

**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 Section 09 21 16 - Gypsum Board Assemblies.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C612-14(2019), Standard Specification for Mineral Fibre Block and Board Thermal Insulation.
  - .2 ASTM C1320-10(2016), Standard Practice for Installation of Mineral Fibre Batt and Blanket Thermal Insulation for Light Weight Frame Construction.
  - .3 ASTM E557-12, Standard Practice for Architectural Application and Insulation of Operable Partitions.
- .2 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
  - .2 CAN/ULC-S702-14, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
  - .3 CAN/ULC-S704.1-17, Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.
  - .4 CAN/ULC-S710.1-11-R18, Standard for Thermal Insulation –Bead – Applied One Component Polyurethane Air Sealant Foam, Part1 and Part 2

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with contract requirements and in accordance with manufacturer's written instructions.

**Part 2 Products**

**2.1 RIGID INSULATION**

- .1 Extruded polystyrene (XPS): to CAN/ULC-S701.
  - .1 Type: Type IV
  - .2 Compressive strength: 210 kPa (30 psi)
  - .3 Thickness: to match existing
  - .4 Installation: Multi layers; Maximum 50 mm per layer
  - .5 Edges: ship lapped.

**2.2 SOUND BATT INSULATION**

- .1 Glass Fibre Batt: to CAN/ULC-S702
  - .1 Type: 1.
  - .2 Surfaces: un-surfaced
  - .3 Thickness: 65 mm or as indicated.

## **2.3 ADHESIVE**

- .1 Adhesive: VOC compliant polyurethane construction adhesive, resistant to freezing; VOC limit 70 g/l when tested in accordance with USEPA Method 24 and ASTM D23569.

## **2.4 ACCESSORIES**

- .1 Insulation clips: impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self-locking type.
- .2 Insulation clips for non-adhesive friendly substrate: steel, concrete screw with 25 mm diameter washer, length to suit insulation.

# **Part 3 Execution**

## **3.1 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.
- .4 Keep insulation minimum 75mm from heat emitting devices such as recessed light fixtures.
- .5 Cut and trim insulation neatly to fit spaces.
  - .1 Butt joints tightly, offset vertical joints.
  - .2 Use only insulation boards free from chipped or broken edges.
  - .3 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 the departmental representative.

## **3.2 EXAMINATION**

- .1 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.

### **3.3 RIGID INSULATION INSTALLATION**

- .1 Provide Type IV XPS
- .2 Apply adhesive to insulation board or use plastic insulation fasteners in accordance with manufacturer's recommendations.
- .3 Cut, fit, stagger and butt joints tight.
- .4 Foam fill voids with foam insulation.
- .5 Coordinate work with placement of vapour retarder.

### **3.4 BATT AND SOUND INSULATION INSTALLATION**

- .1 Interior application: install where indicated.
- .2 Cut, fit and butt joints tight.
- .3 Secure with insulation clips or other means where required to prevent sagging.
- .4 Stagger Joints.

**END OF SECTION**

**Part 1 General**

**1.1 GENERAL**

- .1 Membranes are not to be installed by individual trades.**
- .2 Membranes are to be installed by qualified installer as noted.**

**1.2 RELATED REQUIREMENTS**

- .1 Section 07 21 00 - Building Insulation
- .2 Section 07 92 00 – Joint Sealants
- .3 Section 07 46 13 – Preformed Metal Siding

**1.3 REFERENCES**

- .1 American Society for Testing and Materials (ASTM).
  - .1 ASTM D4263-83(2018), Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
  - .2 ASTM D4541-17, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
  - .3 ASTM E96/E96M-16, Standard Test Methods for Water Vapour Transmission of Materials.
  - .4 ASTM E283/E283M-19, Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  - .5 ASTM E783-02(2018), Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.
  - .6 ASTM E1105-15, Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference.
  - .7 ASTM E1186-17, Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems.

**1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00- Standard General Requirements.
- .2 Product Data: Provide data indicating material characteristics, performance criteria, and limitations. Include data sheets for membrane, primers, and sealants.
- .3 Submit WHMIS and MSDS data sheets for all materials used.
- .4 Manufacturer's Installation Instructions: Indicate preparation, installation requirements and techniques, and product storage and handling criteria.

## **1.5 ENVIRONMENTAL REQUIREMENTS**

- .1 Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.
- .2 Do not apply AVB membrane to damp or wet substrates.
- .3 Do not install AVB membrane in snow, rain, fog or mist.

