

Part 1 General

1.1 REFERENCES

- .1 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S604-2012, Standard for Factory-Built Type A Chimneys.
 - .2 CAN/ULC-S702-2012, Standard for Mineral Fibre Insulation for Buildings.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for blanket insulation and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Certificates:
 - .1 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .4 Test Reports:
 - .1 Submit certified test reports showing compliance with specified performance characteristics and physical properties.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return by manufacturer of padding, packaging materials, crates and pallets as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 INSULATION

- .1 Batt and blanket mineral fibre: to CAN/ULC-S702.
 - .1 Type: 1.

- .2 Thickness: as indicated.

Part 3 Execution

3.1 EXAMINATION

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

- .1 Install insulation as per manufacturer's instructions to maintain continuity of acoustic performance to building elements and spaces as indicated.
- .2 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .3 Do not compress insulation to fit into spaces.
- .4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN/ULC-S604 Type A chimneys.
- .5 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 ASTM International
 - .1 ASTM C518 - 10 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
 - .2 ASTM D1622 - 08 Standard Test Method for Apparent Density of Rigid Cellular Plastics
 - .3 ASTM E84 - 12 Standard Test Method for Surface Burning Characteristics of Building Materials
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S710.1-05: Standard for Thermal Insulation - Bead Applied One-Component Polyurethane Air Sealant Foam, Part 1: Material Specification.
 - .2 CAN/ULC-S710.2-05: Standard for Thermal Insulation - Bead Applied One-Component Polyurethane Air Sealant Foam, Part 2: Application.

1.2 DELIVERY, STORAGE AND HANDLING

- .1 Store Products in a dry and adequately ventilated area, with an ambient temperature maintained between 0 degrees C and 32 degrees C.
- .2 Keep containers tightly closed when not in use.
- .3 Protect containers from damage.
- .4 Keep Products away from direct sunlight.
- .5 Do not incinerate aerosol canisters.

1.3 ENVIRONMENTAL REQUIREMENTS

- .1 Apply foamed-in-place air barriers when ambient air temperature is greater than -3 degrees C and less than 44 degrees C.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with the Waste Management Plan as specified in Section 01 74 21, and place in designated areas for recycling.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

Part 2 Products

2.1 MATERIALS

- .1 Foamed-in-Place Sealant - General Purpose Type: semi-rigid single-component polyurethane sealant, to CAN/ULC-S710.1; and having the following properties:
 - .1 Thermal Resistance (ASTM C518): RSI 0.73 per 25 mm thickness.
 - .2 Core Density (ASTM D1622): 24.03 kg/m³.

- .3 Fire Resistance (ASTM E84): Flame spread = 15, Smoke Developed = 20.
- .4 Colour: Light Tan.
- .5 Cure Time: approximately 1 hour.
- .6 Tack-free Time: 6-7 minutes.
- .7 Applicator: Gun applied.

Part 3 Execution

3.1 INSTALLATION

- .1 Apply foamed-in-place air barrier sealants in strict accordance with manufacturer's installation guidelines.
- .2 Conform to CAN/ULC-S710.2.
- .3 Avoid overfilling restricted spaces.
- .4 Apply general purpose foamed-in-place sealant in gaps and cracks up to 75 mm in size.
- .5 Apply low pressure foamed-in-place sealant in gaps and cracks adjacent to door and window frames, up to a maximum gap width of 75 mm.

3.2 INSTALLATION/GENERAL

- .1 Where foam-in-place insulation is used to maintain continuity of thermal barrier and air barrier, around door frames and other protrusions through the exterior envelope, ensure that the foam-in-place insulation is installed on the exterior side of the air barrier membrane.

