Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 04 22 00 – Concrete Unit Masonry.

.2 Section 07 26 00 – Vapour retarders.

.3 Section 09 21 16 – Gypsum Board Assemblies.

.4 Section 09 22 16 – Non-Structural Metal Framing.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).
- .1 ASTM D2842-12, Standard Test Method for Water Absorption of Rigid Cellular Plastics.
- .2 ASTM E 96-15, Test Methods for Water Vapour Transmission of Materials.

.2 Underwriters Laboratories of Canada (ULC).
- .1 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .2 CAN/ULC-S604-04, Standard for Factory-Built Type A Chimneys.

.3 CSA Group.
- .1 CSA B149.1-15, Natural gas and propane installation code.
- .2 CSA B149.2-15, Propane storage & handling code.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

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

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

Part 2 PRODUCTS

2.1 RIGID INSULATION

.1 Rigid insulation **IR1**
Closed cell rigid insulation, CFC free, high-density stressed skin, ship-lapped edges.
- .1 Extruded polystyrene: to CAN/ULC-S701.
- .2 Type: 4.
- .3 RSI: 0.88 m²K/W / 25mm.
- .4 Dimensions: 610mm x 2440mm. Thickness as indicated.
- .5 Compressive resistance: minimum 210 kPa.
- .6 Water absorption: ASTM D2842, 0.7% by volume, maximum.
- .7 Water vapour transmission: ASTM E96, maximum 50ng/Pa s m².
- .8 Recycled content : 20% minimum.
- .9 Thickness: as indicated.

2.2 ADHESIVE

.1 Adhesive (for polystyrene): comply with manufacturers recommendation.

Part 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 WORKMANSHIP

.1 Install insulation after building substrate materials are dry.

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

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

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

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

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

.7 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

3.3 EXAMINATION

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

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

3.4 RIGID INSULATION INSTALLATION

.1 Interior application:
  .1 Apply adhesive to substrate and insulation board in accordance with manufacturer’s recommendations.
  .2 Extend boards vertically on inside face of perimeter foundation walls to indicated level.

.2 Under slab application:
  .1 Extend boards width as indicated from perimeter foundation wall. Lay boards on level compacted fill.

3.5 CLEANING

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

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 04 22 00 - Concrete Unit Masonry.

.2 Section 06 10 00 - Rough Carpentry.

.3 Section 07 26 00 - Vapour retarders.

.4 Section 09 21 16 - Gypsum Board Assemblies.

.5 Section 09 22 16 - Non-Structural Metal Framing.

1.2 REFERENCES

.1 Underwriters Laboratories of Canada (ULC).
- .1 CAN/ULC-S702-14, Mineral Fibre Thermal Insulation for Buildings.
- .2 CAN/ULC-S702.2-15, Mineral Fibre Thermal Insulation for Buildings, Part 2: Application Guidelines.

.2 Association canadienne de normalisation (CSA)/CSA International.
- .1 CSA B111-1974(R2003), Clous, fiches et cavaliers en fil d'acier.
- .2 CSA B149.1-15, Natural gas and propane installation code.
- .3 CSA B149.2-15, Propane storage & handling code.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

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

.3 Certification
- .1 For blanket and acoustic insulation products, provide a "Greenguard" certification for products with low emissivity.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

Part 2 PRODUCTS

2.1 INSULATION

.1 Blanket insulation
Batt and blanket mineral fibre.
- .1 To CAN/ULC-S702, type 1.
- .2 RSI: 0.62 m² ºC/W / 25mm.
- .3 Recycled content: 40% minimum.
- .4 Thickness: as indicated.

.2 Acoustic insulation
Acoustic insulation, fire-rated, mineral fibre: volcanic rock and slag.
- .1 To CAN/ULC-S702, type 1.

.2 Density: 45 kg/m³.
.3 RSI: 0.76 m² ºC/W / 25 mm.
.4 Flame propagation: 0
.5 Smoke developed: 0
.6 Recycled content: 40% minimum
.7 Thickness: as indicated.

2.2 ACCESSORIES

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

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

.3 Staples: 12 mm minimum leg.

Part 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with CAN/ULC S702.2, manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSULATION INSTALLATION

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

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

.3 Do not compress insulation to fit into spaces.

.4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN/ULC-S604 Type A chimneys, CAN/CGA-B149.1 and CAN/CGA-B149.2 Type B or L vents. Install fire-retardant insulation in space adjacent to heat-emitting sources.

