

PART 1 - GENERAL

1.1 REFERENCES

- .1 ASTM International
 - .1 ASTM C612-14, Standard Specification for Mineral Fibre Block and Board Thermal Insulation.
 - .2 ASTM E96/E96M-13, Standard Test Methods for Water Vapour Transmission of Materials.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 71-GP-24M-AMEND-77(R1983), Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
 - .2 CAN/ULC-S702-2012, Standard for Mineral Fibre Insulation for Buildings.
 - .3 CAN/ULC-S704-11, Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for board insulation and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS. Indicate VOC's during application and curing.
- .2 Samples:
 - .1 Submit 300 x 300mm sample of board insulation.
- .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.
- .5 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground indoors and in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect specified materials from nicks, scratches, and blemishes.

- .3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 INSULATION

- .1 Extruded polystyrene: to CAN/ULC-S701.
 - .1 Type: 4, compressive strength 210 kPa.
 - .2 Thickness: 75mm or as indicated.
 - .3 Size: 600 x 1200mm.
 - .4 Edges: ship lap.
 - .5 Min. RSI = 088/25.4mm
- .2 Cavity Wall Semi-Rigid Mineral Fibre Insulation to CAN/ULC S708.
 - .1 Type 2, Class 4.
 - .2 Density: 64kg/m².
 - .3 Min. RSI = 0.75/25.4mm, Flame spread max. 25 to ULC – S102M.
- .3 Expanding Foam Insulation:
 - .1 Two component polyurethane to CAN/ULC – S711.1, low expansion, non-shrinking.
 - .2 Primers in accordance with manufacturer's recommendations for surface conditions.

2.2 ADHESIVE

- .1 Adhesive (for polystyrene): to CGSB 71-GP-24M.
 - .1 Permanently flexible, synthetic rubber base.
 - .2 Physical properties:
 - .1 Solids: 73% by weight.
 - .2 Density: 1.2 kg/ litre.
 - .3 Dry time: initial 4hrs/ set through 48hrs.
 - .4 Application temperature: -12°C.
 - .5 Long term flexibility: to CGSB 71-GP-24M, no fracturing.
 - .6 Permeance: ASTM 96 for 3mm net film: 1.7 ng/Pa m².5.

2.3 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 Mechanical Fasteners to secure rigid polystyrene to concrete:
 - .1 Plastic fasteners for use intended.

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 board 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

3.2 INSTALLATION

- .1 Install insulation after building substrate materials are dry.
- .2 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .3 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.
- .4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, type B vents, or use non-combustible insulation.
- .5 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.
- .6 Offset both vertical and horizontal joints in multiple layer applications.
- .7 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

3.3 RIGID INSULATION INSTALLATION

- .1 In addition to adhesive, install mineral fibre insulation boards with insulation clips and disk, 2 per 600 x 1200 mm board minimum, fit boards tight, cut off fastener spindle 3 mm beyond disk.

3.4 CAVITY WALL INSTALLATION

- .1 Install mineral fibre insulation boards on outer surface of wall cavity over impaling clips.

3.5 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

-END OF SECTION-

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 09 22 16 Non-Structural Metal Framing.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM C553-13, Standard Specification for Mineral Fibre 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.
- .2 CSA Group
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S702-2012, Standard for Mineral Fibre Insulation for Buildings.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground indoors and in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect specified materials.
 - .3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 INSULATION

- .1 Batt and blanket mineral fibre: unfaced 400 mm wide purpose made for fitting between steel studs.
 - .1 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

3.2 INSULATION INSTALLATION

- .1 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .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 50mm from Type B vents.
- .5 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

3.3 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

-END OF SECTION-

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 07 21 13 Board Installation.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.13M-M87, Sealing Compound, One Component, Elastomeric Chemical Curing.
 - .2 CAN/CGSB-19.24M-M90, Multi-Component, Chemical Curing Sealing Compound.
 - .3 CGSB 19-GP-14M-84, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
- .2 Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .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.

1.4 DELIVERY, STORAGE AND HANDLING

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

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.

1.6 AMBIENT CONDITIONS

- .1 Install solvent curing sealants and vapour release adhesive materials in open spaces with ventilation.
- .2 Maintain temperature and humidity recommended by materials manufactures before, during and after installation.

