
Part 1 General

1.1 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C165-07(2017), Standard Test Method for Measuring Compressive Properties of Thermal Insulations.
 - .2 ASTM C423-17, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 - .3 ASTM C1071-19, Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material)
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 71-GP-24M-AMEND-77 (R1983), Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Safety Data Sheets (SDS).
- .4 Underwriters Laboratories of Canada (ULC)
 - .1 ULC 102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies (ULC S102)
 - .2 ULC 702.1, Standard for Mineral Fibre Insulation for Buildings, Part 1: Material Specification.
 - .3 ULC 702.2, Mineral Fibre Thermal Insulation for Buildings, Part 2: Application Guidelines

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.
- .3 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 in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect board insulation.
- .3 Replace defective or damaged materials with new.
- .4 Develop Waste Reduction Workplan and Construction Waste Management Plan related to Work of this Section.
- .5 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 INSULATION

- .1 Mineral fibre board: to ULC 702.
 - .1 Exterior wall cavity at roof curbs.
 - .2 Purpose made, dual density fibre board for use in cavity and rainscreen applications.
 - .3 Surface burning characteristics: to ULC 102
 - .1 Flame spread: 0.
 - .2 Smoke developed: 0.
 - .4 R-Value: RSI 0.76/25.4 mm (R4.3/inch)
 - .5 Type: 1.
 - .6 Density: Outer layer 100 kg/m³, inner layer approximately 55 kg/m³.
 - .7 Thickness: as indicated.
 - .8 Approved products:
 - .1 Rockwool – Cavityrock DD
 - .2 Approved alternate
- .2 Duct Insulation (at underside of existing floor structure, above fan coil units)
 - .1 Faced semi-rigid non-combustible mineral fibre to ULC 702, ASTM C165, and ASTM C1071.
 - .2 Type: 2
 - .3 Density: 48 kg/m³ minimum
 - .4 Surfaces: black colour glass fibre mat on exposed face
 - .5 Coated air side for maximum 20.3m/s air velocity.
 - .6 Thickness: as indicated.
 - .7 Noise Reduction Coefficient (NRC) designation of 0.95 at 50mm to ASTM C423, Type A apparatus, material against a solid support.
 - .8 Ksi value: 0.035 at 24 degrees C.
 - .9 40% minimum certified recycled materials content.
 - .10 Size: 1219 mm x 2438 mm sheets.
 - .11 Fire and smoke rating in accordance with CAN/ULC-S102

- .1 Maximum flame spread rating: 25
- .2 Maximum smoke developed rating: 50
- .12 Accessories: installation clips: disc type, length to suit installation, 25 mm diameter head.

2.2 ADHESIVE

- .1 Adhesive: to CGSB 71-GP-24M.
 - .1 As recommended by 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 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .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 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.
- .5 Offset both vertical and horizontal joints in multiple layer applications.
- .6 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C423-17, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - .2 ASTM C612-14(2019), Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
 - .3 ASTM C1320-20, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
 - .4 ASTM E90-09(2016), Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
 - .5 ASTM E413-16, Classification for Rating Sound Insulation
 - .6 ASTM E1050-19, Standard Test Method for Impedance and Absorption of Acoustical Materials Using a Tube, Two Microphones and a Digital Frequency Analysis System
- .2 CSA Group (CSA)
 - .1 CSA B149 PACKAGE-10, Consists of B149.1, Natural Gas and Propane Installation Code and B149.2, Propane Storage and Handling Code.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 ULC 102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
 - .2 ULC 604, Standard for Factory-Built Type A Chimneys.
 - .3 ULC 702.1, Standard for Mineral Fibre Insulation for Buildings, Part 1: Material Specification.
 - .4 ULC 702.2, Mineral Fibre Thermal Insulation for Buildings, Part 2: Application Guidelines

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 batt and blanket insulation and include product characteristics, performance criteria, physical size, finish and limitations.

