Part 1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB 37.2, Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
- .2 CAN/CGSB 37.3, Application of Emulsified Asphalts for Dampproofing or Waterproofing.
- .3 CAN/CGSB 37.5, Cutback Asphalt Plastic Cement.
- .4 CGSB 37-GP-9Ma, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
- .5 CGSB 37-GP-11M, Application of Cutback Asphalt Plastic Cement.
- .6 CAN/CGSB 37.16, Filled, Cutback, Asphalt for Damproofing and Waterproofing.
- .7 CGSB 37-GP-36M, Application for Filled Cutback Asphalts for Damproofing and Waterproofing.

.2 Health Canada

- .1 Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

1.2 PRODUCT DATA

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

.2 Submit WHMIS MSDS - Material Safety Data Sheets.

.3 Submit product data sheets for bituminous dampproofing products. Including:

- .1 Product characteristics.
- .2 Performance criteria.
- .3 Application methods.
- .4 Limitations.

.4 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures.

1.3 DELIVERY, STORAGE AND HANDLING

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

.2 Provide and maintain dry, off-ground weatherproof storage.

.3 Store materials on supports to prevent deformation.

.4 Remove only in quantities required for same day use.

.5 Store materials in accordance with manufacturer's written instructions.

1.4 PROJECT/SITE ENVIRONMENTAL REQUIREMENTS

.1 Temperature, relative humidity, moisture content.

.1 Apply dampproofing materials only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

.2 Do not proceed with Work when wind chill effect would tend to set bitumen before proper curing takes place.

.3 Maintain air temperature and substrate temperature at dampproofing installation area above 5 degrees C for 24 hours before, during and 24 hours after installation.

.4 Do not apply dampproofing in wet weather.

.2 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.

.3 Ventilation: Provide continuous ventilation during and curing periods for enclosed applications.

Part 2 Products

2.1 MATERIALS

.1 For application and curing at temperatures above 5 degrees C: waterproof emulsion, mineral colloid emulsifier type to CAN/CGSB 37.2.

.1 Package label or bill of lading for bulk hot liquid asphalt must indicate type, flash point, equiviscous temperature range and final blowing temperature.

.2 For applications and curing at temperatures above 0 degrees C but below 5 degrees C: solvent type waterproofing and dampproofing compound of selected asphalts and fibers to CAN/CGSB 37.16.

.1 Package label or bill of lading for bulk hot liquid asphalt must indicate type, flash point, equiviscous temperature range and final blowing temperature.

.3 Primer for applications at temperatures above 0 degrees C but below 5 degrees C: asphalt/solvent cutback to CAN/CGSB 37.9.

.4 Sealing compound: plastic cutback asphalt cement to CAN/CGSB-37.5. C.

Part 3 Execution

3.1 PREPARATION

.1 Before applying dampproofing:

.1 Seal exterior joints between foundation grade beams, joints between concrete floor slab and foundation and around penetrations. through dampproofing with sealing compound.

3.2 APPLICATION

.1 Do dampproofing in accordance with CAN/CGSB 37.3 and CGSB 37-GP-36M except where specified otherwise.

.2 Do sealing work in accordance with CGSB 37-GP-11M except where specified otherwise.

.3 Do priming of surface in accordance with CGSB 37-GP-15M except where specified otherwise.

.4 Apply primer.

3.3 SCHEDULE

.1 Apply continuous, uniform coating to entire exterior faces of foundation grade beams from 50 mm below finished grade level.

.2 Apply two additional coats of dampproofing to vertical corners and construction joints for a minimum width of 230 mm on each side, and all around and for 230 mm along pipes passing through walls.

END OF SECTION

Part 1 General

1.1 REFERENCES

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

- .1 ASTM C203 – Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation
- .2 ASTM C209 – Standard Test Methods for Cellulosic Fiber Insulating Board
- .3 ASTM C518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- .4 ASTM C578 - 12b Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- .5 ASTM D1621 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics
- .6 ASTM D2126 – Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging
- .7 ASTM E96 – Standard Test Method for Water Vapor Transmission of Materials
- .8 ASTM D1623 – Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
- .9 ASTM C1289, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

.2 Canadian Gas Association (CGA)

- .1 CAN/CGA-B149.1, Natural Gas and Propane Installation Code Handbook.
- .2 CAN/CGA-B149.2, Propane Storage and Handling Code.

.3 Canadian General Standards Board (CGSB).

- .1 CGSB 71-GP-24M, Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.
- .2 CAN/CGSB 51.26-M86,

.4 Underwriters Laboratories of Canada (ULC).

- .1 CAN/ULC-S701, Standard for Thermal Insulation, Polystrene, Boards and Pipe Coverings.
- .2 CAN/ULC-S702, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
- .3 CAN/ULC-S704, Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.

1.2 SUBMITTALS

.1 Product Data:

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

.2 Manufacturer's Instructions: Submit manufacturer's installation instructions.

□

Part 2 Products

2.1 BOARD INSULATION

.1 Foundation at grade level to pile: Owens Corning FOAMULAR® C-300 Extruded Polystyrene Rigid Insulation (XPS).

- .1 Type: 4, rigid closed cell type with high density skin.
- .2 Compressive strength: to ASTM D1621, minimum 30 Psi.
- .3 Board size: 610 mm x 2440 mm and 1220 x 2440mm, thickness as indicated, joints sealed.
- .4 Thermal resistance: R 5.0/inch [0.88 RSI/inch] @ 24 degrees C mean temperature.
- .5 Manufacturer and Product
  - .1 Manufacturer: Owens Corning
  - .2 Product: FOAMULAR® C-300
- .6 Thicknesses:
  - .1 Minimum 2” (RSI 1.76/R10).

.2 Below grade on earth: Owens Corning FOAMULAR® C-300 Extruded Polystyrene Rigid Insulation (XPS).

- .1 Type: 4, rigid closed cell type with high density skin.
- .2 Compressive strength: to ASTM D1621, minimum 30 Psi.
- .3 Board size: 610 mm x 2440 mm and 1220 x 2440mm, thickness as indicated.
- .4 Thermal resistance: R 5.0/inch [0.88 RSI/inch] @ 24 degrees C mean temperature.
- .5 Manufacturer and Product
  - .1 Manufacturer: Owens Corning
  - .2 Product: FOAMULAR® C-300
- .6 Thicknesses:
  - .1 Minimum 4” (RSI 3.52/R20).

.3 Tapered Roof Insulation: Owens Corning FOAMULAR® Tapered 400 (XPS).

- .1 Type: 4, rigid closed cell type with high density skin.
- .2 Compressive strength: to ASTM C578, minimum 40 Psi.
- .3 Board size: 610 mm x 2440 mm and 1220 x 2440mm, thickness as indicated.
- .4 Thermal resistance: R 5.0/inch [0.88 RSI/inch] @ 24 degrees C mean temperature.
- .5 Manufacturer and Product
  - .1 Manufacturer: Owens Corning
  - .2 Product: Tapered FOAMULAR® 400
- .6 Thicknesses:
  - .1 As indicated, refer to drawings for slope and thickness information.
  - .2 Ensure a minimum mean RSI 7.04 (R40) over the entire roof with a minimum RSI 3.52 (R20) at roof drains.

□

.4 Insulated Precast Concrete Wall Panels: Owens Corning FOAMULAR® C-300 Extruded Polystyrene Rigid Insulation (XPS).

.1 Type: 4, rigid closed cell type with high density skin.

.2 Compressive strength: to ASTM D1621, minimum 30 Psi.

.3 Board size: 610 mm x 2440 mm and 1220 x 2440mm, thickness as indicated.

.4 Thermal resistance: R 5.0/inch [0.88 RSI/inch] @ 24 degrees C mean temperature.

.5 Manufacturer and Product

.1 Manufacturer: Owens Corning

.2 Product: FOAMULAR® C-300

.6 Thicknesses:

.1 As indicated in drawings and Section 03 45 00 – Insulated Precast Concrete Wall Panels.

.5 Insulated Precast Concrete Wall Panels: John Manville AP Foil-Faced Polyisocyanurate Foam Sheathing (ISO).

.1 Type 1, Facing 2: Glass-fiber reinforced poly-isocyanurate foam core faced with nominal 16.5 mil embossed white thermoset-coated aluminum sheet laminated on one side and 1 mil aluminum on the other.

.2 Compressive strength: to ASTM D1621, minimum 20 Psi.

.3 Board size: 1220 mm x 2440 mm, thickness as indicated.

.4 Thermal resistance: R 6.5/inch [1.14 RSI/inch] @ 24 degrees C mean temperature.

.5 Manufacturer and Product

.1 Manufacturer: John Manville

.2 Product: AP Foil-Faced Polyisocyanurate Foam Sheathing (ISO).

.6 Thicknesses:

.1 As indicated in drawings and Section 03 45 00 – Insulated Precast Concrete Wall Panels.

2.2 SUBSTITUTIONS:

.1 Refer to Section 01 33 00 – Submittal Procedure, subsection 2.2.

2.3 ADHESIVE

.1 Adhesive to manufacturer's written recommendations.

2.4 ACCESSORIES

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

.2 Joint sealing tape: air resistant pressure sensitive adhesive tape as recommended by insulation manufacturer.

□

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 WORKMANSHIP

.1 Install insulation after building substrate materials are dry.

.2 Install insulation to maintain continuity of thermal protection to building elements and spaces.

.3 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.

.4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and CAN/CGA-B149.1 and CAN/CGA-B149.2 type B and L vents.

.5 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.

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

.7 Do not enclose insulation until it has been inspected and approved by Contract Administrator.

3.3 EXAMINATION

.1 Examine substrates and immediately inform Contract Administrator in writing of defects.

.2 Prior to commencement of work ensure:

.1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

3.4 RIGID INSULATION INSTALLATION

.1 Apply adhesive to insulation board in accordance with manufacturer's recommendations.

.2 Imbed insulation boards into vapour barrier type adhesive, applied as specified, prior to skinning of adhesive.

.3 In addition to adhesive install mineral fibre insulation boards with insulation clips and disk, 2 per 600 x 1200 mm board minimum, fit boards tight, cut off fastener spindle 3 mm beyond disk.

.4 Leave insulation board joints unbonded over line of expansion and control joints. Bond a continuous 150 mm wide 0.15 mm modified bituminous membrane over expansion and control joints using compatible adhesive and primer before application of insulation.

.5 Carefully inspect for continuity of air barrier prior to placement of insulation.

□

3.5 PERIMETER FOUNDATION INSULATION

.1 Exterior application: Install on exterior face of concrete with fastening clips and cap flashing in accordance with manufacturer's installation guidelines. Extend boards as indicated on earth.

