PART 1 - GENERAL

1.1 RELATED SECTIONS

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

.2 Section 04 05 00 - Common Work Results for Masonry.

.3 Section 07 26 00 - Air Barriers/Vapour Retarders.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).
.1 ASTM E96/E96M-05, Test Methods for Water Vapour Transmission of Materials.

.2 Canadian General Standards Board (CGSB).
.1 CGSB 71-GP-24M, Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.

.3 Underwriters Laboratories of Canada (ULC).
.1 CAN/ULC-S701-11, Thermal Insulation, Polystrene, Boards and Pipe Coverings.
.2 CAN/ULC-S702-09-AM1, Thermal Insulation, Mineral Fibre, for Buildings.

1.3 SUBMITTALS

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

.2 Manufacturer's Instructions:
.1 Submit manufacturer's installation instructions.

1.4 WASTE MANAGEMENT AND DISPOSAL

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

PART 2 - PRODUCTS

2.1 INSULATION

.1 Extruded polystyrene (XPS): Regular Density: to CAN/ULC-S701; for vertical applications:
.1 Type: 4.
.2 Thickness: 25 mm or 50mm on drawings as indicated.
.3 Size: to suit.
.4 Edges: shiplapped.

.5 Compressive Strength: 210 kPa.
.6 Acceptable material:
.1 Celfort 300
.2 Styrofoam SM
.3 Trueboard EPS Type 2

.2 Polyethylene vapour retarder: to CAN/CGSB-51.34, 0.15mm, 6 mil thick.

2.2 ADHESIVE

.1 Adhesive (for polystyrene): to CGSB 71-GP-24.
.1 As recommended by board manufacturer.
.2 VOC emission: zero.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 WORKMANSHIP

.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 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.

.5 Do not enclose or cover insulation until it has been inspected and approved by Departmental Representative.

3.3 EXAMINATION

.1 Examine substrates and immediately inform Departmental Representative in writing of defects.

.2 Prior to commencement of work ensure:
.1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

3.4 CLEANING

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

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 09 21 16 - Gypsum Board Assemblies.

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

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
.1 ASTM C423-09a Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
.2 ASTM C665-01e1, Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
.3 ASTM C1320-05, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
.4 ASTM E136 Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees F (unfaced).

.2 Underwriters Laboratories of Canada (ULC)
.1 CAN/ULC-S702-1997, Standard for Mineral Fibre Insulation.

1.3 SUBMITTALS

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

.2 Manufacturer's Instructions:
.1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

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

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

.3 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 30 - Health and Safety Requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

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

.2 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.

PART 2 - PRODUCTS

2.1 ACOUSTIC BLANKET INSULATION

.1 Blanket Glass Fibre: to CAN/ULC S102:
.1 Type I: unfaced glass fiber insulation complying with ASTM C 665 and ASTM E136.
.2 Surface burning characteristics:
.1 Unfaced insulation.
.2 Maximum flame spread: 10
.3 Maximum smoke developed: 10.
.3 Combustion characteristics: unfaced insulation to pass ASTM E136 test.
.4 Dimensional stability: linear stability less than 0.1%.
.5 Acceptable material:
.1 Quiet Zone by Owens Corning. Thickness: to suit partition thickness. Fill full stud.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION:

.1 Install insulation in gypsum board partitions and in

BATT INSULATION

locations indicated, to meet acoustic requirements of building elements and spaces.

.2 Fit insulation firmly between studs and closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.

.3 Do not compress insulation to fit into spaces.

.4 Keep insulation minimum 75 mm (3") from heat emitting devices such as recessed light fixtures.

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

3.3 INSTALLATION: ACOUSTIC BLANKET INSULATION

.1 Coordinate installation with other trades including painting, mechanical and electrical.

.2 Fit blankets over conduit, cutting around hangers, junction boxes, devices, valves, etc., as required, leaving them exposed for access.

3.4 CLEANING

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

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-19.13M-M87, Sealing Compound, One Component, Elastomeric Chemical Curing.

1.2 SUBMITTALS

.1 Submit manufacturer's product data sheets in accordance with Section 01 33 00 - Submittal Procedures.

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

1.3 QUALITY ASSURANCE

.1 Perform Work in accordance with the requirements of the manufacturer of the specified products.

.2 Maintain one copy of documents on site.

1.4 DELIVERY, STORAGE AND HANDLING

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

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

.3 Avoid spillage.

.4 Clean spills and leave area as it was prior to spill.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

1.6 PROJECT ENVIRONMENTAL

.1 Do not install solvent curing sealants or vapour release adhesive materials in enclosed spaces without ventilation.

REQUIREMENTS

.2 Ventilate enclosed spaces.

.3 Maintain temperature and humidity recommended by materials manufactures before, during and after installation.

1.7 SEQUENCING

.1 Sequence work to permit installation of materials in conjunction with related materials and seals.

PART 2 - PRODUCTS

2.1 SHEET MATERIALS

.1 Sheet Seal Type 1: Combination air barrier/vapour barrier self-Adhesive bitumin laminated to high-density polyethylene film, nominal total thickness of 40mm.

.1 Acceptable material:

.1 W.R. Grace - Perm-A-Barrier.

.2 Bakor - Blueskin SA.

.3 IKO - Aquabarrier AVB

.4 Soprema Stick 1.1mm.

.2 Primer and mastic sealant as recommended by the membrane manufacturer. Primer to be solvent base type.

.2 Sheet Seal Type 2: Weather resistant, breathable air barrier membrane - spun bonded olefin, non-woven and non-perforated.

2.2 SEALANTS

.1 Sealant Type A: CAN/CGSB-19.13M, single component, chemical curing, capable of continuous water immersion, non-sagging type, Shore "A" Hardness Range of 20 to 35 for use with type 2 air barrier membrane.

.2 Primer: Recommended by sealant manufacturer Appropriate to application.

.3 Substrate Cleaner: Non-corrosive type recommended by sealant manufacturer compatible with adjacent materials.

2.3 ACCESSORIES FOR TYPE 2 AIR BARRIER

.1 Approved contractors sheathing tape evaluated by CCMC.

.2 Fasteners appropriate for substrate.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verify that surfaces and conditions are ready to accept the Work of this section.

.2 Ensure all surfaces are clean, dry, sound, smooth, continuous and comply with air barrier manufacturer's requirements.

.3 Report any unsatisfactory conditions to the Departmental Representative in writing.

.4 Do not start work until deficiencies have been corrected. Commencement of Work implies acceptance of conditions.

3.2 PREPARATION

.1 Remove loose or foreign matter which might impair adhesion of materials.

.2 Ensure all substrates are clean of oil or excess dust; all masonry joints struck flush, and open joints filled; and all concrete surfaces free of large voids, spalled areas or sharp protrusions.

.3 Ensure all substrates are free of surface moisture prior to application of self-adhesive membrane and primer.

.4 Ensure metal closures are free of sharp edges and burrs.

.5 Prime substrate surfaces to receive Type 1 self-adhesive membrane in accordance with manufacturer's instructions.

3.3 INSTALLATION

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

.2 Adhere sheet seal Type 1 to materials after priming the surface. Caulk laps with mastic approved by membrane manufacturer.

.3 All laps are to be taped with CCMC approved sheathing tape.