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 in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect batt and blanket insulation.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Waste Reduction Workplan and Construction Waste Management Plan related to Work of this Section.
- .5 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 INSULATION

- .1 Batt and blanket mineral fibre: to ULC 702.
 - .1 Mineral fibre batt for stud walls.
 - .2 Type: 1.
 - .3 Thickness: as indicated in drawings.
 - .4 Density: to ASTM C612, 45 kg/m³.
 - .5 Non-combustible: to ULC 114.
 - .6 Surface burning characteristics: to ULC 102.
 - .1 Flame spread: 0.
 - .2 Smoke developed: 0 to 10.
 - .7 Zero formaldehyde content.
 - .8 Acoustical performance:
 - .1 Airborne sound transmission loss: to ASTM E90.
 - .2 Rating sound insulation: to ASTM E413.
 - .3 Sound absorption coefficients: to ASTM C423 (NRC 0.95 for 50 mm thickness)
 - .4 Impedance and absorption of acoustical materials: to ASTM E1050.

2.2 ACCESSORIES

- .1 As recommended by 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 blanket insulation application in accordance with manufacturer's written instructions.
 - .1 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSULATION INSTALLATION

- .1 Install insulation to maintain continuity of thermal protection to building elements and spaces and to ASTM C1320.
- .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 ULC 604 Type A chimneys, CSA B149.1 and CSA B149.2 Type L and Type B vents.
- .5 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 American Association of Textile Chemists and Colorists (AATCC)
 - .1 Technical Manual 2020
- .2 ASTM International
 - .1 ASTM D3330/D3330M-04(2018), Standard Test Method for Peel Adhesion of Pressure-Sensitive Tape
 - .2 ASTM E96/E96M-16, Standard Test Methods for Water Vapor Transmission of Materials
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2
- .4 Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification.

1.2 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.

1.3 QUALITY ASSURANCE

- .1 Mock-Up:
 - .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct typical air/vapour assembly; illustrating materials interface and seals.
 - .3 Locate where directed.
 - .4 Mock-up may remain as part of finished work.
 - .5 Allow 48 hours for inspection of mock-up by Departmental Representative before proceeding with air/vapour barrier Work.

1.4 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.
- .3 Avoid spillage: immediately notify Departmental Representative if spillage occurs and start clean up procedures.

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

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.

1.6 AMBIENT CONDITIONS

- .1 Install solvent curing sealants and vapour release adhesive materials in open spaces with 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.

1.7 SEQUENCING

- .1 Sequence work in accordance with Section 01 32 16.19 - Construction Progress Schedule - Bar (GANTT) Charts.
- .2 Sequence work to permit installation of materials in conjunction with related materials and seals.

Part 2 Products

2.1 SHEET MATERIALS

- .1 Sheet Vapour Barrier:
 - .1 Polyethylene film: to CAN/CGSB-51.34, 0.15 mm thick.
- .2 Air/Vapour Barrier Membrane:
 - .1 Self-adhesive bitumen laminated to high-density polyethylene film. Underface is covered with a silicone release paper or film.
 - .2 Components:
 - .1 Reinforcement: woven polyethylene.
 - .2 Elastomeric bitumen: mix of selected bitumen and SBS polymer.
 - .3 Properties:
 - .1 Thickness: 1.0 mm minimum
 - .2 Flexibility at cold temperature: -35 °C
 - .3 Water vapour permeability: less than 0.50 ng/m²sPa
 - .4 Static puncture: greater than 305 N
 - .5 Lap adhesion: 2000 N/m
 - .4 Acceptable manufacturers:
 - .1 Soprema: Sopraseal Stick 1100T

- .2 IKO: Aquabarrier AVB
- .3 Carlisle: CCW 705 A/V Barrier
- .4 Approved alternate

2.2 SEALANTS

- .1 Sealants in accordance with Section 07 92 00 - Joint Sealants.
- .2 Compatible with air barrier membranes, air/vapour barrier membranes, and vapour permeable membranes.
- .3 Primer: recommended by sealant manufacturer and appropriate to application.
- .4 Substrate Cleaner: non-corrosive compatible with adjacent materials and type recommended by sealant manufacturer.

2.3 ADHESIVES

- .1 Adhesive: compatible with sheet seal and substrate, permanently non-curing.

2.4 ACCESSORIES

- .1 Thinner and cleaner for Sheets: as recommended by sheet material manufacturer.
- .2 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer, 50 mm wide.