.5 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

3.3 CLEANING

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

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 04 22 00 - Concrete Unit Masonry.

.2 Section 07 26 00 – Vapour Retarders.

.3 Section 08 11 00 – Metal Doors and Frames.

.4 Section 09 21 16 – Gypsum Board Assemblies.

.5 Section 09 22 16 – Non-Structural Metal Framing.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).
- .1 ASTM C518-15, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- .2 ASTM D1621-10, Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.
- .3 ASTM D1622-14, Standard Test Method for Apparent Density of Rigid Cellular Plastics.
- .4 ASTM D1623-09, Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
- .5 ASTM D2126-15, Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
- .6 ASTM D2842-97, Standard Test Method for Surface Strength of Paper (Wax Pick Method)
- .7 ASTM E 96-15, Test Methods for Water Vapour Transmission of Materials.

.2 Underwriters Laboratories of Canada (ULC).
- .1 CAN/ULC-S101-14, Standard Methods of Fire Endurance Tests of Building Construction and Materials.
- .2 CAN/ULC-S102-10, Standard Method of Test for Surface Burning Characteristics of building Materials and Assemblies.
- .3 CAN/ULC-S705.1-15, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density.
- .4 CAN/ULC-S705.2-05, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Application.
- .5 CAN/ULC-S770-15, Standard test method for determination of long term thermal resistance of closed-cell thermal insulating foams.

.3 Canadian Urethane Foam Contractors Association (CUFCA).
- .1 Quality Assurance Program.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:
- .1 Submit manufacturer’s datasheet and product literature in accordance with Section 01 33 00 – Submittal Procedures.

.2 Manufacturer’s instructions:
- .1 Submit manufacturer’s installation instructions.

1.4 TEST REPORTS

.1 Submit in accordance with Section 01 45 00 - Quality Control, test reports indicating compliance with requirements of this section.

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

1.5 QUALITY ASSURANCE

.1 Applicators to conform to CUFCA Quality Assurance Program.

.2 Role of manufacturer’s representative:
- .1 Verify substrate prior to commencement of work, during application and upon completion.
- .2 Provide technical assistance to installer and assist with proper installation of insulation.

1.6 HEALTH AND SAFETY REQUIREMENTS

.1 Protect workers as recommended by CAN/ULC-S705.2 and manufacturer's recommendations.
- .1 Workers must wear gloves, respirators, dust masks, long sleeved clothing and eye protection when applying foam insulation.
- .2 Workers must not eat, drink or smoke while applying foam insulation.

1.7 PROTECTION MEASURES

.1 Ventilate area.

.2 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and 24 hour 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.

1.8 SITE CONDITIONS

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

.2 Carry out work under this section when humidity level is less than 80%.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Place substances corresponding to definition of hazardous waste in designated containers.

.3 Fold, flatten and place metal bands in designated areas for recycling.

.4 Return solvents for reuse or appropriate disposal, and oil soaked rags for bleaching or appropriate disposal.

.5 Ensure empty containers are sealed and stored safely until disposed of.

.6 Dispose of surplus chemicals and finish products in accordance with federal, provincial and municipal regulations.

Part 2 PRODUCTS

2.1 MATERIALS

.1 **IR2** sprayed on insulation: sprayed polyurethane foam closed-cell, Type 2, to CAN/ULC S705.1-01.

.1	Density:	ASTM-D-1622, 33 kg/m3.
.2	Compressive resistance:	ASTM D-1621, 245 kPa.
.3	Tear resistance:	ASTM D-1623, 313 kPa.
.4	Water absorption (%):	ASTM D-2842, 88%.
.5	Water vapour permeance:	ASTM E 96, 41 ng / Pa•s•m² (50mm).
.6	Flame spread:	CAN/ULC S102, <500.
.7	Thermal resistance:	ASTM C-518, 1.17 / 25.4mm. RSI (180 days/23°C).
.8	LTTR thermal resistance:	CAN/ULC S770, 1.04 / 25.4mm RSI.
.9	Dimensional stability:	ASTM D-2126% variation vol. (28 days). -20°C min. 0.30%. 80°C max. 1.10%. 70°C max. 12% (97% HR).
.10	Recycled content:	16.5%.

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

.3 Thermal barrier: Portland cement based cementitious fireproofing approved by Underwriters Laboratories (ULC).

