Part 1 General

1.1 REFERENCES

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

.1 ASTM C553-02, Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.

.2 ASTM C665-01e1, Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

.3 ASTM C1320-05, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.

.2 Canadian Gas Association (CGA)

.1 CAN/CGA-B149.1-05, Natural Gas and Propane Installation Code Handbook.

.2 CAN/CGA-B149.2-05, Propane Storage and Handling Code.

.3 Canadian Standards Association (CSA International)

.1 CSA B111 1974 (R2003), Wire Nails, Spikes and Staples.

.4 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S604-M1991, Type A Chimneys.

.2 CAN/ULC-S702-1997, Standard for Mineral Fibre Insulation.

1.2 SUBMITTALS

.1 Product Data:

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

.2 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordinate with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

.4 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.4 WASTE MANAGEMENT AND DISPOSAL

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

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

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site for recycling in accordance with Waste Management Plan.

Part 2 Products

2.1 INSULATION

.1 Batt and blanket mineral fibre: to ASTM C553, ASTM C665, CAN/ULC S702.

.1 Type: 1. 2, or 3 for purpose intended by manufacturer.

.2 Thickness: 89 mm as indicated.

2.2 ACCESSORIES

.1 Insulation clips:

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

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

.3 Staples: 12 mm minimum leg.

.4 Tape: as recommended by manufacturer.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSULATION INSTALLATION

.1 Install insulation to maintain continuity of thermal protection to building elements and spaces and to ASTM C1320.

.2 Install insulation with factory applied vapour barrier facing warm side of building spaces and vapour permeable membrane facing cold side. Lap ends and side flanges of membrane over framing members. Retain in position with nails staples insulation clips wire ties installed as recommended by manufacturer. Tape seal butt ends and lapped side flanges. Do not tear or cut vapour barrier.

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

.4 Do not compress insulation to fit into spaces.

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

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

3.3 CLEANING

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM C411-05 – Standard test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.

.2 ASTM C518-10 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

.3 ASTM C1338-08 – Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.

.4 ASTM D1622-08 – Standard Test Method for Apparent Density of Rigid Cellular Plastics.

.5 ASTM D1621-10 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics.

.6 ASTM D1623-09 – Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics (Type C sample).

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

.8 ASTM D2369-10, Standard Test Method for Volatile Content of Coatings.

.9 ASTM D2842-06 – Standard Test Method for Water Absorption of Rigid Cellular Plastics.

.10 ASTM D6226 – Standard Test Method for Open Cell Content of Rigid Cellular Plastics.

.11 ASTM E96/E96M-10 – Standard Method for Water Vapour Transmission of Materials.

.12 CAN/ULC S102.10 – Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

.13 CAN/ULC S127-07 – Standard Corner Wall Method of Test for Flammability Characteristics of Non-Melting Building Materials.

.14 CAN?ULC S705.1-01, including amendment 1 & 2 – Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Material – Specification, Includes Amendments 1, 2.

.15 CAN/ULC S705.2-05 – Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Application.

.16 CAN/ULC S774-03 – Standard laboratory Guide for the Determination of Volatile Organic Compound Emissions from Polyurethane Foam.

.17 Canadian Construction material Centre (CCMC) Evaluation Report CCMC 13530-L.

1.2 SUBMITTALS

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

.2 Sprayed polyurethane foam (SPF) installer certificate: Submit name of SPF installer with copy of certification card verifying that the SPF installer is licensed by the source manufacturer.

.3 Manufacturer's Certificate: Certify that products meet or exceed specified requirements as evidenced by a current CCMC Evaluation Report.

.4 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 WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.5 Samples: submit duplicate 300 x 300 mm samples of exposed insulation for approval of texture and colour.

.6 Installation Data: Submit manufacturer's special installation requirements, perimeter conditions requiring special attention and requirements to access the site.

.7 Testing Reports: Submit as performed by manufacturer's approved testing agency and as required by CAN/ULC S705.2.

.8 Daily reports: As required by CAN/ULC S705.2.

