

BLANKET INSULATION**Part 1 General****1.1 REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C553-11. Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .2 ASTM C1320-10. Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.

1.2 SUBMITTALS

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

1.3 QUALITY ASSURANCE

- .1 Submit certified test reports showing compliance with specified performance characteristics and physical properties. Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 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 and recycle waste materials 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 and corrugated cardboard packaging material in appropriate on-site containers for recycling in accordance with Waste Management Plan.

Part 2 Products**2.1 INSULATION**

- .1 Semi rigid batt. Mineral fibre: to ASTM C553. Manufactured from basalt rock and slag.
 - .1 Type: 1. Flexible, industrial, blanket. Semi - rigid batt mineral wool insulation. Water repellent, fire resistant and sound absorbent.
 - .2 RSI: 0.76 m²K/W per 25 mm thickness.
 - .3 Density: 96 kg/cubic meter.

BLANKET INSULATION

- .4 Thickness: full thickness to completely fill each stud cavity for each location as indicated.

2.2 ACCESSORIES

- .1 Insulation clips: impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.
- .2 Retention wires: rigid wires placed horizontally specifically intended by the manufacturer to suit stud spacing to hold blanket insulation in place.

Part 3 Execution**3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 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. Install in accordance with ASTM C1320.
- .2 Retain insulation in position within stud cavity insulation clips installed as recommended by manufacturer.
- .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 insulated chimneys and vents.
- .6 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

END OF SECTION

PART 1 General**1.1 REFERENCES**

- .1 Canadian Urethane Foam Contractors Association Inc. (CUFCA)
- .2 Underwriters' Laboratories of Canada (ULC).
 - .1 CAN-ULC-S101-07-EN. Standard Methods of Fire Endurance Tests of Building Construction and Materials.
 - .2 CAN-ULC-S102-10-EN. Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .3 CAN/ULC-S705.1-01-AM3-EN. Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification.
 - .4 CAN/ULC-S705.2-05. Standard for Thermal Insulation Spray Applied Rigid Polyurethane Foam, Medium Density - Application.

1.2 TEST REPORTS

- .1 Provide the CCMC Evaluation Report and the manufacturer's documentation confirming material has been evaluated and conforms to the requirements of CAN/ULC-S705.1.
- .2 Submit proof of License of the Contractor by CUFCA (Canadian Urethane Foam Contractors Association Inc.) prior to commencing the work.
- .3 Submit test reports, verifying qualities of insulation meet or exceed requirements of this specification, in accordance with Section 01 45 00 - Quality Control.
- .4 Submit test reports in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.
- .5 Submit manufacturer's installation instructions. Indicate preparation, installation requirements and techniques, product storage and handling criteria, and limitations of the material.

1.3 QUALITY ASSURANCE

- .1 Contractor performing work to be licensed under the CUFCA SPF Quality Assurance Program. Provide only materials that conform to the requirements of CAN/ULC-S705.1.
- .2 Applicators performing work under this section to be licensed under the CUFCA SPF Quality Assurance Program. Applicators to be trained by CUFCA and certified by Professional Skills Development Institute in accordance with the training requirements outlined in CAN/ULC-S705.2.

1.4 SAFETY REQUIREMENTS

- .1 Protect workers as recommended by CAN/ULC-S705.2 and manufacturer's recommendations.

FOAMED-IN-PLACE INSULATION

- .1 Workers must wear gloves, respirators, dust masks, long sleeved clothing, eye protection and protective clothing when applying foam insulation.
- .2 Workers must not eat, drink or smoke while applying foam insulation.

1.5 PROTECTION

- .1 Adequately ventilate area as per manufacturers written recommendations.
- .2 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.
- .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.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction / Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Fold up metal banding, flatten and place in designated area for recycling.
- .5 Dispose of waste foam daily in location designated by Departmental Representative and decontaminate empty drums in accordance with foam manufacturer's instructions.
- .6 Divert metal drums from landfill to metal recycling facility as approved by Departmental Representative.