3.6 CLEANING

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

END OF SECTION

□

Part 1 General

1.1 REFERENCES

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

- .1 ASTM C165, Test for Measuring Compressive Properties of Thermal Insulations
- .2 ASTM C423, Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
- .3 ASTM C518, Standard Method for Test for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- .4 ASTM C553, Specification for Mineral (Glass) Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.
- .5 ASTM C665, Specification for Mineral (Glass) Fibre Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- .6 ASTM C1104, Test Method for Determining the Water Vapour Sorption of Unfaced Mineral Fibre Insulation.
- .7 ASTM C1320, Standard Practice for Installation of Mineral (Glass) Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
- .8 ASTM C1338, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.

.2 Canadian Gas Association (CGA)

- .1 CAN/CGA-B149.1HB, Natural Gas and Propane Installation Code Handbook.
- .2 CAN/CGA-B149.2, Propane Storage and Handling Code.

.3 Canadian Standards Association (CSA International).

- .1 CSA B111, Wire Nails, Spikes and Staples.

.4 National Research Council (NRC) of Canada, Institute for Research in Construction (IRC) – Canadian Construction Materials Centre (CCMC):

- .1 CCMC Product Listing Number 05650-L
- .2 Summary Report for Consortium on Gypsum Board Walls: Sound Transmission Results, Internal Report IRC-IR-693
- .3 Gypsum Board Walls: Transmission Loss Data, Internal Report IRC-IR-761
- .4 Summary Report for Consortium on Floors: Sound Transmission Class and Impact Insulation Results, Internal Report IRC-IR-766

.5 Underwriters Laboratories of Canada (ULC).

- .1 CAN/ULC-S702, Thermal Insulation, Mineral (Glass) Fibre, for Buildings
- .2 CAN/ULC-S102, Standard Method for Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .3 CAN/ULC-S102.2, Standard Method for Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies.
- .4 CAN4-S114, Standard Method for Test for Determination of Non-Combustibility in Building Materials
- .5 CAN/ULC-S604, Type A Chimneys

1.2 SUBMITTALS

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

.2 Manufacturer's Instructions: Submit manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

.1 Convene pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

Part 2 Products

2.1 BLANKET THERMAL INSULATION

.1 Glass Fibre Thermal Insulation: Owens Corning EcoTouch™ PINK™ FIBREGLAS® Blanket Thermal Insulation:

- .1 To CAN/ULC-S702, Type 1, unfaced blanket thermal insulation
- .2 Thermal Resistance: in accordance with manufacturer's tested performances and to requirements of ASTM C518
  - .1 RSI 2.11 (R12) for 92 mm steel stud framing
  - .2 RSI 3.52 (R20) for 152 mm steel stud framing
- .3 Surface burning characteristics to CAN/ULC-S102:
  - .1 Flame spread: 0
  - .2 Smoke developed: 0
- .4 Surface burning characteristics to CAN/ULC-S102.2:
  - .1 Flame spread: 0
  - .2 Smoke developed: 0
- .5 Smoulder resistance: to ULC S-129
- .6 Non-combustible: to CAN4-S114
- .7 Formaldehyde free formulation
- .8 Does not support mold growth: meets fungal resistance criteria in ASTM C1338
- .9 Sizes: As required.
- .10 Manufacturer and Product
  - .1 Manufacturer: Owens Corning
  - .2 Product: EcoTouch™ PINK™ FIBREGLAS®

2.2 BLANKET ACOUSTIC INSULATION

.1 Glass Fibre Acoustic Insulation for Cavities in Partitions, Furred Walls, Ceilings and Floors: Owens Corning EcoTouch™ QuietZone® PINK™ FIBREGLAS® Acoustic Insulation:

- .1 To CAN/ULC-S702, Type 1, pre-formed unfaced fibre batt acoustic insulation
- .2 STC contribution and fire resistance (hr):
  - .1 Refer to NBC 2010 tables A-9.10.3.1.-A/B and manufacturers product data sheet for various assemblies contributing to acoustic performance and fire resistance.
- .3 Surface burning characteristics to CAN/ULC-S102.2:
  - .1 Flame spread: 0

.2 Smoke developed: 0

.4 Smoulder resistance: to ULC S-129

.5 Non-combustible: to CAN4-S114

.6 Formaldehyde free formulation

.7 Does not support mold growth: meets fungal resistance criteria in ASTM C1338

.8 Sizes: As required.

.9 Manufacturer and Product

.1 Manufacturer: Owens Corning

.2 Product: EcoTouch™ QuietZone® PINK™ FIBREGLAS®

2.3 BLANKET MINERAL WOOL INSULATION

.1 Glass Fibre Acoustic Insulation for Cavities in Partitions, Furred Walls, Ceilings and Floors: Owens Corning EcoTouch™ QuietZone® PINK™ FIBREGLAS® Acoustic Insulation:

.1 To CAN/ULC-S702, Type 1, Complies

.2 To ASTM C665, Type 1 Complies

.3 Surface burning characteristics to CAN/ULC-S102:

.1 Flame spread: 0

.2 Smoke developed: 0

.4 Smoulder resistance: to ULC S-129

.5 Non-combustible: to CAN4-S114

.6 Sizes: As required.

.7 Manufacturer and Product

.1 Manufacturer: ROXUL

.2 Product: ROXUL AFB

2.4 SUBSTITUTIONS:

.1 Refer to Section 01 33 00 – Submittal Procedure, subsection 2.2.

2.5 ACCESSORIES

.1 Nails: galvanized steel, length to suit insulation plus 25 mm, to CSA B111.

.2 Staples: 12 mm minimum leg.

.3 Adhesives and tape: as recommended by manufacturer.

Part 3 Execution

3.1 WORKMANSHIP - GENERAL

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

.2 Examine existing conditions: ensure adjacent and support materials and products are dry and ready to receive insulation, and that mechanical and electrical services to be covered by the insulation have been inspected.

.3 Do not commence installation until base work has been corrected and inspections completed.

3.2 INSULATION INSTALLATION

.1 Install insulation to maintain continuity of thermal protection to building elements and spaces.

.2 Wall, parapets, curbs and partitions: select blanket dimensions for steel stud spacing for friction fit.

.3 Install insulation with factory applied vapour barrier facing warm side of building spaces and vapour permeable membrane facing cold side. Lap ends and side flanges of membrane over framing members. Retain in position with nails, staples installed as recommended by manufacturer. Tape seal butt ends and lapped side flanges. Do not tear or cut vapour barrier.

.4 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.

.5 Do not compress insulation to fit into spaces.

.6 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN/ULC-S604 Type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 Type B and L vents.

.7 Do not enclose insulation until it has been inspected and approved by Contact Administrator.

3.3 CLEANING

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

.2 Take all necessary precautions to keep acoustical insulation and its components clean. Immediately remove all dirt and stains.

END OF SECTION

Part 1 General

1.1 REFERENCES

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

.1 Canadian Urethane Foam Contractors Association, “Manual for Installers of Spray

.2 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S101, Fire Endurance Tests of Building Construction and Materials.

.2 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.

.3 CAN/ULC-S705.1, Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Material Specification.

.4 CAN/ULC-S705.2, Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Installer's Responsibilities-Specification.

.3 Canadian General Standards Board (CGSB)

.1 CGSB-51.46 “Manual for Installers of Spray Urethane Foam Thermal Insulation” Polyurethane Foam Thermal Insulation”.

.2 CGSB 51-GP-23M - Thermal Insulation, Urethane, Spray-in-Place.

1.2 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer’s printed product data literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS – Material Safety Data Sheets.

.2 Test Reports

.1 Submit certified test reports, from approved independent testing laboratories verifying qualities of insulation meet or exceed requirements of this specification.

.2 Submit test reports in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.

.3 Submit manufacturer’s installation instructions and special handling criteria, installation sequence and cleaning procedures.

1.3 QUALITY ASSURANCE

.1 Applicators to conform to CUFCA Quality Assurance Program.

.2 Qualifications:

.1 Installer: person specializing in sprayed insulation installations with minimum 5 years’ experience approved by manufacturer.

.2 Manufacturer: company with minimum 5 years’ experience in producing of material used for work required for this project, with sufficient production capacity to produce and deliver required units without causing delay in work.

1.4 MOCK-UP

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

.2 Construct mock-up 10 m2 minimum, of spray in place urethane foam insulation including one inside corner and one outside corner. Mock-up may be part of finished work.

.3 Allow 24 hours for inspection of mock-up by Contract Administrator before proceeding with waterproofing work.

1.5 SAFETY REQUIREMENTS

.1 Protect workers as recommended by CAN/ULC-S705.2 and manufacturer's recommendations:

.1 Workers must wear gloves, respirators, dust masks, eye protection, protective clothing when applying foam insulation.

.2 Workers must not eat, drink or smoke while applying foam insulation.

1.6 PROTECTION

.1 Ventilate area in accordance with Section 01 51 00 - Temporary Utilities.

.2 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and 24 hours after application to maintain non-toxic, unpolluted, safe working conditions.

.3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.

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

.5 Dispose of waste foam daily in location designated by Contract Administrator and decontaminate empty drums in accordance with foam manufacturer’s instructions.

1.7 ENVIRONMENTAL REQUIREMENTS

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

1.8 WARRANTY

.1 Warrant work under this section against defects in workmanship or material for a minimum period of two (2) years from date of substantial completion; such as but not limited to debonding or cracking.

.2 Promptly rectify, at Contractor’s expense, defects or deficiencies which become apparent during the warranty period.

Part 2 Products

2.1 MATERIALS

.1 Test report from a certified testing laboratory indicating product meets the requirements of ULC S705.1 to be on file in the CUFCA office.

.2 Insulation: spray polyurethane foam to CAN/ULC-S705.1, thickness and RSI value as indicated on drawings.

.1 RSI: minimum 1.09 per 25 mm.
.2 Density: 28 kg/m^3, to ASTM D-1622.
.3 Air barrier properties: to ASTM E-28:
.1 @75 Pa: < 0.05 L/s/m^2
.2 @300 Pa: < 0.05 L/s/m^2
.4 Perm rating: to ATSM E-96:
.1 25 mm thick: 149.3 ng/(m^2.Pa.s)
.2 75 mm thick: 72.1 ng/(m^2.Pa.s)
.5 Tensile Strength: 310 kPa , to ASTM D-1623
.6 Compressive Strength: 158 kPa, to ASTM D-162,
.7 Flame Spread: 25, to ASTME-84
.8 Smoke development: 200, to ASTM E-84

.3 Sprayed polyurethane foam to meet requirements for minimum Type 2 air barrier and vapour retardant requirements as per the National Research Council, and CMHC specifications' performance requirements.