3.3 CLEANING

- .1 Clean overspray from adjacent surfaces and ensure a suitable substrate for subsequent work.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Urethane Foam Contractors Association Inc. (CUFCA)
- .2 Green Seal (GS)
 - .1 GS-11-2013, Standard for Paints and Coatings.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S101-07, Standard Methods of Fire Tests of Building Construction and Materials.
 - .2 CAN/ULC-S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .3 CAN/ULC-S705.1-01, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification. Includes Amendment 1.2.
 - .4 CAN/ULC-S705.2-05, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Application.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for polyurethane foam sprayed insulation and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures.
- .3 Test Reports:
 - .1 Submit certified test reports for insulation from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
 - .2 Submit test reports in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.
- .4 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.
- .5 Manufacturer's Reports:
 - .1 Manufacturer's Field Reports: submit to manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

1.3 QUALITY ASSURANCE

- .1 Applicators to conform to CUFCA Quality Assurance Program.
- .2 Qualifications:
 - .1 Installer: person specializing in sprayed insulation installations with documented experience and approved by manufacturer.
 - .2 Manufacturer: company with experience in producing of material used for work required for this project, with sufficient production capacity to produce and deliver required units without causing delay in work.
- .3 Mock-up:
 - .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct mock-up 10 m² minimum, of sprayed insulation including one inside corner and one outside corner, window openings.
 - .3 Mock-up may be part of finished work.
 - .4 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with sprayed insulation work.
- .4 Health and Safety Requirements: worker protection:
 - .1 Protect workers as recommended by CAN/ULC-S705.2 and manufacturer's recommendations:
 - .2 Workers must wear eye protection, gloves, protective clothing and respirators when applying foam insulation.
 - .3 Workers must not eat, drink or smoke while applying foam insulation.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return by manufacturer of padding, crates, packaging materials and pallets, as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.5 SITE CONDITIONS

- .1 Ventilate area in accordance with Section 01 51 00 - Temporary Utilities.
- .2 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and 24 hour after application to maintain non-toxic, unpolluted, safe working conditions.

- .3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.
- .4 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.
- .5 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

Part 2 Products

2.1 MATERIALS

- .1 Insulation: spray polyurethane to CAN/ULC-S705.1.
- .2 Primers: in accordance with manufacturer's recommendations for surface conditions.
 - .1 Maximum VOC limit 100 g/L to GS-11 Standard.

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 sprayed insulation application 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 APPLICATION

- .1 Apply insulation to clean surfaces in accordance with manufacturer's printed instructions and CAN/ULC-S705.2.
- .2 Use primer where recommended by manufacturer.
- .3 Apply sprayed foam insulation in thickness as indicated.

3.3 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 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.

3.4 CLEANING

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

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove insulation material spilled during installation and leave work area ready for application of wall board.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American Society of Mechanical Engineers (ASME)
 - .1 ASME B18.6.3-2011, Machine Screws, Tapping Screws, and Metallic Drive Screws (Inch Series).
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
 - .2 CAN/CGSB-93.4-92, Galvanized and Aluminum-Zinc Alloy Coated Steel Siding Soffits and Fascia, Prefinished, Residential.
 - .3 CAN/CGSB-93.5-92, Installation of Metal Residential Siding, Soffits and Fascia.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for metal siding and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.
 - .1 Indicate VOC's for caulking materials during application [and curing].
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Saskatchewan, Canada.
 - .2 Indicate dimensions, profiles, attachment methods, schedule of wall elevations, trim and closure pieces, soffits, fascia, metal furring, and related work.
- .4 Samples:
 - .1 Submit duplicate 300 x 300 mm samples of siding material, of colour and profile specified.

1.3 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.4 DELIVERY, STORAGE AND HANDLING

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

- .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 metal siding from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 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 and Disposal.

Part 2 Products

2.1 STEEL CLADDING AND COMPONENTS

- .1 Strip siding: to CAN/CGSB-93.4, Type vertical, Class plain.
 - .1 Finish coating: Class F1S.
 - .2 Colour: as selected by Departmental Representative.
 - .3 Gloss: as selected by Departmental Representative.
 - .4 Thickness: 0.61 mm base metal thickness.
 - .5 Profile: as selected by Departmental Representative, depth as indicated.