1.7 ENVIRONMENTAL REQUIREMENTS

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

PART 2 Products**2.1 MATERIALS**

- .1 Insulation: multi-component, Type 2, closed cell, spray applied rigid polyurethane foam to CAN/ULC-S705.1. Medium density. Containing soybean oil and recycled plastics, Zero VOC. Zero ozone depletion blowing agent.
 - .1 Core Density: 34-37 kg/m3.

FOAMED-IN-PLACE INSULATION

- .2 Compressive strength: 195 kPa.
- .3 Tensile Strength: 355 kPa.
- .4 Water Absorption: 0.80 % by volume.
- .5 Dimensional Stability: aged 28 days at 70°C at 97±3% RH: 9.8 % volume change max.
- .6 Design RSI value: minimum RSI 1.15 per 25 mm.
- .7 Water Vapor Permeance: 58 ng/Pa x second x square meter.
- .8 Specific Gravity: 1.20 - 1.24.
- .9 Maximum thickness per pass: 50 mm.
- .10 Final Thickness: as indicated on drawings.
- .2 Primers: in accordance with manufacturer's recommendations for surface conditions.
- .3 Accessories: air / vapour barrier membranes, mastics, sealants, liquids complete with required primers to complete the transitions for the air barrier system.

2.2 EQUIPMENT

- .1 Spray equipment shall be in accordance with CAN/ULC-S705.2 and the equipment manufacturer's recommendations for specific type of application.
- .2 Record equipment settings on the Daily Work Record as required by CAN/ULC-S705.2.
- .3 Each proportioner unit to supply only one spray gun.

PART 3 Execution**3.1 EXAMINATION**

- .1 Verify that surfaces and conditions are suitable to accept work as outlined in this section.
- .2 Prior to commencement of work report in writing to the Departmental Representative any defects in surfaces or conditions that may adversely affect the performance of products installed under this section.
- .3 Commencement of work outlined in this section shall be deemed as acceptance of existing work and conditions.

3.2 PROTECTION

- .1 Mask and cover adjacent areas to protect from over spray.
- .2 Ensure any required foam stop or back up material are in place to prevent over spray and achieve complete seal.
- .3 Seal off existing ventilation equipment. Install temporary ducting and fans to ensure exhaust fumes. Provide for make-up air.

FOAMED-IN-PLACE INSULATION

- .4 Erect barriers, isolate area and post warning signs to advise non-protected personnel to avoid the spray area.

3.3 SURFACE PREPARATION

- .1 Surfaces to receive foam insulation shall be clean, dry and properly fastened to ensure adhesion of the foam to the substrate.
- .2 Ensure that all work by other trades that may penetrate through the thermal insulation is in place and complete.
- .3 Ensure that surface preparation and any primers required conform to the manufacturer's instructions.

3.4 APPLICATION

- .1 Clean areas to receive insulation and apply primer. Apply primer in accordance with manufacturer's instructions.
- .2 Apply foam insulation to primed surfaces in accordance with CAN/ULC-S705.2 and manufacturer's printed instructions.
- .3 Spray apply foam insulation in thickness as indicated in the drawings.
- .4 Spray-application of foam shall be performed in accordance with CAN/ULC-S705.2 and the manufacturer's instructions.
- .5 Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer and CAN/ULC-S705.2.
- .6 Apply in consecutive passes as recommended by manufacturer to thickness as indicated on drawings. Passes shall be not less than 15 mm and not greater than 50 mm.
- .7 Do not install spray foam within 75mm of heat emitting devices such as light fixtures and chimneys.
- .8 Finished surface of foam insulation to be free of voids and imbedded foreign objects.
- .9 Remove masking materials and over spray from adjacent areas immediately after foam surface has hardened. Ensure cleaning methods do not damage work performed by other sections.
- .10 Trim, as required, any excess thickness that would interfere with the application of cladding system by other trades.

3.5 TOLERANCES

- .1 Maximum variation from indicated thickness: minus (-) 5mm; plus (+) 5mm.

3.6 PROTECTION

- .1 Protect the spray foam from ultraviolet as per manufacturer's requirements.

FOAMED-IN-PLACE INSULATION

- .2 Cover the spray foam with an appropriate thermal barrier as detailed.