.4 Use only plastic washer nails to secure membrane, either for temporary fastening or permanent fastening.

.5 Staples are not to be used to secure the membrane. There

is a great danger that the staple gun or hammer tacker will cut holes in the membrane.

.6 Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

3.4 PROTECTION OF WORK

.1 Protect finished Work.

.2 Do not permit adjacent work to damage work of this section.

.3 Ensure finished Work is protected from climatic conditions.

3.5 SCHEDULES

.1 Roof vapour barrier to lap over wall membrane with sheet seal Type 1.

PART 1 - GENERAL

1.1 REFERENCES

.1 CGSB 51-GP-23-92 - Spray-Applied Rigid Polyurethane Cellular Plastic Thermal Insulation.

1.2 PROTECTION

.1 Ventilate area.

.2 Protect workers as recommended by insulation manufacturer.

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

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Insulation: one component spray polyurethane to CGSB 51-GP-23M.

PART 3 - EXECUTION

3.1 APPLICATION

.1 Apply insulation to clean surfaces in accordance with manufacturer's printed instructions.

.2 Apply sprayed foam insulation into space between door, PVC window and the adjacent building components to form a continuous air barrier and to insulate interior of frames. Refer to drawings for locations.

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Design, supply, installation and warranty of a complete standing seam metal roof system for entrance canopy.

.2 System to include all accessories sufficient to render water tight the roof system.

1.2 REFERENCES

.1 American National Standards Institute (ANSI).
.1 ANSI B18.6.4-99, Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws.

.2 American Society for Testing and Materials International, (ASTM).
.1 ASTM A653/A653M-13 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
.2 ASTM A755/A755M-11, Steel Sheet, Metallic-Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Projects.
.3 ASTM A924/A924M-13, Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

.3 Canadian General Standards Board (CBSB):
.1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
.2 CAN/CBSB-37.29-M89, Rubber-Ashalt Sealing Compound.
.3 CSA A123.3-05(2010), Asphalt Saturated Organic Roofing Felt.

.4 Department of Justice Canada (Jus)
.1 Canadian Environmental Protection Act (CEPA), 1999.

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

.6 National Building Code of Canada - latest edition.

.7 National Research Council Canada (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC)
.1 CCMC-2011, Registry of Product Evaluations.

.8 Transport Canada (TC)
.1 Transportation of Dangerous Goods Act (TDGA),

1992.

1.3 DESIGN CRITERIA

.1 Design metal roof system in accordance with CAN/CSA-S136, CSA 136.1 standards and in conformance with relevant Canadian Sheet Steel Building Institute (CSSBI) standards.

.2 Design roof system to resist:
.1 Snow loads and snow build-up and rain load, expected in this geographical region NBCC climatic data, 50 year probability.
.2 Wind loads, positive and negative, expected in this geographical region NBCC climatic data, 50 year probability.
.3 Dead load of roof system.

.3 Deflection of the roof system is not to exceed 1/240 of the span for the specified live loading.

.4 Thermal movement: design metal roof system to provide for thermal movement of component materials caused by ambient temperature range of 80§C without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.

.5 Include expansion joints to accommodate movement in roof system and between wall/roof system and building structure, caused by structural movements, without permanent distortion, damage to infills, racking of joints, breakage of seals, or water penetration.

.6 Provide for positive drainage of condensation occurring within roof construction and water entering at joints in accordance with NRC "Rain Screen Principles": and manufacturer's rain screen systems.

.7 Permeance through roof system not to exceed 30 ng/Pa.s.m²).

.8 Design roof system to accommodate specified erection tolerances of structure.

.9 Provide effective connections between intersections of all wall and roof assemblies.

.10 Proposed detail changes to accommodate the individual manufacturer's roof system must be submitted in writing for approval.

1.4 ACTION & INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 00 02 - Standard General Requirements.
.1 Submit manufacturer's instructions, printed product literature and data sheets for metal roofing and include product characteristics, performance

criteria, physical size, finish and limitations.
.2 Proof of manufacturer's CCMC listing and listing number.
.3 Submit 2 copies of WHMIS MSDS.

.2 Shop Drawings:
.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of New Brunswick, Canada.
.2 Indicate dimensions, roof openings, materials and finishes, anchor details, compliance with design criteria and requirements of related work. Details shall clearly indicate fabrication and installation requirements at wall and roof terminations, including roof ridges, valleys, stack penetrations, wall/roof junctions and wall/soffit junctions. Continuity of the air/vapour barrier and waterproofing systems shall be clearly shown. Provide details for movement caused by thermal expansion.

.3 Samples:
.1 Submit duplicate 300 x 300 mm samples of each sheet metal material.

1.5 QUALITY ASSURANCE

.1 Installer: metal roof installation shall be carried out by the manufacturer's approved qualified erectors.

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

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

.4 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 DELIVERY, STORAGE AND HANDLING

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

.2 Storage and Handling Requirements:
.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect sheet metal roofing from nicks, scratches, and blemishes.

scratches, and blemishes.
.3 Replace defective or damaged materials with new.

.3 Packaging Waste Management: remove for reuse and recycling pallets, crates, padding, and packaging materials.

1.7 EXTENDED WARRANTY

.1 Provide a written warranty, signed and issued in the name of owner, stating that the total metal roofing system is warranted against leakage, defects and malfunction under normal usage for a period of fifteen (15) years from date of Certificate of Substantial Performance. Total system includes related caulking. Defective materials and workmanship include, but are not limited to, oil canning, abnormal deterioration, aging and weathering of the work; leakage of water or air, structural failure of components resulting from forces and movements up to specified limits; deterioration, peeling and discolouration of finishes in excess of normal usage.

PART 2 - PRODUCTS

2.1 DECK COVERING

.1 Fiberglass mat faced gypsum roof board, coated:
.1 Thickness: 13mm.
.1 Width: 1220mm.
.2 Length: 1220 and 2440mm.
.3 Weight: 9.64 kg/m2 (1.98 lb/sq. ft.) nominal.
.4 Surfacing: Fiberglass mat, with non-asphaltic, highly filled coating on one side.
.5 Flexural Strength, parallel (ASTM C 473): 80 lbs., minimum.
.6 Flute Spanability (ASTM E 661): 5 inches.
.7 Permeance (ASTM E 96): 35 perms, maximum.
.8 R-Value (ASTM C 518): 0.56 minimum.
.9 Water Absorption (ASTM C 1177): 10 percent of weight, maximum.
.10 Acceptable material:
.1 DensDeck Prime Roof Board by Georgia Pacific.
.2 GlasRoc Roof Board by CertainTeed.
.3 Approved alternate.

2.2 AIR/VAPOUR BARRIER MEMBRANE

.1 Sheet materials:
.1 Sheet Seal: Combination air barrier/vapour

barrier self-adhesive bitumin laminated to high-density polyethylene film, nominal total thickness of 40 mils 1.0mm)

.1 Acceptable material:

.1 W.R.Grace - Perm-A-Barrier.
.2 Bakor - Blueskin SA.
.3 IKO - Aquabarrier AVB.
.4 Soprema Stick 1100.
.5 Carlisle QSC-705.
.6 Approved alternate.

.2 Accessory materials:

.1 Primer: solvent based, as recommended by the sheet membrane manufacturer for application to coated gypsum roof board.
.2 Mastics: at terminations and projections as recommended and supplied by membrane manufacturer.
.3 Substrate Cleaner: non-corrosive type recommended by sealant manufacturer compatible with adjacent materials.