2.2 FASTENERS

- .1 Screws: ASME B18.6.3. Purpose made stainless steel.

2.3 CAULKING

- .1 Sealants: in accordance with Section 07 92 00 - Joint Sealants.

2.4 SHEATHING PAPER

- .1 Exterior wall sheathing paper: to CAN/CGSB-51.32, as indicated.

2.5 ACCESSORIES

- .1 Exposed trim: inside corners, outside corners, cap strip, drip cap, under-sill trim, starter strip and window/door trim of same material, colour and gloss as cladding, with fastener holes pre-punched.
- .1 Z-bar furring: manufacturer's standard Z-bars, minimum 1.2 mm base metal thickness or as otherwise required to withstand all superimposed loading, widths as indicated, with Z275 Zinc coating.
- .2 Angles and Clips: Manufacturer's standard clips and angles, thickness as required. All to be hot dipped galvanized after fabrication.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable 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 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.

3.3 INSTALLATION

- .1 Install cladding in accordance with CGSB 93.5, and manufacturer's written instructions.
- .2 Install one layer exterior wall sheathing paper horizontally by stapling lapping edges 150 mm.
- .3 Install continuous starter strips, inside and outside corners, edgings, soffit, drip, cap, sill and window/door opening flashings as indicated.
- .4 Install outside corners, fillers and closure strips with carefully formed and profiled work.
- .5 Install soffit and fascia cladding as indicated.
- .6 Maintain joints in exterior cladding, true to line, tight fitting, hairline joints.
- .7 Attach components in manner not restricting thermal movement.
- .8 Caulk junctions with adjoining work with sealant. Do work in accordance with Section 07 92 00 - Joint Sealants.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by preformed metal siding installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A653/A653M-07, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM B32-04, Standard Specification for Solder Metal.
 - .3 ASTM D523-89(1999), Standard Test Method for Specular Gloss.
 - .4 ASTM D822-01(2006), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .2 Canadian Roofing Contractors Association (CRCA)
 - .1 Roofing Specifications Manual 1997.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 37.5-M89, Cutback Asphalt Plastic Cement.
- .4 Canadian Standards Association (CSA International)
 - .1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt.
 - .2 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature for sheet metal flashing systems materials, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit copies WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 29.06 - Health and Safety Requirements and Section 01 35 43 - Environmental Procedures.
- .3 Shop Drawings:
 - .1 Shop drawings: submit drawings stamped and signed by professional engineer registered or licensed in Province of Saskatchewan, Canada.
- .4 Samples:
 - .1 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, finishes and colours.
- .5 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.

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

1.3 QUALITY ASSURANCE

- .1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with Departmental Representative in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart.
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 SHEET METAL MATERIALS

- .1 Zinc coated steel sheet: minimum 24 gauge thickness, commercial quality to ASTM A653/A653M, with Z275 designation zinc coating.

2.2 PREFINISHED STEEL SHEET

- .1 Prefinished steel with factory applied polyvinyl chloride.
 - .1 Class F1S.
 - .2 Colour selected by Departmental Representative from manufacturer's standard range.
 - .3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.
 - .4 Coating thickness: not less than 200 micrometres.
 - .5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D822 as follows:
 - .1 Outdoor exposure period 5000 hours.
 - .2 Humidity resistance exposure period 5000 hours.

2.3 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CAN/CGSB 37.5.

- .3 Underlay for metal flashing: No. 15 perforated asphalt felt to CSA A123.3.
- .4 Sealants: in accordance with Section 07 92 00, colour as selected by Departmental Representative.
- .5 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
- .6 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.
- .7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .8 Solder: to ASTM B32.
- .9 Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details.
- .2 Form pieces in 2400 mm maximum lengths.
 - .1 Make allowance for expansion at joints.
- .3 Hem exposed edges on underside 12 mm.
 - .1 Mitre and seal corners with sealant.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.5 METAL FLASHINGS

- .1 Form flashings, copings and fascias to profiles indicated of .0276 mm thick prefinished steel.