1.3 QUALITY ASSURANCE / MOCK-UPS

.1 Products of this section listed with Canadian Construction Materials Centre (CCMC) certifying the product for use as insulation in accordance with the National Building Code of Canada.

.2 Eco-efficiency, life cycle analysis approved by NSF or equivalent.

.3 Spray Polyurethane Foam (SPF) Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten year documented experience.

.4 Spray Polyurethane Foam (SPF) Contractor Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

.5 Independent Testing Agency: arrange for site reviews by manufacturer's authorized agent prior to commencement of the work and at completion of the work.

.6 On-Site Documentation: Maintain a copy of the manufacturer's technical manual on site during application of polyurethane foam and compile daily reports chronologically and maintain on site during application.

.7 Erect mock-up in accordance with Section 01 45 00 - Quality Control.

.8 Provide a 5.0 square meter mock-up including window, steel frame and floor/roof junction terminations. Locate where directed by the Departmental Representative.

.9 Approved mock-up may remain as part of the Work.

.10 Mock-up will be used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.2 For testing to determine compliance with performance requirements: perform following tests:

.1 Thermal scans of identified areas.

.2 Thermal scans to be completed by the contractor.

.11 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with coating work.

1.4 WASTE MANAGEMENT AND DISPOSAL

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

1.5 ENVIRONMENATL REQUIREMENTS

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

.2 Do not install insulation when ambient temperature is outside <-10 C or >+40 C.

.3 Occupancy: In accordance with CAN/ULC-S774, occupancy is only permitted following delivery of minimum 0.3 air changes per hour for 24 hour following installation.

.4 Arrange for existing building ventilation system to be closed and sealed during application of polyurethane foam insulation.

.5 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

.6 Run continuous 24 hour/day ventilation during and for 7 days after insulation application.

1.6 CO-ORDINATION

.1 Co-ordinate with other work having a direct bearing on work of this section.

.2 Co-ordinate work to ensure timely placement of insulation within construction spaces.

Part 2 Products

2.1 MATERIALS

.1 Polyurethane Foam: To CAN/ULC S705.1, including amendment 1&2 closed cell, spray-applied rigid cellular polyurethane foam air barrier and thermal insulation, medium density:

.1 Performance Requirements:

.1 Water vapour permeance ASTM E96: 42ng/Pa-s-sq m (0.70 Perms).

.2 Flame spread classification CAN?ULC S102: Flame spread <500, Smoke developed <500.

.3 Hot surface performance ASTM C411: Passed when exposed to 93 deg C for 96 hours.

.4 Fungi resistance ASTM C1338: No fungal growth after 28 day incubation.

.5 Long term thermal resistance (LTTR): Conform to the following when tested to CAN/ULC S770.

.1 RSI 1.95 @ 50 mm (R11.24 @ 2 inches).

.2 RSI 3.00 @ 75 mm (R17.32 @ 3 inches).

.3 RSI 4.12 @ 100 mm (R23.73 @ 4 inches).

.4 RSI 1.03/25 mm above 100 mm (R5.93/inch above 4 inches).

.6 Physical Requirements:

.1 Colour: must have indicator dye technology.

.2 Density ASTM D1622: Minimum 29 kg/cu m (1.8 lb/cu ft).

.3 Compressive Strength ASTM D1621: 186 kPa (27.0 psi).

.4 Tensile Strength ASTM D1623: 241 kPa (35.0 psi).

.5 Open Cell Content ASTM DD2856: 8.0%.

.6 Water Absorption ASTM D2842: 1.2% by volume.

2.2 EQUIPMENT

.1 Comply with CAN/ULC S705.2 and the equipment manufacturer’s recommendations for specific type of application.

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 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 from contaminating air beyond application area.

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

.4 Protect workers as recommended by insulation manufacturer.

3.3 APPLICATION

.1 Apply insulation to clean dry surfaces. Verify work within construction space or crevices are complete prior to insulation application. Verify that surfaces are clean, dry and free of mater that may inhibit adhesion.

.2 Apply insulation in thickness as indicated.

.3 Mask and protect adjacent surfaces from over spray or dusting.

