
Part 1 GENERAL

1.1 SUMMARY OF WORK

- .1 This section specifies mineral wool insulation for use in repairs to walls adjacent to window and door installations.

1.2 RELATED REQUIREMENTS

- .1 Division 01 – General Requirements.
- .2 Section 07 21 20 – Low Expanding Foam Sealant.
- .3 Section 07 27 13 – Modified Bituminous Sheet Air Barriers.
- .4 Section 09 29 00 – Gypsum Board Assemblies.

1.3 REFERENCE STANDARDS

- .1 Underwriters' Laboratories of Canada (ULC).
 - .1 CAN/ULC S702-14, Standard for Thermal Insulation Mineral Fibre for Buildings.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Co-ordinate work of this section with repair work to areas adjacent to wall and door installations.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product data: submit product data including manufacturer's literature for insulation materials and accessories.

1.6 CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data: supply maintenance data for insulation materials for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

Part 2 PRODUCTS

2.1 MATERIALS

- .1 Non-combustible, lightweight, semi-rigid stone wool batt insulation to CAN/ULC-S702 type 1.

2.2 ACCESSORIES

- .1 Fasteners in accordance with insulation manufacturer's written recommendations.

Part 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of walls receiving repairs are acceptable for insulation installation.

3.2 INSTALLATION

- .1 Install in cavities to produce a friction fit between edges of insulation and adjoining framing members.

3.3 PROTECTION

- .1 Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED REQUIREMENTS**

- .1 Division 01 – General Requirements.
- .2 Section 08 11 16 – Aluminum Doors and Frames.
- .3 Section 08 44 13 – Glazed Aluminum Curtain Walls.
- .4 Section 08 51 13 – Aluminum Windows.

1.2 **REFERENCES**

- .1 Canadian Urethane Foam Contractors' Association Inc. (CUFCA)
- .2 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-11, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 CAN/ULC-S705.2-05, Standard for Thermal Insulation Spray-Applied Rigid Polyurethane Foam Application.
 - .3 CAN/ULC-S710.1-11, Standard for Thermal Insulation-Bead-Applied One Component Polyurethane Air Sealant Foam, Part 1: Material Specification.

1.3 **ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Product data: submit product data including manufacturer's verification that product conforms to CAN/ULC-S710.1 and CAN/ULC-S102.

1.4 **QUALITY ASSURANCE**

- .1 Applicators to conform to CUFCA Quality Assurance Program.

1.5 **SAFETY REQUIREMENTS**

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

1.6 **PROTECTION**

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

- .2 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.
- .3 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.
- .4 Dispose of waste foam sealant daily in location designated by Departmental Representative and decontaminate empty drums in accordance with foam sealant manufacturer's instructions.

1.7 ENVIRONMENTAL REQUIREMENTS

- .1 Apply foam sealant only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Foam Sealant: single component, moisture cure, low expansion rate spray-in-place polyurethane liquid foam insulation to ULC-S710.1.

PART 3 EXECUTION

3.1 APPLICATION

- .1 Apply foam sealant to clean surfaces in accordance manufacturer's printed instructions. Surfaces to be free of dust, dirt, oil and other foreign materials.
- .2 Cover surfaces not intended to be foamed.
- .3 Apply foam sealant to perimeter of window, curtainwall and door openings and to thickness as recommended by manufacturer of foam sealant, windows, curtainwalls, and doors. Trim excess cured foam from finished area.
- .4 Cover exposed urethane foam sealants to protect from adverse affects from ultraviolet light (sunlight).