.1	Density :	384 kg / m³
.2	Bond strength :	2441 kg / m²

2.2 EQUIPMENT

.1 Spray equipment must comply with CAN/ULC S705.2 and manufacturer’s recommendations.

Part 3 EXECUTION

3.1 VERIFICATION

.1 Verify if work already carried out is ready for work under this section. Report any discrepancy or non-compliant component. Do to began work until corrective measures have been applied.

3.2 APPLICATION

.1 Prime galvanized metal surfaces and others as recommend by manufacturer.

.2 Install temporary shelter to control spread of volatile compounds from foam spray.

.3 Temporarily brace doors and windows to prevent warping of frames due to expansion of sprayed in place insulation.

.4 Apply insulation to clean surfaces in accordance with CAN/ULC-S705.2 and manufacturer's printed instructions. Use primer where recommended by manufacturer. Do not exceed 50 mm thick per layer. Spray in several layers to reach required thickness.

.5 Apply insulation when surface temperatures of substrate and ambient air are within manufacturer’s prescribed limits.

.6 Remove foreign matter from surfaces to be insulated to maximize adherence of urethane foam.

.7 For existing garage doors metal pre-painted which are to isolate, previously sand doors before the application of the insulation to ensure the full adherence of the product.

.8 Apply indicated insulation thickness.

.9 Do not apply insulation less than 75 mm from chimneys, steam ducts, recessed lighting or other heat sources.

.10 Sprayed foam must be applied by installer recognized by manufacturer.

.11 In places where plastic foam insulation is exposed in shaft and depending on the details to the drawings, cover the insulation with a thermal barrier continues according to regulations and the requirements of the manufacturer.

3.3 TOLERANCE

.1 Apply average ± 6mm thickness (9 readings over 1 m² surface), as indicated on drawings.

3.4 PROTECTION

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

.2 Expanded urethane foam must be applied by personnel familiar with the product's restrictions to ensure professional use. Apply in accordance with manufacturer's recommendations.

3.5 CLEANING

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

.2 Clean adjacent surfaces.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 03 00 00.01 – Cast-in-Place Concrete.

.2 Section 04 22 00 – Concrete Unit Masonry.

.3 Section 07 21 13 – Board Insulation.

.4 Section 07 21 29.03 – Sprayed Insulation – Polyurethane Foam.

.5 Section 08 11 00 – Metal Doors and Frames.

.6 Section 09 21 16 – Gypsum Board Assemblies.

.7 Section 09 22 16 – Non-structural Metal Framing.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).
- .1 ASTM D412-15a, Standard Test Methods for Rubber Properties in Tension.
- .2 ASTM D5147-14, Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material.
- .3 ASTM E 96-15, Test Methods for Water Vapour Transmission of Materials.
- .4 ASTM E154-08a (2013), Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
- .5 ASTM E283-04 (2012), Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

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

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Manufacturer’s instructions:
- .1 Submit manufacturer’s installation instructions.

.3 Samples:
- .1 Submit two samples of each product and/or material described in this section.

1.4 QUALITY ASSURANCE

.1 Membrane must be installed by installer trained and recognized by manufacturer of product to be installed.

.2 Role of manufacturer’s representative:
- .1 Verify substrate prior to commencing work, during installation of membrane and upon completion of work.
- .2 As required, provide technical assistance to installer and assist with installing membrane properly.

.3 Materials: provide and install basic materials for each type of product from same manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Storage and protection:
  .1 Deliver, store and handle in accordance with manufacturer's written instructions and Section 01 61 00 – Common Product Requirements.

.2 Deliver in labelled packaging. Store and handle in accordance with manufacturer's instructions. Protect from weather, extreme temperatures and work site incidents. Remove and dispose of damaged materials in accordance with applicable regulations.

1.6 AMBIENT CONDITIONS

.1 Ambient and environmental conditions:
  .1 Maintain substrate surface to be waterproofed at temperature indicated in written instructions of waterproofing sealant manufacturer.

.2 Install upon completion of construction work and preparation of substrate, ready to receive waterproofing membrane.

.3 Protect the plants and vegetation from damage caused by the work.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

.2 Remove packaging waste from work site and ship to appropriate recycling centres.

.3 Divert waterproofing products from landfill to to official hazardous material collections site.

