c. when support allows.
- .4 Base flashing:
  - .1 Prime surfaces to receive flashing and allow to dry.
  - .2 Base flashing length at parapet: to allow flashing to extend over parapet and down outside face 50 mm and to extend 100 mm onto roof.
  - .3 Base flashing length at vertical intersections: to provide 200 mm overlap above surface of roof sheet and 100 mm onto roof.
  - .4 Position membrane and remove release paper. Promptly apply firm pressure to membrane using roller to ensure full contact and uniform adhesion.
- .5 Cap flashing:
  - .1 Cap flashing length at parapet: to allow flashing to extend over parapet and down outside face 75 mm and to extend 150 mm onto roof.
  - .2 Cap flashing length at vertical intersections: to provide 200 mm overlap above surface of roof sheet and 150 mm onto roof.
  - .3 Layout straight line on cap sheet surface, 150 mm from vertical face and, using torch and round-nosed roofing trowel, embed surface granules into the heated and soft bitumen.
  - .4 Promptly apply firm pressure to membrane using roller to ensure full contact and uniform adhesion.

### 3.9 CLEANING

- .1 Clean surfaces soiled by work of this section. Consult manufacturer of surfaces for cleaning advice and complying with their documented instructions.
- .2 Repair or replace defaced or disfigured finishes caused by work of this section.

END OF SECTION

PART 1 - GENERAL1.1 Related  
Requirements

- .1 Section 06 10 00 - Rough Carpentry.
- .2 Section 07 55 00 - Modified Bitumen Roofing.
- .3 Section 07 31 13 - Asphalt Shingles.
- .4 Section 07 92 10 - Joint Sealing.

1.2 References

- .1 ASTM International (ASTM).
  - .1 ASTM A653/A653M-13, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .2 ASTM A924/A924M-13, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
  - .3 ASTM C920-14, Specification for Elastomeric Joint Sealants.
  - .4 ASTM D523-14, Test Method for Specular Gloss.
  - .5 ASTM D2244-14, Standard Practice for Calculation of Color Tolerances and Color Differences From Instrumentally Measured Color Coordinates.
  - .6 ASTM D2247-11, Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
  - .7 ASTM D2794-93(2010), Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
  - .8 ASTM D3359-09e2, Standard Test Methods for Measuring Adhesion by Tape Test.
  - .9 ASTM D3363-05(2011)e2, Standard Test Method for Film Hardness by Pencil Test.
  - .10 ASTM D4138-07a(2013), Standard Practices for Measurement of Dry Film Thickness of Protective Coating Systems by Destructive, Cross-Sectioning Means.
  - .11 ASTM D4145-10, Standard Test Method for Coating Flexibility of Prepainted Sheet.

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	.12	ASTM D4214-07, Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.
	.13	ASTM D5402-06(2011), Standard Practice for Assessing the Solvent Resistance of Organic Coatings Using Solvent Rubs.
	.14	ASTM F1667-13, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.
	.2	Canadian General Standards Board (CGSB)
	.1	CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
<u>1.3 Definitions</u>	.1	Custom colours: colours not normally produced by the industry and have not been assigned a colour number.
	.2	Special colour range: colours produced by the industry that have been assigned a colour number; but, are more costly to produce than "standard colour range".
	.3	Standard colour range: colours produced by the industry that are currently popular and/or cost effective, and have been assigned a colour number, and are available for the gauge specified. Colours may or may not be in stock by manufacturer.
	.4	Stock colour range: colours in stock by an individual manufacturer for the gauge specified.
<u>1.4 Action and Informational Submittals</u>	.1	Submit in accordance with Section 01 33 00 - Submittal Procedures.
	.2	Submit duplicate 50 x 50 mm samples of each type of sheet metal material, colour and finish.
<u>1.5 Delivery, Storage and Handling</u>	.1	Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
	.2	Prevent contact of dissimilar metals during storage and protect from corrosive materials and elements.