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Division 01 – General Requirements.
- .2 Section 07 92 00 – Joint Sealants.
- .3 Section 08 11 16 – Aluminum Doors and Frames.
- .4 Section 08 44 13 – Glazed Aluminum Curtain Wall.
- .5 Section 08 51 13 – Aluminum Windows.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CGSB 37-GP-56M, Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
 - .2 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

1.3 DEFINITIONS

- .1 Air Barrier Assembly: The collection of air barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.4 PERFORMANCE REQUIREMENTS

- .1 General: Air barrier shall be capable of performing as a continuous vapour-retarding air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

1.5 QUALITY ASSURANCE

- .1 Product Compatibility: Use only products with known compatibility with adjacent products proposed, and in particular any torch or heat applied membranes applied or to be applied as part of the work of this Project.
- .2 Applicator Qualifications: A firm experienced in applying air barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- .3 Mock-up: Build mock-up to verify selection made under submittals and to set quality standard for installation.
 - .1 Build mock-up of air barrier around new aluminum window and adjacent wall undergoing repair work. Demonstrate overlap and seal with existing air barrier

- (or existing substrate if wall assembly does not have air barrier), surface preparation, crack and joint treatment, sealing of gaps, terminations and penetrations.
- .2 If Departmental Representative determines mock-ups do not comply with requirements, reconstruct mock-ups and apply air barrier until mock-ups are approved.
- .3 Approved mock-up may become part of the completed Work if undisturbed at time of Substantial Completion.
- .4 Preinstallation Conference: Conduct conference at Project site.
 - .1 Include installers of other construction connecting to air barrier such as sheet metal flashing, foam sealant, joint sealants, windows, glazed curtain walls, and door frames.
 - .2 Review air barrier requirements including surface preparation, substrate condition and pre-treatment, minimum substrate curing period, forecasted weather conditions, special details and sheet flashings, mock-ups, installation procedures, sequence of installation, mock-up, and protection and repairs.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data, including accessories (primer, adhesive, substrate patching membrane); and tested physical and performance properties of air barrier.
- .2 Samples: Provide 100 mm x 100 mm product sample.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 In accordance with Section 01 61 00 – Common Product Requirements and manufacturer's instruction.

1.8 PROJECT CONDITIONS

- .1 Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air barrier manufacturer. Protect substrates from environmental conditions that affect performance of air barrier. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

Part 2 PRODUCTS

2.1 SELF-ADHERING SHEET AIR VAPOUR BARRIER

- .1 Modified Bituminous Sheet: 1.0 mm thick, self-adhering sheet consisting of 0.9 mm of rubberized asphalt laminated to a thermoplastic film, flexible at low temperatures and impermeable to air, moisture vapour and water.
 - .1 Physical and Performance Properties:
 - .1 Membrane Air Leakage: Not to exceed 0.0001 CFM/ft² at 75-Pa pressure difference; ASTM E 2178.
 - .2 Tensile Strength (membrane): 3.4 MPa minimum, ASTM D 412.

- .3 Ultimate Elongation: 200 % minimum; ASTM D 412, modified.
- .4 Low-Temperature Flexibility: Pass at -30° C (-22° F), CGSB 37-GP-56M.
- .5 Watertightness: pass CAN/CGSB-37.58.
- .6 Puncture Resistance: 40 lbf. minimum.
- .7 Moisture Absorption: 0.1 %, ASTM D 570.
- .8 Installation temperature: 10°F (-12°C) minimum.

2.2 AUXILIARY MATERIALS

- .1 General: Auxiliary materials recommended by air barrier manufacturer for intended use and compatible with air barrier. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- .2 Primer: as recommended for substrate by manufacturer of air barrier material.
- .3 Substrate Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
- .4 Adhesive and Tape: as recommended by air barrier manufacturer.
- .5 Modified Bituminous Transition Strip: Vapour-retarding, 1.0 mm thick, smooth-surfaced, self-adhering; consisting of 0.9 mm of rubberized asphalt laminated to a 0.1 mm thick polyethylene film with release liner backing.
- .6 Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low-modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Section 07 92 00 Section Joint Sealants.

Part 3 EXECUTION

3.1 EXAMINATION

- .1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.
 - .1 Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
 - .2 Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 - .3 Verify that masonry joints are flush and completely filled with mortar.
 - .4 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- .1 Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.

