Part 1 General

1.1 REFERENCE STANDARDS

.1 CSA Group

.1 CSA B149 PACKAGE-10 Consists of B149.1, Natural Gas and Propane Installation Code and B149.2, Propane Storage and Handling Code.

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

.1 Material Safety Data Sheets (MSDS).

.3 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S604-2012, Standard for Factory-Built Type A Chimneys.

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

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for board insulation and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit copies of WHMIS MSDS in accordance with Section 01 35 29.06- Health and Safety Requirements. Indicate VOC's during application and curing.

.3 Samples:

.1 Submit 300 x 300 mm.

.4 Certificates:

.1 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.5 Test Reports:

.1 Submit certified test reports showing compliance with specified performance characteristics and physical properties.

.6 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

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

.2 Store and protect specified materials from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse by manufacturer and return of crates, padding, packaging materials and pallets, as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 INSULATION

.1 Extruded polystyrene (XPS): to CAN/ULC-S701.

.1 Type: 2.

.2 Compressive strength: 110 kPa

.3 Thickness: as indicated.

.4 Size: to suit.

.5 Edges: square.

.6 Thermal Resistance: RSI-0.88.

2.2 ADHESIVE

.1 Adhesive: as recommended by insulation manufacturer.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for board insulation application in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of the Departmental Representative.

.2 Inform the Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from the Departmental Representative.

3.2 INSTALLATION/GENERAL

.1 Comply with insulation manufacturer's written instructions applicable to products and application indicated.

.2 Install insulation that is undamaged, dry, and unsoiled.

.3 Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

.4 Apply single layer of insulation boards to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

.5 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 as well as CSA B149.1 and CSA B149.2 type B vents.

.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 CAVITY WALL INSTALLATION

.1 Secure insulation boards with construction adhesive. Place pads of construction adhesive spaced approximately 24 inches (610 mm) o.c. along the edges of the inside face of the insulation board, or as recommended by the adhesive manufacturer. Construction adhesive must be recommended by its manufacturer for use with polystyrene rigid board insulation. Fit courses of insulation horizontally between wall ties and other obstructions, with edges butted tightly in both directions. Press insulation firmly against inside back-up wall surface.

.2 Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Division 04 - Masonry.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.

.3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM D1621-04a, Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.

.2 ASTM D1622-08, 08 Standard Test Method for Apparent Density of Rigid Cellular Plastics.

.3 ASTM D1623-09, Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.

.4 ASTM D2126-09, Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.

.5 ASTM D2842-06, Standard Test Method for Water Absorption of Rigid Cellular Plastics.

.6 ASTM E84-09c, Standard Test Method for Surface Burning Characteristics of Building Materials.

.7 ASTM E96/E96M-05, Standard Test Methods for Water Vapor Transmission of Materials.

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 Provide copies of most recent data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Provide copies of MSDS for all products and indicate VOC content.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Deliver and store materials, undamaged in original wrappings, in a suitable environment.

.2 Storage and Handling Requirements:

.1 Store to protect materials from wind, moisture, sunlight and accidental ignition.

.3 Waste Management and Disposal:

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

1.4 SITE CONDITIONS

.1 Maintain minimum ambient temperature of 5°C for minimum 24 hours before, during and 72 hours after completion of application.

Part 2 Products

2.1 SPRAY APPLIED POLYURETHANE FOAM

.1 Spray Applied Polyurethane Foam: rigid, cellular thermal insulation with following properties when applied:

Property	Test Method	Requirement
Density	ASTM D1622	42 kg/m^3 max. 10 kg/m^3 min.
Compressive strength	ASTM D1621	104 kPa with max. 10% deformation
Tensile Strength	ASTM D1623	138 kPa min.
Response to thermal and humid aging	ASTM D2126	12% max. volume change
Water absorption	ASTM D2842	5% max. by volume
Water vapour permeability	ASTM E96E96M	Core: max. 180 ng/(Pa.s.m^2) Skins: max. 60 ng/(Pa.s.m^2)

Part 3 Execution

3.1 VERIFICATION OF CONDITIONS

.1 Inspect areas to receive work of this Section and ensure conditions are suitable to begin application.