2.3 STANDING SEAM METAL ROOF COMPONENT

.1 Clip and subgirt system:

.1 Thermally responsive flush mount clip system, designed to allow for full thermal expansion and contraction of the exterior roof sheet. Clips to be fabricated from a minimum of 1.22mm (0.048") steel, with minimum Z275 (G90) galvanized coating.
.2 Continuous hat bar and zee clips made from galvanized material, thickness to suit design parameters, to accommodate depth of insulation.
.3 Roof fasteners: as specified by manufacturer to resist wind uplift and sliding snow forces.

.2 Prefinished roof sheet, exposed to exterior:

.1 Prefabricated standing seam exterior roof panel, with stiffening flutes, zinc coated sheet steel, produced in accordance with ASTM A653/A653M S.S., Z-275 (G90) galvanizing, Gr. 33 (Gr. 230), 22 ga. (0.030") (0.76 mm) thick, excluding finish coat.
.2 Topcoat finish to be 4 coat PVDF (Polyvinylidene Flouride) system with a minimum total topcoat DFT of 1.6 mil comprised of 0.80 - 1.20 mil PVDF primer and a 0.8 mil PVDF colour coat.
.3 Colour: Baycoat 10000 Series, Bright Red, QC18386.
.4 Acceptable materials:

.1 Agway Metals AR-38.
.2 Approved alternate.

2.4 ACCESSORIES

.1 Accessories: all visible cap flashings, drip flashings, copings and closures of same material, thickness and finish as exterior cladding, fabricated and brake formed to shape.

.2 Closures: pre-painted metal closures complete with foam closure backer.

.3 Butyl tape: 100% solid Polyisobutylene-butyl preformed sealant, 3mm thickness by 13mm width, supplied in rolls with protective backing paper.
.1 Acceptable material:
.1 Tremco 440 tape.

.4 Thermal tape: flexible, resilient and conformable of closed cell polyvinyl chloride (PVC) foam, with a pressure-sensitive adhesive backing and protective liner.
.1 Acceptable material:
.1 Foamflex #1308.

.5 Foam closure: polyethylene compressive foam closure strip to match the profiles (2 lbs/cu.ft. of density).
.1 Acceptable material:
.1 Goodco Evalite Cross Link Polyethylene #12207.

.6 Sealant: thermoplastic, elastomer-based, solvent curing sealant, according to the CAN/CGSB-19.0-M and ASTM C794 and ASTM C719 regarding adhesion and durability.
.1 Acceptable material:
.1 Dymonic 1 Part Polyurethane Sealant.
.2 Sonolastic NPI by BASF.

2.5 FASTENERS

.1 All the screws should be in accordance with the manufacturers standards and meet the ANSI B18.6.4 and CSA B-35.31962 specifications. Screw heads to match colour of roofing.

.2 Thermal clip fasteners to be Buildex Climaseal #14 Tekdriller.

.3 Gypsum board fasteners to steel deck to be #12 FM approved screws and plates.

2.6 PENETRATION FLASHING

.1 For circular pipes penetrating the roof, up to 450mm in diameter, use a flexible, weather-resistant, EPDM or silicone pipe flashing system.

.2 Provide all required accessories, fasteners, and sealants for a complete system, including the additional reinforcing plates installed under the metal roof panel.

.3 Acceptable material:
.1 Dektite System EPDM and DekTite 4939910-#9 silicone.

2.7 FABRICATION

.1 Fabricate roof system components to comply with dimensions, profiles, gauges and details as shown on the shop drawings, including fascia panels and all companion flashing, in accordance with CSSBI specifications.

.2 Form bends sharp and true.

.3 Fabricate systems to allow for structural movements within the systems.

.4 Fabricate all components of the system in the factory, ready for field installation.

.5 Provide roof sheet and all accessories in longest practical lengths to minimize field lapping of joints.

.6 Fabricate system to prevent entry of water into building and from collection within assembly and to prevent infiltration of air through system.

.7 Ensure all components are free from deformation and other defects detrimental to their appearance and/or performance.

.8 Join intersecting parts together to provide tight, accurately fitted joints with adjoining surfaces in true planes.

.9 Fabricate systems to confirm to requirements of reference standards specified.

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 sheet metal roofing installation in accordance with manufacturer's written instructions.

.2 Inform Consultant and Construction Manager of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 REQUIRED

.1 The installer of this section must have all the

EQUIPMENT

necessary equipment to make the cuts in the panels and complete the work.

.2 Abrasive blades must not be used for cutting steel.

.3 Use all available modern equipment, such as laser equipment, to insure a perfect alignment of the thermal clips, of the subgirts and of the panels.

3.3 INSTALLATION OF THE WATER TIGHT COMPONENTS

.1 Screws and plates to be FM approved and screws to go through the high flute of deck only.

.2 The air/vapour barrier membrane installer must be certified by the membrane manufacturer.

.3 Apply the primer at a rate recommended by the membrane manufacturer and let dry.

.4 Weld the membrane in place by using a propane torch. The overlaps should be a minimum of 50mm. With a trowel, level and seal the joint and edges of the membrane.

.5 The installer will meticulously inspect the membrane at the end of each day and prior to installing the insulation.

3.4 INSTALLATION OF THE THERMAL CLIPS

.1 Install in accordance with the approved shop drawings.

.2 Ensure that the roof air/vapour barrier membrane is properly sealed to all adjacent building envelope air/vapour and moisture membranes.

.3 Install the thermal clips as per manufacturer's recommendations and details on shop drawings. Use a minimum of 3 screws per clips. If necessary, install a galvanized steel base plate underneath the clip. Make sure that each clip or base plate is attached to two (2) flutes of the steel deck.

3.5 INSTALLATION OF THE STANDING SEAM ROOF PANELS

.1 Install in accordance with the approved shop drawings and the manufacturer's recommendations.

.2 Ensure metal roofing sheet side-lap is positively retained by clips and proper sheet coverage is maintained.

.3 Mechanically seam panel joints using an electric seaming matching, 180$ I-style. Panel joints shall be factory or field caulked.

.4 Install using concealed fasteners where possible. Lock end joints and caulk to provide weathertight seal.

.5 Install panels in maximum lengths available. End laps shall be a minimum of 150mm, with two rows of caulking between panels.

.6 Generally, flashings such as at gable ends and ridges are to be connected at ends with an S-lock joint.

3.6 TOLERANCES

.1 Maintain following installation tolerances:
.1 Maximum variation from plane or location shown on approved shop drawings: 10mm/m of length and up to 20mm/100m maximum.
.2 Maximum offset from tru alignment between two adjacent members abutting end to end, in line: 0.75mm.

3.7 CLEANING

.1 Progress cleaning: leave work area clean at end of each day.

.2 Final cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.3 Waste management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and Waste Management Plan.

3.8 PROTECTION

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

.2 Repair damage to adjacent materials caused by sheet metal roofing installation.

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 07 21 13 - Board Insulation.

.2 Section 07 26 00 - Sheet Membrane Air Vapour Barriers.

.3 Section 07 62 00 - Sheet Metal Flashing and Trim.