- .2 Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- .3 Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- .4 Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.
- .5 At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

3.3 INSTALLATION

- .1 Install modified bituminous sheets around windows, aluminum curtain wall, and doors, and overlap and seal to existing air barrier according to air barrier manufacturer's written instructions and according to recommendations in ASTM D 6135. Seal to existing substrate if existing air barrier is not present in wall assembly.
 - .1 When ambient and substrate temperatures range between -4°C and $+5^{\circ}\text{C}$, install self-adhering, modified bituminous air barrier sheets produced for low-temperature application. Do not use low-temperature sheet if ambient or substrate temperature is higher than 16°C .
- .2 Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations with termination mastic according to ASTM D 6135 and manufacturer's instructions.
- .3 Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.
- .4 Apply and firmly adhere modified bituminous sheets horizontally over area to receive air barrier sheets. Accurately align sheets and maintain a uniform 64 mm minimum lap widths and end laps. Overlap and seal seams and stagger end laps to ensure airtight installation.
 - .1 Apply sheets in a shingled manner to shed water without interception by any exposed sheet edges.
 - .2 Roll sheets firmly to enhance adhesion to substrate.
- .5 Apply continuous modified bituminous sheets over modified bituminous strips bridging substrate cracks, construction, and contraction joints.
- .6 CMU: Install air barrier sheet horizontally against the CMU. Align top edge of air barrier sheet immediately below protruding masonry ties or joint reinforcement or ties and firmly adhere in place.
 - .1 Overlap horizontally adjacent sheets a minimum of 50 mm and roll seams.
 - .2 Apply overlapping sheets with bottom edge slit to fit around masonry reinforcing or ties. Roll firmly into place.
 - .3 Seal around masonry reinforcing or ties and penetrations with termination mastic.

- .4 Continue the membrane into all openings in the wall, such as doors, windows, and terminate at points to maintain an airtight barrier that will not be visible from interior.
- .7 Seal exposed edges of sheets at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- .8 Install air barrier sheets and auxiliary materials to form a seal with adjacent existing construction and to maintain a continuous air barrier.
- .9 Connect and seal exterior wall air barrier membrane continuously to exterior glazing and window systems, glazed curtain-wall systems, exterior door framing, using accessory materials and according to manufacturer's tested assembly.
- .10 Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, and doors. Apply modified bituminous transition strip so that a minimum of 75mm of coverage is achieved over both substrates. Maintain 75mm of full contact over firm bearing to perimeter frames with not less than 25mm of full contact.
 - .1 Modified Bituminous Transition Strip: Roll firmly to enhance adhesion.
- .11 Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous penetrations of air barrier membrane with foam sealant.
- .12 At end or each working day, seal top edge of membrane to substrate with termination mastic.
- .13 Apply joint sealants forming part of air barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- .14 Repair punctures, voids, and deficient lapped seams in air barrier. Slit and flatten fishmouths and blisters. Patch with air barrier sheet extending 150mm beyond repaired areas in all directions.
- .15 Do not cover air barrier until it has been tested and inspected by the testing agency.
- .16 Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

3.4 CLEANING AND PROTECTION

- .1 Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
 - .1 Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace air barrier exposed to these conditions for more than 30 days.
 - .2 Protect air barrier from contact with materials and sealants not approved by air barrier manufacturer.

- .2 Clean spills, stains, and soiling from adjacent construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS:

- .1 Division 01 – General Requirements.
- .2 Section 07 92 00 – Joint Sealants.
- .3 Section 08 11 16 – Aluminum Doors and Frames.
- .4 Section 08 44 13 – Glazed Aluminum Curtainwalls.
- .5 Section 08 51 13 – Aluminum Windows.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A153/A153M–2009, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - .2 ASTM A653/A653M-07, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 SMACNA – Architectural Sheet Metal Manual, 2012.