.4 Do not dispose of unused waterproofing products materials into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 PRODUCTS

2.1 Materials:

.1 Self-adhesive membrane **MAA1:**
Membrane de transition, sealing exterior gypsum and connection joints and around exterior openings.
SBS modified bitumen, surface three-ply polyethylene mat, minimum thickness 1.0 mm (40 mils) and appropriate width.
Minimum requirements:

.1	Tensile strength:	11.2/13.1 Mpa (ASTM D412).
.2	Allongement:	88/55 L/T (ASTM D412).
.3	Puncture resistance:	747 N (ASTM E154).
.4	Water vapour permeance:	< 0.90ng/Pa(sm²) ASTM E96.
.5	Air permeance (75Pa):	0.5 ml/sm² (ASTM E283).
.6	Water absorption:	0.1% max. (ASTM D5147).

.2 Underslab vapour barrier **PV1**:
  .1 Polyethylene film: to CAN/CGSB-51.34, 0.15 mm thick.

.3 Primer for self-adhesive vapour barrier:
Appropriate for climatic conditions when membrane is applied.

.4 Liquid membrane:
High yield sealant, two compound, 100% solids content for trowel or caulking gun dry application.

Part 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation recommendations, product carton installation recommendations and data sheets.

3.2 PREPARATION

.1 Examine surfaces to receive membrane, and report any problems to the Departmental Representative before undertaking work.

.2 Clean and dry substrate, in accordance with manufacturer's written instructions.

.3 Ensure surfaces are smooth, clean, dry and free of foreign matter that may adversely affect membrane's adherence or regularity.

.4 Prior to applying sealant:

.1 Remove dirt, grease, oil, rough spots and foreign matter from surfaces to be coated. Fill holes, cracks and honeycombing with cement sealant. Cut form wires flush and fill holes with non-shrinking cement.

.2 Apply sealant to outside joints and around penetrating elements to be sealed.

3.3 APPLICATION/ MAA1 WATERPROOFING MEMBRANE

.1 Prime surfaces to receive membrane at rate recommended by membrane manufacturer. Do not prime more than can be covered the same day with membrane. Prime surfaces again if membrane is not applied the same day.

.2 Fully adhere membrane over transitions between structural elements and gypsum board, gypsum board joints, angles, around openings and indicated areas.

.3 Hand roll membrane firmly in place to ensure complete adherence to substrate.

.4 Lap 75 mm strips laterally and 150 mm at ends. Stagger joints minimum 300 mm.

.5 Seal junctions with other surfaces to ensure continuity of air/vapour barrier system.

.6 Apply sealing bead at the end of each work day to top edge of membrane and ends to prevent water infiltration between substrate and membrane.

.7 Coordinate inspection of waterproofing work with Departmental Representative 48 hours in advance prior to installation of insulation panel.

3.4 WALL JUNCTIONS/OPENINGS

.1 To ensure continuity of air/vapour barrier, seal all window and door junctions and structural elements where vapour barrier cannot be installed.

.2 Secure vapour barrier to framing with self-adhering membrane sealed to both parts.

.3 Apply membrane to plywood surfaces around openings prior to installation of wood framing. Seal junction corners with liquid membrane once frame is in place.

.4 Mechanically secure membrane around opening or secure with a sub-girt.

3.5 UNDERSLAB VAPOUR RETARDER APPLICATION

.1 Place polyethylene over insulation or granular fill to cover entire slab surface.

.2 Lap joints between 450 mm minimum polyethylene sheets.

.3 Seal holes, anchors and conduits penetrating membrane with liquid membrane.

.4 Extend polyethylene 200 mm vertically up pilasters and foundation walls and seal.

3.6 CLEANING

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

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 04 22 00 – Concrete Unit Masonry.

.2 Section 06 10 00 – Rough Carpentry.

.3 Section 07 26 00 – Vapour retarders.

.4 Section 07 92 00 – Joint Sealants.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM International)
- .1 ASTM A653/A653M-15e1, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM A924/A924M-14, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-37.5-M89, Mastic plastique de bitume fluxé.
- .2 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.

.3 Canadian Standards Association (CSA International)
- .3 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Sort and recycle waste in accordance with Section 01 74 21 – Construction/Demolition Management and Disposal.

.2 Remove packaging waste from work site and ship to appropriate recycling centres.

.3 Collect and separate for disposal, paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling.

.4 Sort steel, metal and plastic waste for reuse and recycling in designated containers.

.5 Place in designated containers subtances corresponding to the definition of toxic and hazardous waste.