.4 Primers: in accordance with manufacturer's recommendations for surface conditions.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 PREPARATION

.1 Prepare substrate as directed by the manufacturer and as follows:

.1 Provide temporary enclosures as requested, to prevent spray and noxious vapours from contaminating air beyond application area.
.2 Protect workers as recommended by insulation manufacturer.
.3 Protect adjacent surfaces, furniture, finishes and equipment from damage by overspray, fall-out, and dusting of insulation materials.

.2 Prior to application, a test pattern shall be sprayed to ensure that proper equipment settings have been selected. Consideration shall be given to reactivity, pattern and appearance of the cellular plastic to ensure that each of these properties meets the requirements specified by the manufacturers of the equipment and the chemical components.

.3 The spray gun shall always be held perpendicular to the substrate being sprayed. A different angle can cause elongation of cells diminishing the physical and thermal properties.

.4 The chemical components shall be applied in passes to a clean, dry substrate, prepared in accordance with manufacturer requirements. The thickness of the insulation shall be ascertained by using a thickness gauge. Successive passes shall overlap to ensure a smooth surface, free of ridges. A final pass shall be applied to cover all the holes made by the gauges, bringing the insulation to the specified thickness.

.5 Because rigid polyurethane cellular plastic is combustible, it shall not be used at a continuous service temperature outside the range of -60 to +80oC (such as in contact with chimneys, heater vents, steam pipes), unless the thermal insulation has been designed for use at other service temperatures as specified by the chemical manufacturer.

.6 Rigid polyurethane cellular plastic shall not be:

.1 Used on or in the vicinity of heat emitting devices, such as recessed lighting fixtures, at a lesser distance than 75 mm or as specified by the authority having jurisdiction;

.2 Used inside electrical outlets or junction boxes;

.3 Used to cover electrical wiring in the insulation by more than 20 mm unless protective shielding is installed to prevent possible overheating of the electrical

.4 Wiring

.5 Directly exposed to water (i.e. liquid water as opposed to water vapour); and

.6 Exposed to continuous ultraviolet light.

.7 Because proper adhesion between the substrate and the thermal insulation is extremely important, the polyurethane cellular plastic shall not be applied on a substrate that is wet, damp, covered by frost, ice, oil, grease, dust, loose scale, rust or if the surface is otherwise unsuitable for the application. Nor shall the cellular plastic be applied on loose fill materials.

.8 Climatic conditions, such as humidity over 80%, wind, sun/shade and an ambient/substrate temperature difference over can adversely affect the application, the reaction times and the physical properties of the thermal insulation. Therefore, appropriate chemical components (system) shall be chosen for the specific temperature conditions of application in consultation with the chemical manufacturer. When Necessary, steps shall be taken to overcome the conditions such as installation of wind screens or by increasing the substrate temperature.

.9 Mask and cover adjacent areas to protect from overspray.

.10 Surfaces to receive foam insulation shall be free of visible frost or moisture in any phase, oil, rust or other foreign matter which may compromise adhesion.

3.3 APPLICATION

.1 Spray-application of polyurethane foam shall be per formed in accordance with ULCS705.2.

.2 Apply only when surfaces and environmental conditions are within limits prescribed bythe material manufacturer.

.3 Apply in consecutive passes as recommended by manufacturer to thickness as indicated on drawings.

.4 Finished surface of foam insulation to be free of voids and imbedded foreign objects.

.5 Remove masking materials and overspray from adjacent areas immediately after foam surface has hardened. Ensure cleaning methods do not damage work performed by other sections.

3.4 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 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.

3.5 TOLERANCES

.1 Maximum variation from indicated thickness: 6 mm.

3.6 CLEANING

.1 Upon completion of foam installation, provide access for Contract Administrator to facilitate inspection of work.

.2 Clean-up all material and clean site to pre-construction form.

END OF SECTION

Part 1 General

1.1 REFERENCES

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

- .1 ASTM D1709 - 09 Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method.
- .2 ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
- .3 ASTM E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs.
- .4 ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- .5 ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
- .6 ASTM F1249-01 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.

.3 Underwriters Laboratories Canada (ULC)

- .1 CAN/ULC S102, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

.4 National Air Barrier Association (NABA)

1.2 SUBMITTALS

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

.2 Product Data: Submit manufacturer's printed product literature, specifications and datasheet and include:

- .1 Product characteristics.
- .2 Performance criteria.
- .3 Limitations.

.3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).

.4 Quality Assurance Program: Submit evidence of current Contractor accreditation and Installer certification under the National Air Barrier Association's (NABA) Quality Assurance Program (QAP). Submit accreditation number of the Contractor and certification number(s) of the NABA Certified Installer(s).

1.3 MOCK-UPS

.1 Construct mock-up of sheet vapour barrier installation including one lap joint, one inside corner and at one electrical box. Mock-up may be part of finished work.

.2 Mock-up will be used to judge workmanship, substrate preparation, and material application.

.3 Allow 24 hours for inspection of mock-up by Contract Administrator before proceeding with vapour barrier work.

.4 When accepted, mock-up will demonstrate minimum standard of quality required for this work.

1.4 QUALIFICATIONS

.1 Air Barrier Subcontractor Qualifications: Air barrier Subcontractor(s) shall be accredited at the time of bidding and during the complete installation, period by the National Air Barrier Association (NABA) whose Installer(s) are certified in accordance with the site Quality Assurance Program used by NABA

.2 Each worker who is installing air barriers must be a certified applicator and have a minimum of 3 (three) years' experience with installation of the air barrier system.

1.5 WARRANTY

.1 Material Warranty: Provide material manufacturer's standard product warranty, for a minimum three (3) years from date of Substantial Completion.

.2 Subcontractor (approved by NABA and Manufacturer) Installation Warranty: Provide a two (2) year installation warranty from date of Substantial Completion, including all materials of the air barrier assembly, against failures including loss of air tight seal, loss of watertight seal, loss of attachment, loss of cohesion/adhesion and failure to cure properly.

Part 2 Products

2.1 SHEET VAPOUR BARRIER

.1 Performance-Based Specification: Vapour retarder membrane shall be manufactured from virgin polyolefin resins, and when tested according to all requirements of ASTM E1745, shall meet the following minimum performance requirements:

.1 Maximum Water Vapour Permeance (ASTM E154 Sections 7, 8, 11, 12,13, by ASTM E96, Method B or ASTM F1249).

.1 As received: 0.0183 perms.

.2 After Wetting and Drying: 0.0210 perms.

.3 Resistance to Plastic Flow and Temperature: 0.0197 perms.

.4 Effect Low Temperature and Flexibility: 0.0212 perms.

.5 Resistance to Deterioration from Organisms and Substances in Contacting Soil: 0.0198 perms.

.2 Puncture Resistance (ASTM D1709): 4,394 grams.

.3 Tensile Strength ASTM E154, Section 9: 52 Lb. Force/Inch.

.4 Acceptable Manufacturer and Product: PERMINATOR 10 mil by W. R. MEADOWS.

2.2 SUBSTITUTIONS:

.1 Refer to Section 01 33 00 – Submittal Procedure, subsection 2.2.

2.3 ACCESSORIES

.1 Joint sealing tape: air resistant pressure sensitive adhesive tape, [type recommended by vapour barrier manufacturer, 100 mm wide]

.2 Sealant: compatible with vapour retarder materials, recommended by vapour retarder manufacturer. To Section 07 92 00 - Joint Sealing.

.3 Staples: minimum 6 mm leg.

.4 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

Part 3 Execution

3.1 EXAMINATION

.1 The Air Barrier Contractor shall examine substrates, areas, and conditions under which the Air Barrier Assembly will be installed, with NABA Certified Installer(s) present, for compliance with requirements.

.2 Verify that surfaces and conditions are suitable prior to commencing work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

.3 Verify substrate is visibly dry.

.4 Ensure that the following conditions are met:

.1 Surfaces are sound, dry, even, and free of excess mortar or other contaminants

.2 Inspect substrates to be smooth without large voids or sharp protrusions. Inform Contractor if substrates are not acceptable and need to be repaired by the concrete sub-trade.

3.2 INSTALLATION

.1 Ensure services are installed and inspected prior to installation of retarder.

.2 Install sheet vapour retarder on warm side of exterior wall, ceiling, assemblies prior to installation of gypsum board to form continuous retarder.

.3 Install sheet vapour retarder on granular base (floors only).

.4 Use sheets of largest practical size to minimize joints.

.5 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.

3.3 EXTERIOR SURFACE OPENINGS

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

3.4 PERIMETER SEALS

.1 Seal perimeter of sheet vapour barrier as follows:

.1 Apply continuous bead of sealant to substrate at perimeter of sheets.

.2 Lap sheet over sealant and press into sealant bead.

.3 Install staples through lapped sheets at sealant bead into wood substrate.

.4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.5 LAP JOINT SEALS

.1 Seal lap joints of sheet vapour barrier as follows:

.1 Attach first sheet to substrate.

.2 Apply continuous bead of sealant over solid backing at joint.

.3 Lap adjoining sheet minimum 150 mm and press into sealant bead.

.4 Install staples through lapped sheets at sealant bead into wood substrate.

.5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.6 ELECTRICAL BOXES

.1 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:

.1 Install moulded box vapour barrier or wrap boxes with film sheet providing minimum 300 mm perimeter lap flange.

.2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

3.7 CLEANING

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

3.8 FIELD QUALITY CONTROL

.1 The City Inspection and Testing: Cooperate with The City's testing agency. Allow access to work areas and staging. Notify The City testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection. Do not cover Work of this Section until testing and inspection is accepted.

.2 Forward written inspection reports to the Contract Administrator within 10 working days of the inspection and test being performed.

.3 If the inspections reveal any defects, promptly remove and replace defective work at no additional cost to The City or the Contract Administrator.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CGSB 37-GP-56M: Membrane, Modified, Bituminous, Prefabricated, and Reinforced.

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

.1 ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

.2 ASTM E2178: Standard Test Method for Air Permeance of Building Materials.

.3 ASTM E283: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

.4 E1677 Specification for Air Retarder (AR) Material or System for Low-Rise Framed Building Walls

.5 ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

.6 ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

.7 ASTM E96: Water Vapor Transmission of Materials.

.3 National Building Code of Canada (NBCC)

.1 NBCC, Part 5 - Environmental Separation

.4 Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification.

1.2 SUBMITTALS

.1 Submit documentation from an approved independent testing laboratory certifying the air leakage and vapor permeance rates of the air barrier membranes, including primary membrane and transition sheets, exceed the requirements of the Massachusetts Energy Code and in accordance with ASTM E2178.

.1 Test report submittals shall include test results on porous substrate and include sustained wind load and gust load air leakage results.

.2 Submit copies of manufacturers' current ISO certification.

.3 Submit manufacturers' current product data sheets for the air barrier membrane system

1.3 QUALITY ASSURANCE

.1 Submit document stating the applicator of the primary air/vapor barrier membranes specified in this section is qualified by the manufacturer as suitable for the execution of the Work.