1.3 PERFORMANCE REQUIREMENTS

- .1 General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- .2 Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.
 - .1 Temperature Change (Range): 67 deg C, ambient; 100 deg C, material surfaces.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product data: submit product data including manufacturer's literature for flashing, coatings, attachments and colour chart.
- .2 Shop drawings indicating flashing for window, curtainwall and doors.

1.5 QUALITY ASSURANCE

- .1 Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- .2 Mock-ups: Build mock-up to verify selections made under submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - .1 Build mock-up of typical window flashing, attachments and accessories.

- .2 Approval of mock-up does not constitute approval of deviations from the Contract Documents contained in mockups unless Departmental Representative specifically approves such deviations in writing.
- .3 Approved mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 In accordance with Section 01 61 00 Common Product Requirements.
- .2 Stack material to prevent twisting, bending, and abrasion; and to provide ventilation. Slope metal sheets to ensure drainage.
- .3 Prevent contact with materials which may cause discolouration or staining.

Part 2 Products

2.1 SHEET METALS

- .1 Pre-coated Galvanized Steel: to ASTM A653/A653M, Z275 zinc coating designation; 0.6 mm core steel. Shop coated with modified silicone PVDF coating. Colour to be selected by Departmental Representative from manufacturer's full colour range.

2.2 ACCESSORIES

- .1 Fasteners: to ASTM A153/A153M as recommended by steel sheet manufacturer.
- .2 Protective Backing Paint: bituminous.
- .3 Joint Sealants: in accordance with Section 07 92 00 – Joint Sealants.

2.3 FABRICATION

- .1 General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's *Architectural Sheet Metal Manual* that apply to design, dimensions, geometry, metal thickness, and other characteristics of aluminum windows, curtainwalls and doors. Fabricate items at the shop to greatest extent possible.
 - .1 Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - .2 Obtain field measurements for accurate fit before shop fabrication.
 - .3 Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - .4 Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

- .2 Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance within 3 mm offset of adjoining faces and of alignment of matching profiles.
- .3 Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 100 mm beyond wall openings, unless otherwise noted. Form head and sill flashing with 50 mm high, end dams.
- .4 Do not use graphite pencils to mark metal surfaces.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
 - .1 Verify compliance with requirements for installation tolerances of substrates.
 - .2 Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- .2 For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- .3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- .1 General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations. Coordinate installation of wall flashing with installation of aluminum windows, doors, and curtainwall.
- .2 Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted by Consultant.
- .3 Metal Protection: where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or as recommended by SMACNA.
- .4 Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 100 mm beyond wall openings unless otherwise indicated.
- .5 Expansion Provisions: provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 3m with no joints allowed within 600 mm of corners or intersections.
- .6 Seal joints as required for watertight construction.

3.3 ERECTION TOLERANCES

- .1 Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance and within 3 mm offset of adjoining faces and of alignment of matching profiles.

3.4 CLEANING AND PROTECTION

- .1 Clean off excess sealants.
- .2 Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.
- .3 Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touch up or similar minor repair procedures.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS:

- .1 Division 01 – General Requirements.
- .2 Section 06 20 23 – Interior Finish Carpentry.
- .3 Section 07 27 13 – Modified Bituminous Sheet Air Barriers.
- .4 Section 07 62 00 – Sheet Metal Flashing and Trim.
- .5 Section 08 11 16 – Aluminum Doors and Frames.
- .6 Section 08 44 13 – Glazed Aluminum Curtain Walls.
- .7 Section 08 51 13 – Aluminum Windows.
- .8 Section 08 80 00 – Glazing
- .9 Section 09 29 00 – Gypsum Board

