Part 1 General

1.1 SUMMARY

.1 This Section includes requirements for supply and installation of a cold applied below grade waterproofing membrane system, as required for complete and proper installation:

- .1 Fluid Applied Waterproofing Membrane
- .2 Fabric Reinforcement
- .3 Flashing Membrane
- .4 Flashing Membrane Adhesives
- .5 Mastics & Termination Sealants
- .6 Protection Board
- .7 Auxiliary Materials

1.2 RELATED REQUIREMENTS

.1	Section 03 30 00:	Cast-In-Place Concrete
.2	Section 03 35 00:	Concrete Finishing
.3	Section 07 16 16:	Crystalline Waterproofing
.4	Section 07 21 13:	Board Insulation
.5	Section 31 23 33:	Excavation, Trenching and Backfilling

1.3 REFERENCE STANDARDS

.1 American Society for Testing of Materials (ASTM):

- .1 ASTM C836/C836M, Standard Specification for High Solids Content, Cold Liquid Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.
- .2 ASTM D412, Standard Test Method for Vulcanized Rubber and Thermoplastic Elastomers – Tension
- .3 ASTM D570, Standard Test Method for Water Absorption of Plastics
- .4 ASTM D882, Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- .5 ASTM D903, Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
- .6 ASTM D1227, Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing
- .7 ASTM D1876, Standard Test Method for Peel Resistance of Adhesives (T-Peel Test)
- .8 ASTM D1970, Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
- .9 ASTM D2243, Standard Test Method for Freeze-Thaw Resistance of Water-Borne Coatings

.10 ASTM D3330, Standard Test Method for Peel Adhesion of Pressure Sensitive Tape

.11 ASTM D5385, Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes

.12 ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials

.13 ASTM E96, Standard Test Methods for Water Vapor Transmission of Materials

.14 ASTM E154, Standard Test Methods for Water Vapour Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

.2 Canadian General Standards Board (CGSB):

.1 CAN/CGSB 37.2, Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing, and for Roof Coatings

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate the Work of this Section with the installation of exterior substrate; Sequence work so that installation of fluid applied waterproofing membrane coincides with installation of substrate preparation without causing delay to the Work.

.2 Pre-Construction Conference: Arrange a site meeting attended by the Contractor, the Subcontractor, the Departmental Representative, materials supplier(s), and other relevant personal before commencement of work for this Section; as indicated in Section 01 31 13 Project Meetings.

.1 Review methods and procedures related to installation, including manufacturer's written instructions;

.2 Examine substrate conditions for compliance with manufacturers installation requirements;

.3 Review temporary protection measures required during and after installation.

1.5 SUBMITTALS

.1 Provide required information in accordance with Section 01 33 00.

.2 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Product Data: Submit manufacturer’s data sheets covering the care and recommended maintenance procedures for incorporation into maintenance manuals.

.2 Certifications:

.1 Submit copies of manufacturers’ current ISO 9001 certification. Fluid applied waterproofing membrane, adhesives and associated auxiliary materials shall be included.

.3 Submit references clearly indicating that the fluid applied waterproofing membrane manufacturer has successfully completed projects on an annual basis of similar scope and nature for a minimum of fifteen (15) years. Submit references for a minimum of ten (10) projects.

.4 Submit manufacturers’ complete set of standard details for the fluid applied waterproofing membrane showing a continuous plane of water tightness below grade.

.5 Provide material checklist complete with application rates and minimum thickness of adhesives and primers.

1.6 QUALITY ASSURANCE

.1 Qualifications: Provide proof of qualifications when requested by Departmental Representative:

.1 Submit in writing, a document stating that the applicator of the fluid applied waterproofing membrane specified in this section is recognized by the manufacturer as suitable for the execution of the Work.

.2 Perform Work in accordance with the manufacturer's written instructions of the fluid applied waterproofing membrane and this specification.

.3 Maintain one copy of manufacturer's written instructions on site.

.4 At the beginning of the Work and at all times during the execution of the Work, allow access to Work site by the fluid applied waterproofing membrane manufacturers' representative.

.5 Components used in this section shall be sourced from one manufacturer; including fluid applied waterproofing membrane, sealants, primers, mastics and adhesives.

1.7 MOCK-UPS

.1 Mock-ups: Construct mock-ups to verify selections made under submittals and to set quality standards for materials and execution in accordance with Section 01 45 00 Quality Control for mock-ups and as follows:

.1 Where directed by Departmental Representative, construct typical assembly, 2134mm x 2134mm (8' x 8'), incorporating substrate materials, fluid applied waterproofing membrane and adjacent materials including flashing, protection course, insulation, and drainage boards; showing fluid applied waterproofing membrane application details.

.2 Notify Departmental Representative a minimum seven (7) days prior to mock-up construction.

.3 Review and acceptance of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless Departmental Representative specifically notes such deviations in writing.

.4 Once reviewed by Departmental Representative, acceptable mock-up can form a permanent part of the Work, and will form the basis for acceptance for the remainder of the project.

.5 Remove and replace materials found not acceptable, at no additional cost to Owner.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Delivery: At the time of delivery, visually inspect all materials for damage. Note any damaged to materials on the receiving ticket and immediately report to the shipping company and the material manufacturer.

.1 Remove damaged materials from the site immediately.

.2 Storage:

.1 Store materials as recommended by manufacturer and conforming to applicable safety regulatory agencies. Refer to all applicable data including but not limited

to MSDS sheets, Product Data sheets, product labels, and specific instructions for personal protection.

.2 Store materials off the ground and cover with a weather proof flame resistant sheeting or tarpaulin.

.3 Store role materials on end in original packaging.

.4 Store fluid applied waterproofing in closed containers outdoors.

.5 Store adhesives and primers at temperatures of 5 deg C (41 deg F) and above to facilitate handling.

.6 Keep solvent away from open flame or excessive heat.

.7 Protect rolls from direct sunlight until ready for use.

.3 Handling: Material shall be handled in accordance with sound material handling practices and in accordance with manufacturer's written instructions.

1.9 COORDINATION

.1 Ensure continuity of the water seal throughout the scope of this section.

.2 Ambient Conditions:

.1 Install materials outlined in this Section after completion of work by other Sections is complete; to provide adequate dry, clean, level, and plumb surfaces for installation and adhesion.

.2 Apply when ambient air and substrate temperatures are above temperature range indicated by fluid applied waterproofing membrane manufacturer, during time of install, and for a minimum of forty-eight (48) hours after installation, unless otherwise indicated.

.3 Ensure surfaces are sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants.

.4 Ensure surfaces are dry prior to and a minimum of sixteen (16) hours after time of install.

.5 Do not permit traffic of any kind over unprotected waterproof membranes. Apply protection course as soon as possible in accordance with manufacturers written instructions.

1.10 WARRANTY

.1 Contractor Warranty: Warrant that the fluid applied waterproofing membrane and membrane flashings will stay in place and remain leak proof for two (2) years.

.2 Manufacturer's Warranty: Fluid applied waterproofing membrane manufacturer must warranty the membrane and membrane flashings for leak coverage as a result of faulty materials for a period of ten (10) years from the date of substantial completion.

Part 2 Products

2.1 MANUFACTURERS

.1 Components and auxiliary materials must be obtained as a single-source from the assembly manufacturer to ensure total system compatibility and integrity.

2.2 MATERIALS

.1 Fluid Applied Waterproofing Membrane: Cold applied, elastomeric, one component asphalt emulsion waterproofing membrane, in compliance with ASTM C836/C836M; 53 to 58 percent solids by weight, solvent-free, odorless, VOC-free, and coal-tar free:

- .1 Solids by Weight: Not less than 53 to 58 Solids.
- .2 Application humidity: relative humidity not exceeding 85%, and temperatures less than 4.4 deg C above dew point.
- .3 Application Temperature: 5 deg C (40 deg F) minimum.
- .4 Hydrostatic-Head Resistance: 20 m (65') minimum; ASTM D5385/D5385M.
- .5 Water Leakage: Pass (no leakage) in accordance with CGSB 37-GP-56.
- .6 Water Vapor Transmission: 2.3 ng/Pa x s x sq. m (0.04 perm) in accordance with ASTM E96.
- .7 Accelerated Weathering: Pass (no deterioration of film) in accordance with ASTM G155, 0 412.
- .8 Adhesion to Concrete: 765 kPa (8 tons/sq. ft.) in accordance with ASTM C907.
- .9 Elongation: 850 percent in accordance with ASTM D7832.
- .10 Hardness: 50 Type A in accordance with ASTM D2246.
- .11 Impact Resistance: Pass; 19 Nm (168 in-lbf) or greater in accordance with CSB37-GP-500 23'C.
- .12 Puncture Resistance: No perforations in accordance with CGSB 37-GP-56.
- .13 Biological Resistance: Pass (90 percent of original value or greater) in accordance with ASTM E154, 0412.
- .14 Standard of Acceptance:
  - .1 Shield Wall 39 by SPG-Specialty Products Group, Inc.

.2 Concrete additive: refer to Section 03 30 00: Cast-In-Place Concrete.

.3 Fabric Reinforcement: Manufacturer's standard open weave glass fabric consisting of glass fibre yarn saturated with synthetic resins.

.4 Sheet Flashing: Nominal 1.6mm (1/16"), manufacturer's standard non-staining premanufactured elastomeric membrane and adhesive.

.5 Reinforcing Strip: Manufacturer's recommended fibreglass mesh or polyester fabric.

.6 Termination and joint Sealant: Polymer modified sealing compound, compatible with waterproofing; and as recommended by manufacturer for substrate and joint conditions.

.7 Protection Board: 6mm (1/4") thick semi-flexible type protection board, consisting of a core of blended asphalt and mineral fillers, laminated between faces of asphalt saturated felts, conforming to DSM 9.90.60.

- .1 Protection Board Adhesive: As recommended by membrane protection board manufacturer.

.8 Auxiliary Materials:

- .1 Securement Bars (By Others): Continuous aluminum, stainless steel or galvanized metal, 3mm x 25mm x 25mm (1/8" x 1" x 1") in size and shall be pre-drilled for non-corrosive screw attachment on a maximum of 200mm (8") centers.
- .2 Below Grade Insulation: As specified in Section 07 21 13.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions:

.1 Examine substrates to receive work and surrounding adjacent surfaces for conditions affecting installation.

.2 Strike masonry joints flush. Concrete surfaces shall be smooth and without large voids, honeycombing, spalled areas or sharp protrusions.

.3 Notify Departmental Representative in writing of any discrepancies. Commencement of the work or any parts thereof shall mean acceptance of the prepared substrate.

.2 Notify Contractor in writing of any conditions that are not acceptable.

.3 The installing contractor shall examine and determine that surfaces and conditions are ready to accept the Work of this section in accordance with published literature. Commencement of Work or any parts thereof shall mean installers acceptance of the substrate.

3.2 PREPARATION

.1 All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants.

.2 Provide adequate protection of materials and work of this section from damage by weather, backfilling operations and other causes.

.3 Protect adjacent surfaces and Work of other trades from damage resulting from Work of this section. Make good such damage at no additional cost to the Owner.

.1 Provide sound handling and installation procedures to prevent and protect against spillage and overspray of materials specified in this Section.

3.3 INSTALLATION

.1 Waterproof Membrane:

.1 Unreinforced Waterproofing Applications: Mix materials and apply waterproofing by spray, roller, or other application method suitable to slope of substrate.

.1 Apply one or more coats of waterproofing to obtain a seamless membrane free of entrapped gases and pinholes, with a dry film thickness of 2.25 mm (90 mils).

.2 Apply waterproofing to prepared wall terminations and vertical surfaces.

.3 Verify manufacturer's recommended wet film thickness of waterproofing every 9.3 sq. m (100 sq. ft.).

.2 Reinforced Waterproofing at Joint Applications: Mix materials and apply waterproofing by spray, roller, or other suitable application method.

.1 Apply first coat of waterproofing, embed membrane-reinforcing fabric at joints, and apply second coat of waterproofing to completely saturate reinforcing fabric and to obtain a seamless reinforced membrane free of entrapped gases and pinholes, with an average dry film total thickness 2.25 mm (90 mils).

.2 Apply reinforced waterproofing to joints at prepared wall terminations and vertical surfaces.

.3 Verify manufacturer's recommended wet film thickness of waterproofing every 9.3 sq. m (100 sq. ft.).

.3 Cure waterproofing, taking care to prevent contamination and damage during application and curing.

.4 Install protection course with butted joints over waterproofing before starting subsequent construction operations.

.1 For horizontal applications, install protection course loose laid over fully cured membrane.

.2 For vertical applications, set protection course in nominally cured membrane, which will act as an adhesive. If membrane cures before application of protection course, use adhesive.

.2 Protection Board Installation:

.1 Install protection board over the fluid applied waterproofing membrane to prevent damage from backfilling.

.2 Apply protection board adhesive in 13mm (1/2”) wide strips spaced at 457mm (18”) o/c to fluid applied waterproofing membrane.

.3 Immediately embed protection board and press into adhesive to ensure full contact.

.4 Backfill once protection board adhesive has fully cured.

.3 Drainage Board Installation:

.1 Attach drainage board to surface using adhesive. Permanent fixing is achieved once backfilling operation is complete.

.2 Vertical Application: Place drainage board with fabric side outwards.

.1 Start at the top or bottom of the wall. Drain board may be applied horizontally or vertically.

.2 When installed horizontally, position edge of core with flange at the top. When installed vertically, align edge with flange at the upstream edge.

.3 Bottom panel should be placed behind the discharge pipe.

.3 Horizontal Application: Place drainage board with fabric side up.

.1 Start installation at lowest point to ensure positive drainage. Position edge of core with flange at the higher edge of the substrate, away from drains.

.4 Overlaps: Pull back loose fabric to expose core. Position core of second panel over the overlap flange of first level.

.1 Overlap in direction of water flow and adhere the overlapped fabric with adhesive to prevent soils and/or concrete from entering core.

.5 Corners: Bend drainage board for inside corners. Cut drainage board to reach corner, providing 100mm (4”) of extra fabric to wrap around corner. Overlap fabric at joint.

.4 Insulation Installation:

.1 Co-ordinate with Section 07 21 13 for insulating materials.

.2 Adhesive (Optional):

.1 Apply the insulation adhesive in a serpentine pattern to fluid applied waterproofing membrane.

.2 Immediately embed insulation into the adhesive and press firmly into place to ensure full contact. Apply additional adhesive if allowed to skin over.

.3 Fully butter all joints of insulation panels with adhesive during installation, except at expansion joints.

.4 Stagger the end joints of the insulation.

.5 Cut the insulation to fit closely to all protrusions and obstructions.

.3 Insulation Clips:

.1 Mechanically fasten insulation clips to the fluid applied waterproofing membrane with adhesive recommended by insulation clip manufacturer.