.2 Ensure that all work penetrating through air seal is complete.

.3 Ensure that appropriate back-up material has been installed in all large voids.

3.2 PROTECTION OF EXISTING WORK

.1 Protect from overspray all finish surfaces which will be exposed to view.

3.3 SUBSTRATE PREPARATION

.1 Clean substrates of dirt, dust, grease, oil, loose material and other matter which may affect bond of spray applied materials.

.2 If recommended by manufacturer, prime substrates in accordance with manufacturer's instructions.

.3 Remove oil from galvanized sheet steel substrates and apply prime coating in accordance with manufacturer's instructions.

3.4 SPRAY APPLIED POLYURETHANE FOAM APPLICATION

.1 Spray-apply polyurethane foam in accordance with manufacturer's instructions. Use equipment recommended by manufacturer.

.2 Apply material as indicated and in sufficient thickness to achieve a complete air seal.

3.5 AIR SEAL APPLICATION SCHEDULE

.1 Provide air seal at the following:

.1 Perimeter of windows & doors.

.2 Around all protrusions through the exterior envelope, including mechanical and electrical protrusions to achieve and maintain continuity of air/vapour seal.

.3 Other locations indicated on drawings.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Provide flexible sheet membrane that is continuously adhered to wall substrates, bridging joints and gaps.

.2 Provide flexible sheet membrane which is sealed to vapour retarders in existing wall assemblies.

.3 Provide flexible sheet membrane that is installed to permit an effective seal at window frames, door frames, and other components fitted into openings in building envelope.

.4 Provide flexible sheet membrane that is sealed to pipes, ducts, conduits, masonry connectors and other items penetrating the building envelope.

.5 The intent is to provide a continuous barrier to air movement and an effective barrier to water vapour transmission through the building envelope.

1.2 REFERENCES

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

- .1 ASTM D412-06ae2, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- .2 ASTM D903-98 (2004), Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.
- .3 ASTM E96/E96M-05, Standard Test Methods for Water Vapor Transmission of Materials.

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB 37-GP-56M, Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

- .1 Select products to be compatible with adjoining membranes previously installed under related Sections.
- .2 Select products from a single manufacturer, or products which are compatible, from different manufacturers.

.2 Sequencing and Scheduling:

- .1 If climatic conditions may result in condensation between membranes and substrates, schedule installation of insulation to immediately follow installation of membranes.
- .2 Install membranes over joints and gaps before installing membranes over adjacent substrates.

.3 Unless membrane will be adhered directly to window frames or other components fitted into openings, install membrane before installation of such components.

.4 Provide reasonable notice to Departmental Representative to allow inspection of completed installation prior to concealing work of this Section.

1.4 SUBMITTALS

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

.2 Shop drawings:

.1 Provide drawings of special joint conditions.

.3 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet.

.2 Submit product data illustrating membranes and accessory materials and indicating compliance with specified requirements.

.3 Submit statement from manufacturer(s), indicating products supplied under this Section are compatible with one another and with products previously installed under the work of related Sections.

.4 Samples:

.1 Provide duplicate 200 mm x 200 mm samples of membrane adhered to all project substrates, including adjoining membranes specified in other Sections.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Applicator: company specializing in performing work of this section with minimum three (3) years documented experience with installation of air/vapour barrier systems.

.2 Mock-ups:

.1 Prior to installation of system, provide minimum 2.4 m x 2.4 m site mock-up showing methods of attachment, terminations at wall openings and penetrations, reveals, custom shapes, flashings, joints required.

.2 Approved mock-up will establish a minimum standard. Mock-up may be incorporated into finished work of this Section. Retain and maintain mock-up for reference during construction. Promptly remove rejected mock-ups from site.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Deliver and store materials, undamaged in original wrappings, in a suitable environment.

.2 Storage and Handling Requirements:

.1 Provide adequate protection of materials and work of this section from damage by weather and other causes.

.3 Waste Management And Disposal:

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

1.7 SITE CONDITIONS

.1 Apply materials under environmental conditions recommended by manufacturer.