PART 2 - PRODUCTS

<u>2.1 Metal Materials</u>	.1	Galvanized steel sheet: fabricated in accordance with ASTM A653/A653M, having a core of Grade 230 (33) steel; zinc-coated in accordance with ASTM A924/A924M to a Z275 designation; prefinished with polyester coating system. .1 Thickness: 0.76 mm base thickness steel.
<u>2.2 Accessories</u>	.1	Isolation coating: alkali resistant bituminous paint.
	.2	Plastic cement: to CAN/CGSB-37.5-M.
	.3	Cleats/hook strip: of same material and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
	.4	Fasteners: to ASTM F1667, flat head roofing nails, of length and thickness suitable for flashing application; of same material as sheet metal.
	.5	Washers: of same material as sheet metal, 1.6 mm with rubber packings.
	.6	Exposed screws: zinc coated steel, head colour same as exterior sheet, dished steel/neoprene washer; 25 mm long.
	.7	Sealant: silicone, to ASTM C920, Type S, Grade NS, uses NT, G, M, A and O.
<u>2.3 Finishes</u>	.1	Steel sheet: .1 Silicone modified polyester. .2 Coating thickness: exposed surface 0.025 mm; unexposed surface to have washcoat finish. .3 Colour: as selected by Departmental Representative from custom range. .4 Performance: .1 Specular Gloss (ASTM D523): 20 to 80 at 60°. .2 Pencil Hardness (ASTM D3363): F to 2H.

- .3 Formability (ASTM D4145): 2T to 4T3 with no loss of adhesion.
- .4 Cross Hatch Adhesion (ASTM D3359): No loss of adhesion.
- .5 Reverse Impact (ASTM D2794): No loss of adhesion.
- .6 Humidity Resistance (ASTM D2247): No field blisters @ 100% RH 1,000 Hours.
- .7 Colour change (ASTM D 2244): No more than 5ΔE Hunter units at 90° vertical angle and 7ΔE non vertical at 30 years.
- .8 Chalk (ASTM D4214): Rating no less than 8 at 90° angle and 6 at non vertical angle at 30 years.
- .9 Dry Film Thickness (ASTM D 4138):
  - .1 Top coat: 0.018 mm to 0.020 mm.
  - .2 Primer: 0.005 mm to 0.007 mm.
  - .3 Total system: 0.023 mm to 0.027 mm.
- .10 MEK Double Rubs (ASTM D5402): 150 Plus.

#### 2.4 Fabrication

- .1 Fabricate metal flashings to profiles indicated.
- .2 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.
- .3 Hem exposed edges on underside 13 mm. Miter and seal corners with sealant.
- .4 Use flat lock seam joints, unless otherwise shown. Soldering will not be permitted.
- .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 Drip Edge

- .1 Form metal drip edge for asphalt shingles from sheet prefinished sheet steel. Profile shall direct water away from roof without impeding flow.



- .2 Metal drip edge supplied under this section; but, installed under Section 07 31 13 - Asphalt Shingles.
- 2.6 Eaves Trough and Downpipes
- .1 Eave trough: 100 mm seamless type, fabricated from prefinished sheet aluminum; colonial or similar profile acceptable to Departmental Representative; complete with corners, ends and accessories.
- .1 Provide spacer ferrules or proprietary type anchoring systems acceptable to Departmental Representative.
- .2 Downpipe: fabricated from prefinished sheet aluminum; sized to suit eave trough; compete with elbows and anchoring straps. Fabricate adapter to tie downpipes into drainage system.
- .3 Fasteners: non-ferrous, compatible with eave trough and down pipes.
- .4 Splash pad: precast concrete, natural finish and colour, trough shaped, designed specifically for use as splash pad.