END OF SECTION

VAPOUR BARRIERS**Part 1 General****1.1 REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM E1745-11. Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-51.34-M86(1988). Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.

1.2 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit manufacturer's printed product literature, specifications and datasheet. Include product characteristics, performance criteria and limitations.
- .3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).
- .4 Provide certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5 Submit manufacturer's installation instructions.
- .6 Submit proof of manufacturer's CCMC Listing and listing number to Departmental Representative.

1.3 MOCK-UPS

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control. Locate where directed by Departmental Representative.
- .2 Construct mock-up of sheet vapour barrier installation including one lap joint, one inside corner and at one electrical box. When approved, Mock-up may be part of finished work.
- .3 Mock-up will be used to judge workmanship, substrate preparation, and material application. When accepted, mock-up will demonstrate minimum standard of quality required for this work.
- .4 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with vapour barrier work.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with the Waste Reduction Workplan specified in Section 01 74 21 - Construction / Demolition Waste Management and Disposal.

VAPOUR BARRIERS

- .2 Place used hazardous sealant tubes and adhesive containers in areas designated for hazardous materials. Place materials defined as hazardous or toxic waste in designated containers.
- .3 Close and seal tightly, all partly used sealant and adhesive containers and store protected in well ventilated, fire-safe area at moderate temperature. Ensure emptied containers are sealed and stored safely for disposal away from children.

Part 2 Products**2.1 SHEET VAPOUR BARRIER**

- .1 In wall assemblies, polyethylene film: to CAN/CGSB-51.34, 0.15 mm thick.
- .2 Under new interior slabs, heavy duty polyolefin based film: to meet or exceed ASTM E1745 Class A, B & C, 0.381 mm thick.

2.2 ACCESSORIES

- .1 Joint sealing tape: air resistant adhesive tape. Type recommended by vapour barrier manufacturer. Minimum 50 mm wide. Bright red.
- .2 Sealant: acoustic sealant as specified in Section 07 92 00 - Joint Sealants.

Part 3 Execution**3.1 INSTALLATION**

- .1 Ensure services are installed and inspected prior to installation of vapour barrier.
- .2 Install sheet vapour barrier on warm side of exterior walls and below concrete floor assemblies to form continuous barrier.
- .3 Use sheets of largest practical size to minimize joints.
- .4 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.
- .5 Cut sheet vapour barrier to form openings. Ensure material is lapped and sealed to frame.
- .6 Install vapour barrier on prepared bed without wrinkles or puckers. Lap joints minimum 150 mm and seal joints with tape. Install prefabricated boots at all penetrations through slab and seal as recommended by manufacturer.

3.2 PERIMETER SEALS

- .1 Seal perimeter of sheet vapour barrier on walls as follows:
 - .1 Apply continuous bead of sealant to substrate at perimeter of sheets.
 - .2 Lap sheet over sealant and press into sealant bead.

VAPOUR BARRIERS

- .3 Install self tapping, flat pan head steel screws with integral washers into steel studs.
- .4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.3 LAP JOINT SEALS

- .1 Seal lap joints of sheet vapour barrier on walls as follows:
 - .1 Attach first sheet to substrate.
 - .2 Apply continuous bead of sealant over solid backing at joint.
 - .3 Lap adjoining sheet minimum 150 mm and press into sealant bead.
 - .4 Install self tapping, flat pan head steel screws with integral washers through lapped sheets at sealant bead into steel studs.
 - .5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.4 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning. Upon completion and verification of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 07 92 00 - Joint Sealants.

1.2 REFERENCES

- .1 American Society of Mechanical Engineers (ASME).
 - .1 ASME B18.6.3-2010. Machine Screws, Tapping Screws, and Metallic Drive Screws (Inch Series).
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A792/A792M-10. Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - .2 ASTM D523-08. Standard Test Method for Specular Gloss.
 - .3 ASTM D822-01(2006). Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .3 Canadian Roofing Contractors Association (CRCA).
 - .1 Roofing Specifications Manual 2012.
- .4 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-37.5-M89. Cutback Asphalt Plastic Cement.
 - .2 CAN/CGSB-51.32-M77. Sheathing, Membrane, Breather Type.
- .5 Canadian Standards Association (CSA International).
 - .1 CSA-A123.3-05 (R2010). Asphalt Saturated Organic Roofing Felt.