.2 Apply number of insulation clips as recommended by insulation manufacturer, in locations indicated in their written documentation.

3.4 FIELD QUALITY CONTROL

.1 Final Observation and Verification:

.1 Final inspection of fluid applied waterproofing membrane shall be carried out by the Owner's representative, and the contractor.

.2 Contact Manufacturer for warranty issuance requirements.

.2 Fluid applied waterproofing membrane is not designed for permanent UV exposure. Apply protection as soon as possible after installation of fluid applied waterproofing membrane. Refer to manufacturer published literature for product limitations.

3.5 CLEANING AND PROTECTION

.1 Progress Cleaning: Leave work area clean at the end of each work day, ensuring safe movement of passing pedestrians.

.2 Waste Management: Co-ordinate recycling of waste materials and packaging at appropriate facility, diverting waste from landfill. Certified installer shall be responsible for ensuring waste management efforts are practiced.

END OF SECTION

Approved: 2012-12-31

Part 1 General

1.1 REFERENCE STANDARDS

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-37-GP-37M, Application of Hot Asphalt for damp proofing or Waterproofing.

.2 CAN/CGSB-37-GP-6Ma, Asphalt, Cutback, Unfilled, for damp proofing.

.2 Green Seal Environmental Standards (GS)

.1 GS-11, Standard for Paints and Coatings.

.2 GS-36, Standard for Commercial Adhesives.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for water repellents and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06- Health and Safety Requirements. Indicate VOC's for water repellent.

.3 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

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

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

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 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 indoors off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect water repellents.

.3 Replace defective or damaged materials with new.

1.5 SITE CONDITIONS

.1 Ambient Conditions:

.1 Maintain substrate temperature at water repellent installation area in accordance with water repellent manufacturer's printed instructions.

.2 Apply coating during dry weather. Allow surfaces to dry minimum of 3 days after rainfall or cleaning before applying further coats.

.3 Protect plants and vegetation which might be damaged by water repellents.

.4 Protect surfaces not intended to have application of water repellents.

Part 2 Products

2.1 MATERIALS

.1 Solvent base coating: colour selected by Departmental Representative penetrating, methyl and butyl, methyl methacrylate co-polymer resin.

.2 Water base coating: colour selected by Departmental Representative.

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 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 PREPARATION

.1 Prepare and clean substrate surfaces in accordance with water repellent manufacturer's printed instructions.

3.4 APPLICATION

.1 Spray Application: Spray apply water repellent material to exterior concrete, plaster, and masonry surfaces using low-pressure airless spray equipment in strict accordance with manufacturer's printed application, instructions, and precautions. Maintain copies at the

job site. Apply flood coat in an overlapping pattern allowing approximately 200 to 250 mm 8 to 10-inch rundown on the vertical surface. Maintain a wet edge at all overlaps, both vertical and horizontal. Hold gun maximum 450 mm 18 inches from wall.

.2 Brush or Roller Application: Brush or roller apply water repellent material only at locations where overspray would affect adjacent materials and where not practical for spray applications.

.3 Covered Surfaces: Coat all exterior concrete, plaster, or masonry surfaces including back faces of parapets, tops of walls, edges and returns adjacent to window and door frames, window sills, and free-standing walls.

.4 Rate of Application: Apply materials to exterior surfaces at the coverages recommended by the manufacturer and as determined from sample panel test. Increase or decrease application rates depending upon the surface texture and porosity of the substrate so as to achieve even appearance and total water repellency.

.5 Number of Coats: The sample panel test shall determine the number of coats required to achieve full coverage and protection.

.6 Appearance: If unevenness in appearance, lines of work termination or scaffold lines exist, or detectable changes from the approved sample panel occur, the Departmental Representative may require additional treatment at no additional cost to the Government. Apply any required additional treatment to a natural break off point.

3.5 FIELD QUALITY CONTROL

.1 After water repellent has dried, spray coated surfaces with water to verify coating coverage. Allow Departmental Representative to witness tests.

3.6 CLEANING

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

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by water repellent application.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 ASTM International

.1 ASTM C612, Standard Specification for Mineral Fibre Block and Board Thermal Insulation.

.2 ASTM C1126, Standard Specification for Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation.

.3 ASTM E96/E96M- , Standard Test Methods for Water Vapour Transmission of Materials.

.2 Canadian General Standards Board (CGSB)

.1 CGSB 71-GP-24M-AMEND, 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, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Coverings.

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

.3 CAN/ULC-S704, Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for board insulation and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit 2 copies of WHMIS MSDS. Indicate VOC's during application and curing.

.3 Certificates:

.1 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.4 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.3 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

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

.2 Store and protect specified materials.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 INSULATION

.1 Polystyrene: to CAN/ULC S701, Type 3, extruded polystyrene; of compressive strength: 175 kPa @ 10% deflection; minimum long term thermal resistance (LTTR): RSI 0.87/25 mm, maximum water absorption: 0.7% by volume; thickness as shown on drawings. Location: above grade.

.1 Acceptable products:

.1 "Cavitymate" by Dow Chemical Canada Ltd.

.2 Foamular C-200 by Owens Corning

.2 Polystyrene: to CAN/ULC S701, Type 4, maximum flame spread index of 25 for 25 mm of material, thicknesses shown on drawings. Ship lapped edge, minimum compressive strength of 210 kPa, maximum water vapour transmission of 35, minimum long term thermal resistance (LTTR): RSI 0.87/25 mm thickness. Location: below grade - perimeter curbs and foundation.

.1 Acceptable products:

.1 "Styrofoam SM" by Dow Chemical Canada Ltd.

.2 Foamular C-300 by Owens Corning

2.2 ADHESIVE

.1 Adhesive: to CGSB 71-GP-24M, Type II, synthetic rubber base, solvent type, trowel consistency, cream colour. Standard of acceptance: Bakor 230-21.

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.

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 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative

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, and minimum 50 mm from sidewalls of CAN/ULC-S604 type A chimneys.

.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 Imbed insulation boards into vapour barrier type adhesive, applied as specified, prior to skinning of adhesive.

.2 Leave insulation board joints unbonded over line of expansion and control joints. Bond a continuous 150 mm wide 0.15 mm modified bituminous membrane over expansion and control joints using compatible adhesive and primer before application of insulation.

3.4 PERIMETER FOUNDATION INSULATION

.1 Exterior application: extend boards as indicated. Install on exterior face of perimeter foundation wall with adhesive.

3.5 CAVITY WALL INSTALLATION

.1 Install polystyrene insulation boards on outer surface of inner wythe of wall cavity over impaling clips on bed of adhesive.

3.6 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00- Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00- Cleaning.

.3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19- Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Supply and install the following as indicated in this Section:

.1 Glass Fibre Batt Insulation

.2 Mineral Fibre Batt Insulation

.3 Vapour Barrier

1.2 RELATED REQUIREMENTS

.1	Section 04 20 00:	Masonry
.2	Section 04 43 13:	Cut Stone Veneer
.3	Section 05 12 00:	Structural Steel
.4	Section 05 31 23:	Steel Roof Deck
.5	Section 05 40 00:	Cold Formed Metal Framing
.6	Section 07 52 16:	Modified Bituminous Sheet Roofing and Sheet Metal; Roof Insulation
.7	Section 07 55 52:	Protected Modified Bituminous Sheet Roofing and Sheet Metal; Roof Insulation
.8	Section 07 81 29:	Sprayed Mineral Fibre Fireproofing
.9	Section 09 21 16:	Gypsum Wallboard
.10	Division 20 and 26:	Mechanical and Electrical Insulation

1.3 REFERENCE STANDARDS

.1 Underwriters Laboratories of Canada (ULC):

.1 CAN/ULC S702-09-AM1, Standard for Thermal Insulation Mineral Fibre for Buildings

.2 CAN/ULC S114-05, Standard Method of Test for Determination of Non-Combustibility in Building Materials

.3 CAN/ULC S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

.2 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-51.10-92, Mineral Fibre Board Thermal Insulation

.2 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction

1.4 SUBMITTALS

.1 Provide submittals in accordance with the General Conditions and Section 01 33 00.

.2 Affidavits:

.1 In lieu of samples and inspection procedures when required by CGSB Standards, submit affidavits, if requested, that materials supplied under these requirements meet CGSB Standards.

.3 Safety Data Sheets:

.1 Submit WHMIS safety data sheets for inclusion with project record documents. Keep one copy of WHMIS safety data sheets on site for reference by workers.

1.5 DELIVERY, STORAGE, HANDLING AND PROTECTION

.1 Handle and store material in accordance with the manufacturer's recommendations.

.2 Materials shall be delivered to the job in their original packages and containers bearing the manufacturer's labels intact and clearly visible.

.3 Store materials in dry, watertight areas and protect to prevent damage by other trades.

.4 Do not expose rigid insulation board to sunlight after installation. Protect it with black polyethylene or tarpaulin cover as recommended by manufacturer if permanent covering is not completed within twenty-four (24) hours.

Part 2 Products

2.1 MATERIALS

.1 Mineral Fibre Batt Insulation:

.1 Unfaced, semi-rigid mineral slag batt insulation in accordance with CAN/ULC S702-09, Type 1; having a nominal RSI of 0.67/25 mm; rated non-combustible in accordance with CAN/ULC S114-05 and having a flame spread rating of 5 or less in accordance with CAN/ULC S102; density 32 kg/m3; square edges, thickness as required to meet design insulation values indicated on drawings or as required to fill insulated spaces where not indicated.

.2 Basis of Design Materials:

.1 Roxul Inc., Roxul COMFORTBATT

.2 Thermafiber, SAFB (2.5 pcf Density)

.2 Vapour Barrier:

.1 6 mils thick clear polyethylene sheet conforming to CAN/CGSB-51.34.

.3 Polyethylene Adhesive Tape:

.1 'Scotch Brand No.483' manufactured by 3M Company, or 'Polyken No.827' manufactured by Kendall Co. (Canada) Ltd.

Part 3 Execution

3.1 PREPARATION

.1 All materials and methods used in application shall be in strict accordance with the printed instructions of the manufacturer.

.2 Remove stains, defective work or materials when directed by the Departmental Representative and replace with approved work and materials at no cost to Owner.

.3 Clean all surfaces of dust, dirt and projecting surfaces prior to the application of insulation.

.4 Do not install insulation when ambient air and surface temperatures are below 4 deg C (40 deg F) or more than 38 deg C (100 deg F). The temperature shall be maintained in the building during and after installation as necessary by the above requirement and as directed for curing of the adhesive. Obtain approval prior to proceeding with application of adhesive and insulation.

3.2 INSTALLATION

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

.2 Cut insulation to fit around electrical boxes, pipes, ducts, openings, corners and all protruding obstructions occurring on the surface to be insulated and seal with adhesive.

.3 Keep insulation minimum of 75mm (3") away from heat emitting devices.

.4 Trim and cut insulation neatly to fit spaces. Butt joints tightly, offsetting vertical joints. In multiple layer application, offset both vertical and horizontal joints.

.5 Install batt insulation in locations and thicknesses shown. Seal joints to prevent transfer of moisture.

.6 Install continuous vapour barrier, overlapping adjacent surfaces including self-joints a minimum of 50mm (2") and seal with specified tape. Applications to form a complete vapour seal.

END OF SECTION

Part 1 General

1.1 SUMMARY NO SPRAY USED IN DRAWINGS

.1 Spray application of medium-density, closed-cell polyurethane foam insulation to provide continuous thermal insulation and air/vapour barriers to substrates indicated on drawings and specified herein.

1.2 RELATED REQUIREMENTS

.1 Section 04 20 00: Masonry

.2 Section 05 12 00: Structural Steel

.3 Section 05 40 00: Cold Formed Metal Framing

.4 Section 05 50 00: Miscellaneous Metals

Part 2 Section 07 21 00: Interior Insulation and Vapour Barrier

.1 Section 07 21 56: Perimeter Insulation

.2 Section 09 21 16: Gypsum Wallboard

.3 Division 20 and 26: Mechanical and Electrical Insulation

2.2 REFERENCE STANDARDS

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

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

.2 ASTM E84-12b: Test Method for Surface Burning Characteristics of Building Materials

.3 ASTM E96-10: Standard Test Methods for Water Vapor Transmission of Materials

.4 ASTM E283-04(2012): Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

.2 Underwriters Laboratories of Canada (ULC):

.1 CAN/ULC S705.1, Standard for Thermal Insulation - Spray-applied Rigid Polyurethane Foam, Medium Density: Material Specification.

.2 CAN/ULC S770-09, Standard Test Methods for Determination of Long-term Thermal Resistance of Closed-Cell Thermal Insulating Foams.

2.3 SUBMITTALS

.1 Provide submittals in accordance with the General Conditions and Section 01 33 00.

.2 Product Data for each type of insulation product specified.

.3 Product test reports performed by a qualified third-party testing agency evidencing compliance of insulation products with specified requirements including those for thermal resistance, fire-test-response characteristics, water-vapor transmission, and other properties, based on comprehensive testing of current products.

.4 Manufacturer's certificate certifying insulation provided meets or exceeds specified requirements.

.5 Installer's certificate showing manufacturers installation certification for quality assurance.

2.4 QUALITY ASSURANCE

.1 Contractor executing work of this section shall have a minimum of five (5) years continuous Canadian experience in successful installations. Provide proof of experience to Departmental Representative upon request.

.2 Single Source Responsibility: Single source product from one manufacturer.

.3 The insulating material must be applied by personnel who are certified by manufacturer. These certified individuals must have their certification cards in their possession and available for presentation upon request.

.4 A copy of the manufacturer's installation manual or guide for the application of sprayed on polyurethane foam must be kept on site.

.5 Tests must be conducted daily on both core density and cohesion/adhesion to the substrate, following procedures established by the manufacturer. The results of these tests must be entered in the daily report forms provided by the manufacturer.

.6 Fire-Test-Response Characteristics: Provide materials specified as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

.1 Surface-Burning Characteristics: ASTM E 84

.7 Submit copy of all completed forms to Departmental Representative prior to making application for payment.

.8 Toxicity/Hazardous Materials:

.1 Provide products that contain no urea-formaldehyde

.2 Provide products that contain no PBDEs

.3 Provide products that are "Low-emitting"

2.5 SEQUENCING AND SCHEDULING

.1 Co-ordinate the work of this section with installation of associated work specified under other sections.

2.6 DELIVERY, STORAGE, HANDLING AND PROTECTION

.1 Co-ordinate deliveries to comply with construction schedule. Comply with manufacturers written instructions for handling and protection prior to and during installation.

.2 Store material as recommended by manufacturers written instructions in original, undamaged containers with manufacturers seals and labels intact. During cold weather, store raw materials in heated storage.

.3 Protect adjacent surfaces and equipment from damage by overspray.