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 GENERAL

- .1 Perform Work in accordance with Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification requirements for materials and installation.
- .2 Perform Work in accordance with National Air Barrier Association - Professional Contractor Quality Assurance Program and requirements for materials and installation.

3.3 EXAMINATION

- .1 Verify that surfaces and conditions are ready to accept work of this section.
- .2 Ensure surfaces are clean, dry, sound, smooth, continuous and comply with air barrier manufacturer's requirements.
- .3 Report unsatisfactory conditions to Departmental Representative in writing.
- .4 Do not start work until deficiencies have been corrected.
 - .1 Beginning of Work implies acceptance of conditions.

3.4 PREPARATION

- .1 Remove loose or foreign matter, which might impair adhesion of materials.
- .2 Ensure substrates are clean of oil or excess dust; masonry joints struck flush, and open joints filled; and concrete surfaces free of large voids, spalled areas, or sharp protrusions.
- .3 Ensure substrates are free of surface moisture prior to application of self-adhesive membrane and primer.
- .4 Ensure metal closures are free of sharp edges and burrs.
- .5 Prime substrate surfaces to receive adhesive and sealants in accordance with manufacturer's instructions.

3.5 SHEET VAPOUR BARRIER INSTALLATION

- .1 Install materials in accordance with manufacturer's instructions.
- .2 Install sheet vapour retarder on warm side of exterior assemblies prior to installation of gypsum board to form continuous retarder.
- .3 Use sheets of largest practical size to minimize joints.
- .4 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.
- .5 Perimeter Seals:
 - .1 Apply continuous bead of sealant to substrate along perimeter of sheets.
 - .2 Lap sheet over sealant and press into sealant bead.
 - .3 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.
 - .4 Seal self-adhesive membrane to sheet vapour barrier where these two membrane meet. Roll self-adhesive membrane to sheet vapour barrier to ensure an air-tight seal.
- .6 Lap Joint Seals:
 - .1 Seal lap joints of sheet vapour barrier as follows:
 - .2 Attach first sheet to substrate.
 - .3 Apply continuous bead of sealant over solid backing at joint.
 - .4 Lap adjoining sheet minimum 150 mm and press into sealant bead.
 - .5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.
- .7 Apply sealant within recommended application temperature ranges.
 - .1 Consult manufacturer when sealant cannot be applied within these temperature ranges.

3.6 AIR VAPOUR AND VAPOUR PERMEABLE MEMBRANE INSTALLATION

- .1 Refer to drawings for locations of membranes.
- .2 Install materials in accordance with manufacturer's instructions.

- .3 Preparation:
 - .1 Remove loose or foreign matter which might impair adhesion of materials.
 - .2 Ensure all substrates are clean of oil or excess dust; all masonry joints struck flush, and open joints filled; and all concrete surfaces free of large voids, spalled areas, or sharp protrusions.
 - .3 Ensure all substrates are free of surface moisture prior to application of self-adhesive membrane and primer.
 - .4 Ensure metal closures are free of sharp edges and burrs.
 - .5 Prime substrate surfaces to receive adhesive in accordance with manufacturer's instructions.
- .4 Installation:
 - .1 Install materials in accordance with manufacturer's instructions to create a continuous seal between all material junctions within the building envelope.
 - .2 Apply sealants and primers within recommended application temperature ranges. Consult manufacturer when products cannot be applied within these temperature ranges.
 - .3 Install membrane using a consecutive overlap method. Provide minimum 50mm side laps and 80mm end laps.
 - .4 Position membrane for alignment, remove protective film and firmly apply pressure to ensure adhesion. Eliminate all gaps and wrinkles.
 - .5 Roll entire membrane surface, including seams, to ensure full contact and adhesion.
 - .6 Seal membrane terminations, heads of mechanical fasteners, masonry tie fasteners, around penetrations, duct work, electrical and other apparatus extending through the water resistive air barrier membrane and around the perimeter edge of membrane terminations at window and door frames with manufacturer recommended sealant.