1.7 SEQUENCING

- .1 Sequence work to permit installation of materials in conjunction with related materials and seals.
- .2 Warranty: include coverage of installed sealants and sheet materials which:
 - .1 Fail to achieve air tight and watertight seal.
 - .2 Exhibit loss of adhesion or cohesion.

PART 2 - PRODUCTS

2.1 SHEET MATERIALS

- .1 Sheet Seal Type 1: self-adhesive bitumen laminated to high-density polyethylene film.

2.2 SEALANTS

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

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 GENERAL

- .1 Perform Work in accordance with Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification requirements for materials installation.
- .2 Perform Work in accordance with National Air Barrier Association - Professional Contractor Quality Assurance Program and requirements for materials installation.

3.3 EXAMINATION

- .1 Verify that surfaces and conditions are ready to accept work of this section.
- .2 Ensure surfaces are clean, dry, sound, smooth, continuous and comply with air barrier manufacturer's requirements.
- .3 Report unsatisfactory conditions to Departmental Representative in writing.
- .4 Do not start work until deficiencies have been corrected.
 - .1 Beginning of Work implies acceptance of conditions.

3.4 PREPARATION

- .1 Remove loose or foreign matter, which might impair adhesion of materials.
- .2 Ensure substrates are clean of oil or excess dust; masonry joints struck flush, and open joints filled; and concrete surfaces free of large voids, spalled areas or sharp protrusions.
- .3 Ensure substrates are free of surface moisture prior to application of self-adhesive membrane and primer.

- .4 Ensure metal closures are free of sharp edges and burrs.
- .5 Prime substrate surfaces to receive adhesive in accordance with manufacturer's instructions.

3.5 INSTALLATION

- .1 Install materials in accordance with manufacturer's instructions.

3.6 CLEANING

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

3.7 PROTECTION OF WORK

- .1 Do not permit adjacent work to damage work of this section.
- .2 Ensure finished work is protected from climatic conditions.

-END OF SECTION-

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 07 62 00 sheet Metal Flashing and Trim.

1.2 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 ASTM International
 - .1 ASTM D2369-10e1, Test Method for Volatile Content of Coatings.
 - .2 ASTM D2832-92(2011), Standard Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
- .3 CSA International
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .4 Environmental Choice Program (ECP)
 - .1 CCD-045-95, Sealants and Caulking Compounds.
- .5 Green Seal Environmental Standards (GS)
 - .1 GS-36-11, Standard for Commercial Adhesives.
- .6 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 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 2 copies of WHMIS MSDS.
 - .1 Indicate VOC's for caulking materials during application and curing.
- .2 Shop Drawings:
 - .1 Submit drawings.
 - .2 Indicate dimensions, profiles, attachment methods, schedule of wall elevations, trim and closure pieces, and related work.
- .3 Samples:
 - .1 Submit duplicate 300 x 300 mm samples of siding material, of colour and profile specified.
- .4 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan Waste Reduction Workplan highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50% of construction wastes were recycled or salvaged.

- .2 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer post-industrial content, and total cost of materials for project.
- .3 Low-Emitting Materials:
 - .1 Submit listing of adhesives and sealants used in building, comply with VOC and chemical component limits or restriction requirements.

1.4 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.

1.5 DESIGN CRITERIA

- .1 Design metal panel wall to provide for thermal movement of component materials caused by ambient temperature range of 100°C without causing buckling, failure of seal joints, undue stress on fasteners or other detrimental effects.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .2 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Stack panel sheets tilted to provide water run-off.
 - .3 Cover components with opaque covering to protect from direct sunlight and moisture penetration.
 - .4 Store and protect metal siding from nicks, scratches, and blemishes.
 - .5 Replace defective or damaged materials with new.
- .3 Develop Construction Waste Management Plan Waste Reduction Workplan related to Work of this Section.
- .4 Packaging Waste Management: remove for reuse by manufacturer of pallets, crates, padding, packaging materials.

PART 2 - PRODUCTS

2.1 STEEL CLADDING AND COMPONENTS

- .1 Strip siding: to CAN/CGSB-93.4, Type A.
 - .1 Finish coating: Class F1S.
 - .2 Colour: QC 28305 Stone Grey.
 - .3 Gloss: medium.
 - .4 Thickness: 0.305 mm base metal thickness.