Part 3 Products

3.1 MATERIALS

.1 Sprayed Polyurethane Foam Insulation:

.1 CFC free formulation, closed-cell sprayed polyurethane foam type insulation and conforming to CAN/ULC 705.1.

.1 Basis of Design Product: Walltite ECO by BASF, as represented by Building Resource Inc, or ICYNENE MD-C-200 by Icynene Inc.

.2 Provide primers in accordance with manufacturers recommendations if required for surface conditions.

3.2 EQUIPMENT

.1 Use equipment as recommended by sprayed polyurethane foam insulation manufacturer for types of applications required.

Part 4 Execution

4.1 EXAMINATION

.1 Verify that surfaces and conditions are suitable to accept work of this section.

.2 Report in writing, defects in surfaces or conditions which may adversely affect the performance of products installed under this section to the Contractor, prior to commencement of work of this section.

.3 Do not commence work of this section until defects have been corrected.

.4 Commencement of work of this section implies acceptance of surfaces and conditions.

4.2 PREPARATION

.1 Mask and cover adjacent areas to protect from overspray.

.2 Apply primers for special conditions as required by sprayed polyurethane foam manufacturer.

.3 Clean work area prior to commencing spray operations.

.4 Coordinate with work of other sections.

4.3 APPLICATION

.1 Apply sprayed polyurethane foam insulation to clean surfaces in accordance with manufacturers written instructions. Use primers where recommended by manufacturer.

.2 Thicknesses of sprayed polyurethane foam insulation shall be minimum 2-5/8" and thicker as indicated on drawings, with a maximum tolerance from required thickness of 1/4". Fill in gaps and spaces around structural steel, steel deck and other locations with sprayed polyurethane foam insulation to form continuous air/vapour and thermal barriers.

END OF SECTION

Approved: 2014-12-18

Part 1 General

1.1 REFERENCE STANDARDS

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.33, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

.2 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for vapour retarders and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06- Health and Safety Requirements.

.3 Certificates:

.1 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.3 QUALITY ASSURANCE

.1 Mock-Ups:

.1 Submit mock-ups in accordance with Section 01 45 00- Quality Control.

.2 Construct mock-up of sheet vapour barrier installation including one lap joint, one inside corner and at one electrical box. Mock-up may be part of finished work.

.3 Mock-up will be used to judge quality of work, substrate preparation, and material application.

.4 Locate where directed.

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

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

1.4 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

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

.2 Store and protect specified materials from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse and return by manufacturer of packaging materials, crates, padding, pallets, as specified in Waste Reduction Workplan and Construction Waste Management Plan]in accordance with Section 01 74 19- Waste Management and Disposal.

Part 2 Products

2.1 Sheet Materials

.1 Sheet Vapour Retardant: 150 micron (6 mil) thick, polyethylene film conforming to CAN/CGSB 51.34-M86.

.2 Sheet Vapour Retardant Under Slabs: 380 micron (15 mil) thick, polyethylene film.

.3 Membrane Air Barrier: self-adhering membrane of rubberized asphalt integrally bonded to polyethylene sheeting, minimum thickness 1.0 mm.

.1 Standard of Acceptable products:

.1 Bakor Blueskin SA

.2 Grace Perm-a-Barrier

.3 Meadows Air-Shield

2.2 ACCESSORIES

.1 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer, 50 mm wide for lap joints and perimeter seals, 25 mm wide elsewhere.

.2 Sealant: compatible with vapour retarder materials, recommended by vapour retarder manufacturer.

.3 Staples: minimum 6 mm leg.

.4 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

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 vapour retarder installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Ensure services are installed and inspected prior to installation of retarder.

.2 Install sheet vapour retarder on warm side of exterior ceiling, wall and floor assemblies prior to installation of finish materials to form continuous retarder.

.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.

3.3 EXTERIOR SURFACE OPENINGS

.1 Cut sheet vapour retarder to form openings and ensure material is lapped and sealed to frame.

3.4 PERIMETER SEALS

.1 Seal perimeter of sheet vapour barrier as follows:

.1 Apply continuous bead of sealant to substrate at perimeter of sheets.

.2 Lap sheet over sealant and press into sealant bead.

.3 Install staples through lapped sheets at sealant bead into wood substrate.

.4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.5 LAP JOINT SEALS

.1 Seal lap joints of sheet vapour barrier 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 staples through lapped sheets at sealant bead into wood substrate.

.5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.6 ELECTRICAL BOXES

.1 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:

.1 Install moulded box vapour barrier. Wrap boxes with film sheet providing minimum 300 mm perimeter lap flange.

.2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

3.7 CLEANING

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

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.

.1 Remove insulation material spilled during installation and leave work area ready for application of wall board.

.3 Waste Management: separate waste materials for in accordance with Section 01 74 19- Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section includes requirements for supply and installation of self-adhered air and vapour membranes that prevent exfiltration and infiltration between interior and exterior of building through wall and roof transition construction**.**

1.2 RELATED REQUIREMENTS

.1 Section 04 20 00: Masonry

.2 Section 06 10 00: Rough Carpentry

.3 Section 07 27 26: Fluid Applied Air Barrier Membrane

.4 Section 07 42 16: Preformed Aluminum Panels

.5 Section 07 46 19: Preformed Metal Siding

.6 Section 07 51 00: Built-Up Bituminous Roofing and Sheet Metal

.7 Section 07 54 23: Thermoplastic Olefin Roofing (TPO)

.8 Section 08 41 13: Aluminum Framed Entrances and Storefronts

.9 Section 08 44 13: Glazed Aluminum Curtain Wall

.10 Section 09 21 16: Gypsum Wallboard

1.3 REFERENCE STANDARDS

.1 American Society for Testing of Materials (ASTM):

.1 ASTM E96/E96M-10, Standard Test Methods for Water Vapour Transmission of Materials

.2 ASTM E2178-11, Standard Test Method for Air Permeance of Building Materials

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Conference:

.1 Convene a pre-installation conference two (2) weeks prior to commencing work of this section. Require attendance of parties directly affecting work of this section, including, but not limited to, the Departmental Representative, General Contractor, air and vapour barrier membrane contractor, air and vapour barrier membrane manufacturer's representative and substrate installer.

.2 Contact Departmental Representative two (2) weeks prior to pre-installation conference to confirm schedule.

.3 Review preparation and installation procedures and co-ordinating and scheduling required with related work.

.4 Record discussions of conference and decisions and agreements (or disagreements) reached and furnish copy of record to each party attending. Review foreseeable methods and procedures related to the vapour permeable air barrier membrane, including the following:

.1 Tour, inspect and discuss condition of substrate, penetrations and preparatory work performed by other trades.

.2 Review surface preparation, minimum curing period and installation procedures.

.3 Review special details and flashings.

.4 Review required submittals, both completed and yet to be completed.

.5 Review and finalize construction schedule related to work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.

.6 Review required inspections, testing, protection and repair procedures.

.7 Review weather and forecasted weather conditions, and procedures for coping with unfavourable conditions.

.2 Coordination: Coordinate interface of membranes specified in this Section with adjacent systems to ensure continuity of system and that junctions between various components are effectively sealed; verify with manufacturers and installers for installation procedures of materials incorporated into air and vapour membrane elements including membranes, transitions, coatings and sealants and continuity with roofing membrane.

1.5 SUBMITTALS

.1 Provide submittals in accordance with the General Conditions and Section 01 33 00.

.2 Action Submittals:

.1 Product Data: Submit manufacturer's product literature, and installation instructions required for complete and proper installation of air and vapour retarder elements including membranes, primers, fasteners, proprietary application equipment, etc.

.2 Samples: Submit representative sample of air and vapour membrane minimum 305mm x 305mm (12" x 12") with factory applied identification clearly visible.

.3 Safety Data Sheets:

.1 Submit WHMIS safety data sheets for inclusion with project record documents. Keep one copy of WHMIS safety data sheets on site for reference by workers.

1.6 QUALITY ASSURANCE

.1 Qualifications: Provide proof of qualifications when requested by Departmental Representative:

.1 Manufacturer: Obtain air and vapour membrane materials through one source from a single manufacturer or using materials from a secondary source that are acceptable to the manufacturer.

.2 Installer: Use an installation company that is acceptable to the manufacturer, using workers who are trained and approved by the membrane manufacturer having experience with projects of similar complexity and area.

1.7 ENVIRONMENTAL CONDITIONS

.1 Air and vapour barrier are not to be applied to surfaces that are either wet, oily, frosted, dirty or contaminated in any way.

.2 Ambient Conditions: Apply air and vapour membrane to substrate surfaces that are within manufacturer's installation temperature threshold range accounting for wind cooling and apparent temperature when actual temperature is approaching manufacturer's minimum temperature threshold.

.3 Air and vapour barrier are not to be applied over lightweight cast-in-place concrete containing high moisture or certain curing compounds. Cast-in-place concrete should be cured for a minimum of two weeks prior to application of air barrier membrane.

1.8 DELIVERY, STORAGE, HANDLING AND PROTECTION

.1 Coordinate deliveries with construction schedule and arrange for proper storage areas.

.2 All materials are to be stored in a clean, dry and protected area in their original containers sealed and undamaged. Manufacturer's labels are to be easily visible and undamaged.

.3 Care and precaution are to be exercised by the applicator so as not to damage the work of other trades. Applicator is responsible to take all necessary precautions to protect work of other trades during application.

.4 In addition to the above, store modified bituminous sheet type air and vapour barrier membrane as follows:

.1 Store rolls of membrane on end, in vertical position without leaning with selvage end up.

.2 Store materials away from direct heat or open flame.

.3 For installation in cold weather, store rolls of membrane in heated storage trailer for minimum of 24 hours with the temperature kept at 21 deg C and remove for application with as little exposure as possible to low ambient temperatures.

.5 Provide portable fire extinguishers within easy access of torching applications.

1.9 WARRANTY

.1 Manufacturer's Warranty: Submit manufacturer's warranty stating that air and vapour membranes and accessories are free of defects and are manufactured to meet manufacturer's published physical properties and material specifications as of the date of product delivery.

.2 Installer's Warranty: Submit installers warranty stating that air and vapour membranes and accessories are installed in accordance with manufacturer's recommendations and that membrane, transitions and through-wall flashing membranes, primers, mastics, adhesives and sealants are sourced from one manufacturer.

Part 2 Products

2.1 MANUFACTURERS

.1 Basis-of-Design products are named in this Section; form the basis-of-design materials for the project; additional manufacturers offering similar products may be incorporated into the work of this Section provided they meet the performance requirements established by the named products and provided they submit requests a minimum of five (5) days in advance of Bid Closing.

.2 Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

.1 Henry Company

.2 Soprema Inc.

.3 Tremco

2.2 MATERIALS

.1 Self adhering SBS modified bitumen reinforced membrane; having low temperature formulation appropriate for installation requirements; tested in accordance with ASTM E96 and ASTM E2178, and having the following nominal properties:

.1 Low Temperature Flexibility: Less than -10°C

.2 Basis of Design Products:

.1 Sopraseal Stick 1100-T by Soprema Inc.

.2 ExoAir 110LT by Tremco

.2 Primer: Solvent based, synthetic rubber adhesive type, quick setting, solvent based, roller consistency type primer.

.1 Basis of Design Product: Blueskin Primer by Henry Company.

.3 Air Barrier Sealant: High solids, rubber asphalt caulking and sealing compound.

.1 Basis of Design Product: 570-05 Polybitume Sealing Compound by Henry Company.

.4 Through Wall Flashing Membrane: 40 mils (1mm) thick x width to suit, strips of self-adhering, SBS rubberized asphalt laminated to a cross-laminated, high density polyethylene film with a siliconized release liner.

.1 Basis of Design Product: Blueskin TWF by Henry Company

.5 Packing Insulation: Loose, glass fibre or mineral fibre insulation, 1.0 lbs./cu.ft. density, and conforming to CAN/CGSB-51.11.

Part 3 Execution

3.1 EXAMINATION

.1 Ensure that surfaces to receive air barrier membrane are dry, firm, suitable for bond, and free from dust, dirt, loose material, projections, ice, frost, slick, grease, oil or other matter detrimental to bond of sheet type air barrier membrane.

.2 Report surfaces left unacceptable by other trades in writing to the Departmental Representative before commencing installation.

.3 Co-ordinate work of this section with the work of other sections.

.4 Commencement of work of this section implies acceptance of surfaces and conditions.

3.2 PREPARATION

.1 Prepare surfaces in accordance with manufacturer's written requirements for type of substrate; free from voids, spalled areas, loose aggregates or sharp points; clean surfaces to remove contaminants that could affect bond such as grease or wax, dust, dirt and debris.

.2 Apply primer to substrates when required by manufacturer at rate recommended by manufacturer; cover primed substrates on same day, reapply primer when work cannot be completed on the same day.

3.3 INSTALLATION

.1 Install air and vapour barrier membranes in accordance with manufacturer's written requirements, using appropriate equipment and skilled workers and as follows:

.1 Transition Membranes: Connect air and vapour membranes to adjacent assemblies having pre-installed transition membranes; install transition membranes where required to maintain continuity of building envelope.

.2 Through Wall and Flexible Flashings: Install flexible membranes where required to maintain flow direction to divert water away from face of building envelope.

.2 Separate air and vapour barrier membranes from incompatible materials and provide manufacturer's recommended transition materials required to maintain continuity of building envelope.

.3 Cut and tightly seal air and vapour barrier membrane around penetrations and protrusions to provide a continuous air barrier.

.4 Lap joints in air and vapour barrier membrane minimum of 75mm (3").

.5 Where masonry anchors and supports pass through air and vapour barrier membrane, ensure continuity of air and vapour barrier membrane by applying air barrier mastic all around/over masonry anchors.

.6 Prior to masonry being installed by section 04 20 00, inspect air and vapour barrier membrane for punctures, misaligned seams and fishmouths. Apply additional layer of air and vapour barrier membrane over damaged/affected areas, extending membrane minimum of 6" beyond damage in all directions.

3.4 SITE QUALITY CONTROL

.1 Allow access for review and inspection and testing of installed air and vapour barrier membrane, and repair of deficiencies before placement of insulation materials.

.2 Manufacturer's Site Services: Arrange for air and vapour barrier membrane manufacturer's technical personnel to review building envelope during installation.

.3 Owner reserves the right to engage a testing firm to perform air and vapour barrier membrane testing to confirm performance of installed membranes and insulation systems in accordance with Section 01 45 00; testing will be performed when the building mechanical systems are balanced and operating; when building is occupied, and climatic conditions are suitable for infrared thermographic scan of the building.