.2 Perform Work in accordance with manufacturer's written instructions and this specification.

.3 Maintain one copy of manufacturer's written instructions on site.

.4 Allow access to Work site by the air barrier membrane manufacturer's representative.

.5 Components used shall be sourced from one manufacturer, including sheet membrane, air barrier sealants, primers, mastics, and adhesives.

1.4 QUALIFICATIONS

.1 Applicator: Company specializing in performing work of this section with minimum 5 years documented experience with installation of air/vapour barrier systems. Complete installation must be approved by the material manufacturer.

.2 Applicator: Company who is currently licensed by certifying organization must maintain their license throughout the duration of the project.

1.5 PRE- INSTALLATION MEETINGS

.1 Convene one week prior to commencing work of this section.

1.6 DELIVERY, STORAGE AND HANDLING

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

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions. Deliver membrane materials in factory wrapped packaging indicating name of manufacturer and product.

.3 Avoid spillage. Immediately notify Contract Administrator if spillage occurs and start clean up procedures.

.4 Clean spills and leave area as it was prior to spill.

.5 Store roll materials on end in original packaging.

.6 Store primers at temperatures of 5˚C and above to facilitate handling. Keep solvent away from open flame and excessive heat.

1.7 PROJECT ENVIRONMENTAL REQUIREMENTS

.1 Do not install solvent curing sealants or vapour release adhesive materials in enclosed spaces without ventilation.

.2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

.3 Maintain temperature and humidity recommended by materials manufactures before, during and after installation.

1.8 WARRANTY

.1 Provide a written warranty for work of this section from Manufacturer for failure due to defective materials and from contractor for failure due to defective installation workmanship for ten (10) years respectively.

.2 Include coverage of installed sealant and sheet materials which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion or do not cure.

Part 2 Products

2.1 MATERIALS

.1 Air/vapor barrier membrane components and accessories must be obtained as a single-source from the membrane manufacturer to ensure total system compatibility and integrity.

1. Acceptable Manufacturer:
   .1 Henry Company, 999 N Sepulveda Blvd, Suite 800, El Segundo, CA, 90245, 1-800-598-7663

2.2 MEMBRANES

.1 Primary sheet air/vapor barrier membrane shall be Blueskin® SA LT manufactured by Henry; an SBS modified bitumen, self-adhering sheet membrane complete with a blue engineered thermoplastic film. Membrane shall have the following physical properties:

.1 ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies,

.2 Air leakage: <0.0001 CFM/ft² @1.6 lbs/ft^2 to ASTM E2178 and ASTM E283 and have no increased air leakage when subjected to a sustained wind load of 10.5 lbs/ft^2 for 1 hour and gust wind load pressure of 62.8 lbs/ft^2 for 10 seconds when tested at 1.6 lbs/ft^2 to ASTM E331,

.3 Vapor permeance: 0.03 perms to ASTM E96 (Desiccant Method),

.4 Membrane Thickness: 0.0394 inches (40 mils),

.5 Low temperature flexibility: -22 degrees F to CGSB 37-GP-56M,

.6 Elongation: 200% to ASTM D412-modifed,

.7 Meets CAN/CGSB-51-33 Type I Water Vapor Permeance requirements

.2 Alternate self-adhering membrane for all window and window sill flashings, door openings, inside and outside corners and other transitions shall be HE200 AM Metal Clad manufactured by Henry; a SBS modified bitumen, self-adhering sheet membrane complete with surface layer of metallic aluminum film that many sealants adhere well to. Membrane shall have the following physical properties:

.1 Peel Adhesion to Primed Steel 15.0 to ASTM D 1000

.2 Vapor Permeance: < 0.014 perms to ASTM E 96

.3 Membrane Thickness: 0.0443 inches (45 mils)

.4 Low temperature flexibility: -15 degrees F to ASTM D146 min

.5 Elongation: 40% to ASTM D412-modifed min

2.3 PRIMER

.1 Primer for self-adhering membranes at temperatures above 25 degrees F shall be Aquatac™ Primer manufactured by Henry; a polymer emulsion based adhesive, quick setting. Primer shall have the following physical properties:

.1 Color: Aqua,

.2 Weight: 8.7 lbs/gal,

.3 Solids by weight: 53%,

.4 Water based, no solvent odors,

.5 Drying time (initial set): 30 minutes at 50% RH and 70 degrees F

.2 Adhesive for self-adhering membranes at all temperatures shall be Blueskin® Adhesive manufactured by Henry, a synthetic rubber based adhesive, quick setting, having the following physical properties:

.1 Color: Blue,

.2 Weight: 6 lbs/gal,

.3 Solids by weight: 35%,

.4 Drying time (initial set): 30 minutes

.3 Adhesive with low VOC content for self-adhering membranes at all temperatures shall be Blueskin® LVC Adhesive manufactured by Henry, a synthetic rubber based adhesive, quick setting, having the following physical properties:

.1 Color: Blue,

.2 VOC: <240 g/L,

.3 Solids by weight: 40%,

.4 Drying time (initial set): 30 minutes

.4 Termination Sealant shall be HE925 BES Sealant manufactured by Henry; a moisture cure, medium modulus polymer modified sealing compound having the following physical properties:

.1 Compatible with sheet air barrier, roofing and waterproofing membranes and substrate,

.2 Complies with Fed. Spec. TT-S-00230C, Type II, Class A,

.3 Complies with ASTM C 920, Type S, Grade NS, Class 25,

.4 Elongation: 450 – 550%,

.5 Remains flexible with aging,

.6 Seals construction joints up to 1 inch wide

2.4 INSULATION ADHESIVE

.1 Insulation adhesive shall be Air-Bloc 21 Insulation Adhesive manufactured by Henry; a synthetic, trowel applied, rubber based adhesive, having the following physical properties:

.1 Compatibility: With air barrier membrane, substrate and insulation,

.2 Air leakage: 0.0026 CFM/ft^2 @ 2.1 lbs/ft^2 to ASTM E283,

.3 Water vapour permeance: 0.03 perms to ASTM E96,

.4 Long term flexibility: CGSB 71-GP-24M

2.5 SUBSTITUTIONS:

.1 Refer to Section 01 33 00 – Submittal Procedure, subsection 2.2.

Part 3 Execution

3.1 EXAMINATION

.1 Ensure all surfaces are clean, dry, sound, smooth, continuous and comply with air barrier manufacturer's requirements.

.2 All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane. Strike masonry joints flush.

.3 Where curing compounds are used they must be clear resin based without oil, wax or pigments.

.4 Do not proceed with application of air barrier membrane when rain is expected within 24 hours.

.5 Condition materials to room temperature prior to application to facilitate handling.

3.2 PREPARATION

.1 Surfaces must be sound, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane.

.2 New concrete should be cured for a minimum of 14 days and must be dry before air/vapour barrier membranes are applied.

.3 Ensure all preparatory Work is complete prior to applying primary air/vapor barrier membrane.

.4 Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing and fastened into solid backing.

.5 Apply primer at rate recommended by manufacturer to all areas to receive self-adhering sheet air/vapor barrier membrane and or through-wall flashing membrane as indicated on drawings by roller or spray and allow minimum 30 minute open time. Primed surfaces not covered by self-adhering membrane or self-adhering through-wall flashing membrane during the same working day must be re-primed.

3.3 INSTALLATION

.1 Inside and outside corners

.1 Seal inside and outside corners of sheathing boards with a strip of self-adhering air/vapor barrier membrane extending a minimum of 3 inches on either side of the corner detail.

.1 Prime surfaces as per manufacturers' instructions and allow to dry.

.2 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all end and side laps of membrane.

.3 Roll all laps and membrane with a counter top roller to ensure seal.

.2 Transition areas:

.1 Tie-in to structural beams, columns, floor slabs and intermittent floors, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials as indicated in drawings with self-adhering air/vapor barrier membrane.

.1 Prime surfaces as per manufacturers' instructions and allow to dry.

.2 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Provide minimum 3 inch lap to all substrates.

.3 Ensure minimum 2 inch overlap at all end and side laps of membrane.

.4 Roll all laps and membrane with a counter top roller to ensure seal.

.3 Windows and rough openings

1. Wrap rough openings with self-adhered air/vapor barrier membrane as detailed.
   .1 Prime surfaces as per manufacturers' instructions and allow to dry.
   .2 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inch overlap at all end and side laps of membrane.
   .3 Roll all laps and membrane with a counter top roller to ensure seal.

.4 Through-wall flashing membrane

.1 Apply through-wall flashing membrane along the base of masonry veneer walls and over shelf angles as detailed.
   .1 Prime surfaces and allow to dry, press membrane firmly into place, over lap minimum 2 inches at all end and side laps. Promptly roll all laps and membrane to ensure the seal.
   .2 Applications shall form a continuous flashing membrane and shall extend up a minimum of 8 inches up the back-up wall.
   .3 Seal the top edge of the membrane where it meets the substrate using termination sealant. Trowel-apply a feathered edge to seal termination to shed water.
   .4 Install through-wall flashing membrane and extend 1/2 inch from outside edge of veneer. Provide end dam flashing as detailed.

.5 Primary air barrier

1. Apply self-adhering air/vapor barrier membrane complete and continuous to prepared and primed substrate in an overlapping shingle fashion and in accordance with manufacturer's recommendations and written instructions. Stagger all vertical joints.
   .1 Prime surfaces as per manufacturers' instructions and allow to dry.
   .2 Align and position self-adhering air/vapor barrier membrane, remove protective film and press firmly into place. Ensure minimum 2 inch overlap at all end and side laps of membrane.
   .3 Roll all laps and membrane with a counter top roller to ensure seal.
   .4 At the end of each day's work seal the top edge of the membrane where it meets the substrate with termination sealant. Trowel apply a feathered edge to seal termination and shed water.

3.4 PROTECTION OF WORK

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

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

.3 Ensure finished Work is protected from climatic conditions.

.4 Damp substrates must not be inhibited from drying out. Do not expose the backside of the substrate to moisture or rain.

.5 Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane.

.6 Air/vapor barrier membrane is not designed for permanent exposure. Good practice calls for covering as soon as possible.

3.5 INSPECTION

.1 Carefully inspect for continuity of air barrier prior to placement of insulation.

.2 Repair all deficient membrane areas.

.3 Misaligned or inadequately lapped seams, punctures or other damage must be repaired with a patch of air barrier membrane extending 50mm in all directions from edge of damaged areas.

.4 Cover membrane immediately after Contract Administrator's inspection to protect from damage by other trades.

3.6 TESTING

.1 Air leakage testing as directed by Contract Administrator and paid for by contractor will be performed by professional testing agency for the locations selected at random for penetrations, laps, corners, etc.