### 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 flashings as detailed.
- .2 Coat flanges of flashing with asphalt primer before embedding into roofing.
- .3 Use concealed fastenings except where approved before installation.
- .4 Nail gravel stop flashing at 150 mm o.c.; stagger nails.
- .5 Provide lock seam joints for all flashing at 2400 mm sections and lock seam slip joints every 4800 mm. Provide lock seam joints at exterior corners. Apply sealant to completely fill joints.

3.3 Eaves Troughs and  
Downpipes

- .1 Install eaves troughs and secure to building at 750 mm o.c. with eaves trough spikes through spacer ferrules. Slope eaves troughs to downpipes as indicated. Seal joints watertight.
- .2 Install downpipes and provide goosenecks back to wall. Secure downpipes to wall with straps at 1800 mm o.c.; minimum two straps per downpipe. Connect downpipes to drainage system and seal joint with plastic cement.
- .3 Install splash pads at outlet of downpipes

3.4 Adjust and Clean

- .1 Clean all flashing surfaces after installation. Do not use solvents detrimental to roofing membrane or roofing components.
- .2 Remove all fasteners, metal clippings, etc., from roof surfaces and site.

END OF SECTION

PART 1 - GENERAL

1.1 Related  
Requirements

- .1 Section 21 05 01 - Mechanical  
General Requirements.
- .2 Section 26 05 00 - Common Work  
Results General  
Instructions.

1.2 References

- .1 Underwriters Laboratories of Canada  
(ULC).
  - .1 CAN/ULC-S115-11, Standard Method of  
Fire Tests of Firestop Systems.

1.3 Action and  
Informational  
Submittals

- .1 Submit in accordance with Section 01 33  
00 - Submittal Procedures.
- .2 Product data:
  - .1 Submit manufacturer's product data  
for materials and prefabricated  
devices. Include manufacturer's  
printed instructions for  
installation.
- .3 Shop Drawings
  - .1 Submit ULC design system for each  
type of joint and service  
penetration.
    - .1 Show proposed material, fire  
rating, reinforcement,  
anchorage, fastenings and  
method of installation.  
Construction details should  
accurately reflect actual job  
conditions.
    - .2 Where more than one product is  
acceptable for a component,  
clearly indicate the product  
being supplied on this  
Project.
  - .2 When no ULC or cUL system is  
available for an application,  
submit manufacturer's engineered  
judgement identification number and  
drawing details. Engineered  
judgement shall include both  
project name and contractor's name  
who will install firestopping  
system as described in drawing.
- .4 Samples
  - .1 Submit duplicate 300 mm x 300 mm or  
300 mm long samples, as applicable,  
of each type firestopping material.

1.4 Quality Assurance

- .1 Provide manufacturer's direct representative (not distributor or agent) on site during initial installation of firestopping systems, to train personnel in proper selection and installation procedures.
- .2 For firestopping applications where no ULC or cUL tested systems exist, submit manufacturer's engineering judgement derived from similar ULC or cUL system design or other tests to local authority having jurisdiction for their review and approval before installation.
- .3 Installer: company specializing in firestopping installations approved by manufacturer.
- .4 Site Meetings: as part of Manufacturer's Services described in Part 3 - Field Quality Control, schedule site visits, to review Work, at stages listed.
  - .1 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.
  - .2 Twice during progress of Work at 25% and 60% complete.
  - .3 Upon completion of Work, after cleaning is carried out.

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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