## **1.6 COORDINATION**

- .1 Coordinate the work of this section with all sections referencing this Section.
- .2 Coordinate the interfacing of roof level vapour retarder with exterior wall air/vapour retarder.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management HPB.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 AVB Membrane: SBS-modified membrane, minimum 1.0 mm (40 mil) thickness:
  - .1 Use regular or low-temperature formulation depending on site conditions, within temperature ranges specified by membrane manufacturer.
  - .2 Provide related accessories including non-water based primer, seam tape, mastic, fluid and sealant recommended by manufacturer.
  - .3 Transition Membrane: AVB membrane noted, field-cut to suit. Alternatively, provide manufacturer's membrane tape.

### **2.2 ACCESSORIES**

- .1 Transition Membrane: AVB membrane, field-cut to suit. Alternatively, provide manufacturer's membrane tape.
- .2 Galvanized Steel: Membrane support, to ASTM A653/A653M, Z275 (G90) finish; 0.60 mm (24 gauge) core steel.
- .3 Pressure Plate /Termination Bar: Painted Aluminum extrusion or formed 18 gauge sheet metal pressure plate /termination bar with sealant trough.
- .4 Sealant: Two-part, VOC compliant elastomeric, trowel grade material designed for use with self-adhered membranes and tapes.

**Part 3 Execution**

**3.1 PERFORMANCE REQUIREMENTS**

- .1 Install air and vapour barrier components and assemblies to resist air leakage caused by static air pressure across exterior wall assemblies and other interruptions to the integrity of the building enclosure systems as follows:
  - .1 Maximum air leakage rate of 0.02 L/sec·m<sup>2</sup> when subjected to a pressure differential of 75 Pa as measured in accordance with ASTM E283.
  - .2 Maximum vapour permeance of 0.1 perms when tested according to ASTM E96.
- .2 Air and vapour barrier system to be a continuous barrier to air infiltration, air exfiltration and water vapour transmission.
- .3 Air and vapour barrier system to act as a liquid water drainage plane, flashed to discharge condensation or water penetration.
- .4 Connections to Adjacent Materials: Provide connections to prevent air leakage and vapour migration at all possible locations including but not limited to the following locations:
  - .1 Foundation and walls, including penetrations, ties and anchors.
  - .2 Walls, windows, curtain walls, storefronts, louvers or doors.
  - .3 Different wall assemblies, and fixed openings within those assemblies.
  - .4 Wall and roof connections.
  - .5 Floors over unconditioned space.
  - .6 Walls, floor and roof across construction, control and expansion joints.
  - .7 Walls, floors and roof to utility, pipe and duct penetrations.
  - .8 Seismic and expansion joints.
  - .9 All other leakage pathways in the building envelope.
  - .10 Make all penetrations of the AVB membrane and paths of air infiltration/exfiltration airtight.

**3.2 EXAMINATION**

- .1 Examine substrates, areas, and conditions under which air and vapour barrier assemblies will be applied, with Applicator present, for compliance with requirements.
- .2 Verify that surfaces and conditions are suitable prior to commencing work of this Section.
  - .1 Do not proceed with installation until unsatisfactory conditions have been corrected.
- .3 Ensure that surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants.
- .4 Ensure that concrete surfaces are cured and dry, smooth without large voids, spalled areas or sharp protrusions.
- .5 Ensure that masonry joints are flush and completely filled with mortar, and all excess mortar sitting on masonry ties has been removed.

- .6 Verify substrate is visibly dry and free of moisture.
  - .1 Test for capillary moisture by plastic sheet method according to ASTM D4263 and take suitable measures until substrate passes moisture test.
- .7 Verify sealants used in sheathing are compatible with AVB membrane.
  - .1 Perform field peel-adhesion test on materials to which sealants are adhered.
- .8 Do not install AVB membrane until items penetrating it are in place.
- .9 Notify Departmental Representative in writing of anticipated problems using AVB membrane over substrate prior to proceeding.