- .5 Profile: ribbed, 13 mm deep, preformed interlocking joints, fastener holes pre-punched.

2.2 FASTENERS

- .1 Nails: CSA B111. Screws: ASME B18.6.3. Purpose made, cadmium plated steel.

2.3 CAULKING

- .1 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
 - .1 Test for acceptable VOC emissions in accordance with ASTM D2369 and ASTM D2832.

2.4 ACCESSORIES

- .1 Exposed trim: inside corners, outside corners, cap strip, drip cap, undersill trim, starter strip and trim of same material, colour gloss as cladding, with fastener holes pre-punched.

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 continuous starter strips, inside and outside corners, edgings, door opening flashings as indicated.
- .3 Install outside corners, fillers, and closure strips with carefully formed and profiled work.
- .4 Maintain joints in exterior cladding, true to line, tight fitting, hairline joints.
- .5 Attach components in manner not restricting thermal movement.
- .6 Caulk junctions with adjoining work with sealant. Do work in accordance with Section 07 92 00 - Joint Sealants.

3.4 CLEANING

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for reuse recycling.
 - .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 RELATED REQUIREMENTS

- .1 Section 06 10 00 –Rough Carpentry.
- .2 Section 07 62 00 – Sheet Metal Flashing and Trim.

1.2 REFERENCES

- .1 ASTM International Inc.
 - .1 ASTM C591-13, Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation.
 - .2 ASTM D41-05, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
 - .3 ASTM D312-00(2006), Standard Specification for Asphalt Used in Roofing.
 - .4 ASTM D2178-04, Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
 - .5 ASTM D6162-00a, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.
 - .6 ASTM D6163-00e1, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.
 - .7 ASTM D6164-05, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
 - .8 ASTM D6222-02e1, Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcement.
 - .9 ASTM D6223-02e1, Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcement.
 - .10 ASTM D6509-00, Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcement.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
 - .2 CGSB 37-GP-56M-1985, Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
 - .3 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
- .3 Canadian Roofing Contractors Association (CRCA)
 - .1 CRCA Roofing Specifications Manual-1997.
- .4 Canadian Standards Association (CSA International)
 - .1 CSA-A123.3-05(R2020), Asphalt Saturated Organic Roofing Felt.
 - .2 CSA-A123.4-04(R2018), Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.
 - .3 CSA O121-17, Douglas Fir Plywood.
 - .4 CSA O151-17, Canadian Softwood Plywood.
- .5 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .6 Underwriters Laboratories' of Canada (ULC)
 - .1 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

- .2 CAN/ULC-S702.2-10, Standard for Mineral Fibre Thermal Insulation for Buildings.
- .3 CAN/ULC-S704-03, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
- .4 CAN/ULC-S706-02, Standard for Wood Fibre Thermal Insulation for Buildings.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Provide one copy of most recent technical roofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Provide one copy of WHMIS MSDS for:
 - .1 Primers.
 - .2 Asphalt.
 - .3 Sealers.
 - .4 Filter fabric.
- .2 Provide shop drawings:
 - .1 Indicate flashing details.
- .3 Manufacturer's Certificate: certify that products meet or exceed specified requirements.
- .4 Test and Evaluation Reports: submit laboratory test reports certifying compliance of membrane with specification requirements.
- .5 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.
- .6 Reports: indicate procedures followed, ambient temperatures and wind velocity during application.

1.4 QUALITY ASSURANCE

- .1 Installer qualifications: company or person specializing in application of modified bituminous roofing systems approved by manufacturer with 5 years documented experience.

1.5 FIRE PROTECTION

- .1 Fire Extinguishers:
 - .1 Maintain one stored pressure rechargeable type with hose and shut-off nozzle,
 - .2 ULC labelled for A, B and C class protection.
 - .3 Size 2.25 kg on roof per torch applicator, within 6 m of torch applicator.
- .2 Maintain fire watch for 1 hour after each day's roofing operations cease.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.
 - .2 Provide and maintain dry, off-ground weatherproof storage.
 - .3 Store rolls of felt and membrane in upright position. Store membrane rolls with salvage edge up.

- .4 Remove only in quantities required for same day use.
 - .5 Place plywood runways over completed Work to enable movement of material and other traffic.
 - .6 Store sealants at +5 degrees C minimum.
 - .7 Store insulation protected from daylight weather and deleterious materials.
- .3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials.
- .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.
 - .2 Fold up metal banding, flatten and place in designated area for recycling.