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|--|---|
| <u>2.1 Materials -<br/>General</u>                 | <p>.1 Fire stopping and smoke seal systems:<br/>in accordance with CAN/ULC-S115.</p> <p>.1 Asbestos-free materials and systems<br/>capable of maintaining an effective<br/>barrier against flame, smoke and<br/>gases, in compliance with<br/>requirements of CAN/ULC-S115 and<br/>not to exceed opening sizes for<br/>which they are intended.</p> <p>.2 Firestopping system rating: not<br/>less than the fire-resistance<br/>rating of surrounding floor and<br/>wall assembly.</p> <p>.2 Service penetration assemblies:<br/>certified by ULC in accordance with<br/>CAN/ULC-S115 and listed in ULC Guide No.<br/>40 U19.</p> <p>.3 Service penetration firestopping<br/>components: certified by ULC in<br/>accordance with CAN/ULC-S115 and listed<br/>in ULC Guide No. 40 U19.13 and ULC Guide<br/>No. 40 U19.15 under the Label Service of<br/>ULC.</p> |
| <u>2.2 Firestopping /<br/>Smoke Seal Materials</u> | <p>.1 Mineral wool: ULC listed, semi-rigid,<br/>non-combustible, capable of being<br/>compressed 75% of original width; precut<br/>to required width and depth required,<br/>complete with impaling clips for use in<br/>horizontal fire separations; product as<br/>recommended by Firestopping manufacturer<br/>and listed in applicable ULC design.</p> <p>.2 Firestopping sealant: ULC listed.</p> <p>.1 Silicone: one-part silicone based,<br/>non-sag or self-levelling for<br/>floor; movement capabilities<br/>minimum 25%.</p> <p>.2 Acrylic: one-part, water-based,<br/>flexible to accommodate movement.</p> <p>.3 Miscellaneous firestopping products:</p> <p>.1 Other products, such as mortar,<br/>fire blocks, collars, putty,<br/>intumescent sealants and foams, may<br/>be used provided such products are<br/>ULC listed.</p>                |

- .2 At combustible piping, in addition to firestopping sealant, provide intumescent tape and retaining collar.
- .4 Primers: in accordance with manufacturer's recommendation for specific material, substrate, and end use.
- .5 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .6 Damming and backup materials, supports and anchoring devices: to firestopping manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .7 Sealants for vertical joints: non-sagging.

### 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 openings to be filled to establish correct thicknesses and installation of materials.
- .2 Remove combustible materials and loose impediment from penetration opening and involved surfaces.
- .3 Ensure that substrates and surfaces are clean, dry and free from oil, grease and other deleterious matter.
- .4 Prepare surfaces in contact with fire stopping materials in accordance with manufacturer's instructions.
- .5 Maintain insulation around pipes and ducts penetrating fire separation.

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|  | .6 | Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces. |
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| <u>3.3 Installation</u> | .1 | Install fire stopping material and components in accordance with ULC certification and manufacturer's instructions.   |
|                         | .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 a neat finish.   |
|                         | .5 | Remove excess compound promptly as work progresses and upon completion.   |
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| <u>3.4 Installation Limitations</u> | .1 | When air or surface temperature is below 5°C, use silicone sealant only. Latex permitted only when temperatures are 5°C or above. |
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| <u>3.5 Cleaning</u> | .1 | Remove equipment, excess materials and debris and clean adjacent surfaces immediately after application. |
|                     | .2 | Trim excess cured foam, if necessary, with a sharp knife or blade.                                       |
|                     | .3 | Remove temporary dams after initial set of fire stopping materials.                                      |

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- 3.6 Schedule
- .1 Firestopping and smoke seal at:
    - .1 Penetrations through fire-resistance rated partitions and walls.
    - .2 Top of fire-resistance rated partitions.
    - .3 Penetrations through fire-resistance rated ceilings.
    - .4 Around mechanical and electrical assemblies penetrating fire separations.
  - .2 Maintain fire rating of assembly.