1.2 REFERENCES

- .1 National Building Code of Canada latest edition
- .2 ASTM International
 - .1 ASTM C919-08, Standard Practice for Use of Sealants in Acoustical Applications.
 - .2 ASTM C570 (2009), Standard Specification for Oil- and Resin-Base Caulking Compound for Building Construction
 - .3 ASTM C638 (2009), Standard Descriptive Nomenclature of Constituents of Aggregates for Radiation-Shielding Concrete
 - .4 ASTM C732 (2006), Standard Test Method for Aging Effects of Artificial Weathering on Latex Sealants
 - .5 ASTM C790 (1990), Standard Guide for Use of Latex Sealants
 - .6 ASTM C834 (2014), Standard Specification for Latex Sealants
 - .7 ASTM C882/C882M (2013), Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear
 - .8 ASTM C920 (2014), Standard Specification for Elastomeric Joint Sealants
 - .9 ASTM C1193 (2013), Standard Guide for Use of Joint Sealants
 - .10 ASTM C1247 (2014), Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids
 - .11 ASTM C1248 (2012), Standard Test Method for Staining of Porous Substrate by Joint Sealants
 - .12 ASTM C1311 (2014), Standard Specification for Solvent Release Sealants
 - .13 ASTM C1330 (2013), Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants
 - .14 ASTM D695 (2015), Standard Test Method for Compressive Properties of Rigid Plastics

- .15 ASTM E90 (2009), Standard Test Method for Laboratory Measurement of Air-borne Sound Transmission Loss of Building Partitions and Element
- .3 Canadian General Standards Board (CGSB)
 - .1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
 - .2 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
 - .3 CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
 - .4 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
 - .5 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.
- .4 General Services Administration (GSA) - Federal Specifications (FS)
 - .1 FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .6 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.3 ACTION SUBMITTALS

- .1 Product Data: For each joint-sealant product indicated.
- .2 Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- 13 mm wide joints formed between two 6-inch-150 mm long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- .3 Joint-Sealant Schedule: Include the following information:
 - .1 Joint-sealant application, joint location, and designation.
 - .2 Joint-sealant manufacturer and product name.
 - .3 Joint-sealant formulation.
 - .4 Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- .1 Qualification Data: For qualified Installer.
- .2 Warranties: Sample of special warranties.

1.5 SUBMITTALS

- .1 Product Data: For each joint-sealant product indicated.
- .2 Samples for Initial Selection: Manufacturer's colour charts consisting of strips of cured sealants showing the full range of colours available for each product exposed to view.
- .3 Joint-Sealant Schedule: Include the following information:
 - .1 Joint-sealant application, joint location, and designation.
 - .2 Joint-sealant manufacturer and product name.
 - .3 Joint-sealant formulation.
 - .4 Joint-sealant colour.
- .4 Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.
- .5 Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

- .1 Installer Qualifications: An experienced installer in the installation of sealants.
- .2 Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.
- .3 Mock-ups: Install sealant in mock-ups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.
- .4 Preinstallation Conference: Conduct conference at Project site.

1.7 PROJECT CONDITIONS

- .1 Do not proceed with installation of joint sealants under the following conditions:
 - .1 When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 5 deg C.
 - .2 When joint substrates are wet.
 - .3 Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - .4 Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 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 off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect joint sealants from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse by manufacturer of padding, as specified in Waste Reduction Workplan.

1.9 WARRANTY

- .1 Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - .1 Warranty Period: Two years from date of Substantial Completion.
- .2 Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - .1 Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - .2 Disintegration of joint substrates from natural causes exceeding design specifications.
 - .3 Mechanical damage caused by individuals, tools, or other outside agents.
 - .4 Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

Part 2 Products

2.1 MATERIALS, GENERAL

- .1 Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- .2 VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when:
 - .1 Architectural Sealants: 250 g/L.
 - .2 Sealant Primers for Nonporous Substrates: 250 g/L.
 - .3 Sealant Primers for Porous Substrates: 775 g/L.
- .3 Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing

ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

- .1 Suitability for Immersion in Liquids: Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- .4 Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- .5 Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- .6 Colours of Exposed Joint Sealants: As selected by Departmental Representative from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- .1 Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
- .2 Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.
- .3 Single-Component, Nonsag, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
- .4 Multicomponent, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type M, Grade NS, Class 50, for Use NT.