.6 Handle and dispose of hazaroud materials in accordance with the Canadian Environmental Protection Act and the Transportation of Dangerous Goods Act, and regional and municipal regulations.

Part 2 Products

2.1 SHEET METAL MATERIALS

.1 Metal flashing:
- .1 Sheet metal, to ASTM A653/A653M. Grade A steel core, yield strength 230 MPa and maximum constraint 144 MPa. Steel core coated both sides hot dipped, zinc-coated, to Z-275 (G-90), to ASTM A924/A924M, with following characteristics:
  - .1 Finish: prepainted panels both sides.
  - .2 Colour: to match adjacent colour.
  - .3 Bare metal thickness: 0.65 mm or other as indicated as plans.

2.2 ACCESSORIES

.1 Isolation coating: alkali resistant bituminous paint.

.2 Plastic cement: to CAN/CGSB 37.5.

.3 Underlay for metal flashing: dry sheathing to CAN/CGSB-51.32.

.4 Sealants: to Section 07 92 10 – Joint Sealants.

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

.6 Fasteners: of same material as sheet metal, to CSA B111, flat head roofing nails of length and thickness suitable for metal flashing application.

.7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

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

2.3 FABRICATION

.1 Les solins métalliques et les autres éléments en tôle doivent être façonnés conformément aux indications.

.2 Form pieces in 2400 mm maximum lengths or as indicated. Allow for joint dilation.

.3 Hem exposed edges on underside 12 mm. Mitre and seal corners with sealant.

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

.5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.4 METAL FLASHINGS

.1 Fabricate roof flashings, crowns and edging according to prescribed profiles, with prepainted steel sheet, with clips.

Part 3 Execution

3.1 Installation

.1 Install sheet metal work as indicated.

.2 Use concealed fastenings except where approved before installation.

.3 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.

.4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock forming tight fit over hook strips, as detailed.

.5 Lock end joints and caulk with sealant.

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

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

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 04 22 00 – Concrete Unit Masonry.

.2 Section 09 21 16 – Gypsum Board Assemblies.

.3 Section 09 22 16 – Non-Structural Metal Framing.

1.2 REFERENCES

.1 Underwriter's Laboratories of Canada (ULC).
- .1 CAN/ULC S101-14, Standard Methods of Fire Endurance Tests of Building Construction and Materials.
- .2 CAN/ULC S115-11, Fire Tests of Fire stop Systems.

.2 American Society for Testing and Materials (ASTM International)
- .1 ASTM C612-14, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
- .2 ASTM E 119-16, Standard Test Methods for Fire Tests of Building Construction and Materials.
- .3 ASTM E 814-13a, Standard Test Method for Fire Tests of Penetration Firestop Systems.

1.3 CONTROL REQUIREMENTS

.1 Perform work in strict compliance with flame resistance test data under ASTM E119 (CAN/ULC S101) and Underwriters' Laboratories (ULC). Comply with municipal and provincial regulations and National Building Code requirements.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

1.5 PRODUCT DATA

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

.2 Submit of manufacturer of prefabricated components. Provide sufficient detail to enable location of materials. Include manufacturer’s written instructions.

1.6 HOMOLOGATION

.1 Submit homologation certificates to Departmental Representative for each fire protection sealant.

Certificates must include information required for sealing, installation, etc. as well as certifying body, test number, and name of products.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate manufacturer’s warranty. Store above ground.

.2 Do not use material that has been in contact with water prior to use.

1.8 TEMPERATURE

.1 Temperature of materials and ambient air as recommended by manufacturer of product used.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Fire stopping and smoke seal systems: in accordance with CAN/ULC S115.
- .1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN/ULC S115 and not to exceed opening sizes for which they are intended and conforming to specified special requirements described in paragraph 3.5.

.2 Fire resistant mineral fibre insulation:
- .1 Rock wool insulation to CAN/ULC S115, Type 1, 72 kg/m3 density, 6.9 kPa comrpressive resistance at 25% or more, minimum thickness 89 mm; flame spread 0; smoke developed 0.
- .2 Anchorage and fastenings: as recommended by manufacturer and compatible with specified assemblies.

.3 Fire resistant modified elastomeric acrylic latex coating:
- .1 Fire and smoke stopping sealants, water soluble, non-toxic, meeting or exceeding CAN/ULC S115, CAN/ULC S101, ASTM E814 and ASTM E119 standards, for sealing through-penetrations such as metal ducts, pipes, conduits, wall/ceiling junctions, as indicated.
- .2 Following variants are considered:
  - .1 Floor; multiple or single through-penetrations: high performance fire stopping caulking.
  - .2 Dry wall and masonry wall; single penetration: high performance intumescent fire-stopping caulking.
  - .3 Dry wall and masonry wall; multiple through penetrations: fire stopping mortar.