.4 Apply primer in accordance with manufacturer's written instructions.

.5 Prime all metal and non-porous surfaces when required by polyurethane foam manufacturer's written instructions.

.6 Apply insulation to CAN/ULC-S705.2 and manufacturer's written instructions.

.7 Apply insulation by spray method, to a uniform monolithic density without voids, in lifts not exceeding 50 mm thickness in a single pass.

.8 Finished surface of foam to be free of voids and imbedded foreign objects.

.9 Remove masking material and over spray from adjacent areas immediately after foam surface has hardened.

.10 Repair damaged areas in accordance with SPF manufacturer's application guidelines for insulation.

3.4 FIELD QUALITY CONTROL

.1 Conduct daily visual inspection, adhesion testing and density measurements as required by CAN/ULC S705.2 and the manufacturer's application guidelines.

3.5 PROTECTION OF FINSIHED WORK

.1 Do not permit subsequent construction work to disturb applied polyurethane foam.

3.6 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.

3.7 SCHEDULES

.1 Between all steel framing of exterior walls.

.2 Metal stud exterior wall cavities.

.3 Interior wall/roof junction.

.4 Perimeter of exterior aluminum window framing.

.5 Exterior wall construction abutting differing mechanical services.

.6 Floor to floor/roof exterior wall terminations and conditions as noted on the drawings.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 14 00 – Work Restrictions.

.2 Section 01 33 00 – Submittal Procedures.

.3 Section 01 41 00 - Regulatory Requirements.

.4 Section 01 56 00 - Temporary Barriers and Enclosures.

.5 Section 01 61 00 - Common Product Requirements.

.6 Section 01 73 00 - Execution Requirements.

.7 Section 01 74 00 - Cleaning

.8 Section 01 78 00 - Close Out Submittals

1.2 REFERENCES

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

.1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC)

.1 CAN-ULC-S101-04, Standard Methods of fire Endurance Tests of Building Construction and Materials.

.2 CAN-ULC-S102-03, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.3 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 01 - Hazardous Materials.

.3 Samples: submit duplicate 300 x 300 mm size sample of exposed fireproofing for approval of texture and colour.

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

.1 Test Reports:

.1 Submit product data including certified copies of test reports verifying fireproofing applied to substrate as constructed on project will meet or exceed requirements of Specification.

.2 Submit test results in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics.

.3 For assemblies not tested and rated, submit proposals based on related designs using accepted fireproofing design criteria.

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

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

1.4 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer: person specializing in sprayed-on fireproofing with 5 years documented experience approved by manufacturer.

.2 Mock-ups:

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Apply fireproofing to three specific areas of surfaces needing patching of existing spray fireproofing.

.3 Mock-up will be used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.4 Locate where directed.

.5 Allow 24 hours for inspection of mock-up by Departmental Representative and Consultant before proceeding with fireproofing work.

.6 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

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 packaged materials in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.

.2 Storage and Protection:

.1 Store materials indoors in dry location.

.2 Store and protect materials from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

.3 Damaged or opened containers will be rejected.

.4 Packaging to indicate shelf-life and materials to be applied prior to expiration of shelf-life.

.5 Provide temporary enclosures to prevent spray from contaminating air beyond application area.

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

1.6 AMBIENT CONDITIONS

.1 At temperatures less than 5 degrees C, ensure that 5 degrees C air and substrate temperature is maintained during and for 24 hours after application. Ensure that natural ventilation to properly dry the fireproofing during and subsequent to its application is provided. In enclosed areas lacking openings for natural ventilation, ensure that interior air is circulated and exhausted to the outside.

.2 Maintain relative humidity within limits recommended fireproofing manufacturer.

.3 Ensure that natural ventilation to properly dry fireproofing during and subsequent to its application is provided.

.4 In enclosed areas lacking openings for natural ventilation, provide minimum of 4 air exchanges per hour by forced air circulation. To external location outside of building envelope.

Part 2 Products

2.1 MATERIALS

.1 Sprayed fireproofing: ULC certified cementitious fireproofing qualified for use in ULC Designs specified and fungus resistant for 28 days.