2.3 URETHANE JOINT SEALANTS

- .1 Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
- .2 Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.
- .3 Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 50, for Use NT.

2.4 LATEX JOINT SEALANTS

- .1 Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

2.5 SOLVENT-RELEASE-CURING JOINT SEALANTS

- .1 Acrylic-Based Joint Sealant: ASTM C 1311.

- .2 Butyl-Rubber-Based Joint Sealant: ASTM C 1311.

2.6 PREFORMED JOINT SEALANTS

- .1 Preformed Silicone Joint Sealants: Manufacturer's standard sealant consisting of precured low-modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral-curing silicone sealant for bonding extrusions to substrates.
- .2 Preformed Foam Joint Sealant: Manufacturer's standard preformed, precompressed, open-cell foam sealant manufactured from urethane foam with minimum density of 160 kg/cu. m and impregnated with a nondrying, water-repellent agent. Factory produce in precompressed sizes in roll or stick form to fit joint widths indicated; coated on one side with a pressure-sensitive adhesive and covered with protective wrapping.

2.7 ACOUSTICAL JOINT SEALANTS

- .1 Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

2.8 JOINT SEALANT BACKING

- .1 General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- .2 Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) Type O, (open-cell material), Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- .3 Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.9 MISCELLANEOUS MATERIALS

- .1 Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- .2 Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- .3 Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- .1 Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - .1 Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - .2 Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - .1 Concrete.
 - .2 Masonry.
 - .3 Remove laitance and form-release agents from concrete.
 - .4 Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - .1 Metal.
 - .2 Glass.
- .2 Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- .3 Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- .1 General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

- .2 Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- .3 Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - .1 Do not leave gaps between ends of sealant backings.
 - .2 Do not stretch, twist, puncture, or tear sealant backings.
 - .3 Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- .4 Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- .5 Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - .1 Place sealants so they directly contact and fully wet joint substrates.
 - .2 Completely fill recesses in each joint configuration.
 - .3 Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- .6 Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - .1 Remove excess sealant from surfaces adjacent to joints.
 - .2 Use tooling agents that are approved in writing by sealant manufacturer and that do not discolour sealants or adjacent surfaces.
 - .3 Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
 - .4 Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
 - .5 Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.
 - .1 Use masking tape to protect surfaces adjacent to recessed tooled joints.
- .7 Installation of Preformed Silicone-Sealant System: Comply with the following requirements:
 - .1 Apply masking tape to each side of joint, outside of area to be covered by sealant system.
 - .2 Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 10 mm . Hold edge of sealant bead 6 mm inside masking tape.
 - .3 Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.

- .4 Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.
- .8 Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping. Do not pull or stretch material. Produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures, apply heat to sealant in compliance with sealant manufacturer's written instructions.
- .9 Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

3.4 CLEANING

- .1 Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- .1 Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

- .1 Joint-Sealant Colour: As selected by Departmental Representative from manufacturer's full range of colours.
- .2 Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
 - .1 Joint Locations:
 - .1 Perimeter joints between existing adjacent walls and frames of doors, windows and curtain walls.
 - .2 Joint Sealant: any one of the following:
 - .1 Silicone Joint Sealant: Single component, nonsag, neutral curing, Class 100/50; Single component, nonsag, neutral curing, Class 50; Single component, nonsag, acid curing; Multicomponent, nonsag, neutral curing.
 - .2 Urethane Joint Sealant: Single component, nonsag, Class 100/50; Single component, nonsag, Class 50; Multicomponent, nonsag, Class 50.
 - .3 Preformed Joint Sealant: Preformed silicone; Preformed foam.

- .3 Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
 - .1 Joint Locations:
 - .1 Perimeter joints between interior wall surfaces and frames of interior doors and windows.
 - .2 Joint Sealant: any one of the following:
 - .1 Latex.
 - .2 Acrylic based.
 - .3 Butyl rubber based.

END OF SECTION