1.7 SITE CONDITIONS

- .1 Ambient Conditions
- .1 Do not install roofing when temperature remains below -18 degrees C for torch application, or -5 degrees C for mop application, and to manufacturer's recommendations.
 - .2 Minimum temperature for solvent-based adhesive is -5 degrees C.
- .2 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.

PART 2 - PRODUCTS

2.1 PERFORMANCE CRITERIA

- .1 Compatibility between components of roofing system is essential. Provide written declaration to Departmental Representative stating that materials and components, as assembled in system and with existing roofing system, meet this requirement.

2.2 VAPOUR RETARDER

- .1 Base sheet vapour retarder: to CGSB 37-GP-56M ASTM D6163, Styrene-Butadiene-Styrene (SBS) elastomeric polymer.
- .1 Top and bottom surfaces: sanded/polyethylene.

2.3 MEMBRANE

- .1 Base sheet: to CGSB 37-GP-56M glass fibres to ASTM D6163
- .1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer prefabricated sheet, reinforcement, having nominal weight of 100 g/m2.
 - .2 Type 1, fully adhered.
 - .3 Class A - granule surfaced C - plain surfaced.
 - .4 Grade 1 - standard service.
 - .5 Top and bottom surfaces:
 - .1 Sanded/polyethylene.
 - .6 Base sheet membrane properties: to CGSB 37-GP-56M.
 - .1 Strain energy (longitudinal/transversal): 8.1/8.8 kN/m.
 - .2 Breaking strength (longitudinal/transversal): 17.0/12.5 N/5 cm.
 - .3 Ultimate elongation (longitudinal/transversal): 60/65 %.
 - .4 Tear resistance: 60 N.
 - .5 Cold bending at -30 degrees C : no cracking.
 - .6 Softening point: ≥ 110 degrees C.
 - .7 Static puncture resistance: 300.
 - .8 Dimensional Stability: -0.3 / 0.3 %.

- .7 ULC certification: Class A.
- .2 Cap sheet membrane: to CGSB 37-GP-56M polyester fibres to ASTM D6164
 - .1 Styrene-Butadiene-Styrene(SBS) elastomeric polymer.] reinforcement, having nominal weight of 180 g/m².
 - .2 Type 2, fully adhered.
 - .3 Class A-granule surfaced.
 - .1 Colour for granular surface: gray.
 - .4 Grade heavy duty service.
 - .5 Bottom surface polyethylene.
 - .6 Cap sheet membrane properties: to CGSB 37-GP-56M.
 - .1 Strain energy (longitudinal/transversal): 11.0/11.4 kN/m.
 - .2 Breaking strength (longitudinal/transversal): 25.0/16.0 kN/m.
 - .3 Ultimate elongation (longitudinal/transversal): 60/65 %.
 - .4 Tear resistance: 80 N.
 - .5 Cold bending at -30 degrees C: No cracking.
 - .6 Softening point: ≥ 110 degrees C.
 - .7 Static puncture resistance: 370.
 - .8 Dimensional Stability: -0.2 / 0.2 %.
 - .7 ULC certification: Class A.

2.4 ADHESIVE

- .1 Adhesive for securing overlay board and insulation: asphalt extended vulcanized adhesive, two component unit, consisting of two liquids mixed on site to produce pourable adhesive.

2.5 BITUMEN

- .1 Asphalt: to CAN/CSA A123.4 ASTM D312, Type 2.

2.6 INSULATION

- .1 Polyisocyanurate:
 - .1 To CAN/ULC S704-03 and compatible with roofing products.
 - .2 Compressive strength: Min. 135 kPa to ASTM D1621.
 - .3 Flame Spread: Max. 25.
 - .4 Size: Max. 1.2 x 1.4m mechanically fastened.
 - .5 Thickness: Two equal layers totalling thickness indicated.
- .2 Sloping insulation: Polyisocyanurate conforming to item 2.5.1.
- .3 Protection board:
 - .1 Dimensionally stable, mineral fortified asphaltic core sandwiched between 2 layers of high-strength non-woven glass fibre reinforcement.
 - .2 Weight: 60 g/m².
 - .3 Size: 3.0mm thick x 1220 x 915mm size.
 - .4 FM approved and ULC classified.