.4 Cooperate with testing agency; repair or replace air and vapour barrier membrane as directed by testing agency, at no additional cost to the Owner

3.5 CLEANING AND PROTECTION

.1 Protection: Protect membrane as recommended by manufacturer from effects of long-term exposure where membrane is open to the environment for prolonged time periods using opaque plastic sheets or tarpaulins; protect membrane from penetrations and damage by successive components of the Work; assign payment for repairs to responsible parties; make repairs in accordance with manufacturer's written instructions using original installers.

.2 Cleaning: Remove masking materials, debris, excess materials and equipment from site at completion of the work; conduct ongoing daily cleaning as directed by the Contractor; clean stains, drips or spills of coatings, sealants, mastic or primers visible on finished surfaces.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section includes requirements for supply and installation of factory formed, site assembled, non-structural, concealed fastener, architectural standing seam metal roofing system; including accessories required for weather tight installation; job site manufactured materials will not be acceptable for this project.

.2 Drawings indicate size, profiles, and dimensional requirements of metal roofing system and are based on the specific system indicated; do not modify intended aesthetic effects.

1.2 DEFINITIONS

.1 Metal Roofing System Assembly: Metal roofing system, attachment system components, miscellaneous metal framing, thermal insulation, and accessories necessary for a complete weather tight roofing system.

.2 Core Metal Thickness: Minimum thickness of base metal without metallic coatings or painted finishes.

1.3 RELATED REQUIREMENTS

.1 Section 07 21 13 Board Insulation

.2 Section 07 62 00 Prefinished Metal Flashing and Trim.

.3 Section 07 92 00 Joint Sealants

1.4 REFERENCE STANDARDS

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

.1 ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

.2 ASTM A755/A755M-11, Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products

.3 ASTM C1396/C1396M-11, Standard Specification for Gypsum Board

.2 Canadian General Standards Board (CGSB):

.1 CGSB 37-GP-56M, Membrane, Modified, Bituminous, Prefabricated and Reinforced for Roofing

.3 Canadian Standards Association (CSA):

.1 CSA A123.3-05 (R2010), Asphalt or Tar Saturated Roofing Felt

.2 CSA S136-07, North American Specification for the Design of Cold Formed Steel Structural Members

.4 Canadian Sheet Steel Building Institute (CSSBI):

.1 CSSBI 20M-99, Sheet Steel Cladding for Architectural, Industrial and Commercial Building Applications

.5 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA):

.1 Architectural Sheet Metal Manual, 5th Edition, 1993

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Construction Meeting: Arrange a pre-construction meeting in accordance with Section 01 31 19 – Project Meetings at project site with Contractor and Departmental Representative present before starting roof construction; purpose of meeting is to review methods and procedures related to roof construction and metal roofing system including; but not limited to, the following:

.1 Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.

.2 Review methods and procedures related to metal roofing system installation, including manufacturer's written instructions.

.3 Examine deck substrate conditions for compliance with requirements, including flatness and attachment to structural members.

.4 Review structural loading limitations of deck during and after roofing.

.5 Review flashings, special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect metal roofing system.

.6 Review temporary protection requirements for metal roofing system during and after installation.

.7 Review roof observation and repair procedures after metal roofing system installation.

.8 Departmental Representative will document proceedings, including corrective measures and actions required, and furnish copy of record to each meeting participant.

.2 Coordination:

.1 Coordinate installation of roof curbs, equipment supports, and roof penetrations.

.2 Coordinate metal roofing system with rain drainage work, flashing, trim, and construction of decks, parapets, walls, and other adjoining work to provide a leak proof, secure, and non-corrosive installation.

1.6 SUBMITTALS

.1 Provide required information in accordance with Section 01 33 00 – Submittal Procedures.

.2 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Product Data: Submit product data including; but not limited to, construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal roofing system and accessory.

.2 Shop Drawings: Submit shop drawings indicating fabrication and installation layouts of metal roofing system; details of edge conditions, joints, panel profiles, corners, anchorages, trim, flashings, closures, and accessories; and special details, identify between factory and site assembled work, include details for the following:

.1 Accessory details drawn at minimum 1:10 scale including; but not limited to, the following:

.1 Flashing and trim

.2 Gutters

.3 Downspouts

.4 Roof curbs

.3 Samples: Submit two (2) samples for each type of exposed finish required for Departmental Representative's verification of finishes, prepared in sizes as follows:

.1 Metal roofing system: 12" long by actual panel width; include fasteners, clips, closures, and other metal roofing system accessories.

.2 Trim and Closures: 12" long; include fasteners and other exposed accessories.

.3 Vapour Retarders: 6" square samples.

.4 Accessories: 12" long samples for each type of accessory.

.3 Informational Submittals: Provide the following submittals when requested by the Departmental Representative:

.1 Coordination Drawings: Coordination drawings drawn at minimum 1:100 indicating locations of penetrations and roof mounted items including; but not limited to, the following:

.1 Roof systems and attachments.

.2 Purlins and rafters

.3 Roof hatches

.4 Equipment supports

.5 Pipe supports and penetrations

.6 Lighting fixtures

.7 Snow guards

.8 Items mounted on roof curbs

1.7 PROJECT CLOSEOUT SUBMISSIONS

.1 Operation and Maintenance Data: Submit manufacturers written maintenance data for metal roofing system, include name of original installer and contact information for inclusion in maintenance manuals.

1.8 QUALITY ASSURANCE

.1 Qualifications: Provide proof of qualifications when requested by Departmental Representative:

.1 Manufacturer: Obtain each type of metal roofing system through one source from a single manufacturer.

.2 Installer: Use only installers that are trained and qualified by factory formed roofing panel manufacturer, and who have experience in projects of similar complexity and scope.

1.9 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements: Deliver components, sheets, metal roofing system, and other manufactured items to prevent damage or deformation; package metal roofing system for protection during transportation and handling.

.2 Storage and Handling Requirements: Unload, store, and erect metal roofing system in a manner to prevent bending, warping, twisting, and surface damage, and as follows:

.1 Protect metal roofing system to prevent wetting of materials, and as follows:

.1 Stack metal roofing system on platforms or pallets, covered with suitable weather tight and ventilated covering.

.2 Do not store metal roofing system in contact with other materials that might cause staining, denting, or other surface damage.

.2 Protect strippable protective covering on metal roofing system from exposure to sunlight and high humidity, except to extent necessary for period of metal roofing system installation.

.3 Protect foam plastic insulation from surface degradation, and as follows:

.1 Do not expose to sunlight, except to extent necessary for period of installation and concealment.

.2 Protect against ignition at all times. Do not deliver foam-plastic insulation materials to Project site before installation time.

.3 Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.10 SITE CONDITIONS

.1 Site Measurements: Verify locations of roof framing and roof opening dimensions by site measurements before metal roofing system fabrication and indicate measurements on shop drawings.

.2 Established Dimensions: Establish framing and opening dimensions and proceed with fabricating metal roofing system without site measurements where site measurements cannot be made without delaying the work or allow for site trimming of panels; coordinate roof construction to ensure that actual building dimensions, locations of structural members, and openings correspond to established dimensions.

.3 Ambient Conditions: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal roofing system in accordance with manufacturers' written instructions and warranty requirements.

1.11 WARRANTY

.1 Provide manufacturer's standard form of warranty stating that manufacturer agrees to repair or replace components of metal roofing system that fail in materials or workmanship within specified warranty period; failures will be considered to include; but are not limited to, the following:

.1 Structural failures, including rupturing, cracking, or puncturing.

.2 Deterioration of metals, metal finishes, and other materials beyond normal weathering.

.3 Deterioration of finishes, peeling or cracking of coating, failure to adhere to bare metal, colour fading and chalking.

.2 Warranty Period:

.1 Metal Roof System: Two (2) years from date of Substantial Performance.

.2 Finishes: Twenty (20) years from date of Substantial Performance.

.3 Weather Tightness: Five (5) years from date of Substantial Performance stating that manufacturer agrees to repair or replace metal roofing system failing to remain weather tight; including leaks, within specified warranty period.

Part 2 Products

2.1 MANUFACTURERS

.1 Basis-of-Design products are named in this Section; additional manufacturers offering similar setting systems may be incorporated into the work provided they meet the performance requirements established by the named products.

.2 Additional manufacturers offering similar Products may be incorporated into the work provided they meet the performance requirements established by the named products and provided they submit requests for substitution in accordance with Section 01 62 00 – Product Options a minimum of ten (10) days] in advance of Bid Closing.

.3 Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

.1 Berridge Manufacturing Company

.2 Canadian Metal Rolling Mills

.3 Vicwest Steel Inc.

2.2 STANDING SEAM METAL ROOFING SYSTEM

.1 Performance Requirements: Provide metal roofing system in accordance with performance requirements specified in this Section and as follows:

.1 Design and construct roof so that completed installation will not leak.

.2 Provide maximum deflection not exceeding 1/180 under system weight plus snow load and build-up, and wind and suction loads acting normal to the plane in accordance with the Building Code Climatic Data, wind load for 1:100 years.

.3 Provide movement of components without causing buckling, failure of joint seals, undue stress on fasteners when subject to seasoned temperature range, from -40-degree C to +50-degree C, and preceding noted wind and suction loads.

.4 Provide expansion joints to accommodate movement in wall system and between wall system and building structure where these movements are caused by deflection of building structure, without permanent distortion, damage to in-fills, racking of joints, breakage of seals, or water penetration into system.

.5 Provide for positive drainage to the exterior of all water entering or condensation occurring within the system.

.2 Panel Materials: Coated steel sheet with coil coating having galvanized finish using hot dip process and pre-coated using coil coating process in accordance with ASTM A755M, and as follows:

.1 Galvanized Steel Sheet: Aluminum-Zinc Alloy Coated Steel Sheet: ASTM A792/A792M-10, Class AZM150 coating designation, Grade 275; structural quality.

.2 Surface: Smooth, flat finish.

.3 Solar Reflective Index: 29 minimum.

.3 Auxiliary Levelling Surface: Gypsum board sheathing: ASTM C1396M roof sheathing material having treated core to provide temporary weather protection during installation, suitable for normal humidity buildings, and as follows:

.1 Thickness: As indicated

.2 Long Edges: Square.

.3 Location: Roof substrates over steel decks only.

.4 Acceptable Materials:

.1 CGC Gyplap Sheathing

.2 Georgia Pacific Toughrock Sheathing

.3 BPB Westroc Inc. Sheathing

.4 Ice and Water Shield Membrane: Self adhering, granular faced sheet manufactured in accordance with CGSB 37-GP-56M, minimum 1/16” thick, consisting of glass fibre mat reinforcing and SBS modified asphalt, granule faced, with release paper backing; cold applied; provide primer when recommended by ice and water shield manufacturer.

.5 Girts: Fabricated from minimum 3/64” nominal base metal thickness galvanized steel to ASTM A653/A653M-11, Grade 230 with Z275 zinc coating.

.6 Board Insulation: mineral fibre as specified in Section 07 21 13.

.7 Felts: CSA A123.36-05 (R2010), Type II (No. 30), asphalt saturated organic felts.

.8 Slip Sheet: Building paper, minimum 0.24 kg/m^2, rosin sized.

.9 Miscellaneous Metal Framing: Cold rolled steel framing in accordance with CSA S136-07, and as follows:

.1 Steel Sheet Components: Fabricated from 3/64” nominal base metal thickness galvanized steel to ASTM A653/A653M-11, with Z180 zinc coating.

.2 Hat Shaped, Rigid Furring Channels: Fabricated from 1/32” nominal base metal thickness galvanized steel, depth 7/8”.

.3 Cold Rolled Furring Channels: 1 ½" nominal bare steel thickness, with minimum ½" wide flange, depth 3/4".

.4 Furring Brackets: Adjustable, corrugated edge type, steel sheet with minimum 1/32" nominal bare steel thickness.

.5 Tie Wire: Zinc coated, soft temper, minimum 1 ½" nominal diameter wire, or double strand of 1 ¼" nominal diameter wire.

.6 Z-Bars: Slotted or non-slotted web, face flange 1 ¼" wide; wall attachment flange 7/8" wide x depth to suit insulation thickness, minimum 1/64" nominal bare metal thickness.

.10 Metal Framing Fasteners: Type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates as recommended by manufacturer.

2.3 ACCESSORY MATERIALS

.1 Provide components required for complete metal roofing system assembly including trim, copings, fasciae, corner units, ridge closures, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items; match material and finish of metal roofing system.

.2 Fasteners: Self tapping screws, bolts, nuts, self locking rivets and bolts, end welded studs, and other suitable fasteners designed to withstand design loads, and as follows:

.1 Provide exposed fasteners with heads matching color of metal roofing system by means of plastic caps or factory applied coating.

.2 Fasteners for Roof systems: Self drilling or self tapping, zinc plated, hex head carbon steel screws, with a stainless-steel cap or zinc aluminum alloy head and EPDM or neoprene sealing washer.

.3 Fasteners for Flashing and Trim: Blind fasteners or self drilling screws with hex washer head; no exposed fastenings on exposed faces.

.4 Blind Fasteners: High strength stainless steel rivets.

.3 Bituminous Coating: Cold applied asphalt mastic, SSPC-Paint 12, compounded for 3/64" dry film thickness per coat; inert type non-corrosive compound free of asbestos fibres, sulphur components, and other deleterious impurities.

.4 Flashing, Roof Curbs, Gutters and Downspouts, and Trim: Prefinished flashing materials to match roofing materials in accordance with Section 07 62 00.

.5 Snow Guards: Prefabricated, non-corrosive units designed installed without penetrating metal roofing system, and complete with predrilled holes, clamps, or hooks for anchoring, and as follows:

.6 Pipe Flashing: Pre-moulded, EPDM pipe collar with flexible aluminum ring bonded to base.

2.4 FABRICATION

.1 Fabricate and finish metal roofing system and accessories at the factory to greatest extent possible, using manufacturer's standard procedures and processes to obtain the indicated profiles and meeting dimensional and structural requirements for the Project.

.2 Fabricate flashing and trim in accordance with SMACNA recommendations that apply to the design, dimensions, metal, and other characteristics of item indicated.

2.5 FINISHES, GENERAL

.1 Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

.2 Variations in appearance of abutting or adjacent pieces are acceptable if they are within ½ the range of reviewed samples:

.1 Noticeable variations in the same piece are not acceptable.

.2 Variations in appearance of other components are acceptable if they are within the range of reviewed samples and are assembled or installed to minimize contrast.

Part 3 Execution

3.1 EXAMINATION

.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal roofing system supports, and other conditions affecting performance of work.

.2 Examine primary and secondary roof framing to verify that purlins angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roofing system manufacturer.

.3 Examine roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roofing system manufacturer.

.4 Examine roughing-in for components and systems penetrating metal roofing system to verify actual locations of penetrations relative to seam locations of metal roofing system before metal roofing system installation.

.5 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Clean substrates of substances harmful to insulation, including removing projections capable of interfering with insulation attachment.