1.3 SAMPLES

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, colour and finish.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction / Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene and 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.

SHEET METAL FLASHING AND TRIM

- .5 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .6 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
- .7 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products**2.1 SHEET METAL MATERIALS**

- .1 Aluminum-zinc alloy-coated steel to ASTM A792. Commercial Steel, Special Forming. SS, Grade 33. Coating Designation AZM 180. Factory finish. Minimum thickness 0.61 mm or as indicated in the drawings.

2.2 PREFINISHED STEEL SHEET

- .1 Prefinished steel with factory applied polyvinylidene fluoride. Series 10 000. Minimum thickness 0.61 mm or as indicated in the drawings.
 - .1 Class F1S or F2S.
 - .2 Colour selected by Departmental Representative from manufacturer's complete and extended range of available colours.
 - .3 Specular gloss: 30 units +/- in accordance with ASTM D523.
 - .4 Coating thickness: not less than 22 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 2500 hours.
 - .2 Humidity resistance exposure period 5000 hours.

2.3 ACCESSORIES

- .1 Plastic cement: to CAN/CGSB-37.5.
- .2 Underlay for metal flashing: dry sheathing to CAN/CGSB-51.32 or No. 15 perforated asphalt felt to CSA-A123.3.
- .3 Sealants: as specified in Section 07 92 00 - Joint Sealants.
- .4 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
- .5 Fasteners: self drilling cap screws to ANSI B18.6.3. Purpose made cadmium plated steel complete with Galvalume caps or prefinished nylon caps to match cladding and neoprene washers. Suitable length and diameter as required to penetrate minimum 12 mm into framing.
- .6 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 and as detailed.
- .2 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.
- .3 Hem exposed edges on underside 12 mm. 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.

2.5 METAL FLASHINGS

- .1 Form flashings, copings and fascias to profiles indicated of 0.61 mm thick prefinished steel.

2.6 REGLETS AND CAP FLASHINGS

- .1 Form recessed reglets, surface mounted reglets, and metal cap flashing of 0.61 mm thick prefinished sheet metal in accordance with CRCA FL series details. Provide slotted fixing holes and steel/plastic washer fasteners. Cover face and ends with plastic tape.

2.7 TRIMS

- .1 Provide custom break formed trims to ensure that raw edges of sheet metal are not left exposed.
- .2 Sizes and profiles to suit unless otherwise detailed or indicated.

Part 3 Execution**3.1 INSTALLATION**

- .1 Install new sheet metal work in accordance with CRCA FL series details and as detailed.
- .2 Use concealed fastenings except where approved before installation.
- .3 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.
- .4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock forming tight fit over hook strips or as detailed.
- .5 Lock end joints and caulk with sealant.
- .6 Install surface mounted reglets true and level, and caulk top of reglet with sealant.
- .7 Insert metal flashing into reglets, under cap flashing to form weather tight junction.

SHEET METAL FLASHING AND TRIM

- .8 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25 mm. Lead wedge flashing securely into joint.
- .9 Caulk flashing at reglet cap flashing with sealant.

END OF SECTION

FIRESTOPPING**Part 1 General****1.1 REFERENCES**

- .1 Underwriter's Laboratories of Canada (ULC).
 - .1 CAN/ULC-S115-11-EN. Standard Method of Fire-Tests of Firestop Systems.

1.2 SYSTEM DESCRIPTION

- .1 Fire stopping and smoke seals within Mechanical assemblies (i.e inside ducts, dampers) and Electrical assemblies (i.e. inside cable trays) are specified in Mechanical and Electrical portions of the Specifications respectively.