2.6 PANS

- .1 Form pans to receive roofing plastic from prefinished .0276 mm thick sheet metal with minimum 75 mm upstand above finished roof and 100 mm continuous flanges with no open corners.
 - .1 Solder joints.
 - .2 Make pans minimum 50 mm wider than member passing through roof membrane.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install sheet metal work in accordance with CRCA FL series details.
- .2 Use concealed fastenings except where approved before installation.
- .3 Provide underlay under sheet metal.
 - .1 Secure in place and lap joints 100 mm.
- .4 Lock end joints and caulk with sealant.
- .5 Install pans, where shown around items projecting through roof membrane.

3.3 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Leave work areas clean, free from grease, finger marks and stains.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Intumescent fire protection material.
- .2 Topcoat protective decorative finish.

1.2 REFERENCES

- .1 ULC: List of Equipment and Materials (current edition).
- .2 CAN/ULC-S101-07, Fire Endurance Tests of Building Construction and Materials.
- .3 CAN/ULC-S102-07, Surface Burning Characteristics of Building Materials and Assemblies.

1.3 SYSTEM DESCRIPTION

- .1 Intumescent paint fireproofing system to provide a fire resistance rating to steel structure as indicated on the Drawings to the satisfaction of the Authority Having Jurisdiction.
- .2 Selected product to reference CAN/ULC-S101 and CAN/ULC-S102.

1.4 SUBMITTALS

- .1 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures.

1.5 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit product data indicating product characteristics, performance and limitation criteria.
- .3 Submit copies test reports of fireproofing application to substrate materials required.
- .4 Submit manufacturer's installation instructions to requirements Section 01 33 00.

1.6 MOCK-UP

- .1 Apply coating of each finish to one column for review from the Contractor.
- .2 Allow 24 h for inspection of mock-up by Contractor before proceeding with coating work.
- .3 Refer to Section 01 45 00 for other requirements regarding mock-up.

1.7 QUALITY ASSURANCE

- .1 Applicator: use only manufacturer's approved, licensed and supervised applicator, with a minimum 5 years documented experience, employing skilled labourers.

- .2 Product: Manufactured under ULC follow up program. Provide each container or package bearing ULC label.

1.8 REGULATORY REQUIREMENTS

- .1 Conform to National Building Code for fire resistance rating as noted on the drawings.
- .2 Submit certification of acceptability of fireproofing materials to the Authority Having Jurisdiction and to the Contractor.

1.9 PRODUCT HANDLING

- .1 Deliver and store materials undamaged, in original containers, with manufacturer's seals and labels intact.
- .2 Store materials in a dry location, off ground, protected from the elements, maintain a minimum temperature of 5oC.
- .3 Discard materials which have come into contact with contaminants.

1.10 ENVIRONMENTAL CONDITIONS

- .1 Do not apply sprayed intumescent paint when temperature of substrate and surrounding air is below 5oC.
- .2 Maintain a minimum surface temperature of 5oC 24 hours before, during and after application or until cured, adequate controlled ventilation bright, uniform lighting and clean surface.
- .3 Provide adequate ventilation or isolation measures to protect against toxic fumes during application and for a minimum of 24 hours after application.
- .4 Relative humidity must not exceed 75% throughout the total period of application and drying for the intumescent paint nor 65% throughout the application and drying of the protection decorative finish coat.
- .5 Ensure surfaces to receive coating are clean, sound, non-dusting, free from grease, oil, tar, asphaltic materials, stains or efflorescence.
- .6 Report all unsatisfactory surfaces and conditions in writing to the Contractor and Sub-Contractor prior to start of work.
- .7 Starting work of this section implies acceptance of conditions.