.4 Dual compound foam: formulated for complex openings.

.5 Non-flexible mortar: waterproofing, fibre-reinforced cement mortar.

.6 Intumescent foam: prefabricated blocks, temporary blocking of complex openings.

.7 Inteumescent rings: solid intumescent foam and zinc coated steel collars.

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

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

.10 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.

Part 3 EXECUTION

3.1 PREPARATION

.1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are clean, dry and frost free.

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

.3 Maintain insulation around pipes and ducts penetrating fire separation.

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

3.2 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.

3.3 INSPECTION

.1 Inspections: prior to concealing or covering fire stopping assemblies, inform Departmental Representative that work is ready for inspection.

3.4 FIRE-STOPPING ASSEMBLIES

.1 Install fire-stopping assemblies and smoke seals in following locations:
- .1 Partition and masonry, concrete and gypsum wall penetrations.
- .2 Upper part of fire-rated partitions and masonry and gypsum walls.
- .3 Intersection of fire-rated masonry and gypsum walls.
- .4 Contraction joints and reinforcing joints in fire-rated masonry or gypsum partitions and walls.
- .5 Through fire rated floor slabs, ceilings and roofs.
- .6 Openings in fire-rated floors, ceilings and roofs.
- .7 Access points and sheathing placed in fire stopping partitions for future use.
- .8 Around mechanical and electrical assemblies penetrating fire stopping partitions.
- .9 Rigid piping over 129 cm^2: fire stopping must consist of fire stopping material between mounts and conduits on either side of fire stopping partition.

3.5 CLEANING

.1 Immediately after installation, remove surplus materials and debris and clean area.

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

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 04 22 00 - Concrete Unit Masonry.

.2 Section 07 62 00 - Sheet Metal Flashing and Trim.

.3 Section 08 11 00 - Metal Doors and Frames.

.4 Section 08 80 50 - Glazing.

.5 Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)
- .1 ASTM C919-12, Standard Practice for Use of Sealants in Acoustical Applications.
- .2 ASTM C920-14a, Standard Specification for Elastomeric Joint Sealants.
- .3 ASTM C1135-15, Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants.
- .4 ASTM C1248-08 (2012), Standard Test Method for Staining of Porous Substrate by Joint Sealants.
- .5 ASTM D217-10, Standard Test Methods for Cone Penetration of Lubricating Grease.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
- .2 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
- .3 CAN/CGSB-19.21-M87, Sealing and Bedding Compound, Acoustical.

.3 Canadian Environmental Protection Act. (CEPA 1999).

.4 International Organization for Standardization (ISO)
- .1 ISO 14040-06, Environmental management - Life cycle assessment.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Manufacturer's product data 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 two samples of each colour and each type of product.

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

1.4 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address. Protect materials from water, humidity and freezing; do not place directly on ground or floor.

1.5 SITE CONDITIONS

.1 Ambient Conditions:
  .1 Proceed with installation of joint sealants only when:
    .1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are below 5 degrees C.
    .2 Joint substrates are dry.

.2 Joint-Width Conditions:
  .1 Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.
  .2 Control joints: 10 mm minimum.

.3 Joint-Substrate Conditions:
  .1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Health Canada.

.2 Comply with manufacturer's recommendations regarding temperatures, ralative humidity levels and humidity levels of substrate installatin and drying of sealants and special instructions regarding their use.

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

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Sort and recycle waste in accordance with Section 01 74 21 – Construction/Demolition Management and Disposal.

.2 Remove packaging waste from work site and ship to appropriate recycling centres.

.3 Place paper, plastic, polystyrene and corrugated cardboard packaging in appropriate containers on site for recycling in accordance with waste management plan.

.4 Place waste designated as hazardous or dangerous in designated containers.

.5 Handle and dispose of hazardous waste in accordance with the Canadian Environmental Protection Act, Transportation of Dangerous Goods Act and regional and municipal regulations.

.6 Do not dispose of unused caulking, sealants, and adhesive materials into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

.7 Divert unused sealants from landfill to official hazardous material collections site.