.2 Ensure substrates temperatures and ambient air temperatures are within range recommended by membrane manufacturer. Provide hoarding and temporary heating if required.

Part 2 Products

2.1 SHEET MEMBRANE

.1 Material: styrene-butadiene-styrene (SBS) modified bitumen, premanufactured sheet, with manufacturer's standard reinforcement, compatible with substrates and adjoining membranes, and specifically designed for air and vapour seal application.

.2 Method of Adhesion: self-adhering.

.3 Performance Requirements:

Attribute	Criterion	Test Method
Tensile & lap joint strength, machine & cross-direction	Min. 17 N/cm	CGSB 37GP56M
Elongation at break, machine & cross-direction	Min. 4%	ASTM D41206ae2 (Die C)
Peel adhesion of self-adhering membranes	Min. 8 N/cm	ASTM D903,
Flexibility, low temperature	Pass	CGSB37GP56M
Crack bridging capability	No evidence of cracking or splitting	CGSB37GP56M
Water vapour permeance	Maximum 15 ng/(Pa)(m^2)(s)	ASTM E96/E96M, water method

2.2 JOINT MEMBRANE

.1 Material, Method of Adhesion, and Performance: same as Sheet Membrane, except elongation at break, in machine and cross-direction, shall be minimum 50%.

2.3 TRANSITION MEMBRANE

.1 Material, Method of Adhesion, and Performance: same as Sheet Membrane, except internally reinforced, and minimum thickness of 1 mm.

2.4 ACCESSORY MATERIALS

.1 Primers, Surface Conditioners and Mastic: as recommended by membrane manufacturer, compatible with substrates, including, but not limited to, the following:

.1 Metal substrates.

.2 Concrete which may contain form release agents.

.3 Wood substrates to which preservative or fire retardant treatment has been applied.

Part 3 Execution

3.1 EXAMINATION AND PREPARATION

.1 Verify substrate conditions are acceptable before starting installation of membranes.

.2 Prepare substrate surfaces in accordance with membrane manufacturer's printed recommendations.

.3 Apply primer to substrates to receive membranes, in accordance with manufacturer's recommendations.

3.2 INSTALLATION, GENERALLY

.1 Install membranes in accordance with membrane manufacturer's recommendations, and to ensure continuity of air and vapour seal. Neatly trim membrane terminations.

.2 Lap horizontal membrane joints to shed water to exterior.

.3 The following are unacceptable:

.1 Fishmouths and folds.

.2 Blisters and bulges.

.3 Insufficient overlaps.

.4 Inadequate adhesion.

.5 Punctures, tears, cuts.

.6 Other similar defects.

.4 Position lap seals over firm bearings.

3.3 INSTALLATION OVER JOINTS AND GAPS

.1 Install Joint Membrane, minimum 200 mm wide, centred over joints and gaps.

.2 Lap ends of Joint Membranes minimum 150 mm.

.3 Do not loop Joint Membranes into joints.

3.4 INSTALLATION ON WALLS

.1 Install Sheet Membrane on exterior walls as indicated.

3.5 INSTALLATION AT TRANSITIONS

.1 Install Transition Membrane at window frames, door frames, and other components fitted into openings in building envelope as indicated.

3.6 INSTALLATION AT PENETRATIONS

.1 Cut membrane to ensure it is installed tight to penetrations.

.2 Apply mastic where membrane has been cut to fit around penetrations.

3.7 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

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

3.8 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.

END OF SECTION

Part 1 General

1.1 REFERENCES

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

.1 ASTM A653/A653M-01a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

1.2 SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's printed product literature for sheet metal flashing systems materials, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 29.06 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.

.3 Submit eaves trough fastening detail for review and approval. Fastening to ensure performance of trough when full of water.

.3 Samples:

.1 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, finishes and colours.

.4 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.

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

.2 Manufacturer's Field Reports: submit to manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3, FIELD QUALITY CONTROL.

1.3 QUALITY ASSURANCE

.1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section and on-site installation, with Contractor's representative and Departmental Representative in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart 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 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Waste Management and Disposal:

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

Part 2 Products

2.1 SHEET METAL MATERIALS

.1 Zinc coated steel sheet: minimum .7 mm thickness, commercial quality to ASTM A653/A653M, with Z275 designation zinc coating.