.2 Testing will be witnessed by Contract Administrator and test reports will be signed by tester, site representative and contractor.

.3 Inform Contract Administrator 48 hours prior to required testing.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 07 21 13 – Board Insulation

.2 07 62 00 – Sheet Metal Flashing and Trim

.3 07 71 00 – Roof Specialties

.4 07 72 33 – Roof Hatches

1.2 REFERENCES

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

.1 ASTM C36/C36M-[01], Standard Specification for Gypsum Wallboard.

.2 ASTM C726-[00a], Standard Specification for Mineral Fiber Roof Insulation Board.

.3 ASTM C728-[97e1], Standard Specification for Perlite Thermal Insulation Board.

.4 ASTM C 1177/C1177M-[01], Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

.5 ASTM D41-[94(2002)e1], Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.

.6 ASTM D312-[00], Asphalt Used in Roofing.

.7 ASTM D448-[03], Standard Classification for Sizes of Aggregate for Road and Bridge Construction.

.8 ASTM D2178-[97a], Asphalt Glass Felt Used in Roofing and Waterproofing.

.9 ASTM D6162-[00a], Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.

.10 ASTM D6163-[00e1], Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.

.11 ASTM D6164-[00], Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.

.2 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-37.5-[M89], Cutback Asphalt Plastic Cement.

.2 CGSB 37-GP-9Ma-[83], Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.

.3 CGSB 37-GP-15M-[84], Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.

.4 CGSB 37-GP-19M-[85], Cement, Plastic, Cutback Tar.

.5 CAN/CGSB-37.29-[M89], Rubber-Asphalt Sealing Compound.

.6 CGSB 37-GP-56M-[80b(A1985)], Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

.7 CAN/CGSB-51.33-[M89], Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

.3 Canadian Roofing Contractors Association (CRCA).

.1 CRCA Roofing Specifications Manual-[1997].

.4 Canadian Standards Association (CSA International).

.1 CAN/CSA-A123.3-[98], Asphalt Saturated Organic Roofing Felt.
.2 CAN/CSA-A123.4-[98], Asphalt for Use in Construction of Built-Up Roof Coverings and Waterproofing Systems.
.3 CSA A231.1-[99], Precast Concrete Paving Slabs.
.4 CSA O121-[M1978(R1998)], Douglas Fir Plywood.
.5 CSA O151-[M1978(R1998)], Canadian Softwood Plywood.

.5 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act, 1999 (CEPA).

.6 Factory Mutual (FM Global).

.1 FM Approvals - Roofing Products.

.7 Health Canada / Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.8 Transport Canada (TC).

.1 Transportation of Dangerous Goods Act, 1992 (TDGA).

.9 Underwriters Laboratories' of Canada (ULC).

.1 CAN/ULC-S701-[01], Thermal Insulation, Polystyrene, Boards and Pipe Covering.
.2 CAN/ULC-S704-[2001], Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
.3 CAN/ULC-S706-[02], Standard for Wood Fibre Thermal Insulation for Buildings.

1.3 PERFORMANCE REQUIREMENTS

.1 All waterproofing materials will be provided by the same manufacturer. Compatibility between components of roofing system is essential. Provide written declaration to Contract Administrator stating that materials and components, as assembled in system, meet this requirement.

1.4 SUBMITTALS

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

.2 Submit two copies of most recent technical roofing components data sheets describing materials' physical properties.

.3 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.4 Indicate flashing, control joints.

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

.6 Manufacturer's Certificate: certify that products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

.1 Roofing Contractors and sub-contractors must, when bidding or performing work, possess a roofing Contractor operating license.

.2 Roofing Contractors and Subcontractors must also be registered with SOPREMA's PAQ + S and provide the Contract Administrator with a SOPREMA certificate to this effect before beginning any roofing work.

.3 Only qualified, certified installers employed by a company with the appropriate equipment may execute the roofing work.

.4 Roofing Contractors and Subcontractors must also be members of Local Chapter of Canadian Roofing Association and provide the Contract Administrator with a certificate to this effect before beginning any roofing work.

.5 The roofing product manufacturer can delegate a representative to visit the work site at the start of roofing installation.

.6 The Contractor must at all times enable and facilitate access to the work site by said representative.

.7 Convene pre-installation meeting one week prior to beginning waterproofing Work, with Contract Administrator to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

1.6 STORAGE AND HANDLING

.1 All materials will be delivered and stored in conformance with the requirements described in the Manufacture's Manual; they must remain in their original packaging, displaying the manufacturer's name, product name, weight, and reference standards, as well as all other indications or references considered standard.

.2 At all times, materials will be adequately protected and stored in a dry and properly ventilated area, away from any welding flame or spark and sheltered from the elements or any harmful substance.

.3 Only materials destined for same-day use can be removed from this storage area. In cold weather, these materials should be stored in a heated area at a minimum temperature of $+10^0$C and removed prior to application.

.4 If rolls cannot be stored in a heated environment, they may be pre-conditioned before installation. For precise description, consult Manufacturer's "Roofers' Guide" on membrane application procedures.

.5 Store adhesives and emulsion-based waterproofing mastics at a minimum $+5^0$C. Store adhesives and solvent-based mastics at sufficiently high temperatures to ensure ease of application.

.6 Store rolls upright; flashing to be stored to avoid creasing, buckling, scratches or any other possible damage.

.7 Avoid material overloads which may affect the structural integrity of specific roof areas.

.8 Place plywood runways over completed Work to enable movement of material and other traffic.

1.7 PROTECTION

.1 Prior to the start of work, conduct a site inspection to establish safe working practices and make sure that all procedures and proposed changes are approved to minimize the risk of fires.

.2 Conform to Health and Safety Plan, Manufacturer's Specifications Manual and local CRA association recommendations.

.3 At the end of each workday, use a heat detector gun to spot any smouldering or concealed fire.

.4 Maintain fire watch for 1hour after each day's roofing operations cease.

.5 Throughout roofing installation, maintain a clean site and have one approved ABC fire extinguisher within 6 meters of each roofing torch.

1.8 ENVIRONMENTAL REQUIREMENTS

.1 Do not install roofing when temperature remains below -18 degrees C for torch application, or -5 degrees C for peal and stick to manufacturers' recommendations.

.2 Minimum temperature for solvent-based adhesive is -5 degrees C.

.3 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

.1 The product manufacturer will issue a written and signed document in The City's name, certifying all product performance properties for a period of ten (10) years, starting from the date of acceptance. This warranty will cover the removal and replacement of defective roof membrane products, including labour. The warranty must remain a full warranty for the duration of the period specified. The scope of this warranty must not be limited by other system components manufactured or distributed by the membrane manufacturer. No letter amending the manufacturer's standard warranty will be accepted and the warranty certificate must reflect these requirements.

.2 The Contractor will issue a written and signed document in The City's name, certifying that the work executed will remain in place and free of any workmanship defect for a period of Two years, starting from the date of acceptance.

Part 2 Products

2.1 DECK COVERING

.1 Steel deck: As specified in Section 05 31 00 – Steel Decking.

2.2 VAPOUR RETARDER

.1 Self-adhesive Air/Vapour Barrier: membranes composed of bitumen modified with thermoplastic polymers and high-density polyethylene film. The width of the membrane to be 1,14 meters (45 inches). The self-adhesive under face is covered with a silicone release sheet. Water vapour permeability: 0.06 ng/Pa•s•m^2 (0.0011 Perm).]

.2 Acceptable material: SOPRAVAP'R by SOPREMA.

.3 Vapour retarder continuity strip: waterproofing membrane with non-woven polyester reinforcement, fiberglass and elastomeric bitumen. The upper surface is sanded and the under face is self-adhesive.

2.3 INSULATION

.1 Insulation: As specified in Section 07 21 13 – Board Insulation

2.4 MEMBRANE SYSTEM

.1 Acceptable system: COLVENT system (semi-independent self-adhesive base sheet) by SOPREMA.

.2 Reinforced elastomeric bitumen waterproofing system with a semi-independent, self-adhesive base sheet and a heat-welded cap sheet. The top surface of the base sheet is covered with a thermo-fusible plastic film and must have three distinctive blue lines to facilitate roll alignment. The bottom surface of the cap sheet is covered with a thermo-fusible plastic film and the top surface protected by coloured granules.

.3 Components

.1 Reinforcement: combination of glass and polyester

.2 Elastomeric bitumen: blend of selected bitumen and SBS polymer

.3 System properties:

	Traffic only	MD	XD
.1	Strain energy (kN/m)	9.4	9.2
.2	Breaking strength (N/5 cm)	19.2	16.3
.3	Ultimate elongation (%)	54	62
.4	Cold bending at –30°C	No cracking	
.5	Softening point	≥ 110°C	
.6	Static puncture (N)	380	

.4 Prefabricated membrane, complies with CAN/CGSB 37-GP-56M (9th draft).

.5 Acceptable materials:

.1 Base sheet membrane: COLVENT BASE 810 by SOPREMA

.2 Cap sheet: COLVENT TRAFFIC CAP-860 by SOPREMA

2.5 UPSTAND SYSTEM (SELF ADHESIVE SHEET)

.1 Membrane flashing to be two plies of reinforced modified bitumen membrane and the base sheet to be self-adhesive. The top surface of the base sheet is covered with a thermofusible plastic film and the bottom surface is protected by silicone release paper. Cap sheet top surface is protected with coloured granules and the bottom surface is

covered with a thermofusible plastic film. Cap sheet membrane is applied by heat-welding.

.2 Components

.1 Reinforcement: combination of glass and polyester

.2 Elastomeric bitumen: blend of selected bitumen and SBS polymer

.3 System properties:

		MD	XD
.1	Strain energy (kN/m)	8.4	8.3
.2	Breaking strength (N/5 cm)	18	16
.3	Ultimate elongation (%)	55	56
.4	Tear resistance (N)	120	
.5	Static puncture (N)	380	
.6	Dimensional stability (%)	0.1	0.4
.7	Plastic flow (°C)	105	
.8	Cold bending (at -30°C) Initial No cracking -90 days at 70°C No cracking		

.4 Prefabricated membrane, complies with CAN/CGSB 37-GP-56M (9th draft).

.5 Acceptable materials:

.1 Base sheet flashing membrane: SOPRAFLASH FLAM STICK by SOPREMA

.2 Cap sheet flashing membrane: COLVENT TRAFFIC CAP 860 TRAFFIC by SOPREMA

2.6 ACCESSORIES MEMBRANES

.1 Roofing membrane reinforcement: with composite heavy duty, non-woven polyester, and glass mat, reinforcement and SBS modified bitumen. Both sides are, or the top face is covered with a thermofusible plastic film, sanded the underside is self-adhesive; as applicable for application. The top face must be marked with three (3) distinctive blue chalk lines to ensure proper roll alignment.