3.7 CLEANING

- .1 Proceed in accordance with Section 01 74 00 - 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 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .2 Underwriter's Laboratories of Canada (ULC)
 - .1 ULC 102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies (CAN/ULC S102-11)
 - .2 ULC 115, Standard Method of Fire Tests of Firestop Systems (CAN/ULC S115-11).

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 noncombustible 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 two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 00 - Hazardous Materials.
- .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.
- .5 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 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

1.4 QUALITY ASSURANCE

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

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling, and unloading:
 - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
 - .3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.
- .2 Storage and Protection:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .3 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - 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: as indicted on drawings.
- .2 Re-penetrable fire stop system for power and communication cables.
- .3 Service penetration assemblies: systems tested to CAN/ULC-S115.
- .4 Service penetration fire stop components: certified by test laboratory to CAN/ULC-S115.
- .5 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.
- .6 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.
- .7 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.
- .8 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
- .9 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .10 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .11 Sealants for vertical joints: non-sagging.

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 SPECIAL REQUIREMENTS

- .1 Location of special requirements for fire stopping and smoke seal materials at openings and penetrations in fire resistant rated assemblies are as follows:
 - .1 Designed for re-entry, removable at: electrical and communication penetrations.
- .2 Flexible, non-combustible thermal, flame, and smoke barrier at precast panel joints, where fire resistant ratings are noted. Fire stopping and smoke seals to meet ASTM E119.

3.5 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 Mechanical pipe insulation: certified fire stop system component.
 - .1 Ensure pipe insulation installation precedes fire stopping.

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.

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, precast concrete, and gypsum board partitions and walls.
 - .2 Top of fire-resistance rated masonry and gypsum board partitions.
 - .3 Intersection of fire-resistance rated masonry and gypsum board partitions.
 - .4 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
 - .5 Penetrations through fire-resistance rated floor slabs, ceilings, and roofs.

- .6 Openings and sleeves installed for future use through fire separations.
- .7 Around mechanical and electrical assemblies penetrating fire separations.
- .8 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 C919-19, Standard Practice for Use of Sealants in Acoustical Applications.
- .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 Safety Data Sheets (SDS).

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 Samples:
 - .1 Submit 2 samples of each type of material and colour.
 - .2 Cured samples of exposed sealants for each colour where required to match adjacent material.
- .4 Manufacturer's Instructions:
 - .1 Submit instructions to include installation instructions for each product used.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 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 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 in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect joint sealants.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan and Waste Reduction Workplan related to Work of this Section.
- .5 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - 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 Safety Data Sheets (SDS) acceptable to Health Canada.
- .2 Conform to manufacturer's recommended temperatures. Relative humidity, and substrate moisture content for application and curing of sealant included special conditions governing use.
- .3 Ventilate area of work as directed by Departmental Representative by use of approved portable supply and exhaust fans.

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 Urethanes one part:
 - .1 Non-sag: to CAN/CGSB-19.13, Type 2, colour as selected by Departmental Representative from standard range of manufacturer's colours.
- .2 Urethanes two part:
 - .1 Non-sag: to CAN/CGSB-19.24, Type 2, Class B, colour as selected by Departmental Representative from standard range of manufacturer's colours.
- .3 Acrylic latex one part: to CAN/CGSB-19.17, colour as selected by Departmental Representative from standard range of manufacturer's colours.
- .4 Silicones one part: to CAN/CGSB-19.13.
- .5 Acoustical sealant: to ASTM C919.
- .6 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/m³ 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.

2.3 SEALANT SELECTION

- .1 Exterior sealant: sealant type: 1 or 2.
- .2 Perimeters of exterior openings where frames meet exterior facade of building (i.e. block, granite): sealant type: 1 or 2.
- .3 Seal interior perimeters of exterior openings as detailed on drawings: sealant type: 4.

- .4 Perimeters of interior frames, as detailed and itemized: sealant type: 3.
- .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: 3.
- .7 Perimeter of millwork: sealant type: 3
- .8 Tops and bottoms of acoustic partitions: sealant type: 5
- .9 Poly vapour barrier: sealant type: 5
- .10 In additional locations as noted in the drawings: confirm with Departmental Representative.

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 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 00 - 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 00 – Cleaning.

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