.2 Install auxiliary levelling substrate boards over steel deck; attach with mechanical fasteners into top flutes of steel to prevent wind uplift.

.3 Install flashings and other sheet metal in accordance with requirements specified in Section 07 62 00.

.4 Install fasciae and copings in accordance with requirements specified in Section 07 62 00.

.5 Install sub-purlins, eave angles, furring, and other miscellaneous roof system support members and anchorage in accordance with metal roofing system manufacturer's written recommendations.

3.3 ICE AND WATER SHIELD INSTALLATION

.1 Install self adhering sheet ice and water shield, wrinkle free, on roof sheathing under metal roofing system.

.2 Apply primer if required by manufacturer and install in accordance with temperature restrictions of ice and water shield manufacturer; use primer rather than nails for installing ice and water shield at low temperatures.

.3 Apply over entire roof in shingle fashion to shed water, with end laps of not less than 6” staggered 24" between courses and as follows:

.1 Overlap side edges not less than 3 ½”.

.2 Roll laps with roller.

.3 Cover ice and water shield within 14 days.

.4 Install flashings to cover ice and water shield in accordance with requirements specified in Section 07 62 00.

.5 Apply slip sheet over ice and water shield before installing metal roofing system.

3.4 THERMAL INSULATION INSTALLATION

.1 Extend insulation in thickness indicated to cover entire roof in accordance with installation requirements in Section 07 21 13.

.2 Install insulation horizontally and hold in place with Z-shaped furring members spaced 24” O/C; securely attach narrow flanges of furring members to roof deck with screws spaced 24” O/C.

3.5 METAL ROOFING SYSTEM INSTALLATION

.1 Install metal roofing system in accordance with manufacturer's written instructions and as modified by this Section.

.2 Provide metal roofing system of full length from eave to ridge, unless restricted by shipping limitations.

.3 Anchor metal roofing system and other components of the Work securely in place, with provisions for thermal and structural movement:

.1 Site cutting of metal roofing system by torch is not permitted.

.2 Install panels perpendicular to purlins.

.3 Rigidly fasten eave end of metal roofing system and allow ridge end free movement due to thermal expansion and contraction; pre-drill panels before installing fasteners.

.4 Provide metal closures at peaks and each side of ridge and hip caps.

.5 Flash and seal metal roofing system with weather closures at eaves, rakes, and at perimeter of all openings; fasten with self tapping screws.

.6 Locate and space fastenings in uniform vertical and horizontal alignment.

.7 Install ridge and hip caps as metal roofing system work proceeds.

.8 Locate panel splices over, but not attached to, structural supports.

.9 Stagger panel splices and end laps to avoid a four-panel lap splice condition.

.10 Lap metal flashing over metal roofing system to allow moisture to run over and off the material.

.4 Use stainless steel fasteners for surfaces exposed to the exterior and galvanized steel fasteners for surfaces exposed to the interior.

.5 Protect against galvanic action where dissimilar metals contact each other or corrosive substrates, by painting contact surfaces with bituminous coating, by applying rubberized asphalt ice and water shield to each contact surface, or by other permanent separation as recommended by metal roofing system manufacturer.

.6 Install gaskets, joint fillers, and sealants where required for weatherproof performance of metal roofing system; include types of gaskets, fillers, and sealants recommended by metal roofing system manufacturer, and as follows:

.1 Seal metal roofing system end laps with double beads of tape or sealant, full width of panel.

.2 Seal side joints where recommended by metal roofing system manufacturer.

.3 Prepare joints and apply sealants in accordance with requirements in Section 07 92 00.

.7 Fasten metal roofing system to supports with concealed clips at each standing seam joint at location, spacing, and with fasteners recommended by manufacturer, and as follows:

.1 Install clips to supports with self tapping fasteners.

.2 Install pressure plates at locations indicated in manufacturer's written installation instructions.

.3 Crimp standing seams with manufacturer approved motorized seaming tool, so clip, metal roofing system, and factory applied sealant are completely engaged.

.8 Fasten metal roofing system to supports with concealed clips at each batten seam joint at location, spacing, and with fasteners recommended by manufacturer, and as follows:

.1 Install clips to supports with self-drilling fasteners.

.2 Apply battens to metal roofing system seams, fully engaged to provide weather tight joints.

.9 Provide metal soffit panels full width of soffits and install panels perpendicular to support framing; flash and seal panels with weather closures where metal soffit panels meet walls and at perimeter of all openings.

.10 Align bottom of facia panels and fasten with blind rivets, bolts, or self tapping screws; flash and seal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

3.6 ACCESSORY INSTALLATION

.1 Install accessories with positive anchorage to building and weather tight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

.2 Install components required for a complete metal roofing system assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

.3 Install flashing and trim in accordance with performance requirements, manufacturer's written installation instructions, and SMACNA recommendations; provide concealed fasteners where possible, and set units true to line and level; install work with laps, joints, and seams that will be permanently watertight and weather resistant.

.4 Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.

.5 Provide for thermal expansion of exposed flashing and trim:

.1 Space movement joints at equally spaced intervals to a maximum of 10 feet O/C with no joints allowed within 24” of corner or intersection.

.2 Form expansion joints of intermeshing hooked flanges, not less than 1” deep, filled with mastic sealant concealed within joints where lapped or bayonet type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof.

.6 Join gutter sections with riveted and soldered, or lapped and sealed joints:

.1 Attach gutters to eave with gutter hangers spaced not more than 48” O/C using manufacturer's standard fasteners.

.2 Provide end closures and seal watertight with sealant.

.3 Provide for thermal expansion.

.7 Join downspout sections with 1 ½” telescoping joints:

.1 Provide fasteners designed to hold downspouts securely 1” away from walls.

.2 Locate fasteners at top and bottom and at approximately 60” O/C between top and bottom fasteners.

.3 Provide elbows at base of downspouts to direct water away from building.

.8 Install roof curbs at locations indicated on Drawings; install flashing around bases where they meet metal roofing system.

.9 Attach snow guards to metal roofing system with adhesive, sealant, or adhesive tape, as recommended by snow guard manufacturer; do not use fasteners that will penetrate metal roofing system.

.10 Form flashing around pipe penetration and metal roofing system; fasten and seal to metal roofing system as recommended by manufacturer.

3.7 ERECTION TOLERANCES

.1 Shim and align metal roofing system units within installed tolerance of 6 mm in 6 metres on slope and location lines as indicated and within 3 mm offset of adjoining faces and of alignment of matching profiles.

3.8 SITE QUALITY CONTROL

.1 Engage a factory authorized service representative to inspect completed metal roofing system installation, including accessories and to report results in writing to Departmental Representative.

.2 Remove and replace applications of metal roofing system where inspections indicate that they do not comply with specified requirements.

.3 Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.9 CLEANING AND PROTECTION

.1 Remove temporary protective coverings and strippable films, if any, as metal roofing system are installed, unless otherwise indicated in manufacturer's written installation instructions.

.2 Clean finished surfaces as recommended by metal roofing system manufacturer upon completion of metal roofing system installation; maintain in a clean condition during remainder of construction.

.1 Replace metal roofing system components that become damaged or have deteriorated beyond successful repair by finish touch-up or similar minor repair procedures.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

.1 Sections of Division 1 apply to work of this Section.

1.2 QUALITY ASSURANCE

.1 Installer: Member in good standing of the Canadian Roofing Contractors Association, trained and approved by the manufacturer and having a minimum five years' experience in the installation of the work described in this Section and can show evidence of satisfactory completion of projects of similar size, scope and type. If requested, provide letter of certification from manufacturer stating that installer is certified applicator of its products, and is familiar with proper procedures and installation requirements required by the manufacturer.

.1 Provide adequate number of experienced workers regularly engaged in this type of work who are skilled in the application techniques of the materials specified. Provide at least one thoroughly trained and experienced superintendent on the job at all times roofing work is in progress.

.2 Maintenance Seminars: Provide, to the Owner, training seminars and recommendations on Product maintenance procedures.

.3 Pre-Installation Meeting: Two weeks prior to commencing work of this Section, arrange for manufacturer's technical representative to visit the site and review preparatory and installation procedures to be followed, conditions under which the work will be done, and inspect the surfaces to receive the work of this Section. Advise the Departmental Representative of the date and time of the meeting.

.4 Manufacturer's Site Inspection: Have the manufacturer's technical representative inspect the Work at suitable intervals during application and at conclusion of the work of this Section, to ensure the Work is correctly installed. When requested, submit manufacturer's inspection reports and verification that the work of this Section is correctly installed.

.5 Source Limitations: Obtain products from a single manufacturer.

1.3 SUBMITTALS

.1 Shop Drawings: Show components, details of each condition, locations of mechanical fasteners, flashing details, penetrations, seaming details, connections to air barrier system in walls, dimensions, materials and interface with adjacent construction.

1.4 PROJECT CONDITIONS

.1 Protect surfaces not designated to receive this work, from soiling or other damage as a result of this work.

.2 Proceed with roofing work only when weather conditions are in compliance with the manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with the manufacturer's requirements and recommendations.

.3 Install roofing on dry substrates, free from snow and ice, using only dry materials and during weather which will not introduce moisture into roof system.

.4 Ensure substrate temperature is in accordance with membrane manufacturer's recommendations.

.5 Take precautions to prevent drains from clogging during the roofing application. Remove debris at the completion of each day's work and clean drains, if required. At completion, test drains to ensure the system is free running and drains are watertight. Remove strainers and plug drains in areas where work is in progress. Install flags or other telltales on plugs. Remove plugs each night and screen drain.

.6 Provide protection, such as 19 mm (3/4") thick plywood, smooth and free of fasteners and splinters, for all roof areas exposed to traffic during construction.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials to the job site in the manufacturer's original, unopened containers or wrappings with the manufacturer's name, brand name and installation instructions intact and legible. Deliver in sufficient quantity to permit work to continue without interruption.

.2 Comply with the manufacturer's written instructions for proper material storage.

.1 Store materials, except membrane, between 60□F and 80□F in dry areas protected from water and direct sunlight. If exposed to lower temperature, restore to 60□F minimum temperature before using.

.2 Store materials containing solvents in dry, well ventilated spaces with proper fire and safety precautions. Keep lids on tight. Use before expiration of their shelf life.

.3 Store insulation on pallets, off the ground and tightly covered with waterproof materials.

.4 Remove damaged materials and replace with new materials at own expense.

1.6 WARRANTY

.1 Provide manufacturer's 15 year Total System Warranty, commencing from date of Substantial Performance, covering labor, workmanship and material without monetary limitation. The maximum wind speed coverage shall be peak gusts of 55 measured at 10 meters above ground level.

.2 Pro-rated System Warranties not acceptable.

.3 Include annual manufacturer inspection until end of warranty period.

Part 2 Products

2.1 MANUFACTURERS

.1 Specified Products: Work of this Section is based on specified products. Products by other manufacturers similar in function, design, performance, and construction complying with requirements of this Section may be incorporated into the Work subject to Departmental Representative's prior acceptance.

2.2 MATERIALS

.1 Membrane: ASTM D4637, EPDM membrane, 1.6 mm (0.060") thick, non-reinforced, black, 6. m (20') wide, largest single sheet possible with pre-applied splice tape. Sure-Seal by Carlisle Syn Tec Incorporated, or RubberGard by Firestone Building Products.

.2 Membrane Flashing and Vent Stacks: Uncured EPDM, 1.6 mm (0.060") thick, complete with premoulded corners.

.3 Sheathing: C1177/C1177M, glass-mat, water-resistant gypsum board, acceptable to membrane manufacturer, 16 mm (5/8") thick, Dens-Deck by Georgia-Pacific Corporation.

.4 Polyethylene Vapor Retarder: ASTM D 4397, 0.15 mm (6 mils) thick, minimum, with maximum permeance rating of 7.5 ng/Pa x s x sq. m (0.13 perm) and manufacturer's pressure-sensitive tape and lap adhesive.

.5 Laminated-Sheet Vapor Retarder: Kraft paper, 2 layers, laminated with asphalt and edge reinforced with woven fiberglass yarn with maximum permeance rating of 29 ng/Pa x s x sq. m (0.50 perm) and manufacturer's standard adhesive.

.6 Roof Insulation: CAN/ULC-S704, 138 kPa (20 psi) compressive strength, HCFC free polyisocyanurate foam rigid roof insulation board with bonded inorganic facers on top and bottom surfaces, LTTR to CAN/ULC-S770, in equal lifts of maximum 50 mm (2") thick.

.7 Tapered Insulation: CAN/ULC-S704-03, Type 2, Class 3, polyisocyanurate foam rigid roof insulation board, manufactured with HC blowing agent bonded to organic/inorganic fibre reinforced facers on top and bottom surfaces., taper cut to provide slopes indicated, on computer-controlled machine and sequence packed with detailed installation instruction. Minimum thickness 13 mm (1/2").

.8 Fasteners: Fasteners and pressure distribution plate No. 10 flat countersunk head self-tapping screws, Phillips, cadmium plated, length to suit application and penetrate roof deck by minimum 19 mm (3/4").

.9 Adhesives, Cements, Bonding Agents, Sealant, Sealer, Primer and Tapes: Manufacturer standard for intended end use.

.10 Metal Edging and Membrane Terminations: Manufacturer standard for intended end use.

.11 Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads or rolls, approximately 5 mm (3/16") thick, and acceptable to membrane roofing system manufacturer.

.12 Flashing and Trim Sheet Metal: Minimum 24 gauge core thickness, zinc coating Z275, ASTM A526M commercial quality sheet, stretcher levelled, or temper rolled to stretcher level standard of flatness. Prefinish exposed-to-view sheet metal surface in baked-on, two coat silicone polyester coating, system dry film thickness of 25 micron ±5 micron WeatherX by Valstar on exposed surfaces. Pretreat and prime surfaces prior to application of coating. Prime and wash coat finish unexposed surfaces.

2.3 FABRICATION - METAL FLASHING AND TRIMS

.1 Fabricate metal flashings and other sheet metal work to details shown. Form pieces in 2400 mm (8') maximum lengths. Make allowance for expansion at joints.

.2 Hem exposed edges on underside 13 mm (1/2”). Miter and seal corners with sealant.

.3 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.4 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

Part 3 Execution

3.1 PREPARATION

.1 Report any defects or irregularities in roof deck detrimental to roof application. Do not proceed until corrected.

.2 Check deck is properly installed in compliance with latest CRCA recommendations and specifications, with required slopes to attain positive drainage and drains are connected.

.3 Ensure openings, walls and projections through deck are completed and affixed and reglets, can’t strips and nailing strips are in place prior to membrane installation. Cooperate with other Sections for building-in.

.4 Ensure deck substrate scheduled to receive roof system is smooth, dry, clean and free of sharp projections, snow, frost and ice.