1.11 PROTECTION

- .1 Provide adequate protection of materials and work of this section from damage by weather and other trades. Protect work of other trades from damage resulting from work of this section. Make good all damage to the satisfaction of the Contractor at no extra cost to the Contractor.
- .2 Mask all surrounding surfaces to provide neat, clean, true juncture lines with no spray on adjacent surfaces. Cover all adjacent surfaces as required.

1.12 MAINTENANCE DATA

- .1 Provide maintenance data for coatings for incorporation into manual specified in Section 01 78 00.

1.13 SEQUENCING AND SCHEDULING

- .1 Sequence work in conjunction with the Project Schedule and with the Sub-Contractor.

Part 2 Products

2.1 MATERIALS

- .1 Intumescent Paint: Water borne type coating listed by Underwriters Laboratories and bearing ULC label on each container. One of the following:
 - .1 A/D Firefilm as manufactured by A/D Fire Protection Systems Inc., or
 - .2 Spray Film as manufactured by Cafco
 - .3 Nullifire S607 as manufactured by Carboline

2.2 MIXING

- .1 Thoroughly mix coatings according to manufacturer's instructions.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine surfaces to receive work of this section and report defects which may affect the Work of this section.
- .2 Confirm compatibility of surfaces to receive fireproofing materials.
- .3 Beginning of work implies acceptance of existing conditions.

3.2 PREPARATION OF SURFACES

- .1 Clean substrate free of dust, dirt, grease or other foreign matter which would impair bond of intumescent paint.
- .2 Mask surrounding surfaces to provide neat, clean juncture lines.
- .3 Protect adjacent surfaces and equipment from damage by overspray.
- .4 Work penetrating substrate to be completed before installing coating.

3.3 APPLICATION

- .1 Apply intumescent paint in accordance with manufacturer's printed specifications and recommendations, using equipment as recommended by the manufacturer.

- .2 Apply intumescent paint in sufficient thickness to achieve rating indicated with as many passes as necessary to cover substrate.
- .3 Apply intumescent paint to produce a uniformly textured surface which is as smooth as possible, uniform in sheen, colour and finish, free from marks, dirt, particles, runs, crawls, curling, holes, air pockets and other defects.
- .4 Apply intumescent paint and protective decorative finish by spray, brush or roller.
- .5 Apply protective decorative finish in accordance with manufacturer's recommendations.

3.4 PATCHING

- .1 Patch and repair intumescent paint surfaces damaged by this or any other trade. Cost of repairs to be borne by trade responsible for damage, as assessed by the Sub-Contractor.

3.5 CLEAN-UP

- .1 Promptly as work proceeds and on completion, clean up and remove from premises all masking tape, rubbish and surplus materials resulting from work of this Section.
- .2 Clean all surface splattered or marked with droppings during application of intumescent paint. Leave all surfaces clean and free from marks; all to the satisfaction of the Contractor.

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 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit copies of WHMIS MSDS - Material Safety Data Sheets 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 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.

1.4 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: company specializing in fire stopping installations with 5 years of documented experience.
 - .2 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with Departmental Representative in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.5 DELIVERY, STORAGE AND HANDLING

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

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 PREPARATION

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
 - .1 Ensure that substrates and surfaces are clean, dry and frost free.
- .2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.
- .4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.3 INSTALLATION

- .1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.

- .2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .4 Tool or trowel exposed surfaces to neat finish.
- .5 Remove excess compound promptly as work progresses and upon completion.

3.4 SEQUENCES OF OPERATION

- .1 Proceed with installation only when submittals have been reviewed by Departmental Representative.
- .2 Install floor fire stopping before interior partition erections.
- .3 Metal deck bonding: fire stopping to precede spray applied fireproofing to ensure required bonding.
- .4 Mechanical pipe insulation: certified fire stop system component.
 - .1 Ensure pipe insulation installation precedes fire stopping.