1.3 SUBMITTALS

- .1 Provide Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 300 x 300 mm samples showing actual firestop material proposed for project.
- .3 Submit Shop Drawings. Submit shop drawings to show proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect actual job conditions.
- .4 Submit manufacturer's product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site. Include manufacturer's printed instructions for installation.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction / Demolition Waste Management and Disposal.
- .2 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

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 an effective barrier against flame, smoke and gases in compliance with requirements of ULC-S115 and not to exceed opening sizes for which they are intended and conforming to special requirements specified in 3.5.
 - .2 Firestop system rating: to match fire resistance rating of wall and floor assembly as indicated in the drawings.

FIRESTOPPING**Page 2**

- .2 Service penetration assemblies: certified by ULC in accordance with CAN/ULC-S115 and listed in ULC Guide No.40 U19.
- .3 Service penetration firestop components: certified by ULC in accordance with ULC-S115 and listed in ULC Guide No.40 U19.13 and ULC Guide No.40 U19.15 under the Label Service of ULC.
- .4 Fire-resistance rating of installed fire stopping assembly in accordance with National Building Code (NBC) 2010.
- .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.
- .11 Firestop sealants: non-sagging, primerless, single component, self-leveling silicone sealant.
- .12 Firestop insulation: pre-formed, semi-rigid, non-combustible mineral wool, precut into 1220 mm lengths to required depth and width.
- .13 Junction box/outlet sealing putty: intumescent putty, preformed in pads.
- .14 Gypsum Board: as specified in Section 09 21 16 - Gypsum Board Assemblies.
- .15 High density mineral fiber semi-rigid insulation to suit listed ULC details.

Part 3 Execution**3.1 PREPARATION**

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are clean, dry and frost free.
- .2 Prepare all existing openings in walls of existing electrical and mechanical rooms to receive firestopping. For large openings and penetrations, install steel stud framing, batt insulation and 15.9 mm Type X GWB to both sides of walls, prior to firestopping remainder of opening.

FIRESTOPPING

- .3 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .4 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.
- .5 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.2 INSTALLATION

- .1 Install fire stopping and smoke seal material and components in accordance with ULC certification and manufacturer's instructions.
- .2 Install around pipe, ductwork, cables, and other objects penetrating fire separations to provide fire resistance not less than the fire resistance rating of surrounding floor, ceiling and wall assembly.
- .3 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.
- .4 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .5 Tool or trowel exposed surfaces to a neat finish.
- .6 Remove excess compound promptly as work progresses and upon completion.
- .7 Install firestop insulation as required and where indicated to form complete firestop and smoke seal. Install as backup material where required to areas receiving firestop sealant.
- .8 Install firestop sealant to areas indicated, ensure full depth of joint filled with material, remove excess immediately.
- .9 Seal around electrical boxes and outlets with sealing putty in accordance with manufacturer's instructions.

3.3 INSPECTION

- .1 Notify Departmental Representative when ready for inspection and prior to concealing or enclosing firestopping materials and service penetration assemblies.

3.4 SCHEDULE

- .1 Firestop and smoke seal at:
 - .1 Penetrations through fire-resistance rated gypsum board partitions and walls.
 - .2 Top of fire-resistance rated gypsum board partitions.
 - .3 Intersection of fire-resistance rated gypsum board partitions.
 - .4 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.

FIRESTOPPING

- .5 Openings and sleeves installed for future use through fire separations.
- .6 Around mechanical and electrical assemblies penetrating fire separations.
- .7 Rigid ducts: greater than 129 cm²: Follow fire damper manufacturers written instructions.

3.5 CLEAN UP

- .1 Remove excess materials and debris and clean adjacent surfaces immediately after application.
- .2 Remove temporary dams after initial set of fire stopping and smoke seal materials.

END OF SECTION

PART 1 General**1.1 REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C919-12. 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-19.24-M90. Multi-component, Chemical Curing Sealing Compound.

1.2 SUBMITTALS

- .1 Submit product data, samples and Installation Instructions in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit manufacturer's Product Data Sheets to describe.
 - .1 Each type of sealing compound specified.
 - .2 Primers.
 - .3 Compatibility when different sealants are in contact with each other.
- .3 Submit duplicate samples of each type of material and colour. Cured samples of exposed sealants for each colour where required to match adjacent material.
- .4 Submit complete installation instructions for each product specified. Indicate special handling criteria, surface preparation procedures, application sequence and cleaning procedures.