.5 Do not allow contaminants such as grease, fats and oils to come in direct contact with the roofing materials.

.6 Prior to commencement of work ensure roof drains have been installed at proper elevations relative to finished roof surface.

.7 Mechanically fasten sheathing to steel deck through the top flute of the deck. Lay sheathing perpendicular to deck flutes. Stagger end joints.

.8 Loose lay vapour retarder on steel deck. Seal and lap joints 100 mm (4”).

3.2 INSTALLATION - INSULATION

.1 Before laying any insulation, inspect vapour retarder and repair damage, if any. Ensure surface is free of wrinkles, air pockets, fishmouths or tears.

.2 Lay roof insulation in 2 layers, in parallel courses and stagger end joints in adjacent courses and stagger joints in adjacent layers. Bring each board into moderate contact with adjacent boards and do not force into place. Mechanically fasten insulation using screws and pressure distribution plates to membrane manufacturer’s requirements. Increase fasteners at roof perimeter and corners by 50% and 75% respectively.

.3 Apply tapered insulation in accordance with reviewed shop drawings, with joints staggered from insulation joints.

.4 Where insulation and overlay abuts an irregular surface, scribe to profile, elsewhere cut insulation square and neatly to provide plain butt joints at perimeter of insulation, at curbs and other vertical objects and surfaces.

.5 Lay only as much roof insulation and overlay that can be covered on same day with roofing membrane. At conclusion of day's work, seal exposed edges. Upon resumption of work, cut and remove sealed edges, square, neat and straight.

.6 Reduce thickness of insulation at drains by 12 mm (1/2”) for 1200 mm (4’) square centred on each drain to ensure free flow to drain.

.7 Keep insulation, tapered insulation and insulation overlay dry at all times.

3.3 INSTALLATION – MEMBRANE

.1 Comply with the manufacturer's published instructions for the installation of the membrane roofing system including proper substrate preparation, jobsite considerations and weather restrictions.

.2 Position sheets to accommodate contours of the roof deck and shingle splices to avoid bucking water.

.3 Unroll and position membrane without stretching. Allow the membrane to relax for approximately 1/2 hour before bonding. Fold the sheet back onto itself so half the underside of the membrane is exposed.

.4 When positioning membrane sheets, exercise care to locate all field splices away from low spots and out of drain sumps. All field splices should be shingled to prevent bucking of water.

.5 Apply bonding adhesive full coverage and in accordance with the manufacturer's published instructions, to both the underside of the membrane and the substrate. Allow the adhesive to dry until it is tacky but will not string or stick to a dry finger touch.

.6 Roll the coated membrane into the coated substrate while avoiding wrinkles. Brush down the bonded half of the membrane sheet with a soft bristle push broom to achieve maximum contact.

.7 Fold back the unbonded half of the membrane sheet and repeat the bonding procedure.

.8 Install adjoining membrane sheets in the same manner, overlapping edges approximately 100 mm (4”). Do not apply bonding adhesive to the splice area.

.9 Membrane Splicing (Adhesive Splice)

.1 Fold the top sheet back and clean the dry splice area minimum 75 mm (3”) wide of both membrane sheets by scrubbing with clean natural fiber rags saturated with recommended cleaner.

.2 Apply splicing cement and in seam sealant in accordance with the manufacturer's specifications and roll the top sheet onto the mating surface.

.3 Roll the splice with a 50 mm (2”) wide steel roller and wait at least 2 hours before applying lap sealant to the splice edge following the manufacturer's requirements.

.4 Cover splices without in-seam sealant with fully adhered uncured flashing.

.10 Membrane Splicing (Tape Splice)

.1 Overlap adjacent sheets and mark a line 12 mm (1/2”) out from the top sheet.

.2 Fold the top sheet back and clean the dry splice area minimum 64 mm (2-1/2”) wide of both membrane sheets with recommended cleaner.

.3 Where splice tape is not pre-applied, apply splice tape to bottom sheet with the edge of the release film along the marked line. Press tape onto the sheet using hand pressure. Overlap tape roll ends a minimum of 25 mm (1”).

.4 Remove the release film and press the top sheet onto the tape using hand pressure.

.5 Roll the seam toward the splice edge with a 50 mm (2”) wide steel roller.

.6 Install a 150 mm (6”) wide section of flashing over splice intersections and seal edges of flashing with lap sealant.

.11 Walkway: Provide walkways at traffic concentration points such as roof hatches, access doors, rooftop ladders, and locations indicated. Adhere walkways pads to membrane in accordance with the manufacturer's specifications.

.12 Daily Seal: When the completion of work is not achieved by the end of the work day, provide a daily seal to temporarily close the membrane to prevent water infiltration, using manufacturer’s sealers or other acceptable membrane seal in accordance with the manufacturer's requirements.

3.4 INSTALLATION - FLASHING

.1 Continue the deck membrane as wall flashing where practicable.

.2 Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.

.3 Roof Drain Flashing: Carry flashing down into sump to edge of drain fitting. Embed flashing flange in full bed adhesive or pourable sealer. Extend flashing 200 mm (8") beyond drains onto roof membrane.

.4 Vent Stacks: Embed flashing in full bed of adhesive carry over vents and extend flashing 200 mm (8") beyond vents onto roof membrane.

.5 Lap joints 100 mm (4"), remove wrinkles and buckles, and overcoat with sealer.

3.5 INSTALLATION - METAL FLASHINGS AND TRIMS

.1 Install sheet metal work in accordance with CRCA specifications, using concealed fastenings except where approved before installation.

.2 Counterflash membrane flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock forming tight fit over hook strips.

.3 Lock end joints and caulk with sealant.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Furnish labour, materials and other services to complete the fabrication and installation of;

- .1 Cap and base flashing; curb flashings,
- .2 Roof edge flashing,
- .3 Flashing at intersection of roof with vertical surfaces,
- .4 Break metal flashings where shown,
- .5 Prefinished flashings where indicated,
- .6 Any other flashing as indicated on the drawings or as required, including all materials and fitments required for the operation of any unit furnished, in the manner, direction and performance shown on the shop drawings and specified herein.

.2 Furnish, complete, all materials which shall be installed by other trades as specified and/or shown on the drawings including:

- .1 Furnish to Section 04 20 00 all metal flashings and counter flashings which are to be built into masonry work.

1.2 RELATED REQUIREMENTS

.1 Section 04 20 00: Masonry

.2 Section 05 40 00: Cold Formed Metal Framing

.3 Section 05 50 00: Miscellaneous Metals

.4 Section 06 10 00: Rough Carpentry

.5 Section 07 53 23: Ethylene-Propylene-Diene-Monomer Roofing

.6 Section 07 71 36: Metal Soffits, Gutters and Rainwater Goods

.7 Section 07 92 00: Sealants

1.3 REFERENCE STANDARDS

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

- .1 ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process.

.2 Canadian General Standards Board (CGSB):

- .1 CAN/CGSB-1.108-M89, Bituminous Solvent Type Paint
- .2 CAN/CGSB-1.181-99, Ready Organic Zinc-Rich Coating
- .3 CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound

.3 Canadian Roofing Contractors Association

- .1 CRCA Specifications Manual

1.4 SUBMITTALS

.1 Provide submittals specified and as required to assess conformance with the Contract Documents, in accordance with the Contract Requirements, Contract General Requirements and Section 01 33 00.

.2 Submit shop drawings indicating material, thickness and finish.

.3 Submit duplicate 4 sq.in. samples of each type of sheet metal material, colour and finish for review by Departmental Representative prior to fabrication.

1.5 QUALITY ASSURANCE

.1 Fabricator and tradesmen executing the work of this Section shall have had a minimum five (5) years continuous Canadian experience in successful manufacture and installation of Work of type and quality shown and specified. Submit proof of experience upon Departmental Representative's request.

.2 Erection of metal flashing systems shall be by workmen especially trained and experienced in this type of work. Have a senior, qualified representative at the job site to direct the work of this Section at all times.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Store materials flat at site under protection to prevent staining from the work of other trades or from collection of water on material and secured against wind damage.

.2 Carefully store preformed sheet metal work in such a manner as to prevent twisting, bending and rubbing.

.3 Protect sheet metal work from corrosive materials and dissimilar metals.

1.7 WARRANTY

.1 Warrant the work of this Section against defects in materials and workmanship in accordance with General Conditions, but for a period of two (2) years. Agree to promptly make good defects which become evident during warranty period without cost to the Owner.

.2 Without restricting the generality of the Warranty, defects shall include deformation, buckling, leakage, weather tightness, failure of anchors and fastenings, failure of paint coating and sealants.

.3 Promptly make good defects and/or failures in the work of this Section upon written notification by the Owner that such exist. Remedy shall include labour, materials, equipment and services required to make good defective work, and to replace components and finishes and Owner's property damaged or disturbed in the course of remedying defects.

Part 2 Products

2.1 MATERIALS

.1 Sheet Metal: Prefinished galvanized sheet steel to ASTM A653/A653M-11 Grade A with G90 designation zinc coating to ASTM A653/A653M-11, factory precoated with Series 8000 paint finish, minimum 26 gauge. Standard colour range to Departmental Representative’s later selection.

.2 Hold-down, fastener clips - 20 ga. galv. steel sheet as above, unpainted.

.3 Nails, bolts screws and rivets: Material - galvanized steel, stainless steel or same metal as material to be fastened. Type - to approved samples.

.4 Bituminous Paint: Conforming to CAN/CGSB-1.108-M, Type 2.

.5 Field Touch-Up Paint: Zinc rich anti-corrosion primer, conforming to CAN/CGSB-1.181-92, 'Galvafroid, Grade SB' by W.R. Meadows of Canada Limited and top coating of type and colour to match finish sheet.

.6 Underlay for metal flashing: Asphalt laminated 3.6 to 4.5 kg kraft paper.

.7 Sealant: Multi-component, chemical curing epoxidized polyurethane type sealant conforming to CAN/CGSB-19.24-M90, 'DYmeric 240' by Tremco (Canada) Ltd. or approved equal. Colour as selected later by Departmental Representative. Provide primers, bond breakers and cleaning agents as recommended by the sealant manufacturer.

.8 All other materials not specifically described but required for a complete and proper installation of the work of this Section shall be new first quality of their respective kinds and subject to the approval of the Departmental Representative.

2.2 FABRICATION

.1 Fabricate metal flashings and other sheet metal work to applicable CRCA 'FL' series specifications and as detailed.

.2 Form flashings, counter flashings, scuppers and copings as required to suit each condition. Use prefinished sheet steel in all locations. Form pieces in 8'-0" maximum lengths. Make allowance for expansion at joints.

.3 Fabricate sheet metal components with lines, arises and angles sharp and true and plane surfaces free from objectionable wave, warp or buckle.

.4 Mitre and seal corners with sealant. Form drip edging at 45 deg angle, secure with a continuous 20 ga. hold-down clip.

.5 Exposed edges of sheet metal shall be folded back to form a 1/2" wide hem on the side concealed from view. Prefabricate corner pieces for flashings and copings. The workmanship and methods employed for forming, anchoring, cleating and the provision for expansion and contraction of sheet metal work shall be to the approval of the Departmental Representative.

.6 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.7 Fabricate scuppers and overflow scuppers to applicable CRCA 'FL' Series details and as detailed.

.8 Apply two coats of bituminous paint to metal surfaces to be in contact with masonry, concrete, mortar or dissimilar metals.

2.3 FINISHING

.1 Provide 8000 series finished sheet for all work. Colour: As selected by the Departmental Representative from the manufacture’s standard product line

Part 3 Execution

3.1 EXAMINATION

.1 Inspect substrate surfaces on which the work of this Section is erected for any irregularities detrimental to the application and performance of the Work. Confirm conditions satisfactory before proceeding. Report to Departmental Representative in writing, defects of work prepared by other trades and unsatisfactory site conditions. Commencement of work implies acceptance of surfaces and conditions.

3.2 INSTALLATION

.1 Metal flashing shall be in compliance with best sheet metal trade practice and shall in no way be contrary to sheet metal practice that will qualify for the Guarantee Certificate specified. Install with "S" lock expansion joints or standing seams incorporated on end of flashing length and all joints sealed with mastic.

.2 Provide continuous starter strips to present true, non-waving leading edge. Provide clips and anchor to backup in an approved manner to provide rigid, secure installation. Conceal fastenings in completed flashing. Lap, lock and seal all seams.

.3 Provide underlay under sheet metal. Secure in place and lap joints 100mm (4").

.4 Install sheet metal flashings, cap flashings and copings as indicated on drawings using flat lock seams. Make joints to permit thermal movement. Make surfaces free from buckling, warp, wave, dents, oil canning or other defects. Make corners square and surfaces straight and in true planes. Equally space joints in cap flashings to suit wall panel module. Space seams not farther apart than 2439mm (8').

.5 All sheet and strip flashing to be held in place by 14 gauge galvanized iron clips of a size and type to be determined by the construction requirements, except where specifically detailed on the drawings.

.6 Caulk flashing at cap flashing with sealant.

.7 Lock end joints and caulk with sealant.

.8 Use rubber-asphalt sealing compound for joints between sheet metal and bitumen.

.9 Supply rigid flashing, copings and sheet metal back-up to other trades where required to be built into other work at doors, windows, block openings, curbs and where shown on drawings.

.10 Take careful note of fans, vents, etc., on mechanical drawings to determine whether flashing and counter flashing is required or whether units are self-counter flashing.

.11 Caulking shall be installed as per written manufacturer's recommendations.

.12 Exposed fastenings will be permitted where indicated or where concealed fastening is not possible. Obtain Departmental Representative's approval of exposed fastenings and methods of making same.

.13 If exposed screws or bolts are used, use cupped neoprene washers.

.14 Install scupper drains and overflow scupper drains as indicated on drawings, in strict accordance with CRCA manual.

3.3 CLEANING

.1 Remove, as the work progresses, all excess or foreign material which would set up or become difficult to remove from finished surfaces.

.2 Do all final cleaning upon completion of the Work of this Section. Leave building and Work in condition to meet the approval of the Departmental Representative.

.3 Remove excess sealant by the moderate use of mineral spirits or other solvent acceptable by the sealant manufacturer.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This section shall include the supply and installation of all prefinished metal soffits, fascias, gutters and rainwater goods as indicated on the drawings and specified herein.

1.1 RELATED REQUIREMENTS

.1 Section 04 21 13: Brick Masonry

.2 Section 05 62 00: Prefinished Metal Flashing and Trim

.3 Section 06 10 00: Rough Carpentry

.4 Section 07 41 16: Standing Seam Metal Roofing System

.5 Section 07 53 23: Ethylene-Propylene-Diene-Monomer Roofing

.6 Section 07 92 00: Sealants

.7

1.2 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturer and tradesmen executing the work of this section shall have had a minimum five (5) years continuous Canadian experience in successful manufacture and installation of work of type and quality shown and specified. Submit proof of experience upon Departmental Representative's request.