3.5 FIELD QUALITY CONTROL

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

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

3.7 SCHEDULE

- .1 Fire stop and smoke seal at:
 - .1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.
 - .2 Edge of floor slabs at curtain wall and precast concrete panels.
 - .3 Top of fire-resistance rated masonry and gypsum board partitions.
 - .4 Intersection of fire-resistance rated masonry and gypsum board partitions.
 - .5 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
 - .6 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
 - .7 Openings and sleeves installed for future use through fire separations.
 - .8 Around mechanical and electrical assemblies penetrating fire separations.

- .9 Rigid ducts: greater than 129 cm² : fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 ASTM International
 - .1 ASTM C919-08, Standard Practice for Use of Sealants in Acoustical Applications.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
 - .2 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
 - .3 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for joint sealants and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Manufacturer's product to describe:
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
 - .3 Submit copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and Section 01 35 43 - Environmental Procedures.
- .3 Manufacturer's Instructions:
 - .1 Submit instructions to include installation instructions for each product used.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect joint sealants from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 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 and Disposal.

1.5 SITE CONDITIONS

- .1 Ambient Conditions:
 - .1 Proceed with installation of joint sealants only when:
 - .1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 degrees C.
 - .2 Joint substrates are dry.
 - .3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .2 Joint-Width Conditions:
 - .1 Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.
- .3 Joint-Substrate Conditions:
 - .1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.

1.6 ENVIRONMENTAL REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Health Canada.
- .2 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 Sealant Type 1: one component silicone sealant to CAN/CGSB-19.13, type 2, Class 25, shore A hardness of 25 - 30, non sag, neutral curing.
- .2 Sealant Type 2: one component paintable acrylic latex, to CAN/CGSB-19.17.
- .3 Sealant Type 3 (horizontal joint sealant): multi component, chemical curing, self leveling, polyurethane sealant, conforming to CAN/CGSB-19.24, type 1, Class B, and U.S Federal Specification TT-S-00227E, and ASTM C920, type M, Grade P, Class 25.
- .4 Sealant Type 4: one component, mildew resistant, silicone rubber sealant, conforming to ASTM C920.
- .5 Acoustical sealant: to ASTM C919.
- .6 Preformed compressible and non-compressible back-up materials:
 - .1 Polyethylene, urethane, neoprene or vinyl foam:
 - .1 Extruded closed cell foam backer rod.
 - .2 Size: oversize 30 to 50 %.
 - .2 Bond breaker tape:
 - .1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT SELECTION

- .1 Perimeters of exterior openings where frames meet exterior facade of building (ie. Metal Siding, Parging, around exterior windows and doors or other exterior materials) and to all other exterior joints including around new openings or penetrations through the existing exterior envelope: sealant Type 1.
- .2 Seal interior perimeters of exterior openings as detailed on drawings: sealant Type 2.
- .3 Interior control and expansion joints in floor surfaces: sealant Type 3.
- .4 Perimeters of interior frames, as detailed and itemized: sealant Type 2.
- .5 Between different materials at interior locations, such as between gypsum board and concrete or concrete block: sealant Type 2.
- .6 Sealant to wet areas: sealant Type 4.

2.4 JOINT CLEANER

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

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for joint sealants installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied 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.

3.3 PRIMING

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

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

3.6 APPLICATION

- .1 Sealant:
 - .1 Apply sealant in accordance with manufacturer's written instructions.
 - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .3 Apply sealant in continuous beads.
 - .4 Apply sealant using gun with proper size nozzle.
 - .5 Use sufficient pressure to fill voids and joints solid.
 - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing:
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.

3.7 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Clean adjacent surfaces immediately.
 - .3 Remove excess and droppings, using recommended cleaners as work progresses.
 - .4 Remove masking tape after initial set of sealant.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.8 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by joint sealants installation.

END OF SECTION