.2 Components:

.1 Reinforcement: composite heavy duty, non-woven polyester, and glass mat.

.2 Eletomeric bitumen: Mix of selected bitumen and SBS polymer.

.3 Prefabricated membrane, complies with CAN/CGSB 37-GP-56M (9th draft).

.4 Acceptable materials: SOPRAFLASH FLAM STICK, SOPRAFLASH STICK by SOPREMA.

2.7 PRIMER

.1 Primer for self-adhesive membranes: A blend of elastomeric bitumen, volatile solvents, adhesive enhancing resins used to prime porous substrates and non-porous substrates such as wood, concrete or metal to enhance the adhesion of self-adhesive membranes at temperatures above - 10°C.

.2 Acceptable materials: ELASTOCOL STICK by SOPREMA.

2.8 FASTENERS (ROOFING, INSULATION, AND MEMBRANE)

.1 #14 Phillips pre-assembled mechanical fasteners made of case-hardened carbon steel with a rust preventive coating that comply with FMR approval standards. 50 mm diameter, barbed stress plates that comply with the CSA B35.3 and FM 4470 approval standard.

.2 Acceptable materials: SOPRAFIX FASTENERS/PLATES by SOPREMA and as approved by FM for the specified system.

.3 Fastening: to FM system I90.

2.9 COMPLEMENTRY WATERPROOFING PRODUCTS

.1 Waterproofing mastic: Mastic made of synthetic rubbers, plasticized with bitumen and solvents with aluminium pigments added for greater resistance to U.-V.

.2 Acceptable material: SOPRAMASTIC ALU by SOPREMA

2.10 PREFABRICATED FLASHINGS

.1 Refer to Section 07 71 00 - Roof Specialties

2.11 SEALERS

.1 Sealants: Caulking - see Section 07 92 00 - Joint Sealing.

2.12 CARPENTRY

.1 Refer to Section 06 10 00 - Rough Carpentry.

Part 3 Execution

3.1 WORKMANSHIP

.1 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual and CRCA Roofing Specification Manual, Provincial Roofing Association Manual, particularly for fire safety precautions, and to FM.

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

.3 Assembly, component and material connections will be made in consideration of appropriate design loads.

3.2 EXAMINATION OF ROOF DECKS

.1 Inspect with Contract Administrator deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation outlets to determine readiness to proceed.

.2 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.

.4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.

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

3.3 PROTECTION

.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 Protect roof from traffic and damage. Comply with precautions deemed necessary by Contract Administrator.

.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.

3.4 APPLICATION PRIMER

.1 Apply one coat primer to Manufacturer’s installation manual.

3.5 INSTALLATION OF VAPOUR RETARDER

.1 Beginning at the bottom of the slope, without adhering the membrane, unroll onto the substrate for alignment. Do not immediately remove the silicone release sheet.

.2 Align the roll parallel to the corrugations of the steel deck. Make sure the membrane overlaps are supported along their entire length.

.3 Peel back one end of the silicone release sheet and adhere this part of the membrane to the substrate. Peel back the remaining release sheet at a 45º angle to avoid wrinkles in the membrane.

.4 Overlap adjacent membranes by 75 mm. Overlap end laps by 150 mm. Stagger end laps by at least 300 mm.

.5 The primer must be dry when the vapour retarder is installed

.6 The roof vapour retarder must meet and overlap the air/vapour barrier on adjoining walls to ensure total continuity.

.7 Install vapour retarder membrane at insulation perimeters and around each element piercing the insulation to ensure sealed connections with base sheet at upstands.

.8 Roof vapour retarder must meet and overlap the air/vapour barrier on adjoining walls to ensure total continuity.

.9 Install vapour retarder membrane at insulation perimeters and around each element piercing the insulation to ensure sealed connections with base sheet at upstands.

3.6 INSULATION INSTALLATION

.1 Attach insulation mechanically in conformance with manufacturer's recommendations, and Factory Mutual standards 1-90 pertaining to number and placement of fasteners, namely Bulletin 1-28 for fastening to roof perimeters and corners.

.2 Stagger all vertical joints between two rows of insulation board.

3.7 INSTALLATION OF SELF-ADHESIVE SEMI-ADHERED BASE SHEET (COLVENT) SYSTEM

.1 Beginning at the low points, drains and perpendicular to the slope, install the base sheet membrane without adhering in parallel strips.

.2 Each strip should overlap the preceding strip by 75 mm along the side joint (use the blue line to facilitate alignment) and by 25 mm at the ends. Because of the nature of this system, base sheet membrane joints can be aligned (no staggering) to facilitate the installation of the reinforcing band.

.3 Let the membrane relax at least 15 minutes before installing it, or burn the plastic film in a zigzag fashion using a propane torch to relax it. In cold weather, use the second method.

.4 Peel back the silicone release paper to adhere the membrane to the substrate. Use a broom or brush to apply even pressure and ensure good adherence.

.5 Remove the paper protecting the selvedge then heat the side joints. Seal the joints using a trowel. A bead of molten bitumen should appear along the joint to ensure a perfect seal.

.6 Seal the end joints by welding a 300-mm-wide cover strips centred on the joint.

.7 The base sheet membrane should end over the cant strip or at the edge of the substrate.

.8 Install screws and washers every 300 mm c/c along the edge of the substrate.

3.8 INSTALLATION OF PERIMETER BASE SHEETS WITH MECHANICAL FASTENERS

.1 Unroll a strip of membrane without adhering at the base of the parapets and upstands.

.2 This base sheet membrane will be mechanically fastened using the anchoring patterns approved by Factory Mutual for the SOPRAFIX 1-90 system.

.3 Fasten the base sheet membrane at one end, pull firmly on the membrane to stretch it flat, then install the appropriate anchors, proceeding toward the free end.

.4 Just before installing the base sheet membrane on the field surface or on the upstands, remove the protection strip from each edge of the membrane to adhere the base sheet membrane to the perimeter membrane.

.5 Seal the joints by torch welding a 300-mm-wide protection strip centred on the joint.

.6 Avoid creating wrinkles, blisters, and fishmouths.

3.9 INSTALLATION OF REINFORCEMENT GUSSETS

.1 Install gussets at every angle, on inside and outside corners.

3.10 BASE SHEET FLASHING INSTALLATION (SELF ADHERED)

.1 Apply base sheet flashing only once primer coat is dry.

.2 Before applying membranes, always remove the plastic film on the section to be covered if there is an overlap (inside and outside corners and field surface). For sanded base sheet membranes, apply ELASTOCOL STICK to the area to be covered at the foot of the parapets.

.3 Position the pre-cut membrane piece. Peel back 4 to 6 inches (100 to 150 mm) of the silicone release paper to hold the membrane in place at the top of the parapet.

.4 Then, gradually peel back the remaining silicone release paper, pressing down on the membrane with an aluminium applicator to ensure good adhesion. Use the aluminium applicator to ensure a perfect transition between the upstand and the field surface. Smooth the entire membrane surface with a roller for full adhesion.

.5 Cut off corners at end laps to be covered by the next roll.

.6 Install a reinforcing gusset in all inside and outside corners.

.7 Always seal overlaps at the end of the workday.

3.11 ROOF CAP SHEET INSTALLATION (TORCH APPLIED MEMBRANE)

.1 Once base sheet is applied and no defects are apparent, proceed with cap sheet installation.

.2 Begin with double-selvage starter roll. If starter roll is not used, side laps covered in granules must be degranulated by embedding side laps in torch-heated bitumen over a 75 mm width.

.3 Unroll cap sheet at drain. Carefully align first side lap (parallel to roof edge).

.4 Weld cap sheet onto base sheet with torch recommended by membrane manufacturer. During application, simultaneously melt both designated contact surfaces so a bead of bitumen is apparent as cap sheet unrolls.

.5 Avoid overheating.

.6 Make sure joints between the two layers are staggered by at least 300 mm.

.7 Overlap cap sheet side laps by 75 mm and end laps by 150 mm. Cut off corners at end laps to be covered by next roll. All overlap surfaces must be degranulated.

.8 Complete perfect welds between two membranes. Leave no zone unwelded. In cold weather, adjust welding time to obtain homogenous seam (it may be necessary to slow down in certain cases.)

.9 Once cap sheet is installed, carefully check all overlapped joints.

.10 During installation, take care to avoid excessive bitumen bleed-out at joints.

3.12 INSTALLATION OF CAP SHEETS ON UPSTANDS AND PARAPETS (HEAT WELDED)

.1 Cap sheet must be installed in one-metre-wide strips. The side joints must overlap by 75 mm and must be staggered by at least 100 mm with respect to the joints of the cap sheet on the field surface to avoid areas of excessive membrane thickness. The overlaps on the field surface must be 50 mm wider than those of the base sheet membrane on the upstands and parapets. At end laps, angle-cut the corners that will be covered by the following roll.

.2 Use a chalk line to draw a straight line on the field surface 150 mm from the upstands and parapets.

.3 Use a propane torch and round-nose trowel to embed the surface granules in the layer of hot bitumen [starting from the chalk line on the field surface to the bottom edge of the upstand or parapet as well as] on the granulated vertical surfaces that are to be overlapped.

.4 This cap sheet will be heat-welded directly to the base sheet membrane, proceeding from bottom to top. This technique softens both membranes in order to obtain even, continuous weld.

3.13 WATERPROOFING FOR DRAINS, VARIOUS DETAILS

.1 Install waterproofing membranes in conformance with various roofing details illustrated in the SOPREMA Manual.

3.14 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 The Aluminum Association Inc. (AA)

- .1 Aluminum Sheet Metal Work in Building Construction-2000.
- .2 AA DAF45-97, Designation System for Aluminum Finishes.

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

- .1 ASTM A591/A591M-98, Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications.
- .2 ASTM A606-01, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
- .3 ASTM A653/A653M-01a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .4 ASTM A792/A792M-02, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .5 ASTM B32-00 Standard Specification for Solder Metal.
- .6 ASTM D523-89(1999), Standard Test Method for Specular Gloss.

.3 Canadian Roofing Contractors Association (CRCA)

- .1 Roofing Specifications Manual 1997.

.4 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
- .2 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
- .3 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.

.5 Canadian Standards Association (CSA International)

- .1 CSA A123.3-98, Asphalt Saturated Organic Roofing Felt.
- .2 CSA-A440-00/A440.1-00 - A440-00, Windows / Special Publication A440.1-00. User Selection Guide to CSA Standard A440-00, Windows.
- .3 CSA B111-1974(R1998), Wire Nails, Spikes and Staples.

1.2 SAMPLES

.1 Submit shop drawings 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.Products

1.3 DELIVERY, STORAGE, AND HANDLING

.1 Storage and Handling Requirements:

- .1 Store materials off ground and under cover in a dry, well ventilated enclosure.
- .2 Stack preformed material in manner to prevent twisting, bending and rubbing.