.8 Do not recycle plastic sealant containers. Do not mix with plastics to be recycled.

Part 2 PRODUCTS

2.1 SEALANT MATERIALS

.1 Sealing and caulking products must:
  .1 Meet or exceed all industrial nd government safety and performance standards; and
  .2 Be manufactured and transported to ensure each step of the process including waste disposal meets requirements of all government laws and regulations, including Canadian Environmental Protection Act. (CEPA).

.2 Sealants and caulking compounds must not be manufactured or include aromatic solvents, fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, barium and barium composites, except barium sulfate.

.3 Sealants and caulking compounds must not contain volatile organic compounds (VOC) exceeding 5% of their weight as calculated based on description of the quantity of constituants used to make the product.

.4 Sealants and caulking compounds must include detailed instructions to ensure their application minimizes health hazards and maximizes performance. Instructions must also include adequate 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, nor inside an occupied building.

.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 In this section, products and materials with the following characteristics are preferred: water-based, water soluble, non-flammable, low-emitting VOCs, free of ozone depleting substances, smog enhancing substances, methylene chloride and chlorinated hydrocarbons.

.8 Manufacturing process must comply with life cycle assessments according to ISO 14040.

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

.10 Use primer on previously contaminated surfaces, in renovations and restorations. Consult manufacturer representative to determine if use of a primer is necessary prior to application of a sealant.

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Type 1 – Non-hardening synthetic rubber sealant:
- .1 To CAN/CGSB-19.21 and ASTM D217, non-hardening, non-skinning, non-staining and consistent.
- .2 Around gypsum panels, against metal framing, in concealed areas.

.2 Type 2 – Sealant around exterior openings and metal/metal junction:
- .1 To CAN/CGSB-19.13, ASTM C920 Type S, Grade NS, Class 50 and ASTM C1248. Single compound silicone sealant.
- .2 Elongation at rupture after 21 days (ASTM C1135): 261%.
- .3 Tensile strength after 21 days (ASTM C1135): 0.85 MPa.

.3 Type 3 - Sealant around exterior openings and metal/masonry junction:
- .1 To CAN/CGSB-19.13, ASTM C 920 Type S, Grade NS, Class 35 and ASTM C1248. Single compound, hybrid polyurethane, elastomer, chemical polymerization.
- .2 Movement: 35%.

.4 Type 4 – Silicone sealant, moisture resistant:
- .1 Single compound, to ASTM C 920, Type S, grade NS, class 25, usage NT, colourless, clear.
- .2 In general, all exposed interior joints, between door frames and windows and other steel or aluminum elements and adjacent interior surfaces, around integrated furnishings, electrical and mechanical elements, and electronic controls on walls and on ceilings, around toilets and shower accessories and installation of interior glazing.

.5 Type 5 – Silicone acrylic sealant/mould resistant:
- .1 To CGSB 19.17, for interior joints around door frames and exposed wall joints to be painted (except detention area or if otherwise indicated).

.6 Preformed compressible, back-up materials:
- .1 Polyethylene, urethane, neoprene and vinyl foam elements.
  - .1 Extruded cellular foam support bead.
  - .2 Elements oversized 30 to 50%. Minimum compression 35%.
- .2 Anti-adhesive tape:
  - .1 Non-sticking polyethylene tape.

.7 Preformed backup materials:
- .1 Extrusion d'un cordon en mousse de polyéthylène à cellules ouvertes ou fermées.
  - .1 Extruded polyethylene closed or open cell foam. Waterproof, puncture resistant surface film. Easily compressible for use in prefabricated concrete panel joints. Compressible to 50%.
  - .2 Extruded polyethylene closed cell, round. Not easily compressible. For general purpose use in glazing joints.

2.3 JOINT CLEANER

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

.2 Primer: in accordance with sealant manufacturer's written recommendations.

Part 3 EXECUTION

3.1 PROTECTION

.1 Protect work installed by third parties against staining or other contamination.

3.2 SURFACE PREPARATION

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

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

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

.4 Ensure joint surfaces are dry and frost free.

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

3.3 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

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

3.6 APPLICATION

.1 Sealant:
- .1 Apply sealant in accordance with manufacturer's written instructions.
- .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint r.
- .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 Cleaning:
- .1 Clean adjacent surfaces immediately and let works in perfect condition.
- .2 Remove excess and droppings, using recommended cleaners as work progresses.
- .3 Remove masking tape after initial set of sealant.

END OF SECTION