1.2 REFERENCES

.1 The Aluminum Association, Inc. (AA)
.1 AA DAF45-03, Designation System for Aluminum Finishes.

.2 American Society for Testing and Materials International (ASTM)
.1 ASTM A 167-99(2004), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
.2 ASTM A 240/A 240M-05a, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
.3 ASTM A 480/A 480M-05, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.
.4 ASTM D 523-89(R1999), Standard Test Method for Specular Gloss.
.5 ASTM D 822-01, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.3 Canadian General Standards Board (CGSB)
.1 CGSB 19-GP-14M-76(R1984), Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.

.4 Green Seal Environmental Standards
.1 Standard GC-03-93, Anti-Corrosive Paints.
.2 Standard GS-11-97, Architectural Paints.

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

.6 South Coast Air Quality Management District (SCAQMD), California State
.1 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.

1.3 DESIGN REQUIREMENTS

.1 System Description:
.1 Dry Joint System.
.2 Integral rainscreen, pressure-equalized.
.3 Concealed fasteners.
.4 Non-combustible panel core.

.2 Design metal cladding to allow for thermal movement of component materials caused by variation in ambient temperature range of 80 degrees C without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.

.3 Maximum deviation from vertical and horizontal alignment of erected panels: 1 to 1000.

.4 Water and Air Leakage: provide systems that have been tested and certified to conform to the following criteria:
.1 Air Leakage: not more than 0.003 l/s/m² of wall area when tested at 0.075 kPa in accordance with ASTM E283.
.2 Water leakage: none, when measured in accordance with ASTM E331.

.5 Structural: limit deflection of component parts under maximum design load to the lesser of L/175 when tested to ASTM E330.

.6 Fire Performance:
.1 Flame Spread 0, Smoke Developed 10 maximum, when tested to ASTM E84.
.2 Surface Flammability: pass when tested to ASTM E108.

.7 Composite Metal Panel System to withstand loads caused by positive and negative wind loads acting normal to the plane of the wall as calculated in accordance with NBCC, latest edition, but in no case less than the combined effect of external pressure = 2.0 kPa and integral suction = 0.863 kPa unfactored.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Submit manufacturer's printed product literature for cladding system materials, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) - Material Safety Data Sheets (MSDS) .
.1 For finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.

.3 Shop Drawings:
.1 Shop drawings: submit drawings stamped and signed by professional engineer registered or licensed in Province of New Brunswick, Canada.
.2 Indicate dimensions and thickness of panels, fastening and anchoring methods, detail and location of joints and gaskets, thermal movement provision, wall openings, head, jamb and sill details, materials and finish, compliance with design criteria and requirements of related work.

.4 Samples:
.1 Submit duplicate 300 x 300 mm sample of wall and soffit system, representative of materials, joint types, fastening methods, finishes and colours.

.5 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
.1 Certificates: submit certificates signed by manufacturer certifying that composite wall panels comply with specified performance characteristics and physical properties.
.2 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures and.
.3 Manufacturer's Field Reports: submit to manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

1.5 QUALIFICATIONS

.1 Manufacturer: company specializing in producing composite wall panels with sufficient capacity to produce and deliver required units without causing delay in work.

.2 Installer: person specializing in composite wall panel installations approved by manufacturer.

.3 Mock-ups: construct mock-ups in accordance with Section 01 45 00 - Quality Control and to requirements supplemented as follows:

.1 Provide mock-up for evaluation of surface finishes and workmanship.

.2 Provide initial production units for job-site assembly with other materials for review approval.

.3 Co-ordinate type and location of mock-ups with project requirements.

.4 Accepted units will be used as standard for acceptance of production units.

.5 Remove and replace units which are not accepted.

.6 Do not proceed with remaining work until workmanship, colour, and finish are reviewed and accepted by DCC Representative.

.7 Refinish mock-up area as required to produce acceptable work.

.8 When accepted, mock-up will demonstrate minimum standard of quality required for this work.

.1 Approved mock-up may remain as part of finished work.

.4 Design composite wall panel system under direct uspervision of a Professional Structural Engineer experienced in the design of this work and licensed at the place where the project is located.

1.6 DELIVERY, STORAGE AND HANDLING

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

.2 Deliver, store and protect material in accordance with panel manufacturer's recommendations.

.3 Do not expose panels with strippable film to direct sunlight or extreme heat.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Collect, separate, recycle, and reuse all site generated waste materials.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Composite panels:
- .1 Thickness: 4 mm.
- .2 Core: thermoplastic resin core.

.2 Aluminum face sheets:
- .1 Thickness: 0.51 mm.
- .2 Recycled Content: 20%.
- .3 Alloy: AA-3003.

.3 Panel weight: 4 mm: 5.38 kg/m².

.4 Aluminum extrusions: alloy AA-6063-T5.
- .1 Recycled Content: 20%.

.5 Concealed sealants: one-component, butyl-polyisobutylene polymer base, solvent curing to CGSB 19-GP-14M.
- .1 Maximum VOC limit 250 g/L to SCAQMD Rule 1168.

.6 Exposed sealants: Type 1, see 07 92 00.

.7 Flashings: Parapet and window head flashing: finish to match composite panels, secured with concealed fastening method.
- .1 Parapet Flashing: minimum 1.6 mm thickness.
- .2 Window head flashing: minimum 0.8 mm thickness.

.8 Accessories:
- .1 Fasteners: aluminum extrusion, type continuous edge grip, concealed in accordance with manufacturer's recommendations.

2.2 FABRICATION

.1 Composition: two sheets of aluminum sandwiching core of extruded thermoplastic formed in continuous process with no glues or adhesives.

.2 Factory fabricated.

.3 Tolerances:
- .1 Panel bow: maximum 0.8% of panel dimension in width and length.
- .2 Panel dimensions: where final dimensions cannot be established by field measurement before completion of panel manufacturing, make allowance for field adjustments as recommended by manufacturer.

.3 Panel lines, breaks and angles: sharp, true and surfaces free from warp or buckle.

.4 Provide weep holes in soffit panels, per panel manufacturer's standard design, to permit drainage.

2.3 ANODIZED FINISHES

.1 Finish exposed surfaces of aluminum components in accordance with AA Designations for Aluminum Finishes.
.1 Electrolytically deposited colour anodic finish: designation AA-44, colour to be selected from manufacturer's complete range, minimum thickness 0.8 mils.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 EXAMINATION

.1 Before installation examine alignment of substrate and notify DCC Representative in writing if substrate does not comply with requirements of panel installer.

3.3 INSTALLATION

.1 Install composite panels in accordance with manufacturer's written instructions and shop drawings.
.1 Allow for thermal movement.
.2 Coordinate joints in flashing with centreline of vertical reveals between panels.
.3 Horizontal 'Z' girts supporting ACM panels to be installed with outer leg pointing down.

.2 Maintain following installation tolerances:
.1 Maximum variation from plane or location shown on shop drawings: 10 mm/10 m of length and up to 20 mm/100 m.
.2 Maximum deviation for vertical member: 3 mm in

an 8.5 m run.
.3 Maximum deviation for a horizontal member: 3 mm in an 8.5 m run
.4 Maximum offset from true alignment between two adjacent members abutting end to end, in line: 0.75 mm.

.3 Remove strippable coating from panels as they are erected.