.2 Erection of metal soffits, gutters and rainwater goods shall be by workers especially trained and experienced in this type of work. Have a senior, qualified representative at the job site to direct the work of this section at all times.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Shop Drawings:

.1 Submit fully dimensional shop drawings to Departmental Representative showing construction, assembly, elevations, sections and interfacing with work of other sections.

.2 No work of this section shall be fabricated until shop drawings and all other related submittals, documentation, certifications and samples as required by this section, have been reviewed by the Departmental Representative.

.3 Details shall indicate metal thicknesses, areas to be sealed and sealant materials, gaskets, type of joints, flashings, trim, finishes, fasteners and all anchorage assemblies and components and erection details.

.3 Samples:

.1 Submit to the Departmental Representative for approval, samples of materials and components to be used in the system, prior to fabrication of work together with name of manufacturer and technical literature. Submit 300mm x 300mm samples of prefinished metal.

1.4 DESIGN REQUIREMENTS

.1 Design gutters and rainwater goods to contain volume rainwater coming off sloped roof areas in compliance with the requirements of the local Building Code and the requirements of all authorities having jurisdiction.

.2 Design total systems confirm adequacy of design, proper provision for and use of all proprietary materials and components from other suppliers forming part of the work of this section.

.3 Co-ordination:

.1 Co-ordinate the work of this section with related trades to ensure best quality installation.

1.5 WORKMANSHIP

.1 Joints and intersecting members shall be accurately fitted, in true planes, square, plumb, straight, true with tight joints and intersections. Provide adequate reinforcing, anchorage and fastenings.

.2 Execute the work of this section in accordance with the recognized highest standards of workmanship of the industry.

.3 Exposed steel surfaces shall be smooth and free from imperfections such as warping, buckling, scratches, dents and abrasion.

.4 Thickness of metal shall be adequate for various conditions.

.5 Isolate where necessary to prevent electrolysis due to dissimilar metal to metal contact or metal to masonry or concrete. Use bituminous paint or other approved divorcing membrane.

.6 Ensure proper use of proprietary materials in strict accordance with the material manufacturer's directions.

1.6 DELIVERY, STORAGE, HANDLING AND PROTECTION

.1 Co-ordinate deliveries to comply with construction schedule and arrange ahead for off-the-ground, under cover storage locations. Do not load any area beyond the design limits.

.2 Adequately protect and crate all components against damage, dirt, disfigurement and weather.

.3 Assembled units and/or their component parts shall be transported, handled and stored in a manner to preclude damage. Accessory materials required for erection at the site shall be delivered to the site in manufacturer's labelled containers. Remove all units or components which are cracked, bent, chipped, scratched or otherwise unsuitable for installation and replace with new.

.4 Provide safe and adequate equipment on the Site to execute the work of this section, hoisting, scaffolding, staging, safety protection equipment, tools, plant and other equipment required for the completion of the work of this section.

.5 Delivered damaged materials or materials which do not comply with this section shall be rejected by Departmental Representative, removed from the Site and replaced with acceptable materials at Contractor's expense.

.6 Adequately protect the structure and work of all other trades during delivery, storage, handling and erection of the work of this section.

.7 Components being hoisted to the working level shall be adequately banded and carefully slung employing steel wire rope.

.8 Bundles shall be tag lined during the ascent of the hoisting operation. Precaution shall be taken to avoid damage to metal components and to prevent marring of exposed surfaces.

.9 Metal components, after being positioned, shall be adequately secured in place as quickly as possible and prior to leaving the job site at the end of the working day.

.10 Loose bundles of metal components shall be adequately secured at the completion of each working day.

.11 Scaffolds, platforms, ladders, and the like, required by the erector for installation of metal components shall be properly secured to prevent accidental movement or collapse.

Part 2 Products

2.1 MATERIALS

.1 Steel:

.1 Sheet steel conforming to ASTM A653/A653M-11, structural quality, Grade 'A' with a minimized spangle zinc coating of Z275 conforming to ASTM A653/A653M-11, shall be used for preformed metal soffits, trims, fascias, gutters, rainwater goods and flashings.

.2 Metal fascias and flashings shall be minimum 24 gauge required base steel nominal thickness or thicker, to meet design requirements.

.3 Metal gutters and rainwater goods shall be minimum gauge required base steel nominal thickness or thicker, to meet design requirements.

.2 Preformed Metal Soffit:

.1 Standard of Acceptable Manufacturers:

.1 AD 300 by VicWest

.2 P-12 by Peerless Enterprises

.3 S-12 by Canadian Metal Rolling Mills

.3 Flat Stock Material:

.1 Minimum thickness to suit design requirements, coil coated sheet steel.

.4 Roofing Cement:

.1 Cut back asphalt plastic cement conforming to CAN/CGSB-37.5.

.5 Lap Cement:

.1 Fibrated cut back asphalt plastic cement conforming to CAN/CGSB-37.4.

.6 Bituminous Paint:

.1 Conforming to CAN/CGSB-1.108, Type 2.

.7 Nails and Spikes:

.1 Galvanized steel nails and spikes of sufficient length and conforming to CSA B111, Table 12.

.8 Sealant:

.1 Multi-component, chemical curing epoxidized polyurethane conforming to CAN/CGSB-19.24, 'Dymeric 240' by Tremco (Canada) Ltd. Colour as selected later by Departmental Representative.

.2 Primers: As recommended by sealant manufacturer to suit applicable conditions.

.9 Recessed Reglets:

.1 Preformed 0.70mm prefinished galvanized steel channel with face and ends covered with plastic tape.

.10 Eavestrough Brackets:

.1 3mm x 38mm prefinished galvanized steel straps.

.11 Eavestrough Spacers:

.1 2mm x 38mm prefinished galvanized steel straps.

.12 Eavestrough Anchors:

.1 10mm diameter x 150mm long galvanized lag screws and ferrules.

.13 Field Touch-Up Paint:

.1 Zinc rich anti-corrosion primer, conforming to CAN/CGSB-1.181, 'Galvafroid, Grade SB' by W.R. Meadows of Canada Limited and top coating of type and colour to match finish sheet.

2.2 FABRICATION

.1 Form metal rake and eave edge flashings from 0.55mm thick prefinished galvanized steel.

.2 Form curb metal flashings from 0.55mm thick prefinished galvanized steel.

.3 Form eavestroughs and downspouts from prepainted galvanized sheet steel. Form eavestroughs of 100mm widths using continuous rolling process. Downspouts shall be corrugated type for ogee profile eavestroughs and rectangular box type for rectangular profile eavestroughs. Eavestroughs of different profiles and girths shall require different metal thicknesses as follows:

Ogee Profile	Girth Thickness	Nominal Size
100mm	255mm	.48mm
150mm	380mm	.55mm

Rectangular Profile	Girth Thickness	Nominal Size
100mm	510mm	.55mm
150mm	530mm to 635mm	.70mm

.4 Fabricate all flashings components to maximum length of 2400mm.

.5 Form rake edge flashing with 100mm wide deck flange and minimum 100mm deep fascia flange with 15mm x 45E doubled drip edge.

.6 Form eave edge flashing with 100mm wide deck flange and minimum 100mm deep fascia flange.

.7 Overbrake rake and eave flashings slightly so that when installed, fascia flashings are sprung tightly to fascia boards or wall fascia panels.

.8 Form flashing and counterflashing for penetrations from 0.70mm thick prefinished galvanized sheet steel.

.9 Form valley flashing from 0.70mm thick prefinished galvanized sheet steel. Sheet shall be wide enough to extend 250mm from either side of the valley.

2.3 FINISH

.1 Preformed metal soffits, fascias, gutters, rainwater goods and metal flashings shall be prefinished coil coated material in accordance with Technical Bulletin No. 7 "Prefinished and Post Painted Galvanized Sheet Steel for Exterior Building Products" of the Canadian Sheet Steel Building Institute. (CSSBI), in CSSBI 5,000 Series finish.

.2 Colour: As selected by Departmental Representative from manufacturer's full available colour range including extended colour range.

Part 3 Execution

3.1 EXAMINATION AND PREPARATION

.1 Inspect areas of the Work over which the work of this section is dependent for any irregularities detrimental to the application and performance of the work of this section.

.2 Notify Departmental Representative in writing of all conditions which are at variance with those in the Contract Documents and/or detrimental to the proper and timely installation of the work of this section. The decision regarding corrective measures shall be obtained from the Departmental Representative prior to proceeding with the affected work of this section.

.3 Coordinate work of this section with work of other sections.

.4 Commencement of work of this section implies acceptance of surfaces and conditions.

3.2 INSTALLATION

.1 Join all prefinished steel components with sealant and cadmium plated screws.

.2 Lap flashing joints 50mm and seal both sections along lap with sealant. Nail joints securely.

.3 Backpaint sheet metal with bituminous paint on surfaces in contact with concrete, masonry, other cementitious materials or dissimilar metal.

.4 Where reglet detail is indicated or required, insert metal flashing into reglet to form tight fit. Seal flashing into reglet with sealant.

.5 Set edge flashing on deck along rake and eave edges.

.6 Nail deck flange to deck with two rows of annular ringed nails. Set one row 25mm from fascia board with nails at 200mm O.C. Set second row 25mm from cut edge of metal with nails at 400mm O.C., staggered with first row.

.7 Secure 100mm wide eavestroughs to building with galvanized lag screws through spacer sleeves at 750mm O.C.

.8 Secure eavestroughs over 100mm wide with brackets at 750mm O.C. Install spacer bars at 750mm O.C. Stagger position of brackets and spacer bars.

.9 Slope eavestroughs to downspouts.

.10 Install eavestroughs in maximum 1500mm lengths. Close ends of each length. Allow 15mm between sections. Install to each section at least one downspout.

.11 Install "ells" and "tees" as required, and secure downspouts to wall with prepainted galvanized sheet steel straps at 1500mm O.C., minimum 2 straps per downspout.

.12 Install valley flashing over valley ice dam protection, nailing as far from valley centre as possible and having 150mm headlap.

.13 Install prefinished metal soffit panels complete with all edge trims level to within 3mm in 2400mm.

.14 Install continuous, prefinished perimeter soffit vents to provide ventilation of concealed spaces in accordance with OBC requirements.

3.3 CLEAN UP AND REPAIRS

.1 Clean and make good to the Departmental Representative's approval, surfaces soiled or otherwise damaged in connection with the work of this section. Pay the cost of replacing finishes or materials that cannot be satisfactorily cleaned, without additional cost.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Supply and install materials in accordance with published 'Through-Penetration Firestop Systems' in UL's Fire Resistance Directory or the publication of another approved independent laboratory.

1.2 RELATED REQUIREMENTS

.1 Section 04 20 00: Masonry

.2 Section 07 92 00: Sealants

1.3 REFERENCE STANDARDS

.1 Underwriters Laboratories of Canada (ULC):

.1 CAN/ULC S115-05, Standard Method of Fire Tests and Firestop Systems

.2 American Society for Testing and Materials (ASTM):

.1 ASTM E814-11a, Standard Test Method for Fire Tests of Penetration Firestop Systems

1.4 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Shop Drawings:

.1 Provide details indicating all reinforcing, anchorages, fastening and proposed method of installation for the various conditions within the project.

.3 Samples:

.1 Submit samples of each type of firestop and smoke seal material and accessory.

1.5 QUALITY ASSURANCE

.1 Applicator shall be licensed by the manufacturer of fireproofing materials.

.2 Conform to flame and temperature ratings established by ULC CAN4-S115-05 and ASTM E814-11a.

.3 Submit manufacturer's certification that materials meet or exceed specified requirements.

.4 Maintain flame and temperature ratings equal to surrounding materials.

1.6 DELIVERY, STORAGE, HANDLING AND PROTECTION

.1 Deliver materials in original, unopened packages bearing name of manufacturer and product identification.

.2 Store materials off ground, under cover, and away from damp surfaces.

1.7 SITE CONDITIONS

.1 Do not apply materials when temperature of substrate material is below 4 deg C and surrounding air temperature is below 4 deg C, for 24 hours prior to application.

Part 2 Products

2.1 MATERIALS

.1 Bears UL, ULC or Warnock Hersey label and confirmation of compliance with ASTM E814-11a or CAN4-S115.

.2 Provide fire stopping and smoke sealing systems in accordance with CAN4-S115-M and shall also conform to special requirements in part 3.5 of the Building Code.

.3 Fire-resistant rating of fire stopping material assemblies must meet or exceed the fire-resistance rating of the floor or wall section being penetrated.

.4 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control shall be elastomeric seal type. Do not use a cementitious, or rigid seal at such locations.

.5 Primers shall be to manufacturer's recommendation for specific material, substrate, and end use.

.6 Damming and backup materials, supports and anchoring devices shall be to manufacturer's recommendations, and in strict accordance with tested assembly being installed as acceptable to authorities having jurisdiction.

.7 Sealants for vertical joints, shall be non-sagging type.

2.2 MANUFACTURERS

.1 Fire Rated Separation Wall: Acceptable Material: Hilti Fire Stop Systems - System No. C-AJ-8207

.1 Hilti Construction Chemicals, Div of Hilti Inc — CP648-E- W25/1" Wrap Strip

.2 Hilti Construction Chemicals, Div of Hilti Inc — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant

.3 Hilti Construction Chemicals, Div of Hilti Inc — CFS-BL Firestop Block

.4 Hilti Construction Chemicals, Div of Hilti Inc — FS-ONE Sealant or CP618 Firestop Putty Stick

.2 Penetrations and Viods: Hilti Construction Chemicals, Div. of Hilti Inc — Fire Stop System to suit penetration/void size and material.

.3 Single Source: To maintain control and integrity of the firestop applications a single manufacturer should be used. Specific UL or approved listing agencies systems applicable to each type of firestop condition should be supplied by one manufacturer.

Part 3 Execution

3.1 PROTECTION

.1 Mask adjacent work of other Sections as necessary to avoid spillage onto adjoining surfaces. Remove stains on adjacent surfaces as required.

3.2 PREPARATION

.1 Examine sizes and conditions to establish correct thickness and installation of backup materials. Ensure surfaces are dry and frost free.

.2 Clean bonding surfaces of deleterious substances including dust, paint, rust, oil, grease and other foreign matter which may otherwise impair effective bonding.

.3 Do not apply firestops and smoke seals to surfaces previously painted or 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 Prepare surfaces in accordance with manufacturer's instructions.

.5 Priming and Sealing: Prime surfaces in accordance with manufacturer's instructions.

3.3 APPLICATION

.1 Mix materials in accordance with manufacturers' written instructions.