### **3.3 SURFACE PREPARATION**

- .1 Clean, prepare, and treat substrate according to AVB membrane manufacturer's written instructions.
- .2 Prime substrate that membrane will be applied to with an adequate number of coats to achieve required bond, with adequate drying time between coats.
- .3 All surfaces to receive membrane to be primed even if manufacturer's documentations says otherwise, this includes membrane applied over membrane.
- .4 Apply primer at rate recommended by manufacturer prior to membrane installation.
  - .1 Allow primer to dry completely before membrane application.
  - .2 Apply as many coats as necessary for proper adhesion.
  - .3 Extend primer a minimum 50 mm past joint.
- .5 Perform membrane adhesion tests over each substrate to which AVB membrane is to be installed.
- .6 Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through air and vapour barrier and at protrusions.

### **3.4 INSTALLATION**

- .1 Install self-adhering AVB membrane to gypsum sheathing and wood panel surfaces.
- .2 Install AVB membrane to provide continuity throughout the building envelope.
- .3 Install materials in accordance with manufacturer's written recommendations and the following:
  - .1 When self-adhering membrane is properly positioned, press into place and roll membrane with roller immediately after placement.
  - .2 Overlap adjacent sheets in accordance with manufacturer's written recommendations. Roll seams with roller.
  - .3 Seal around all penetrations with termination mastic, sealant, or membrane tape in accordance with manufacturer's written recommendations.
  - .4 Connect AVB membrane continuously to roof vapour barrier, concrete below grade structures, windows, curtain wall, storefront, louvers, exterior doors and other intersection conditions.

- .5 Seal penetrations using accessory materials in accordance with the manufacturer's written recommendations.
- .6 Provide transition material at changes in substrate plane under AVB membrane to eliminate sharp inside corners and to smooth transition from one plane to another.
- .7 Provide mechanically fastened metal sheet to span gaps in substrate plane and to smooth transition from one plane to another.
  - .1 Continuously support AVB membrane at all transitions.
- .8 Provide backup for AVB membrane at deflection and control joints to accommodate anticipated movement.
- .9 Provide transition at expansion and seismic joints assemblies.
- .4 Install Pressure Plate /Termination Bars at all termination edges of membrane.

### **3.5 CLEANING AND PROTECTION**

- .1 Protect air and vapour barrier assemblies from damage during application and remainder of construction period, according to manufacturer's written instructions.
- .2 Do not allow materials to come in contact with chemically incompatible materials.
- .3 Do not expose AVB membrane to sunlight longer than recommended by the manufacturer.
- .4 Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer.

**END OF SECTION**



**Part 1            General**

**1.1            RELATED SECTIONS**

- .1        Section 09 21 16 - Gypsum Board Assemblies: Blocking required in walls to comply with System Design.

**1.2            REFERENCES**

- .1        Underwriters' Laboratories of Canada (ULC).
  - .1        Guide BXUVC, Fire Resistance Ratings.
  - .2        Guide XHEZC, Firestop Systems.
  - .3        CAN/ULC-S101, Standard Methods of Fire Endurance Tests of Building Construction and Materials.
  - .4        CAN/ULC-S102, Standard Test Method for Surface Burning Characteristics of Building Materials.
  - .5        CAN/ULC-S115, Standard Method of Fire Tests of Firestop Systems.
- .2        Underwriters Laboratories Inc. (UL).
  - .1        Guide BXUV7, Fire Resistance Ratings Certified for Canada.
  - .2        Guide XHEZ7, Through-penetration Firestop Systems Certified for Canada.
  - .3        UL 2079, Tests for Resistance of Building Joint Systems.
- .3        American Society for Testing and Materials (ASTM).
  - .1        ASTM E2174-19, Standard Practice for On-site Inspection of Installed Fire Stops.
  - .2        ASTM E2307-19, Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus.
  - .3        ASTM E2393-10a (2015), Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.
- .4        International Firestop Council (IFC).
  - .1        Guidelines for Evaluating Firestop Systems Engineering Judgments

**1.3            QUALITY ASSURANCE / QUALITY CONTROL**

- .1        Firestop installation must meet requirements of CAN/ULC-S115 tested assemblies.
- .2        For firestop applications for which no ULC or UL System Design is available through a manufacturer, a manufacturer's Engineering Judgment to be submitted to local Authorities Having Jurisdiction for review and approval prior to installation. Engineering Judgment drawings must follow requirements set forth by the International Firestop Council.

- .3 Inspection: The Department Representative will retain an independent inspection agency to examine penetration and joint firestopping in accordance with ASTM E2174 and ASTM E2393.
- .4 Testing will be paid by the Owner.