1.3 QUALITY ASSURANCE/MOCK-UP

- .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 Locate where directed by Departmental Representative. 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 to judge workmanship, substrate preparation, operation of equipment and material application.
- .4 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with sealant work.
- .5 When accepted, mock-up will demonstrate minimum standard of quality required for this Work. Approved mock-up may remain as part of finished Work.

JOINT SEALANTS**1.4 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.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and 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 and 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. Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.
- .5 Handle and dispose of hazardous materials in accordance with appropriate Federal, Provincial and Municipal regulations.
- .6 Fold up metal banding, flatten, and place in designated area for recycling.

1.6 PROJECT CONDITIONS

- .1 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use. 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 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- .3 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.7 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.

JOINT SEALANTS

- .2 Departmental Representative will arrange for ventilation system to be operated on maximum outdoor air and exhaust during installation of caulking and sealants. Ventilate area of work as approved 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 offgas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize offgas time.
- .3 Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

- .1 Polysulfide Two Part: Self-Levelling to CAN/CGSB-19.24, Type 1, Class B. Colour to match adjacent materials.
- .2 Polysulfide Two Part: Non-Sag to CAN/CGSB-19.24, Type 2, Class B. Colour to match adjacent materials.
- .3 Silicones One Part: to CAN/CGSB-19.13. Mildew resistant. Colour to match adjacent materials.
- .4 Acoustical Sealant: to ASTM C919.
- .5 Preformed Compressible and Non-Compressible back-up materials.
 - .1 Polyethylene, Urethane, Neoprene or Vinyl Foam. Extruded closed cell foam backer rod. Size: oversize 30 to 50 %.
 - .2 High Density Foam: extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m³ density, or neoprene foam backer, size as recommended by manufacturer.
- .6 Bond Breaker Tape: polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT SELECTION

- .1 Exterior joints:
 - .1 Perimeters of exterior openings where frames meet exterior facade of building (i.e. brick, block, precast masonry): Sealant type: Polysulfide two part. Non sag.
 - .2 Expansion and control joints in exterior walls: Sealant type: Polysulfide two part. Non sag.

JOINT SEALANTS

- .3 Coping joints and coping-to facade joints: Sealant type: Polysulfide two part. Non sag.
- .4 Horizontal surface joints): Sealant type: Polysulfide two part. Self levelling.
- .5 Horizontal wearing surfaces: Sealant type: Polysulfide two part. Self levelling.
- .6 Joints in roofing: Polysulfide two part. Non sag.
- .2 Interior joints:
 - .1 Perimeters of openings in exterior walls: Sealant type: Polysulfide two part. Non sag.
 - .2 Expansion and control joints in exterior walls: Sealant type: Polysulfide two part. Non sag.
 - .3 Expansion and control joints in unit masonry walls: Sealant type: Polysulfide two part. Non sag.
 - .4 Expansion and control joints in floors: Sealant type: Polysulfide two part. Self levelling.
 - .5 Perimeters of interior door and window frames: Sealant type: Polysulfide two part. Non sag.
 - .6 Joints between intersecting masonry walls): Sealant type: Polysulfide two part. Non sag.
 - .7 Joints at top and bottom of non-load bearing walls at the underside of roof deck: Sealant type: Acoustical sealant.
 - .8 Perimeter of bath fixtures (e.g. sinks, urinals, water closets, basins, vanities): Sealant type: Silicone one part. mildew resistant.
 - .9 Counter top junctions with walls: Silicone one part, mildew resistant.
 - .10 Expansion and control joints in drywall: Sealant type: Silicone one part.
 - .11 Joints and junctions of Air Barrier Membrane: Acoustical sealant.
 - .12 Joints and junctions in Vapour Barrier Membrane: Acoustical sealant.
 - .13 Joints at perimeter of electrical junction boxes in exterior walls: Acoustical sealant.

2.4 CLEANERS AND PRIMERS

- .1 Cleaner: non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.
- .2 Primer: as recommended by manufacturer for specific sealant specified.

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.

JOINT 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.

JOINT SEALANTS

- .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