3.4 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:
.1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.5 CLEANING

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

.2 Leave work areas clean, free from grease, finger marks and stains.

PART 1 - GENERAL

1.1 RELATED

.1 Requirements for the installation of preformed metal cladding system on a steel stud wall assembly gypsum panel on the building interior and gypsum sheathing in the wall cavity.

1.2 RELATED SECTIONS

.1 Section 07 21 13 - Board Insulation.

.2 Section 07 26 00 - Sheet Membrane Air/Vapour Barriers.

.3 Section 07 52 00 - Modified Bituminous Roofing.

.4 Section 07 92 00 - Joint Sealing.

.5 Section 08 44 13 - Glazed Aluminum Curtain Walls and Windows.

1.3 REFERENCES

.1 American National Standards Institute (ANSI).
- .1 ANSI B18.6.4-99, Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws.

.2 American Society for Testing and Materials International, (ASTM).
- .1 ASTM A653/A653M-08 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
- .2 ASTM A755/A755M-03(2008), Steel Sheet, Metallic-Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Projects.
- .3 ASTM A924/A924M-08a, Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

.3 Canadian Sheet Steel Building Institute (CSSBI).
- .1 CSSBI 20M-08 Sheet Steel Cladding for Architectural, Industrial and Commercial Building Applications.

.4 Canadian Standards Association (CSA International).
- .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .2 CSA S136-07, Cold Formed Steel Structural Members.
- .3 CSA S136.1-95, Commentary or CSA Standard S136-94, Cold Formed Steel Structural Members.

.4 CAN/CSA-S16.1-94(R2000), Limit States Design of Steel Structures.

1.4 SUBMITTALS

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

.1 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures Indicate VOCs for caulking materials during application and curing.

.2 Shop Drawings:

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

.2 Indicate dimensions, profiles, attachment methods, schedule of wall elevations, trim and closure pieces, metal sub-girts, liner panels, insulation and related work.

.3 Indicate arrangements of sheets and joints, types and locations of fasteners and special shapes and relationship of panels to structural frame.

.4 No fabrication and/or installation shall commence until all shop drawings have been approved.

.5 All shop drawings are to be stamped by a Professional Engineer licensed to practice in Nova Scotia.

.6 Material thicknesses indicated are the minimum base steel thickness required for this project. Design Engineer shall increase thicknesses as required.

.3 Samples:

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

.2 Submit duplicate 300x300mm samples of siding material and liner panel material, of colours and profiles specified.

.4 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

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

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

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Collect, separate, recycle, and reuse all site generated waste materials in accordance with Section 01 74 21 - Construction & Demolition Waste Management.

.2 Ensure the following forms, included at the end of Section 01 74 21 - Construction & Demolition Waste Management are completed and submitted to the Contractor.
.1 Waste Audit (WA) Sheet - Annex B.

.3 Coordinate all work related to Section 01 74 21 - Construction & Demolition Waste Management with Contractor.

1.7 DESIGN CRITERIA

.1 Design metal cladding systems in accordance with CAN/CSA-S136.1 standards, in conformance with relevant Canadian Sheet Steel Building Institute (CSSBI) standards.

.2 Design metal cladding systems to provide for thermal movement of component materials caused by ambient temperature range of 80 deg C without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.

.3 The laps will be designed to take up the movement caused by the expansion and contraction between the sheets themselves and between the sheets and building structure, and by the shifting of the frame (wind and snow loads) without causing permanent distortions, damage to filling materials, racking of joints, breakage of joints or water penetration.

.4 Sheets will be designed according to the specified tolerances for the erection of the structural support.

.5 Specified tolerances for the installation of sheets:
.1 Maximum allowable variation from plane between the components shall not exceed 20mm/10m.
.2 Maximum allowable offset beween two adjoining sheets in the same plane shall not exceed 1.00mm.
.3 The load-bearing capacity (dead load and wind loads) of the panels shall be in accordance with the specifications of the CNBC and local applicable regulations. The maximum allowable deflection is 1/180.

.6 Design metal cladding systems to provide for positive drainage of condensation occurring within wall through outside joints to the exterior.

1.8 PROTECTION

.1 Protect all materials during transportation, storage on site and installation, in accordance with CSSBI standards.

.2 When stocked on site, the panels must be piled on wooden blocks and sufficiently inclined to avoid water remaining on the material. Stock the membrane according to the instructions of their respective manufacturers.

PART 2 - PRODUCTS

2.1 COMPLETE SYSTEMS

.1 Metal cladding system with concrete block back-up or metal liner on horizontal structural steel girts
.1 Type of system: Insulated panel system, site assembled on sub-girts.

.2 Prefabricated steel exterior facing panel (vertical) with exposed fastening.

.3 Horizontal steel sub-girts, galvanized.

.4 Insulation: thickness as indicated.

.5 Mechanical insulation fasteners.

.6 Sheet membrane air/vapour barrier over concrete block. Block by Division 4.

.7 Prefabricated steel liner panels on horizontal structural steel girts. Girts by Division 5.

2.2 METAL CLADDING AND COMPONENTS

.1 Metal Cladding:
.1 Prefabricated exterior panel, zinc coated sheet steel, produced in accordance with ASTM A653/A653M S.S., Z-275 (G90), Gr. 33, 0.61mm thick (excluding finish coat).
.2 Finish coating: Class F2S, Barrier Series, not less than 200 micrometers; 100 micrometers on inside face.
.3 Colour: selected from manufacturer's standard or extended rouge to consultant and DCC Representative

approval.

.4 Acceptable materials, general:

.1 Vic West CL 7040.

.2 Agway Metals, 7-175.

.3 Roll Form Group, S-175.

.2 Sub-girts: of suitable minimum base metal thickness, structural quality steel to ASTM A653, with Z 275 (G-90) zinc coating, profile as indicated to accept exterior sheet with structural attachment to building components. Minimum sub-girt thickness: 1.6 mm.

2.3 ACCESSORIES

.1 Exterior corners: of same profile, material and finish as adjacent cladding material, factory built and brake formed to required angle, concealed corner brace, pop rivet connections with painted head to match cladding.

.2 Exposed joint: ends of cladding sheet shop cut clean and square, backed with tight fitting filler lapping back of joint, exposed components colour matched to cladding.

.3 Accessories: cap flashing, drip flashings, internal corner flashings, copings and closures for head, jamb, sill and corners, of same material, thickness and finish as exterior cladding, brake formed to shape.

.4 Closures: pre-painted metal closures complete with foam closure backer at termination of metal siding.

.5 Butyl tape: 100% solid Polyisobutylene-butyl preformed sealant, 3mm thickness by 13mm width, supplied in rolls with protective backing paper.

.6 Thermal tape: flexible, resilient and conformable of closed cell polyvinyl chloride (PVC) foam, with a pressure-sensitive adhesive backing and protective liner.

.7 Foam closure: polyethylene compressive foam closure strip to match the profiles (2 lbs/cu.ft. of density).

2.4 FASTENERS

.1 All exposed fasteners to be stainless steel, in accordance with the manufacturers standards and meet the ANSI B18.6.4 and CSA B-35.31962 specifications. Exposed fasteners to be #12 self-tapping screws. Screw heads to match colour of siding/trim.