2.2 PREFINISHED STEEL SHEET

.1 Prefinished steel with factory applied silicone modified polyester.

.1 Class F2S.

.2 Colour: as selected by Departmental Representative from manufacturer's standard offering.

.3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.

.4 Coating thickness: not less than 25 micrometres.

.5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D822 as follows:

.1 Outdoor exposure period 1000 hours.

.2 Humidity resistance exposure period 1000 hours.

2.3 ACCESSORIES

.1 Isolation coating: alkali resistant bituminous paint.

.2 Sealants: in accordance with Section 07 92 00, colour as selected by Departmental Representative.

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

2.4 FABRICATION

.1 Fabricate metal flashings as indicated.

.2 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.

.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.

Part 3 Execution

3.1 INSTALLATION

.1 Install sheet metal work as indicated.

.2 Lock end joints and caulk with sealant.

3.2 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

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

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

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

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

.1 Material Safety Data Sheets (MSDS).

.2 National Research Council Canada (NRC)

.1 National Building Code of Canada 2015 (NBC).

.3 Underwriter's Laboratories of Canada (ULC)

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

1.2 DEFINITIONS

.1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.

.2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.

.3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.

.4 Tightly Fitted; (ref: NBC Part 3.1.9.1(1) and 9.10.9.6(1)): penetrating items that are cast in place in buildings of non-combustible construction or have "0" annular space in buildings of combustible construction.

.1 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

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

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

.3 Quality assurance submittals: submit following in accordance with Section 01 45 00- Quality Control.

.1 Test reports: in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics.

.1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with

specifications for specified performance characteristics and physical properties.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

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

.4 Closeout Submittals: see Identification and Documentation article below.

1.4 QUALITY ASSURANCE

.1 Qualifications:

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

.2 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with Departmental Representative in accordance with Section 01 32 16.19- Construction Progress Schedule - Bar (GANTT) Chart 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.

.5 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.

.6 Twice during progress of Work at 25% and 60% complete.

.7 Upon completion of Work, after cleaning is carried out.

.3 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.

.1 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.

.2 Twice during progress of Work at 25% and 60% complete.

.3 Upon completion of Work, after cleaning is carried out.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

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

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

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

.2 Storage and Protection:

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

.2 Replace defective or damaged materials with new.

.3 Waste Management and Disposal:

.1 Separate waste materials for recycling and reuse 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.

.2 Fire stop system rating: to suit NBC requirements.

.2 Service penetration assemblies: systems tested to CAN-ULC-S115.

.3 Service penetration fire stop components: certified by test laboratory to CAN-ULC-S115.

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

.5 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.

.6 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.

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

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

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

.10 Sealants for vertical joints: non-sagging.

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 Departmental Representative.

.2 Install floor fire stopping before interior partition erections.

.3 Metal deck bonding: fire stopping to precede spray applied fireproofing to ensure required bonding.

.4 Mechanical pipe insulation: certified fire stop system component.

.1 Ensure pipe insulation installation precedes fire stopping.

3.5 IDENTIFICATION AND DOCUMENTATION

.1 The firestop contractor is to supply documentation for each single application addressed. This documentation is to identify each penetration and joint location on the entire project.

.2 The Documentation Form for through penetrations is to include:

.1 A sequential location number.

.2 The project name

.3 Date of installation

.4 Detailed description of the penetrations location

.5 Tested system or engineered judgment number

.6 Type of assembly penetrated

.7 A detailed description of the size and type of penetrating item

.8 Size of opening

.9 Number of sides of assemblies addressed

.10 Hourly rating to be achieved

.11 Installers name

.3 Copies of these documents are to be provided to the general contractor at the completion of the project.

.4 Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:

.1 The words: "Warning -Through Penetration Firestop System-Do Not Disturb. Notify Building Management of Any Damage."

.2 Contractor's name, address, and phone number.

.3 Through-penetration firestop system designation of applicable testing and inspecting agency.

.4 Date of installation.