2.7 SEALERS

- .1 Asphalt primer: to CGSB 37-GP-9Ma-88 and as per membrane manufacturer's recommendations.

- .2 Plastic cement: asphalt to CAN/CGSB 37.5-M89.
- .3 Sealing compound: to CAN/CGSB 37.5-M89, SBS rubber asphalt type.
- .4 Caulking compound: Polyurethane to CAN2-19.13-M87, Type 2, Class B.
- .5 Polyethylene back-up rope: extruded closed cell foam, Shore A hardness 20, tensile strength 140 to 20 kPa, compatible with primers and sealants, oversized to 30 to 50%.

2.8 ACCESSORIES

- .1 Roofing Nails:
 - .1 To CSA B111, Table 12.
 - .2 Ring threaded, 10mm head, galvanized steel, barbed with solid caps.
 - .3 Length to be sufficient to penetrate wood 25mm.
- .2 Mechanical Fasteners:
 - .1 FM approved system of rib stiffened, hot dip galvanized, 16 ga. Steel plates and special low profile head, zinc and dichromate plated, fully threaded screws, length to penetrate deck min. 20mm.
 - .2 Screws for fastening gypsum board to steel decks:
 - .1 #10 flat, countersink head tapering screws, Phillips, yellow zinc plated or better, 25mm long, to CSA B35.4.
- .3 Gypsum Sheathing:
 - .1 Glass mat faced, water resistant, non-combustible gypsum sheathing board, 12.7mm thick, factory primed, Type X.

PART 3 - EXECUTION

3.1 QUALITY OF WORK

- .1 Do examination, preparation, and roofing Work in accordance with Roofing Manufacturer's Specification Manual CRCA Roofing Specification Manual, particularly for fire safety precautions.
- .2 Do priming in accordance with manufacturers written recommendations.
- .3 Assembly, component, and material connections will be made in consideration of appropriate design loads, with reversible mechanical attachments.

3.2 EXAMINATION OF ROOF DECKS

- .1 Verification of Conditions:
 - .1 Inspect with Departmental Representative deck conditions including ventilation outlets to determine readiness to proceed.
- .2 Evaluation and Assessment:
 - .1 Prior to beginning of work ensure:
 - .1 Decks are firm, straight, smooth, dry, free of snow, ice, or frost, and swept clean of dust and debris. Do not use calcium or salt for ice or snow removal.
 - .2 Curbs have been built.
 - .3 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.
- .3 Do not install roofing materials during rain or snowfall.

3.3 PROTECTION OF IN-PLACE CONDITIONS

- .1 Cover walls, walks, and adjacent work where materials hoisted or used.
- .2 Use warning signs and barriers. Maintain in good order until completion of Work.
- .3 Clean off drips and smears of bituminous material immediately.
- .4 Protect roof from traffic and damage. Comply with precautions deemed necessary by Departmental Representative.
- .5 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed Work and materials out of storage.
- .6 Metal connectors and decking will be treated with rust proofing or galvanization.

3.4 VAPOUR RETARDER (GYPSUM BOARD DECK)

- .1 Embed one- ply of felts glass in hot bitumen spread at rate of 1.2 kg/m² for glass asphalt.
- .2 Modified bituminous vapour retarder sheet.

3.5 CONVENTIONAL MEMBRANE ROOFING APPLICATION

- .1 Insulation: mechanically fastened application:
 - .1 Place first layer of insulation with end joints staggered, mechanically fasten to steel deck through sheathing. Fasteners spaced at a rate required to meet FM-I60 specification.
 - .2 Increase quantity of fasteners by 50% at roof perimeters and 75% at roof corners.
 - .3 Cut end pieces to suit.
 - .4 Ensure no gaps, all insulation to be tight fitting.
 - .5 Apply full mopping of asphalt over first layer of insulation. Apply in broken joint construction so that each layer breaks joint both ways with the preceding layer.
 - .6 Do not lay more insulation than can be covered with membrane roofing on the same day.
 - .7 Promptly remove insulation which is damaged by moisture.
- .2 Sloping Insulation:
 - .1 Embed sloped insulation in solid moppings of asphalt.
 - .2 Cut, fill neatly and mitre as required to prevent open joints or irregular surfaces.
 - .3 Walk insulation into place to ensure positive bonding is achieved.
 - .4 Butt boards together without gaps. Keep joints free of asphalt.
- .3 Base sheet application:
 - .1 Unroll and embed base sheet in uniform coating of asphalt applied at rate of 1.2 kg/m², at 230 degrees C.
 - .2 Unroll and torch base sheet onto substrate taking care not to burn membrane or its reinforcement or substrate.
 - .3 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.
 - .4 Application to be free of blisters, wrinkles and fishmouths.
- .4 Cap sheet application:
 - .1 Unroll and embed cap sheet in uniform coating of asphalt applied at rate of 1.2 kg/m², EVT at point of contact.
 - .2 Unroll and torch cap sheet onto base sheet taking care not to burn membrane or its reinforcement.