.2 Curing compound: type recommended by fireproofing manufacturer, qualified for use in ULC Designs specified.

.3 Sealer: type recommended by fireproofing manufacturer, qualified for use in ULC Design specified.

.1 Colour: white.

.4 Fireproofing: minimum dry density and cohesion/adhesion properties as follows:

.1 Fireproofing for structural components concealed above ceiling, or within wall, chase, or furred space: minimum applied dry density of 240 kg per cubic meter and cohesion/adhesion strength of 9.57 kPa.

.2 Fireproofing for exposed structural components, except where otherwise specified or indicated: minimum applied dry density of 350 kg per cubic meter and cohesion/adhesion strength of 20.83 kPa.

.3 Fireproofing for structural components located in mechanical rooms and storage areas: minimum applied dry density of 640 kg per cubic meter and cohesion/adhesion strength of 350 kPa.

.4 Ensure spray-applied fireproofing: does not crack, spall or delaminate under downward deflection conditions over 3 m clear span.

.5 Minimum compressive strength: 48 kPa.

.6 Spray-Applied fireproofing material: not contribute to corrosion of test panels.

.7 Dust removal: not exceed 0.25 gram per square meter.

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 Substrate: free of material, which would impair bond.

.2 Verify that painted substrates are compatible and have suitable bonding characteristics to receive fireproofing.

.3 Remove incompatible materials.

.4 Ensure that items required to penetrate fireproofing are placed before installation of fireproofing.

.5 Ensure that ducts, piping, equipment, or other items which would interfere with application of fireproofing are not positioned until fireproofing work is completed.

3.3 APPLICATION

.1 Apply bonding adhesive or primer to substrate if recommended by manufacturer.

.2 Apply fireproofing to correspond with tested assemblies, or acceptable calculation procedures to provide following fire resistance ratings.

Location	Rating
Columns	2 hrs
Floors and beams	2 hrs
Roof decks	2 hrs

.3 Apply fireproofing over spray foam insulation, building up to required thickness to cover insulation with monolithic blanket of uniform density and texture.

.4 Apply fireproofing directly to open web joists without use of expanded lath.

.5 Tamp smooth, surfaces visible in finished work.

.6 Apply curing compound to surface of cementitious fireproofing as required by manufacturer.

3.4 FIELD QUALITY CONTROL

.1 Inspection and Site Tests:

.1 Inspection and testing of fireproofing will be carried out by Testing Laboratory designated by Departmental Representative.

.2 Departmental Representative will pay costs for testing.

3.5 PATCHING

.1 Patch damage to fireproofing caused by testing or by other trades before fireproofing is concealed, or if exposed, before final inspection.

.2 Patch existing fireproofing to beams, columns and other building elements where removal of existing mechanical and electrical services have damaged existing fireproofing.

3.6 CLEANING

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

.2 Clean surfaces not indicated to receive fireproofing of sprayed material within 24 hours period after application.

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

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

1.2 DEFINITIONS

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

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

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

.4 Tightly Fitted; (ref: NBC Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of 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 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 01 - 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 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

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

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

1.4 QUALITY ASSURANCE

.1 Qualifications:

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

.2 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with contractor's representative and Departmental Representative in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

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

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

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

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

1.5 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

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

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

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

.2 Storage and Protection:

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

.2 Replace defective or damaged materials with new.

.3 Waste Management and Disposal:

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

Part 2 Products

2.1 MATERIALS

.1 Fire stopping and smoke seal systems: in accordance with CAN-ULC-S115.

.1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN-ULC-S115 and not to exceed opening sizes for which they are intended [and conforming to specified special requirements described in PART 3.

.2 Fire stop system rating: One hour.

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

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

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

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

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

.7 Fire stopping and smoke seals at openings around penetrations for pipes, electrical conduit, wiring and cable trays: pillow block 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 Non dust generation: at all locations.

.2 Movement: 15%.

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

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

.1 Ensure pipe insulation installation precedes fire stopping.