.3 Provide protection for galvanized and prepainted surfaces.

.4 Prevent contact of dissimilar metals during storage and protect from acids, flux, and other corrosive materials and elements.

.2 Waste Management and Disposal:

.1 In accordance with Section 01 74 00 – Cleaning and Waste Management.

Part 2 Products

2.1 SHEET METAL MATERIALS

.1 Aluminum-zinc alloy coated steel sheet: to ASTM A792/A792M, commercial quality, grade 33 with AZ150 coating, regular spangle surface, 0.70 mm (24 gauge) and 1.61 mm (16 gauge) base metal thicknesses. Pre-painted to CGSB –GP-71.

2.2 PREFINISHED STEEL SHEET

.1 Galvanized Steel Sheet: commercial quality sheet to ASTM A653/A653M, with Z275 designation zinc coating.

.2 Prepainted Galvanized Steel: commercial quality to ASTM A653/A653M with Z275 zinc coating prepainted with baked on enamel with colours of proven durability for exterior exposure, to CSSBI Technical Bulletin No. 7, 5000 series.

.3 Solder: 50% pig lead and 50% block tin.

.4 Flux: commercial quality as recommended by sheet metal manufacturer.

.5 Flashing Nails: #12 hot dipped zinc coated, annular ringed.

.6 Sheet Metal Screws: Cadmium plated, self-tapping, pan head.

.7 Plastic Cement: to ASTM D2822.

.8 Lap Cement: to ASTM D3019.

.9 Sealing Compound: to Section 07 92 00 – Joint Sealing.

.10 Sealant: one component, elastomeric, chemical curing, CAN/CGSB-19.13 [VOC content compliant with SCAQMD Rule #1168, June 2006].

.11 Recessed Reglet: preformed 0.70 mm thick (24 gauge) galvanized steel channel with face and ends covered with plastic tape.

.12 Flashing Anchor Clips: 0.85 mm thick (22 gauge) galvanized steel.

2.3 FABRICATION, GENERALLY

.1 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.2 Backpaint sheet metal with bituminous paint on surface in contact with concrete, masonry, cementitious materials or dissimilar metal.

2.4 FABRICATION, FLASHING

.1 Maximum Joint Spacing:

.1 Parapet Face Flashings: 1200 mm.

.2 Cap Flashing 300 mm and Greater in Width: 1200 mm.

.3 All Other Flashings: 2400 mm.

.2 Construct flashing joints to allow for flashing movement, using flat "S" lock seams.

.3 Maintain minimum of 22 mm lap at all joints. Provide 25 mm anchor projection of "S" locks.

.4 At inside and outside corners, mitre the joint, and use upstanding seams, 25 mm minimum height and 22 mm minimum lap.

.5 Maintain minimum 1:5 slope on horizontal surfaces of flashings, parapets and control joints.

.6 Hem exposed edges on underside of all flashings.

.7 Fabricate cap flashing to have a drip leg minimum 110 mm high.

.8 Fabricate cap and counter flashings to lap 100 mm over base flashings.

2.5 FABRICATION, ROOF ACCESSORIES

.1 Form sheet steel roof drain sleeves, air-stops etc. from 0.70 mm (24 gauge) galvanized steel.

.2 Form gum boxes from 0.70 mm (24 gauge) galvanized steel, with 75 mm minimum upstand and 100 mm one piece flanges. Solder joints. Make pans wider than member passing through roof membrane by 50 mm minimum all sides.

.3 Fabricate roof scuppers from 0.70 mm (24 gauge), prepainted galvanized sheet steel with one piece deck flange, minimum 150 mm. Contour scuppers to cant strips.

.4 Fabricate air/firestop below control joint box from 0.70 mm (24 gauge) galvanized steel.

.5 Fabricate roof drain sleeves as detailed on drawings, from 0.70 mm (24 gauge) galvanized steel.

Part 3 Execution

3.1 EXAMINATION

.1 Examine surfaces to receive flashings. Notify the Minister of surfaces which are considered unacceptable to receive the work of this Section.

.2 The commencement of flashing work will imply unconditional acceptance of the surfaces and substrates to which the flashing is to be fastened.

.3 Verify that the following are located and installed as detailed on drawings:

.1 Plywood and lumber nailer plates to walls and parapets.

.2 Control joints.

3.2 PROTECTION OF EXISTING WORK

.1 Protect the work of other Sections from damage by the work of this Section.

.2 Place protection to the requirements and satisfaction of this Section before performing the work of other Sections.

3.3 FLASHING INSTALLATION, GENERAL

.1 Install sheet metal work in accordance with CRCA FL series details.

.2 Install flashings not later than seven days after installation of the membrane on any particular section of the roof.

.3 Use 0.80 mm thick x 150 mm long anchor clips on fascia faces, and screws or annular ringed nails on the opposite face.

.4 Use exposed fastenings in approved locations. Install anchors using annular ringed nails.

.5 Fasten flashings of 1.2 m length and shorter, through the extended "S" locks. Fasten flashings over 1.2 m length, through the extended "s" locks, and at mid-length with a 150 mm long, 0.80 mm thick galvanized steel clip.

.6 Fasten flashings at maximum 600 mm O.C.

.7 Where possible, do not set base flashing screws less than 200 mm from top of roof membrane.

.8 Provide 1.61 mm thick (16 gauge) flashing at all areas where curtain wall terminates at foundation wall.

3.4 INSTALLATION OF FLASHING JOINTS

.1 Fit flashings together so that one end of each section is free to move in the joint. Do not use sealant at joints.

.2 Wipe and wash clean, soldered joints to remove traces of flux, immediately after soldering.

3.5 INSTALLATION AT REGLETS

.1 Assist in locating and installing recessed reglets, as required.

.2 Confirm reglet installation and report defects to the Minister.

.3 Insert metal flashing into reglets to form tight fit.

.4 Seal flashing into reglet with sealant.

3.6 GUM BOX INSTALLATION

.1 Fill gum boxes with plastic cement in two equal lifts. Separate lifts with one ply of organic felt, precision cut to fit the box.

.2 Built-up Roofing Membranes: apply two plies of organic felt stripping over flange and extend up face of box curb. Reinforce stripping with 2 layers of woven glass cloth.

.3 Modified Bituminous Roofing: apply roofing and flashing to membrane manufacturer's printed instructions.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA B272-93 - Prefabricated Self-Sealing Roof Vent Flashings]

.2 CRCA (Canadian Roofing Contractor's Association)

.3 NRCA (National Roofing Contractor's Association)

.4 SPRI (Single Ply Roofing Institute)

.5 CUFCA (Canadian Urethane Foam Contractor's Association) and CGSB-51-GP 46MP Manual for "Installers of Spray Polyurethane Foam Thermal Insulation" and ASTM C1029-90 "Spray Applied Rigid Cellular Polyurethane Thermal Insulation"]

1.2 SUBMITTALS

.1 Manufacturer's descriptive literature for each product, including section or other type details.

.2 Manufacturer's written installation instructions.

.3 Shop drawings and samples, when required, in accordance with Section 01 33 00 – Submittal Procedures.

1.3 QUALITY ASSURANCE

.1 Roof accessories manufacturer to have minimum 5 years documented experience in the design and fabrication of roofing specialties and accessories.

1.4 WARRANTY

.1 Warrant products installed under this section of work to be free of leaks, condensation and defects in materials and/or manufacture for a period of 20 years when installed in accordance with the manufacturer's written instructions.

Part 2 Products

2.1 ACCEPTABLE MANUFACTURER

.1 Provide products as manufactured by Thaler Metal Industries, 1-800-387-7217 Mississauga, Ontario, Canada or equal in accordance with B6 and based upon:

.1 20 year warranty against leaks, condensation and defects in materials and/or manufacture, as applicable;

.2 Compliance with CSA B272-93 (Prefabricated Self-Sealing Roof Vent Flashings)

.3 Air barrier design using EPDM seals only;

.4 Maintenance free design;

.5 Materials and sizes options, and thickness;

.6 Injection molded urethane insulation to CGSB-51-GP 46MP and ASTM C1029-90, as applicable;

.7 Treated deck flange, as applicable;

.8 Written installation instructions.

2.2 SUBSTITUTIONS:

.1 Refer to Section 01 33 00 – Submittal Procedure, subsection 2.2.

2.3 MANUFACTURED UNITS

.1 Removable Cap STACK JACK Flashing (Insulated)

.1 Vent stack flashing:

.1 Thaler SJ-27-A, 18” (457 mm) high Removable Cap STACK JACK Flashing (Insulated);

.1 .064” (1.6 mm) mill finish 1100-0T alloy aluminum

.2 Diameter sizes to suit, see Mechanical. Confirm with Contract Administrator prior to ordering.

.3 To CSA B272-93

.4 With removable cap, pre-molded urethane insulation liner, and EPDM Base Seal;

.5 PVC coated deck flange

.6 SS vandal proof cap.

Part 3 Execution

3.1 EXAMINATION

.1 Report to the Contractor in writing, defects of work prepared by other trades and other unsatisfactory site conditions.

.2 Verify site dimensions.

.3 Commencement of work will imply acceptance of prepared work.

3.2 INSTALLATION

.1 Install flashing in accordance with manufacturer’s printed instructions.

.2 Torch membrane until bitumen is fluid and set flange into fluid. Flash in flange with two overlapping layers of ModBit and seal with asphalt sealer. Do not overheat (melt) EPDM Base Seal.

3.3 FIELD QUALITY CONTROL

.1 Comply with the requirements of Section 01 45 00 - Quality Control.

3.4 ADJUSTING

.1 Verify that all manufactured units have been installed in accordance with specifications and details, and will function as intended. Adjust any items where necessary to ensure proper operation.

3.5 CLEANING

.1 Clean manufactured units using materials and methods approved by manufacturer. Do not use cleaners or techniques which could impair performance of the roofing system.

END OF SECTION

Part 1 General

1.1 REFERENCES

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

- .1 ASTM A506-[00], Specification for Alloy and Structural Alloy Steel, Sheet and Strip, Hot-Rolled and Cold-Rolled.
- .2 ASTM B370-[98], Specification for Copper Sheet and Strip for Building Construction.
- .3 ASTM A653/A653M-[03], Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .4 ASTM D2369-[03], Test Method for Volatile Content of Coatings.
- .5 ASTM D2832-[92(R1999)], Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
- .6 ASTM D5116-[97], Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.

.2 Canadian General Standards Board (CGSB).

- .1 CAN/CGSB-1.105-[M91], Quick-Drying Primer.

.3 Canadian Standards Association (CSA International).

- .1 CSA B111-[1974(R2005)], Wire Nails, Spikes and Staples.