END OF SECTION

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PART 1 - GENERAL

<u>1.1 References</u>	.1	ASTM International (ASTM).
	.1	ASTM C920-14, Specification for Elastomeric Joint Sealants.
<u>1.2 Action and Informational Submittals</u>	.1	Submit in accordance with Section 01 33 00 - Submittal Procedures.
	.2	Manufacturer's product shall describe.
	.1	Required primers.
	.2	Sealing compound, each type, including compatibility when different sealants are in contact with each other.
	.3	Submit manufacturer's instructions for each product used.
<u>1.3 Quality Assurance</u>	.1	Use only experienced mechanics specializing in application of sealant and employed by professional caulking contractor for work of this section.
<u>1.4 Delivery, Storage, and Handling</u>	.1	Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Product Requirements.
	.2	Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.
<u>1.5 Waste Management and Disposal</u>	.1	Dispose of materials defined as hazardous or toxic waste in designated hazardous waste disposal site.
<u>1.6 Project Conditions</u>	.1	Environmental Limitations:
	.1	Do not proceed with installation of joint sealants under following conditions:
	.1	When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 5°C.
	.2	When joint substrates are wet.

- .2 Joint-Width Conditions:
    - .1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
  - .3 Joint-Substrate Conditions:
    - .1 Do not proceed with installation of joint sealants until 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 Labour Canada.
  - .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

PART 2 - PRODUCTS

- 2.1 Sealant Materials
- .1 Sealants and caulking compounds shall:
    - .1 meet or exceed all applicable governmental and industrial safety and performance standards; and
    - .2 be manufactured and transported in such a manner that all steps of the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the fisheries Act and the Canadian Environmental Protection Act (CEPA).

- .2 Sealant and caulking compounds must not be formulated or manufactured with: aromatic solvents, fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, barium or their compounds, except barium sulfate.
- .3 Sealant and caulking compounds must contain total VOC content (volatile organic compounds) that do not exceed the requirements of the California South Coast Air Quality Management District (SCAQMD) Rule #1168.
- .4 Sealant and caulking compounds must be accompanied by detailed instructions for proper application so as to minimize health concerns and maximize performance, and information describing proper disposal methods.
- .5 In the selection of the products and materials of this section preference will be given to those with the following characteristics: Water based, water soluble, water clean-up, non-flammable, low Volatile Organic Compound (VOC) content, manufactured without compounds which contribute to ozone depletion in the upper atmosphere, manufactured without compounds which contribute to smog in the lower atmosphere, does not contain methylene chloride, does not contain chlorinated hydrocarbons.

2.2 Sealant Material  
Designations

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- .1 Acrylics One Part.
  - .1 To ASTM C834, Type OP, Grade -18°C.
- .2 Silicones One Part.
  - .1 Mildew resistant: ASTM C920, Type S, Grade NS, Class 25; Uses NT, A and O: single component with fungicide; colour to match adjacent surfaces

- .3 Urethanes Two Part.
    - .1 Non-Sag to ASTM C920, Type M, Grade NS, Class 25.
    - .2 Colour: as selected by Departmental Representative.
  - .4 Preformed Compressible and Non-Compressible back-up materials.
    - .1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
      - .1 Extruded closed 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 Sealant Selection and Colour
- .1 Interior:
    - .1 Perimeters of interior frames:
      - .1 Sealant type - one-part acrylic.
      - .2 Colour: to match frame.
    - .2 Interior control joints (in masonry, concrete, gypsum board):
      - .1 Sealant type - one-part acrylic.
      - .2 Colour: white.
    - .3 Joints between different materials:
      - .1 Sealant type: one-part acrylic.
      - .2 Colour: white.
- 2.4 Joint Cleaner
- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.
  - .2 Primer: as recommended by manufacturer.

PART 3 - EXECUTION

- 3.1 Protection
- .1 Protect installed Work of other trades from staining or contamination.

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| <u>3.2 Surface Preparation</u> | .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.   |
| <u>3.3 Priming</u>             | .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.  |
| <u>3.4 Backup Material</u>     | .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.   |
| <u>3.5 Mixing</u>              | .1 | Mix materials in strict accordance with sealant manufacturer's instructions.   |
| <u>3.6 Application</u>         | .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 Cleanup
- .1 Clean adjacent surfaces immediately and leave Work neat and clean.
  - .2 Remove excess and droppings, using recommended cleaners as work progresses.
  - .3 Remove masking tape after initial set of sealant.

END OF SECTION