.2 Sub-girt fasteners to be #14 with corrosion-resistant coating to withstand:.
.1 2000 hours salt spray exposure before appearance of red rust when tested to ASTM B-117.
.2 35 cycles Kesternich 1 litre SO2 before appearance of red rust.

2.5 FLASHINGS

.1 All the visible flashings, including drip flashings, flashings, valley, inside corners, soffits, sills and corners and ridges must be in the same material, thickness and finish as the exterior panels.

2.6 SEALANTS

.1 Exterior, exposed: Type 1, per Section 07 92 00.

.2 Liner panel, non-exposed: Butyl type.

2.7 FABRICATION

.1 Roll form profiled panels and other work unless impossible because of special design. Use other forming methods only with approval.

.2 Form bends sharp and true.

.3 Fabricate systems to conform to shop drawings and to allow for structural movements within the systems.

.4 Fabricate systems with fasteners of same materials as siding unless required otherwise for structural design and of same colour as siding where exposed to view.

.5 Fabricate systems to prevent entry of water into building and from collection within assembly and to prevent infiltration of air through system.

.6 Join intersecting parts together to provide tight, accurately fitted joints with adjoining surfaces in true planes.

.7 Fabricate systems to confirm to requirements of reference standards specified.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Take site measurements to ensure that work is fabricated to fit structure, existing construction, around obstructions and projections in place, or as shown on drawings, and to suit locations of services.

.2 Verify that backup construction is aligned for proper installation of siding before commencing erection.

.3 Commencement of installation will constitute acceptance of back-up construction.

3.2 REQUIRED EQUIPMENT

.1 The contractor must have all equipment necessary to complete the work.

.2 Abrasive blades must not be used for cutting steel.

.3 Use modern (laser) equipment to insure a perfect alignment of the panels, the fastening systems and the flashings.

3.3 ERECTION

.1 The installation must be made in accordance with the approved shop drawings.

.2 Install the wall panels in accordance with CSSBI standards and also as per manufacturers written recommendations.

.3 The installation shall be carried out by qualified and experienced personnel. The specialized contractor shall be certified by the manufacturer of the metal cladding.

.4 Install panels in maximum lengths available. End laps shall be a minimum of 150 mm.

.5 Erect systems complete with flashings forming part of the systems, subgirts, clips fasteners, closures and caulking to meet same design criteria as specified for fabrication.

.6 Cut and flash panel penetrations.

.7 Erect work in straight lines that are true, level and

plumb.

.8 Provide for differential thermal and structural movement between systems and structure as well as between elements of systems.

.9 Attach systems to structural steel girts and other structure and to other system components with fasteners of the same material and colour as the panels except where other materials are approved.

.10 Caulk systems and junctions with adjoining work to meet specified requirements of Section 07 92 00.

3.4 ADJUSTMENT & CLEANING

.1 After erection, touch up galvanized coatings removed or damaged during erection.

.2 Remove damaged, dented, defaced, defectively finished or tool marked components and replace with new.

.3 Clean off dirt resulting from erection from surfaces exposed to view.

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

.1 The following specification outlines the requirements for a fully reinforced cold fluid-applied polyurethane liquid resin waterproofing membrane and flashing system, and all other ancillary waterproofing work including but not limited to installation of work as specified.

1.2 RELATED SECTIONS

.1 Supplementary General Conditions

.2 Basic Requirements

.3 Sheet Metal Flashing and Trim

.4 Sheet Metal Roofing

.5 Board Insulation

.6 Skylights

1.3 REFERENCES

.1 Canadian Roofing Contractors Association (CRCA) Manual 2011.

.2 ASTM - D638 - Test Methods for Tensile Properties of Plastics

.3 NBC of Canada - 2010.

1.4 SUBMITTALS FOR REVIEW

.1 Membrane System Product Data: Provide current standard printed product literature indicating characteristics of membrane materials, flashing materials, components, and accessories product specification and installation.

.2 Product Samples: Submit product samples of membrane and flashing materials showing color, texture, thickness and surfacing representative of the proposed system for review and approval by the Owners Representative.

.3 Submit sample copies of both the Manufacturer and Applicator warranties for the periods stipulated. Each specimen must be a preprinted representative sample of the issuing company's standard warranty for the system specified.

.4 Submit copies of current Material Safety Data Sheets (MSDS) for all components of the work.

.5 Membrane Shop Drawings: Submit shop drawings of cold fluid-applied reinforced polyurethane system showing all a project plan, size, flashing details, and attachment for review and approval by the Owners Representative and Membrane Manufacturer.

1.5 QUALITY ASSURANCE

.1 Membrane Manufacturer: Company specializing in manufacturing fully reinforced cold fluid applied liquid resin waterproofing membrane systems with a minimum of ten (10) years of documented applications in the United States. Membrane Manufacturer shall submit the following certifications for review:
.1 Substrates and conditions are acceptable for purpose of providing specified warranty.
.2 Materials supplied shall meet the specified requirements.

.2 Applicator: Company specializing in performing the work of this section and approved by system manufacturer for warranted membrane installation. Applicator shall submit the following certification for review:
.1 Applicator shall submit documentation from the membrane manufacturer to verify contractor's status as an approved applicator for warranted installations.

.3 Monitor quantities of installed materials. Monitor application of resin mixture, reinforcing fleece and flashing. Perform Work in accordance with manufacturer's instructions.

1.6 REGULATORY REQUIREMENTS

.1 Conform to applicable building and jurisdictional codes for roofing/waterproofing assembly and fire resistance requirements.

1.7

.1 Comply with requirements of the local governing authority for work place safety.

1.8 PRE-INSTALLATION MEETING

.1 Convene a pre-installation meeting at the job site (1) week before starting work of this section. Require attendance of parties directly affecting work of this section, including but not limited to, Waterproofing Specifier, Departmental Representative, Waterproofing Contractor, and Membrane Manufacturer's Representative. Review waterproofing preparation and installation procedures, coordination and scheduling required with related work, and condition and structural loading limitations of deck/substrate.

1.9 FIELD INSPECTION SERVICES

.1 Manufacturer's technical representative shall provide the following inspections of the membrane application:
.1 Jobstart inspection at the beginning of each phase of the project, to review special detailing conditions and substrate preparation.
.2 Periodic in-progress inspections throughout duration of the project to evaluate membrane and flashing application.
.3 Final punch-list inspection at the completion of each phase of the project prior to installation of any surfacing.
.4 Warranty inspection to confirm completion of all punch list items, surfacing.

1.10 DELIVERY, STORAGE AND PROTECTION

.1 The Contractor together with the Departmental Representative shall define a storage area for all components. The area shall be cool, dry, out of direct sunlight, and in accordance with manufacturer's recommendations and relevant regulatory agencies. Materials shall not be stored in quantities that will exceed design loads, damage substrate materials, hinder installation or drainage.

.2 Store solvent-bearing solutions, resins, additives, inhibitors or adhesives in accordance with the MSDS and/or local fire authority. After partial use of materials replace lids promptly and tightly to prevent contamination.

.3 Roll goods shall be stored horizontally on platforms sufficiently elevated to prevent contact with water and other contaminants. DO NOT use rolls that are wet, dirty or have damaged ends.

.4 Roofing/waterproofing materials must be kept dry at all times. If stored outside, raise materials above ground or roof level on pallets and cover with a tarpaulin or other waterproof material. Plastic wrapping installed at the factory should not be used as outside storage covers.