#### **1.4 SITE REVIEW**

- .1 Review methods and procedures related to firestopping including, but not limited to, the following:
  - .1 Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - .2 Review methods and procedures related to firestopping installation.
  - .3 Verify reinforcement, blocking and other ancillary components required by the System Design, installed by others, are in place.

#### **1.5 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: Provide data on product characteristics, performance and limitation criteria for all firestopping products to be used on this project.
- .3 Submit WHMIS and MSDS data sheets for all materials used.
- .4 Shop Drawings: Submit System Design listings, indicating ULC or UL for Canada mark design number and including illustrations, applicable to each firestop configuration.
  - .1 Where there is no System Design available for a particular firestop configuration, the Installer to pay for and obtain, from the firestop manufacturer, an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRRA) for submittal.
- .5 Schedule: Provide schedule indicating material to be used, building elements to be protected, hourly rating and appropriate references.
- .6 Provide Manufacturer's Installation Instructions including preparation of area to be fire stopped.
- .7 Provide letter from the manufacturer confirming that the sub-contractor is a certified installer of their product and currently in good standing.

#### **1.6 PERFORMANCE REQUIREMENTS**

- .1 Penetrations: Provide and install firestopping systems produced to resist the spread of fire, and the passage of smoke and other gases according to requirements indicated, including but not limited to the following:
  - .1 Firestop all penetrations passing through fire resistance rated wall and floor assemblies and other locations as indicated on the drawings.
  - .2 Provide and install complete penetration firestopping systems that have been tested and approved by third party testing agency.

- .3 F - Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F ratings indicated, but not less than one hour or the fire resistance rating of the construction being penetrated.
- .4 T - Rated Through-Penetration Firestop Systems: Provide firestop systems with T ratings, in addition to F ratings, where required by Code.
- .5 L – Rated Through-Penetration Firestop Systems: Provide firestop systems with L ratings, in addition to F and T ratings, where required by Code.
- .6 W – Rated Through-Penetration Firestop Systems: Provide firestop systems with W Water Resistance ratings, in addition to F, T and L ratings, where indicated.
- .2 Perimeter Fire Containment Systems: Provide interior perimeter joint systems with fire resistance ratings indicated, but not less than the fire-resistance rating of the floor construction.
- .3 Fire-Resistive Joints: Provide joint systems with fire-resistance ratings indicated, but not less than the fire-resistance rating of the construction in which the joint occurs.
- .4 For firestopping exposed to view, traffic, moisture, and physical damage, provide appropriate firestop systems for these conditions.

## **1.7 ENVIRONMENTAL REQUIREMENTS**

- .1 VOC Limitations: for all materials supplied by this Section, the total VOC content must be less than or equal to 250 g/L, less water, when tested to ASTM D2369.
- .2 Comply with manufacturer's recommended requirements for temperature, relative humidity and substrate moisture content during application and curing of materials.
- .3 Do not proceed with installation of firestopping materials when temperatures or weather conditions exceed manufacturer's recommendations.
- .4 Ventilate solvent based and moisture-cure firestopping per manufacturer's instructions by natural means or, where inadequate, by forced air circulation.

## **1.8 SINGLE SOURCE RESPONSIBILITY**

- .1 Obtain firestop systems for each kind of penetration and construction condition indicated from a single primary firestop systems manufacturer.
- .2 Where selected firestop system manufacturer cannot provide a System Design to suit site conditions, provide a tested and listed firestop System Design from an alternate manufacturer before using an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRRA).

## **1.9 SEQUENCING AND SCHEDULING**

- .1 Do not cover up firestopping installations until receipt of written notice from the Departmental Representative.

## **1.10 PRODUCTS DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management HPB.

## **Part 2 Products**

### **2.1 ACCEPTABLE MANUFACTURERS**

- .1 Provide firestopping and smoke seal systems only from manufacturers publishing ULC Listed or UL Certified for Use in Canada System Designs tested in accordance with CAN/ULC-S115:
  - .1 VOC Limit: 250 g/L.

### **2.2 ACCEPTABLE PRODUCTS**

- .1 Selection of appropriate system to maintain required fire resistance rating is the responsibility of the Installer. All systems or EJs are to be submitted for review.
- .2 Selection to be based on specified performance requirements and is limited to ULC Listed or UL Certified for Use in Canada System Designs tested in accordance with CAN/ULCS115.
- .3 Substitution of products, components or accessories forming part of a System Design is not acceptable, unless accompanied by an EJ or EFRRA from the system manufacturer.