.2 Apply in strict accordance with ULC certification and manufacturer's recommendations to provide a temperature and flame rated seal equal as a minimum to the rating of the wall or floor surrounding.

.3 Seal all holes or voids made by penetrations to ensure an air and water resistant seal.

.4 Seal all joints to ensure an air and water resistant seal, capable to withstand compression due to thermal, wind or seismic joint movement.

.5 Consult with Departmental Representative prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.

.6 Apply to mechanical and electrical service through-penetrations, to formed, sleeved, or cored openings in smoke and fire rated masonry and structural floors and ceilings.

.7 Coordinate with plumbing, HVAC and electrical contractors to ensure proper firestopping application, providing smoke seal around penetrations through fire rated assemblies. Ensure that end joints between lengths of firestopping material have been properly sealed.

.8 Apply to head of smoke and fire rated wall abutting underside of structure (concrete or steel deck).

.9 Apply to control joints in rated stud walls.

.10 Apply to penetrations for passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire rated vertical barriers (walls and partitions), horizontal beams (floor/ceiling assemblies) and vertical service shaft walls and partitions.

.11 Apply to sating slots gaps between edge of floor slabs and curtain walls.

.12 Apply to openings between structurally separate sections of walls and floors.

.13 Apply to gaps between tops of walls and ceiling or roof assemblies.

.14 Apply to expansion joints in fire rated walls and floors.

.15 Apply to openings and penetrations in fire rated partitions or walls containing fire doors.

.16 Apply to openings around structural members which penetrate fire rated floors or walls.

.17 Apply firestop and smoke seal materials in accordance with manufacturer's directions, with sufficient pressure to properly fill and seal openings.

.18 Tool or trowel exposed surfaces.

.19 Remove excess compounds promptly as work of this Section progresses and upon completion of work of this Section.

3.4 CURING

.1 Cure materials in accordance with manufacturer's instructions.

.2 Do not cover up materials until proper curing has taken place.

3.5 IDENTIFICATION

.1 Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:

.1 The words: "Warning: Through-Penetration Firestop System - Do Not Disturb"

.2 Contractor's name, address and telephone number.

.3 Designation of applicable testing and inspection agency.

.4 Date of installation.

.5 Manufacturer's name for firestop materials.

3.6 CLEAN UP AND REPAIRS

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

.2 Remove excess materials using recommended procedures, as work progresses.

.3 Remove dams after initial set of firestops and smoke seals as required.

.4 Correct staining and discolouring of adjacent surfaces as directed by Departmental Representative.

.5 Remove all debris and excess materials entirely from the site and leave the work in a neat and tidy condition.

.6 Perform one simulated smoke test for each penetration type once per day. Simulate smoke at a rate of four seconds/100 cubic feet (2.8 cubic metres) and maintain the fog density until inspection is complete.

.7 After inspection is complete, repair all defective firestopping and smoke seals and test again. Continue this procedure until all firestopping and smoke seals passes test.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Read other Sections of the Specification for extent of sealant specified in those Sections. Do all other sealing indicated, specified or required.

.1 Provide all items, articles, materials, operations or methods listed, mentioned or scheduled on drawings and/or herein, including all labour, materials, equipment and incidentals necessary and required for the completion of the sealant.

1.2 RELATED REQUIREMENTS

.1 Section 03 30 00: Cast-in-Place Concrete

.2 Section 04 20 00: Masonry

.3 Section 05 50 00: Miscellaneous Metals

.4 Section 06 10 00: Rough Carpentry

.5 Section 07 84 00: Firestopping and Smokeseals

.6 Section 08 11 13: Steel Doors and Frames

.7 Section 09 90 00: Painting

1.3 REFERENCE STANDARDS

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

.1 ASTM C509-06(2011), Standard Specifications for Elastomeric Cellular Performed Gasket and Sealing Material

.2 ASTM C920-11, Standard Specification for Elastomeric Joint Sealants

.3 ASTM C-1382-11, Standard Test Method for Determining Tensile Adhesion Properties of Sealants when Used in Exterior Insulation and Finish Systems (EIFS) Joints

.4 ASTM D2240-05(2010), Standard Test Method for Rubber Property - Durometer Hardness

.2 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-19.13-M87, Sealing Compound, One-Component, Elastomeric, Chemical Curing

1.4 SUBMITTALS

.1 Provide submittals in accordance with the General Conditions and Section 01 33 00.

.2 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Manufacturer's Data: Submit manufacturer's literature describing each material to be used in the work of this Section. Literature shall contain a statement that the material complies with the specified standard.

.2 Samples: Submit for approval and colour selection sample of each type of compound, recommended primers and joint filler or fillers proposed to be used.

.3 Mock-Up:

.1 If requested by the Departmental Representative, construct mock-ups where directed to show location, size, shape, colour and depth of joints complete with back-up material, primer and sealant. Mock-up may be part of finished work.

.2 Allow 24-hours for inspection of work before proceeding with work.

.4 Safety Data Sheets: Submit WHMIS safety data sheets for inclusion with project record documents. Keep one copy of WHMIS safety data sheets on Site for reference by workers.

1.5 QUALITY ASSURANCE

.1 Adhere to Manufacturer's recommendations for mixing or preparation of materials listed in this Section.

.2 Pot life or installation times shall not be exceeded.

.3 Integral materials which compose a joint detail shall be compatible.

.4 Component parts, where possible, shall have the same manufacturer.

.5 A representative of sealant material manufacturer shall visit the site during application to ensure that all Work is carried out according to the manufacturer's printed instructions.

1.6 SITE CONDITIONS

.1 Apply sealants only to completely dry surfaces, and at air, substrate and material temperatures above minimum established by manufacturer's written specifications.

1.7 DELIVERY, STORAGE HANDLING AND PROTECTION

.1 Deliver all materials to the jobsite in their original, unopened containers, with all labels intact.

.2 Receive and store materials as recommended by materials manufacturer.

.3 Maintain containers and labels in undamaged condition.

1.8 WARRANTY

.1 Provide a written warranty endorsed and issued in the name of the Owner stating that all sealant work of this Section is warranted against leakage, cracking, crumbling, melting, running, deterioration, shrinkage, loss of cohesion, loss of adhesion, staining of adjoining or adjacent work or surfaces, or failure to provide intended seal for a period of five (5) years from the Date of Substantial Performance of the Work, and that any defects will be made good including, related materials and installation at no additional cost to the Owner.

Part 2 Products

2.1 MATERIALS

.1 Joint Cleaner:

.1 Non-corrosive solvents as recommended by sealant manufacturer for applicable substrate material(s).

.2 Primer:

.1 Non-staining type as recommended by sealant manufacturer, for use on substrate conditions outlined, and compatible with specified sealant being applied.

.3 Joint Back-Up – Backer Rod:

.1 Round, open cell, reticulated foam, 50% compression, compatible with sealant and primer, non-adhering to sealant.

.4 Bond Breaker:

.1 Pressure sensitive plastic tape, not bondable to sealant as recommended by sealant manufacturer.

.5 Sealant Type "A" – Joints around Interior Door Frames, Windows and Under Exterior Thresholds:

.1 One-part, low or medium modulus, neutral curing 100% silicone joint sealant, conforming to ASTM C920-11, Type S, Grade NS, Class 35.

.1 DC CWS by Dow Corning.

.2 SWS by GE

.3 SikaSil WS-305CN by Sika

OR

.2 One component, low modulus, moisture curing, polyurethane joint sealant, conforming to ASTM C920-11, Type S, Grade NS, Class 25.

.1 Dymonic FC by Tremco Ltd., division of RPM Company.

.2 Sikaflex 1A by Sika Canada Inc.

.3 Sonolastic NP1 by BASF.

.6 Sealant Type "B" – Expansion / Control Joints:

.1 One-part, ultra low modulus, non-staining neutral curing 100% silicone joint sealant, conforming to ASTM C920-11, Type S, Grade NS, Class 50.

.1 DC 790 by Dow Corning.

.2 Spectrem 1 by Tremco

.3 SCS2700 SilPruf LM by GE

.4 SikaSil WS-290 by Sika

.7 Sealant Type "C" – Floor Control Joints:

.1 Multi-component, chemical curing, self-levelling, polyurethane joint sealant, conforming to ASTM C920-11, Type M, Grade P, Class 25.

.1 THC-900 by Tremco (Canada) Ltd., division of RPM Company.

.2 Sonolastic SL2 by Sonneborn Building Products, division of BASF Building Systems.

.3 Sikaflex 2c SL by Sika Canada Inc.

.8 Sealant Type "D" – Control and Expansion Joints in EIFS:

.1 General purpose, low modulus, high-performance, one-part, neutral-curing, non-staining, construction-grade silicone sealant, conforming to ASTM C920-11, Type S, Grade NS, Class 50 and ASTM C-1382-11.

.1 DC 795 by Dow Corning.

.2 Spectrum 3 or Spectrum 4-TS by Tremco (Canada) Ltd., division of RPM Company.

.3 Sonolastic 150 VLM by Sonneborn Building Products, division of BASF Building Systems.

.4 SikaSil WS-295 by Sika

.9 Sealant Type "E" – Mould and Mildew Resistant:

.1 Mould and mildew resistant, Shore A Hardness 15-25, conforming to ASTM C920-11, Type S, Grade NS, Class25, use NT, G, and A:

.1 SCS1700 by GE

.2 DC 786 by Dow Corning

.3 Tremsil 200 by Tremco

.4 Omni Plus by Sonneborn

.5 SikaSil –GP by Sika

.10 Sealant Type "F" – Glazing Joints:

.1 Silicone Sealant: Butt glazing, one part, moisture curing, shore A hardness 15-25, conforming to CAN/CGSB-19.13-M, Classification C-1-40-B-N and C-1-25-B-N and ASTM C920-11, Type S, Grade NS, Class 25, use NT, G, A, O; Colour: clear (translucent):

.1 DC 795 by Dow Corning

.2 SCS2000 by GE.

.3 Multiseal by Chemtron.

.4 Spectrum 2 by Tremco

.5 SikaSil WS-295 by Sika

.11 Sealant Type "G" – Exterior Wall Joints:

.1 Air-seal sealant: One part, silicone, shore A hardness 15-25, conforming to CGSB 19-GP-13M, classification C-1-40-B-N and C-1-25-B-N and ASTM C920-11, Type S, Grade NS, Class 25. Use NT, M, G, A and O:

.1 DC 791 by Dow Corning

.2 UltraPruf II SCS 2902 by GE

.3 Spectrum 3 by Tremco

.4 SikaSil N-Plus by Sika

.12 Sealant Type "H" – Saw Cut Sealant:

.1 Multi-component, self-levelling, conforming to ASTM D2240-05(2010):

.1 Tremco Control Joint Sealant

.2 BASF Masterfill 300

.3 Sika Loadflex

.13 Sealant Type “I” – HVAC Sealant:

.1 One-part, RTV, acetoxy-cure silicone sealant for heating, ventilation, air conditioning and refrigeration applications:

.1 Dow Corning HVAC Silicone Sealant

.14 Sealant Type “J” – Electrical Sealant:

.1 One-part, white, non-flowing moisture cure adhesive for electrical applications:

.1 Dow Corning 738 Electrical Sealant

.15 Preformed Compression Seal:

.1 Compartmental open cell neoprene extrusion type conforming to ASTM C509-06(2011), complete with liquid lubricant adhesive recommended by manufacturer.

Part 3 Execution

3.1 INSPECTION

.1 Verify at site that joints and surfaces conditions provided will not adversely affect execution, performance or quality of completed work.

.2 Ensure masonry and concrete have cured 28 days minimum.

.3 Ascertain that sealers and coatings applied to substrates are compatible with sealant used and that full bond of the sealant and substrate is attained. Request samples of the sealed or coated substrate from their fabricators for testing of compatibility and adhesion, if necessary.

.4 Verify that specified recommended environmental conditions are present before commending work.

.5 Defective work resulting from application to unsatisfactory joint conditions will be considered the responsibility of those performing the work of this section.

.6 Do not start work of this Section until conditions are satisfactory.

3.2 PREPARATION

.1 Clean joint surfaces using joint cleaner as necessary, to remove dust, paint, loose mortar, and other foreign matter and dry joint surfaces.

.2 Remove dust, silt, scale and coatings from ferrous metals by wire brush, grinding or sandblasting.

.3 Remove oil, grease and other coatings from non-ferrous metals with approved cleaning solvent.

.4 Ensure surfaces are free of frost, rust, lacquers, laitance, release agents, moisture or other matter which might adversely affect adhesion of sealant.

.5 Examine joint sizes and correct as required to allow for anticipated movement and to achieve proper width/depth ratio per manufacturer's written recommendations for specified sealant.

.6 Support joint filler on horizontal traffic surfaces against vertical movement which might result from traffic loads or foot traffic.

.7 Prepare surfaces as recommended by sealant manufacturer.

.8 Fully remove existing sealant scheduled to be removed and replaced with new sealant, in areas indicated on the Drawings.

.1 Follow manufacturers procedures for removal of existing sealant and test areas for adhesion of new sealant. Provide the Departmental Representative with field report identifying results of adhesion testing.

.9 Install joint backing material or apply bond breaker tape to achieve correct joint depth and prevent three-sided adhesion.

.10 To protect adjacent surfaces, mask adjacent surfaces with tape prior to priming and/or sealing.

.11 Prime sides of joints using two cloth method in accordance with manufacturer's directions immediately prior to sealing.

.12 Before any sealing is commended, a test of the material shall be made for indications of staining, poor adhesion or other undesirable effects.

.13 Seal joints in surfaces to be painted before painting. Where surfaces to be sealed are prime painted in shop before sealing, check to make sure prime paint is compatible with primer and sealant. If incompatible inform Departmental Representative, consult the manufacturer, and change primer and sealant to approved compatible types.

.14 Check form release agent used on concrete for compatibility with primer and sealant. If incompatible inform Departmental Representative and change primer and sealant to approved compatible types or clean concrete to Departmental Representative's approval.

3.3 APPLICATION

.1 Apply sealant in accordance with manufacturer's directions, using a gun with proper nozzle size, ensuring to fill voids and joints completely, to leave a weathertight, airtight installation. Superficial pointing with skin bead is not acceptable.

.2 Neatly tool surface to a slight concave profile. Surface of sealant shall be smooth, free from ridges, wrinkles, sags, air pockets and embedded impurities.

.3 Clean adjacent surfaces immediately and leave Work neat and clean. Remove excess sealant and droppings, using recommended cleaners as Work progresses. Remove masking tape after tooling of joints.

3.4 CLEANING AND PROTECTION

.1 Remove all waste materials from site. Sealant shall be cleaned of all foreign material as recommended by the sealant manufacturer. Leave work in a condition satisfactory to the Departmental Representative.

END OF SECTION