- .3 Lap sheets 75 mm minimum for side laps and 150 mm minimum for end laps. Offset joints in cap sheet 300 mm minimum from those in base sheet.
- .4 Application to be free of blisters, fishmouths and wrinkles.
- .5 Do membrane application in accordance with manufacturer's recommendations.
- .5 Flashings:
 - .1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.
 - .2 Torch base sheet onto substrate in 1 metre wide strips.
 - .3 Lap flashing base sheet to membrane base sheet minimum 150 mm and seal by mopping or torch welding.
 - .4 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and torch weld.
 - .5 Provide 75 mm minimum side lap and seal.
- .6 Properly secure flashings to their support, without sags, blisters, fishmouths, or wrinkles.
- .6 Roof penetrations:
 - .1 Install vent stack covers and other roof penetration flashings and seal to membrane in accordance with manufacturer's recommendations and details and as shown.

3.6 FIELD QUALITY CONTROL

- .1 Inspections:
 - .1 Inspection and testing of roofing application will be carried out by testing laboratory designated by Departmental Representative.
 - .2 Departmental Representative will pay for tests.

3.7 CLEANING

- .1 Remove bituminous markings from finished surfaces.
- .2 In areas where finished surfaces are soiled caused by work of this section, consult manufacturer of surfaces for cleaning advice and complying with their documented instructions.
- .3 Repair or replace defaced or disfigured finishes caused by work of this section.
- .4 Waste Management: separate waste materials for reuse recycling
 - .1 Place materials defined as hazardous or toxic in designated containers.
 - .2 Clearly label location of salvaged material's storage areas and provide barriers and security devices.
 - .3 Ensure emptied containers are sealed and stored safely.
 - .4 Divert unused aggregate materials from landfill to local facility for reuse.
 - .5 Unused coating material must be disposed of at official hazardous material collections site.
 - .6 Unused adhesive, sealant and asphalt materials 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 Dispose of unused adhesive material at official hazardous material collections site.
 - .8 Dispose of unused sealant material at official hazardous material collections site.
 - .9 Dispose of unused asphalt material at official hazardous material collections site.

-END OF SECTION-

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 06 10 00 – Rough Carpentry.
- .2 Section 07 52 00 – Modified Bituminous Membrane Roofing.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A167-99(2004), Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM A240/A240M-07e1, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - .3 ASTM A606-04, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
 - .4 ASTM A653/A653M-07, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .5 ASTM A792/A792M-06a, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - .6 ASTM D523-[89(1999)], Standard Test Method for Specular Gloss.
 - .7 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 Standards Association (CSA International)
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Samples:
 - .1 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, finishes and colours.

1.4 QUALITY ASSURANCE

- .1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section with contractor's representative Departmental Representative, to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.

PART 2 - PRODUCTS

2.1 PREFINISHED STEEL SHEET

- .1 Prefinished steel with factory applied polyvinylidene fluoride.
 - .1 Class F1S.
 - .2 Colour: QC 28305 Stone Grey.

- .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.

2.2 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CAN/CGSB 37.5.
 - .1 Maximum VOC limit 50g/L.
- .3 Sealants: To requirements of 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: of same material as sheet metal, to CSA B111, flat head roofing nails of length and thickness suitable for metal flashing application.
- .6 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .7 Touch-up paint: as recommended by prefinished material manufacturer.
 - .1 Maximum VOC limit 150 g/L.

2.3 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work as indicated.
- .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.