### **2.3 ACCESSORIES**

- .1 Primer: Type recommended by firestopping manufacturer for specific substrate surfaces.
- .2 Installation Accessories: Clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place, as required by System Design.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verify openings are ready to receive the work of this section.
- .2 Examine substrates and conditions for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping.
- .3 Verify that blocking, anchoring devices, back-up materials, clips, sleeves, supports and other related materials is in place where required by System Design.

- .4 Do not apply firestopping to painted surfaces or surfaces treated with sealers, curing compounds, water repellent or other coatings unless compatibility of materials has been verified.
- .5 Notify the Departmental Representative of unsatisfactory conditions. Do not proceed with installation until unsatisfactory conditions have been corrected.
- .6 Commencement of Work will be considered acceptance of conditions.

### **3.2 PREPARATION**

- .1 Prime substrates where recommended by firestopping manufacturer using manufacturer's recommended products and methods. Limit priming to area of bond.
- .2 Use masking tape to prevent firestopping from contacting adjoining surfaces scheduled to remain exposed. Remove tape on completion of installation, without disturbing the firestopping seal with substrates.
- .3 Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.
- .4 Remove incompatible materials which may affect bond.

### **3.3 INSTALLATION - GENERAL**

- .1 Install firestopping material and components in accordance with System Design and manufacturer's written instructions.
- .2 Install permanent warning labels, provided by firestopping manufacturer, adjacent to openings that may be re-penetrated or disturbed. Include following information:
  - .1 Warning that opening has being firestop protected.
  - .2 System Design number.
  - .3 F rating or FT rating.
  - .4 Fire stop products used.
  - .5 Contact person and phone number in case of modification or new penetration of firestop system.

### **3.4 INSTALLING PENETRATION FIRESTOPS**

- .1 Verify that pipes, conduit, cable, and other items penetrating fire rated construction have been permanently installed prior to firestopping.
- .2 Schedule work so partitions and other construction that conceals penetrations are not erected prior to firestopping.
- .3 Install forming/damming materials and other accessories in accordance with manufacturers written instructions.
- .4 Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
- .5 Install materials to contact and adhere to substrates formed by openings and penetrating items.

- .6 Finish to produce smooth, uniform surfaces for fill materials to remain exposed.

### **3.5 INSTALLING FIRESTOP JOINT SYSTEMS**

- .1 Install joint fillers to provide support of firestop materials during application.
- .2 Install in full contact with joint substrates.
- .3 Completely fill recesses provided for joint configuration.
- .4 Provide uniform, cross-sectional shapes and depths relative to joint width that optimize movement capability.
- .5 Tool immediately after application and prior to skinning. Form smooth, uniform beads of configuration required to produce fire-resistance rating, eliminate air pockets and ensure contact and adhesion with sides of joint.

### **3.6 INSTALLING PERIMETER FIRE BARRIER SYSTEMS**

- .1 Install metal framing, curtain wall insulation, mechanical attachments, safing materials and firestop materials in accordance with System Design.

### **3.7 FIELD QUALITY CONTROL**

- .1 Notify Departmental Representative when completed installations are ready for inspection prior to concealing or enclosing area containing firestopping materials.
- .2 Arrange for inspections by Departmental Representative's independent inspection agency.
- .3 Where no deficiencies are found, provide repair of inspected installations, paid by Departmental Representative, as required to comply with requirements of the System Design.
- .4 Where deficiencies are found, repair or replace the firestopping, at no cost to Departmental Representative, to comply with requirements of the System Design.

### **3.8 CLEANING**

- .1 Clean excess materials as work progresses and upon completion of Work.

### **3.9 PROTECTION OF FINISHED WORK**

- .1 Protect firestopping during and after curing period from contact with contaminating substances.
- .2 If damage caused by others, make appropriate repairs at no cost to Departmental Representative.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1        Section 09 21 16 – Gypsum Board Assemblies.
- .2        Section 08 11 00 - Standard Metal Doors and Frames.

**1.2            REFERENCES**

- .1        ASTM International
  - .1        ASTM C834-17, Standard Specification for Latex Sealants.
  - .2        ASTM C920-18, Standard Specification for Elastomeric Joint Sealants

**1.3            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        Manufacturer's Instructions:
  - .1        Submit instructions to include installation instructions for each product used.