3.6 FIELD QUALITY CONTROL

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

.2 Manufacturer's Field Services:

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

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

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

3.7 CLEANING

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

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

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

3.8 SCHEDULE

.1 Fire stop and smoke seal at:

.1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.

.2 Edge of floor slabs at curtain wall and precast concrete panels.

.3 Top of fire-resistance rated masonry and gypsum board partitions.

.4 Intersection of fire-resistance rated masonry and gypsum board partitions.

.5 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.

.6 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.

.7 Openings and sleeves installed for future use through fire separations.

.8 Around mechanical and electrical assemblies penetrating fire separations.

.9 Rigid ducts: greater than 129 cm^2: 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 SECTION INCLUDES

.1 Materials, preparation and application for caulking and sealants.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.3 Section 01 45 00 - Quality Control.

.4 Section 01 61 00 - Common Product Requirements.

1.3 REFERENCES

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

.1 ASTM C919-02, Standard Practice for Use of Sealants in Acoustical Applications.

.2 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.

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

.1 Material Safety Data Sheets (MSDS).

1.4 SUBMITTALS

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

.2 Manufacturer's product to describe.

.1 Caulking compound.

.2 Primers.

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

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

.4 Submit duplicate samples of each type of material and colour.

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

.6 Submit manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.

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

1.5 QUALITY ASSURANCE/MOCK-UP

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct mock-up to show location, size, shape and depth of joints complete with back-up material, primer, caulking and sealant.

.3 Mock-up will be used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.4 Locate where directed.

.5 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with sealant work.

.6 When accepted, mock-up will demonstrate minimum standard of quality required for this Work. Approved mock-up may remain as part of finished Work.

1.6 DELIVERY, STORAGE, AND HANDLING

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

.2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.7 WASTE MANAGEMENT AND DISPOSAL

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

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

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

.4 Place materials defined as hazardous or toxic in designated containers.

.5 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.6 Unused sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.7 Divert unused joint sealing material from landfill to official hazardous material collections site approved by Departmental Representative.

.8 Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.

.9 Fold up metal banding, flatten, and place in designated area for recycling.

1.8 PROJECT CONDITIONS

.1 Environmental Limitations:

.1 Do not proceed with installation of joint sealants under following conditions:

.1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.

.2 When joint substrates are wet.

.2 Joint-Width Conditions:

.1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:

.1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.9 ENVIRONMENTAL REQUIREMENTS

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

.2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including 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 Silicones One Part.

.1 To CAN/CGSB-19.13.

.2 Mildew resistant.

.2 Acrylics One Part.

.1 To CGSB 19-GP-5M.

.3 Acrylic Latex One Part.

.1 To CAN/CGSB-19.17.

.4 Acoustical Sealant.

.1 To ASTM C919.

.5 Butyl.

.1 To CGSB 19-GP-14M.

.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/m^3 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 Seal interior perimeters of exterior openings as detailed on drawings: Sealant type: Silicone.

.2 Perimeters of interior frames, as detailed and itemized: Sealant type: Silicone.

.3 Interior masonry vertical control joints (block-to-block, block-to-concrete, and intersecting masonry walls): Sealant type: Silicone.

.4 Joints at tops of non-load bearing masonry walls at the underside of poured concrete: Sealant type: Acoustical Sealant.

.5 Perimeter of bath fixtures (e.g. sinks, tubs, urinals, stools, waterclosets, basins, vanities): Sealant type: Silicone.

.6 Exposed interior control joints in drywall: Sealant type: Acrylic.

2.4 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

.2 Primer: as recommended by manufacturer.

Part 3 Execution

3.1 PROTECTION

.1 Protect installed Work of other trades from staining or contamination.

3.2 SURFACE PREPARATION

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

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

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

.4 Ensure joint surfaces are dry and frost free.

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

3.3 PRIMING

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

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

3.4 BACKUP MATERIAL

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

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

3.5 MIXING

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

3.6 APPLICATION

.1 Sealant.

.1 Apply sealant in accordance with manufacturer's written instructions.

.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.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 Cleanup.

.1 Clean adjacent surfaces immediately and leave Work neat and clean.

.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

END OF SECTION