2.4 METAL FLASHINGS

- .1 Form flashings, copings and fascia's to profiles indicated of 0.55mm thick prefinished steel.
- .2 Lock end joints and caulk with sealant.

PART 3 - EXECUTION

3.1 **CLEANING**

- .1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools, and equipment.
- .2 Leave work areas clean, free from grease, finger marks and stains.

-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 CAN-ULC-S101-14, Standard Methods of fire Endurance Tests of Building Construction and Materials.
 - .2 CAN-ULC-S102-10, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations, and compatibility with existing material.
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets.
- .2 Quality assurance submittals:
 - .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.
 - .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.

1.3 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: company specializing in sprayed-on fireproofing approved by manufacturer with 5 documented experience.
- .2 Site Meetings:
 - .1 Convene pre-installation meeting one week prior to beginning work of this Section on-site installations, with Departmental Representative
 - .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.
 - .2 Prior to start of Work arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work.
 - .3 Ensure key personnel attend.

- .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.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling, and unloading:
 - .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
 - .2 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.

1.5 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.

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. Confirm fireproofing is compatible with materials being protected.
- .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: grey.
- .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 average 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 3m 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	ULC Rating
Roof decks	2 hour	ULC BXUVC.F816

- .3 Apply fireproofing over substrate, building up to required thickness to cover substrate 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.
- .7 Apply sealer to surface of mineral fibre fireproofing as required by manufacturer as indicated.
- .8 Apply fireproofing where existing fireproofing is disturbed by work. Coordinate with other subtrades.

3.4 FIELD QUALITY CONTROL

- .1 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.
- .2 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.

3.6 CLEANING

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

- .1 Section 07 92 00 – Joint Sealants.
- .2 Section 09 21 16 – Gypsum Board Assemblies.

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 ULC-S115-2018, Fire Tests of Fire stop Systems.

1.3 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.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 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.
- .2 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.
 - .3 Listed System Design for each specific location/ condition.
 - .4 Data sheets for each material used.

- .3 Quality assurance submittals:
 - .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, and cleaning procedures.

1.5 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: company specializing in fire stopping installations 5years documented experience.
- .2 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with contractor's representative Departmental Representative.
 - .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.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate ULC markings.
- .3 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.

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: as indicated.
- .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.

3.5 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 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools, and equipment.
- .2 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 exterior walls.
 - .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 Around mechanical and electrical assemblies penetrating fire separations.

-END OF SECTION-

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 07 84 00 Fire Stopping.

1.2 REFERENCES

- .1 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.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 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 2 copies of WHMIS MSDS
- .2 Samples:
 - .1 Submit 2 samples of each type of material and colour.
 - .2 Cured samples of exposed sealants for each colour where required to match adjacent material.
- .3 Manufacturer's Instructions:
 - .1 Submit instructions to include installation instructions for each product used.

1.4 CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

- .3 Storage and Handling Requirements:
 - .1 Store materials off ground indoors and in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

1.6 SITE CONDITIONS

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

PART 2 - PRODUCTS

2.1 SEALANT MATERIALS

- .1 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 Urethanes two part:
 - .1 Self-levelling: to CAN/CGSB-19.24, Type 1, Class B, colour to be chosen by Departmental Representative.
- .2 Urethanes two part:
 - .1 Non-sag: to CAN/CGSB-19.24, Type 2, Class B, colour to be chosen by Departmental Representative.
- .3 Urethanes one part:
 - .1 Non-sag: to CAN/CGSB-19.13, Type 2, colour to be chosen by Departmental Representative.
- .4 Silicones one part: to CAN/CGSB-19.13.
- .5 Acrylic latex one part: to CAN/CGSB-19.17.

- .6 Acoustical sealant: to ASTM C919.
- .7 Butyl: to CGSB 19-GP-14M.
- .8 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 (i.e. brick, block, precast masonry): sealant type: Urethanes, two part.
- .2 Exterior joints in horizontal wearing surfaces (as itemized): sealant type: Urethanes, two part.
- .3 Seal interior perimeters of exterior openings as detailed on drawings: sealant type: Acrylic latex, one part.
- .4 Control and expansion joints on the interior of exterior poured-in place concrete walls: sealant type: Acrylic latex, one part.
- .5 Perimeters of interior frames, as detailed and itemized: sealant type: Acrylic latex, one part.

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.

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:
 - .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.

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-