**1.4            DELIVERY, STORAGE AND HANDLING**

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

**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.

## **Part 2 Products**

### **2.1 SEALANT MATERIALS**

- .1 Where sealants are qualified with primers use only these primers.

### **2.2 SEALANT MATERIAL DESIGNATIONS**

- .1 Acoustical sealant: to ASTM C919, single component, non-hardening, non-skinning, synthetic rubber.
- .2 Acrylic latex: to ASTM C 834, single component general purpose siliconized acrylic latex sealant.
- .3 Epoxy, flexible: Poured flexible 100% solids epoxy joint filler.
- .4 Polyurethane, self-levelling: to ASTM C 920, Type S, Grade P, Class 25, single component self-levelling polyurethane sealant with plus or minus 25 percent movement capability for horizontal joints.
- .5 Silicone, one part: to ASTM C 920, Type S, Grade NS, Class 25, single component neutral cure silicone sealant, plus minus 50% joint movement capability.
- .6 Silicone, mildew resistant: to ASTM C 920, single component mildew resistant silicone sealant, +/- 25% movement capability.

### **2.3 ACCESSORIES**

- .1 Primer: Type recommended by the sealant manufacturer and compatible with joint forming materials.



- .2 Joint Cleaner: Non-corrosive and non-staining type recommended by sealant manufacturer and compatible with joint forming materials.
- .3 Closed-Cell Backer Rod: to ASTM C 1330, closed-cell polyethylene rod designed for use with cold-applied joint sealants for on-grade or below-grade applications. Size required for joint design.
- .4 Joint Filler: closed-cell polyethylene joint filler designed for use in cold joints, construction joints, or isolation joints wider than 6 mm. Size required for joint design.
- .5 Bond Breaker: Pressure-sensitive tape recommended by sealant manufacturer to suit application.

## 2.4 SEALANT SCHEDULE

- .1 The following schedule covers locations requiring sealant whether shown on the drawings or not.
  - .1 All cracks and joints are to be caulked.
    - .1 Locations not included in this schedule shall be caulked at the discretion of the Consultant at no extra cost.
  - .2 Perimeters of exterior openings where frames meet exterior of building.
    - .1 Sealant type: Silicone, one part.
  - .3 All other exterior applications.
    - .1 Sealant type: Silicone, one part.
  - .4 Perimeters of interior door, windows, edges of drywall and other frames and surfaces.
    - .1 Sealant type: Acrylic latex or Silicone, one part.
  - .5 Perimeter of plumbing fixtures, countertop backsplash at wall, window sills, FRP panels, ceramic tile.
    - .1 Sealant type: Silicone, mildew resistant.
  - .6 Building envelope applications (vapour retarder, vapour barrier, vapour barrier/wall openings and vapour retarder/ wall openings, etc):
    - .1 Sealant type: Acoustical sealant.
  - .7 Interior partitions acoustic applications:
    - .1 Sealant type: Acoustical sealant.
  - .8 Interior masonry: walls to floor, wall to steel
    - .1 Sealant type: Silicone, one part.
  - .9 Perimeter and annular space around all interior non rated penetrations in floors, walls, ceilings, partitions etc.,:
    - .1 Sealant type: Acoustical sealant.

- .10 Perimeter all interior walls, ceilings, partitions etc...
  - .1 Sealant type: Silicone, one part.
- .11 Interior concrete control joints and saw cuts.
  - .1 Sealant type: Epoxy, flexible.
- .12 Perimeter of interior concrete slab. – Radon gas seal.
  - .1 Sealant type: Polyurethane, self-levelling.
- .13 Top of masonry walls; 25 mm space between top of non-load bearing wall and structural elements.
  - .1 Non-exposed: Acoustical sealant.
  - .2 Exposed: Silicone, one part.
- .14 Perimeter all countertops, joints between millwork and walls.
  - .1 Sealant type: Silicone, one part.
- .15 Perimeter all stairs and stringers.
  - .1 Sealant type: Silicone, one part.
- .16 Perimeter of cover plates, access doors and other similar items.
  - .1 Sealant type: Silicone, one part.
- .17 For locations not included in this schedule, consult with Departmental Representative for proper selection of sealants.

### **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 and after receipt of written approval to proceed from Departmental Representative.

#### **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.
- .6 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .7 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.
- .8 Apply bond breaker tape where required to manufacturer's instructions.
- .9 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

### **3.3 MIXING**

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

### **3.4 APPLICATION**

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

### **3.5 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**3.6 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**