.4 Environmental Choice Program (ECP).

- .1 CCD-045-[92], Sealants and Caulking Compounds.
- .2 CCD-047a-[98], Surface Coatings.
- .3 CCD-048-[95], Recycled Water-borne Surface Coatings.

1.2 SUBMITTALS

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

- .1 Submit two [2] copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for caulking materials during application and curing.

.2 Shop Drawings:

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate size and description of components, materials, attachment devices, description of frame and finish, and construction details.
- .3 Manufacturer's Instructions:
  - .1 Submit manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.4 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for hardware complete with pertinent details, spare parts lists and warnings against harmful maintenance materials and practices for incorporation into manual specified in 01 78 00 - Closeout Submittals.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 00 – Cleaning and Waste Management.

Part 2 Products

2.1 ROOF HATCHES

.1 Acceptable Manufacturer

Acudor, 1125 Squires Beach Road, Pickering, Ontario, Tel: 1-888-388-3611

.2 Acceptable Products

.1 Model: A4444, 914 mm x 914 mm (36” x 36”) aluminum roof hatch

.1 Hatch Cover:

.1 Double-skin construction (“in box type design”) with 1” cellulose insulation and a continuous EPDM foam weather/draft seal gasket that is attached to inside of cover to provide a flush tight fit.The cover is designed to support a live load of 40 lbs./sq. ft. Outer skin is 0.091” Aluminum up to 36”x36”, Inner Skin: 032” aluminum

.2 Curb:

.1 10 gauge .102 aluminum with 1” thick fibreboard roof insulation at curb exterior. Curb is 12” high, with 3.375” wide bottom flange and pre-drilled mounting holes.

.3 Hinge:

.1 Zinc plated steel or stainless steel

.4 Opening:

.1 Gas spring operators with built in hold open arm and inside pull.

.5 Door Latch:

.1 Self-latching zinc plated outside T-handle with stainless steel inside lock and lever assembly.

.6 Finish:

.1 Aluminum: Mill finish

.7 Location: As indicated in drawings.

2.2 ACCESSORIES

.1 Roof Hatch Safety Rail

.1 Acudor Item # RHSR, Roof Hatch Safety Rail

.2 Telescoping Safety Post

.1 Acudor Item # TSP-1, Telescoping Safety Post

2.3 SUBSTITUTIONS:

.1 Refer to Section 01 33 00 – Submittal Procedure, subsection 2.2.

2.4 FABRICATION

.1 Fabricate components free of twists, bends, or visual distortion and insulated. Weld corners and joints.

.2 Assemble roof hatch components as indicated.

.3 Ensure continuity of weather-tight seal.

.4 Design flashings and extrusions to collect and lead off accumulated condensation.

.5 Zinc plate hardware and attachments and shop prime ready for field painting.

Part 3 Execution

3.1 PREPARATION

.1 Advise installers of other work about specific requirements relating to access door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices.

.2 Verify that rough openings for door and frame are correctly sized and located.

3.2 INSTALLATION

.1 Comply with manufacturer's written instructions for installing access doors and frames.

.2 Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 INSTALLATION

.1 Erect components plumb, level and in proper alignment.

.2 Ensure continuity of building envelope air barrier and vapour retarder systems.

.3 Adjust and seal assembly with provision for expansion and contraction of components.

.4 Secure brake formed metal curb to structure.

.5 Coat aluminum and copper in contact with dissimilar materials, with isolation coating.

.6 Secure and seal frame to curb.

3.4 ADJUSTING AND CLEANING

.1 Adjust doors and hardware after installation for proper operation.

.2 Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC)

.1 ULC-S115-1995, Fire Tests of Fire stop Systems.

1.2 SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets.

.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 Samples:

.1 Submit duplicate 300 x 300 mm samples showing actual fire stop material proposed for project.

1.3 QUALITY ASSURANCE

.1 Qualifications:

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

.2 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

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

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

.3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.

.2 Storage and Protection:

.1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Use only firestop products that have been ULC or cUL tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements and fire-rating involved for each separate instance.

.2 Fire stopping and smoke seal systems: in accordance with CAN-S115.

.1 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN-S115 and not to exceed opening sizes for which they are intended.

.2 Firestop system rating: as indicated on drawings.

.3 Service penetration assemblies: certified and tested by ULC or cUL in accordance with CAN-S115.

.4 Service penetration firestop components: certified and tested by ULC or cUL in accordance with CAN-S115.

.5 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.

.6 Non-curing, re-penetrable intumescent sealants, caulking or putty material for use with flexible cables or cable bundles.

.7 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal. Consult with Contract Administrator and damper manufacturer prior to installation ULC or cUL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.

.8 Intumescent sealants or caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe. No silicone based firestop are allowed to be applied on plastic pipes.

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

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

.11 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.

.12 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 voids to be filled to establish correct thicknesses and installation of materials.

.1 Ensure that substrates and surfaces are clean, dry and frost free.

.2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.

.3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.

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

3.3 INSTALLATION

.1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.

.2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

.3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.

.4 Tool or trowel exposed surfaces to neat finish.

.5 Remove excess compound promptly as work progresses and upon completion.

3.4 SEQUENCES OF OPERATION

.1 Proceed with installation only when submittals have been reviewed by Contract Administrator.

3.5 FIELD QUALITY CONTROL

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

3.6 CLEANING

.1 Proceed in accordance with Section 01 74 00 – Cleaning and Waste Management.

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

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

3.7 SCHEDULE

.1 Fire stop and smoke seal at:

.1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.

.2 Edge of floor slabs at curtain wall and precast concrete panels.

.3 Top of fire-resistance rated masonry and gypsum board partitions.

.4 Intersection of fire-resistance rated masonry and gypsum board partitions.

.5 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.

.6 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.

.7 Openings and sleeves installed for future use through fire separations.

.8 Around mechanical and electrical assemblies penetrating fire separations.

.9 Rigid ducts: greater than 129 cm^2: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

END OF SECTION

Part 1 General

1.1 REFERENCES

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

.1 ASTM C919, Standard Practice for Use of Sealants in Acoustical Applications.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-19.13, Sealing Compound, One-component, Elastomeric, Chemical Curing.

.3 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act (CEPA).

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.5 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act (TDGA).

1.2 SUBMITTALS

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

.2 Manufacturer's product to describe.

.1 Caulking compound.
.2 Primers.
.3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

.3 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.4 Submit duplicate samples of each type of material and colour.

.5 Cured samples of exposed sealants for each color where required to match adjacent material.

.6 Submit manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.

.1 Instructions to include installation instructions for each product used.

1.3 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 – Common 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.

1.4 PROJECT CONDITIONS

.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 4.4 degrees 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.

1.5 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.

.3 Ventilate area of work as directed by Contract Administrator by use of approved portable supply and exhaust fans.

1.6 QUALITY ASSURANCE

.1 Perform the work by experienced and skilled mechanics thoroughly trained and competent in the use of caulking and sealing equipment and the specified materials with at least five years experience.

.2 Arrange with the caulking and sealant manufacturers for a visit at the job site by one of their technical representatives before beginning the caulking and sealing installation to discuss with the Contractor and the Contract Administrator the procedures to be adopted, to analyse site conditions and inspect the surfaces and joints to be sealed, in order that type of sealant recommendations may be made for typical joint configuration.

.3 Discuss the following items and provide a written report indicating:

.1 Sealants and caulking materials selected for use from those specified;

.2 Surface preparation requirements;

.3 Priming and application procedures;

.4 Verification that sealants and caulking are suitable for purposes intended and joint design;

.5 Sealants and caulkings are compatible with other materials and products with which they come in contact including but not limited to sealants provided under other Sections, insulation adhesives, bitumens, block, concrete, metals and metal finishes.

.6 Verification that sealant and caulking are suitable for temperature and humidity conditions at time of application and will not stain adjacent surfaces;

.7 Recommended sealant for each type of joint configuration;

.8 Joint design;

.9 Anticipated frequency and extent of joint movement.

.10 Number of beads to be used in the sealing operation;

.11 Suitability of durometer hardness and other properties of material to be used.

.12 Weather conditions under which work will be done.

1.7 SEALANT MATERIALS

.1 Sealants and Caulking compounds must:

.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 fo 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, mecury, lead, cadium, hexavalent chromium, barium or their compounds, except barium sulphate.

.3 Sealant and caulking compounds must no contain a total of volatile organic compound (VOC's) in excess of 5% by height as calculated from records of the amounts of constituents used to make the product.

.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 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.

.6 When low toxicity caulks are not possible, confine usage to areas which off-gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.

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

.8 Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.

1.8 SEALANT MATERIAL DESIGNATIONS

.1 Urethanes One Part.

.1 Non-Sag to CAN/CGSB-19.13, Type 2.

.2 Silicones One Part.

.1 To CAN/CGSB-19.13, mildew resistant.

.3 Acoustical Sealant.

.1 To ASTM C919.

.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 Neoprene or Butyl Rubber.

.1 Round solid rod, Shore A hardness 70.

.3 High Density Foam.

.1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m^3 density, or neoprene foam backer, size as recommended by manufacturer.

.4 Bond Breaker Tape.

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

1.9 SEALANT SELECTION

.1 Perimeters of exterior openings where frames meet exterior facade of building, Sealant type CAN/CGSB- 19.13.

.2 Expansion and control joints in exterior surfaces of poured-in-place concrete walls: Sealant type CAN/CGSB – 19.13.

.3 Control and expansion joints in exterior surfaces of unit masonry walls: Sealant type: CAN/CGSB – 19.13.

.4 Seal interior perimeters of exterior openings as detailed on drawings: Sealant type: CAN/CGSB – 19.13.

.5 Control and expansion joints on the interior of exterior surfaces of unit masonry walls. Sealant Type CAN/CGSB -19.13.

.6 Interior control and expansion joints in floor surfaces: Sealant type CAN/CGSB -19.13.

.7 Perimeters of interior frames, as detailed and itemized: Sealant type CAN/CGSB -19.13.

.8 Interior masonry vertical control joints (block-to-block, block-to-concrete, and intersecting masonry walls): Sealant type CAN/CGSB -19.13.

.9 Perimeter of bath fixtures (e.g. sinks, tubs, urinals, stools, waterclosets, basins, vanities, counters, plastic laminate and adjacent wall finish, etc.): Sealant type CAN/CGSB – 19.13, mildew resistant.

.10 Exposed interior control joints in drywall: Sealant type: CAN/CGSB -19.13.

.11 Acoustical Sealant ASTM C919.

1.10 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 2 Execution

2.1 PROTECTION

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

2.2 SURFACE PREPARATION

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

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

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

2.3 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.

2.4 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.

2.5 MIXING

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

2.6 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 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.

.4 Remove masking tape after initial set of sealant.

END OF SECTION