.5 Through-penetration firestop system manufacturer's name.

.6 Installer's name.

3.6 FIELD QUALITY CONTROL

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

.2 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

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

3.7 CLEANING

.1 Proceed in accordance with Section 01 74 11- Cleaning.

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

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

3.8 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 cm2: 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 REFERENCE STANDARDS

.1 ASTM International

.1 ASTM C919-08, Standard Practice for Use of Sealants in Acoustical Applications.

.2 ASTM C920-14a, Standard Specification for Elastomeric Joint Sealants.

.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-19.24-M90, Multi-component, Chemical Curing Sealing Compound.

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

.1 Material Safety Data Sheets (MSDS).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for joint sealants and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Manufacturer's product to describe:

.1 Caulking compound.

.2 Primers.

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

.3 Submit copies of WHMIS MSDS in accordance with Section 01 35 29.06- Health and Safety Requirements.

.3 Samples:

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

.4 Manufacturer's Instructions:

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

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00- Closeout Submittals.

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

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements and manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

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

.2 Store and protect joint sealants from damage.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse and return by manufacturer of padding, crates, pallets, packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

1.5 SITE CONDITIONS

.1 Ambient Conditions:

.1 Proceed with installation of joint sealants only when:

.1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 degrees C.

.2 Joint substrates are dry.

.3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.2 Joint-Width Conditions:

.1 Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:

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

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 Departmental Representative will arrange for ventilation system to be operated on maximum outdoor air and exhaust during installation of caulking and sealants.

Part 2 Products

2.1 SEALANT MATERIALS

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

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

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

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Sealant Type 1: Silicone One Part.

- .1 To CAN/CGSB-19.13-M87, type 2. Class 25, shore A hardness of 25 – 30, non-sag, neutral curing.

.2 Sealant Type 2 :Acrylic Latex One Part.

- .1 To CAN/CGSB-19.17.

.3 Sealant Type 3 (horizontal joint sealant): Self-levelling polyurethane.

- .1 Multi component, chemical curing, self-levelling, polyurethane sealant, conforming to CAN/CGSB-19.24-M90, type 1, Class B.

.4 Sealant Type 4: one component, mildew resistant, silicone rubber sealant, conforming to ASTM C920.

.5 Sealant Type 5: acoustical sealant to ASTM C919.

.6 Primer: Non-staining type recommended by sealant manufacturer.

.7 Preformed Compressible and Non-Compressible back-up materials.

- .1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
  - .1 Extruded closed cell foam backer rod.
  - .2 Size: oversize 30 to 50 %.
- .2 Bond Breaker Tape.
  - .1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT SELECTION

.1 Perimeters of exterior openings where frames meet exterior facade of building and to all other exterior joints: sealant Type 1.

.2 Seal interior perimeters of exterior openings as detailed on drawings: sealant Type 2.

.3 Interior control and expansion joints in floor surfaces: sealant Type 3.

.4 Perimeters of interior frames, as detailed and itemized: sealant Type 2.

.5 Perimeter of bath fixtures (e.g. sinks, tubs, urinals, stools, water closets, basins, vanities): sealant Type 4.

.6 Exposed interior control joints in drywall: sealant Type 2.

.7 Refer to Section 09 21 16 – Gypsum Board Assemblies and Section 09 22 16 - Non-Structural Metal Framing for use of sealant Type 5.

2.4 JOINT CLEANER

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

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

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for joint sealants installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

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

3.2 SURFACE PREPARATION

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

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

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

.4 Ensure joint surfaces are dry and frost free.

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

3.3 PRIMING

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

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

3.4 BACKUP MATERIAL

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

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

3.5 MIXING

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

3.6 APPLICATION

.1 Sealant:

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

.2 Curing:

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

3.7 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.

- .1 Leave Work area clean at end of each day.
- .2 Clean adjacent surfaces immediately.
- .3 Remove excess and droppings, using recommended cleaners as work progresses.
- .4 Remove masking tape after initial set of sealant.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.

.3 Waste Management: separate waste materials for reuse in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.8 PROTECTION

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

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

END OF SECTION