.5 Follow manufacturer's directions for protection of materials prior to and during installation. Do not use materials that have been damaged to the point that they will not perform as specified. Fleece reinforcing materials must be clean, dry and free of all contaminants.

.6 Copies of all current MSDS for all components shall be kept on site. Provide any and all crew members with appropriate safety data information and training as it relates to the specific chemical compound he or she

may be expected to deal with. Each crew member shall be fully aware of first-aid measures to be undertaken in case of incidents. Comply with requirements of the local governing authority for work place safety.

1.11 ENVIRONMENTAL REQUIREMENTS

.1 Do not apply roofing/waterproofing membrane during or with the threat of inclement weather.

.2 Application of cold fluid-applied reinforced polyurethane roofing/waterproofing membrane may proceed while air temperature is between 40°F (5°C) and 85°F (30°C) providing the substrate is a minimum of 5°F above the dew point.

.3 When ambient temperatures are at or expected to fall below 50°F (10°C), or reach 85°F (30°C) or higher, follow Membrane System Manufacturer's recommendations for weather related additives and application procedures.

.4 Ensure that substrate materials are dry and free of contaminants. DO NOT commence with the application unless substrate conditions are suitable. Contractor shall demonstrate that substrate conditions are suitable for the application of the materials.

.5 Odor control and elimination measures are not typically necessary, but if required by the Owner or his designated Representative, Contractor shall implement odor control and elimination measures prior to and during the application of the roofing/waterproofing materials. Control/elimination measures shall be field tested at off-hours and typically consists of one (1) or a multiple of the following measures:

.1 Sealing of air intakes with activated carbon filters. Install filters in accordance with requirements and recommendations of the filter manufacturer. Seal filters at joints and against building exterior walls to prevent leakage of unfiltered air.

.2 Sealing of doorways, windows, and skylights with duct tape and polyethylene sheeting to prevent leakage of air into the building.

.3 Erection and use of moveable enclosure(s) sized to accommodate work area(s) and stationary enclosure for resin mixing station. Enclosure shall be field constructed or pre-manufactured of fire retardant materials in compliance with local code requirements in accordance with requirements of the Departmental Representative. Equipment enclosure(s) with mechanical air intake/exhaust openings and Odor Control Air Cleaners, as required to clean enclosed air volume and to prevent odor migration outside the enclosure. Exhaust opening shall be sealed with activated carbon filter.

.4 Protection of Contractor personnel and occupants

of the structure and surrounding buildings as necessary to comply with requirements of OSHA, NIOSH and/or governing local authority.

.6 When disposing of all refuse or unused materials, observe all EPA, OSHA or local disposal requirements.

1.12 COORDINATION & PROTECTION

.1 Coordinate the work with the installation of associated metal flashings, accessories, appurtenances, etc. as the work of this section proceeds.

.2 Building components shall be protected adequately (with tarp or other suitable material) from soil, stains, or spills at all hoisting points and areas of application. Contractor shall be responsible for preventing damage from any operation under its Contract. Any such damage shall be repaired at Contractor's expense to Owner's satisfaction or be restored to original condition.

.3 Provide barricades, retaining ropes, safety elements (active/passive) and any appropriate signage required by OSHA, NIOSH, and NSC and/or the Owner or designated Representative.

.4 Protect finished roofing/waterproofing membrane from damage by other trades by the use of a cushioning layer such as 1" thick expanded polystyrene insulation and an impact layer such as ½" thick exterior-grade plywood.

.5 Do not allow waste products containing petroleum, grease, acid, solvents, vegetable or mineral oil, animal oil, animal fat, etc. or direct steam venting to come into direct contact with the membrane unless approved by manufacturer's chemical resistance chart.

1.13 WARRANTY

.1 Manufacturer's Premier Warranty: Provide ten (10) year manufacturer's warranty under provisions of this section. This warranty provides for cost of labor and materials for loss of watertightness, limited to amounts necessary to effect repairs necessitated by either defective material or defects in related installation workmanship.

1.14

.1 Waterproofing Contractor's Warranty: Provide ten (10) year "Applicator Maintenance Warranty" covering workmanship for all work of this section including installation of membrane, flashings, metal work, and roofing/waterproofing accessories.

1.15

.1 Submit (2) executed copies of both the manufacturer

and applicator warranties for the periods stipulated, starting from the date of substantial completion. Each warranty must be signed by an authorized representative of the issuing company.

1.16 MATERIAL SUBSTITUTIONS

.1 Materials proposed for use in the performance of the work that are not specified herein must be submitted to the Owner/Owner's Representative for evaluation no later than ten days prior to bid.

PART 2 - PRODUCTS

2.1 GENERAL

.1 The products herein specified are totally pre-engineered products of the listed manufacturer and establish criteria for the approval of substitutions. Products must be part of a virtually odorless, pre-engineered, low VOC fully reinforced cold liquid applied polymeric resin waterproofing membrane system, equivalent in function, quality, composition and method of application to be considered for approval as an "Approved Substitute". Substitute materials must meet or exceed the physical performance characteristics of the specified materials. PMMA or single component primers or resin systems will not be accepted. A minimum 165 g/m2 fleece reinforcement is required.

2.2 MEMBRANE

.1 Membrane: Two-component, cold fluid-applied reinforced polyurethane waterproofing membrane with a 360 degree needle punched non-woven 165 g/m2 polyester reinforcing fleece, for a finished dry film membrane thickness of .070 inch nominal per ply. Provide products manufactured and supplied by the following:

.1 Kemper System America's Kemperol 2K-PUR resin for use in an adhered waterproofing system.

.2 Physical Properties: Property / Value / Test Method

.1 Color / Gray-Green / -
.2 Physical state / Cures to solid / -
.3 Nominal thickness(165 fleece)/70mils/-
.4 Tensile strength @ break /120 lb per / ASTM D-751
.5 Elongation / 50% / ASTM D-751
.6 Tearing strength / 5.0 lbs / ASTM D-751
.7 Puncture resistance / 140 lbs / FTMS 101-2031
.8 Dimensional stability / 0.1%/ASTM D-1204
.9 Water absorption / 2.2% / ASTM D-471
.10 Surface hardness / Shore A 85 / ASTM D-2240

.11 Water vapor transmission / 0.04 perms / ASTM E-96
.12 Usage time* / 30 minutes / -
.13 Rainproof after* / 2 hours / -
.14 Solid to walk on after* / 24 hours /-
.15 Solid to drive on with air rubber tires after* / 48 hours / - .
.16 Surfacing to be applied between* / 16-48 hours / -
.17 Overburden may be applied after / 2 days / -
.18 Completely hardened after / 3 days / -
.19 Crack spanning /1 2mm per0.08 inch / -
.20 Resistance to temperatures up to (short term) / 250°C/482°F / -
.21 * indicates all times are approximate and depend upon air flow, humidity and temperature.

2.3 FLASHINGS

.1 Membrane Flashings: A composite of the same resin material as field membrane with 165 g/m2 fleece reinforcement.

2.4 SUBSTRATE PRIMER PRIMERS AND RESIN ADDITIVES

.1 Polyurethane Primer: Two-component, solvent-free polyurethane resin for use in improving adhesion of membrane to wood, metal and bituminous substrate surfaces, as provided by the following manufacturer:
.1 Kemper System America, Inc.'s Kempertec D primer.

.2 Cold Weather Additive: Additive specifically designed to accelerate the resin reaction time at ambient temperatures below 50°F (10°C). Accelerator to be used with cream resin Component A prior to mixing of multi-component resin, as provided by the following manufacturer:
.1 Kemper System America Inc.'s Kemperol A 2K-PUR Accelerator.

2.5 SURFACINGS AND COATINGS

.1 Color Coating: Polyurethane-based coating suitable for use as a colored coating, as provided by the following Manufacturer: Kemper System America, Inc.'s Kemperdur Deko 2KS-FR Finish

2.6 ACCESSORIES

.1 Application Tools, Accessories, and Cleaners: Supplied and/or approved by membrane manufacturer for product installation.

.2 Solvent-Based Cleaner for Tools and Membrane Tie-Ins: Methyl Ethyl Ketone (MEK) or acetone.

.3 Water-Based Cleaner for Membrane: Simple Green HD.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verify that surfaces and site conditions are ready to receive work.

3.2 PREPARATION OF SUBSTRATE

.1 General: Surfaces to be prepared as a substrate for the new waterproofing system as follows: The contractor shall determine the condition of the existing structural deck/substrate. All defects in the deck or substrate shall be corrected before new waterproofing work commences. Areas of deteriorated deck/substrate, porous or other affected materials must be removed and replaced with new to match existing.

.1 Prepare flashing substrates as required for application of new waterproofing membrane flashings.

.2 Inspect substrates, and correct defects before application of new waterproofing.

.3 Remove all ponded water, snow, frost and/or ice from the work substrate prior to installing new waterproofing materials.

.2 Steel/Metal:

.1 Clean and prepare metal surfaces to near white metal in accordance with SSPC - SP3 - power tool clean. Extend preparation a minimum of one (1) inch beyond the termination of the membrane flashing materials.

.2 In addition to cleaning, all metal surfaces shall be abraded to provide a rough open surface. A wire brush finish is not acceptable.

.3 Wood/Plywood:

.1 Plywood shall be identified with American Plywood Association (APA) grade trade marks and shall meet the requirements of product standard PS1. Strip plywood joints with four inch (4") wide strip of flashing membrane. Cover knot holes or cracks with strips of flashing membrane.

3.3 PRIMER APPLICATION

.1 General:

.1 Mix and apply single and two-component primer in strict accordance with written instructions of Membrane Manufacturer. Use only proprietary materials, as supplied by the membrane manufacturer.

.2 The substrate surface must be dry, with any remaining dust or loose particles removed using clean, dry, oil-free compressed air, industrial vacuum, cloth wipe or a combination of methods.

.3 Do not install primer on any substrate containing newly applied and/or active asphalt, coal-tar pitch,

creosote or penta-based materials unless approved in writing by Membrane Manufacturer. Some substrates may require additional preparation before applying primer.

.2 Mixing of Kempertec D Primers: Premix primer Component A thoroughly with a spiral agitator or stir stick. Pour primer Component B into Component A and mix the components for approximately 2 minutes with a clean spiral agitator on slow speed or stir stick without creating any bubbles or streaks. DO NOT AERATE. The Primer solution should be a uniform color, with no light or dark streaks present.

.1 Do not thin primer. Determine required primer coverage for each substrate material/condition and apply in strict accordance with written instructions of Membrane Manufacturer.

.2 Mix only that amount of primer components A & B that can be used in 30 minutes.

.3 Application of Primer: Roll or brush the primer evenly onto the surface to fully saturate the substrate in one application. Do not allow primer to pond or collect in low areas. Follow manufacturer's recommended application rates to ensure that a thin layer of cured primer remains on the substrate surface.

.1 Apply primer only up to the edge of the membrane flashing terminations. Primer application past the membrane terminations requires surfacing with an approved material.

.2 Allow standard primers to cure for a minimum of twelve (12) hours before membrane application. Allow quick-dry primers to cure for a minimum of four (4) hours before membrane application. Membrane must be applied to primer only when completely dry and without tack.

.3 Exposure of the primer in excess of eight (8) days or premature exposure to moisture may require removal and application of new primer. DO NOT apply new primer over exposed primer older than eight (8) days, primer prematurely exposed to moisture, or primer used as temporary waterproofing, unless approved in writing by the Membrane Manufacturer.

.4 Disposal of Primer:

.1 Cured primer may be disposed of in standard landfills. This is accomplished by thoroughly mixing all components.

.2 Uncured primer is considered a hazardous material and must be handled as such, in accordance with local, state and federal regulation. Do not throw uncured resin away.

3.4 MEMBRANE APPLICATION

.1 General:

.1 It is recommended to apply the waterproofing membrane immediately following full curing of the

primer in order to obtain the best bond between primer and membrane.

.2 Mix and apply cold fluid-applied reinforced polyurethane waterproofing membrane in strict accordance with written instructions of Membrane Manufacturer. Use only proprietary membrane resins and materials, as supplied by the membrane manufacturer.

.3 The primed substrate surface shall be dry, with any remaining dust or loose particles removed using clean, dry, oil-free compressed air, industrial vacuum, cloth-wipe or a combination.

.4 Protect all areas where membrane has been installed. Do not work off installed membrane during application of remaining work before forty-eight (48) hours of curing. Movement of materials and equipment across installed membrane is not acceptable. If movement is necessary, provide complete protection of affected areas.

.5 Closely follow the Membrane Manufacturer's recommendation for hot and cold weather application. Monitor surface and ambient temperatures, including the effects of wind chill.

.2 Mixing of Kemperol 2K-PUR Resin:

.1 Mix resin Component A (cream formulation) with a spiral agitator until the liquid is a uniform cream color. If the ambient temperature is below 50°F (10°C), then a weather related additive should be combined and mixed into the Component A.

.2 Accelerator should be added to resin Component A when the ambient temperature is 50°F (10°C) and below. The accelerator should be mixed with the spiral agitator for 2 minutes or until both liquids are thoroughly blended.

.3 Pour resin Component B into Component A at a 4:1 ratio (by weight) and thoroughly mix the components with a clean spiral agitator. The Resin solution should be a uniform color, with no light or dark streaks present.

.4 Mix only that amount of resin components A & B that can be used in 30 minutes.

.3 Application of Resin/Fleece:

.1 Apply mixed resin to the prepared surface at the manufacturer's recommended application rate. The resin should be rolled or brushed liberally and evenly onto the surface using a broad, even stroke. Cover one working area at a time, between 15 - 20 ft.2 (1.4 - 1.9 m2).

.2 Roll out dry polyester fleece onto the liquid resin mix, making sure the SMOOTH SIDE IS FACING UP (natural unrolling procedure), avoiding any folds and wrinkles. The fleece will begin to rapidly saturate with the liquid resin mix. Use a medium nap roller or brush to work the resin into the fleece, saturating from the bottom up, and eliminating air bubbles, wrinkles, etc. The appearance of the saturated fleece

should be light opaque amber with no white spots. White spots are indications of unsaturated fleece or lack of adhesion. It is important to correct these faults before the resin cures.

.3 Apply additional liquid resin mix on top of fleece at the manufacturer's recommended application rate to finish the saturation of the fleece. Roll this final coating into the fleece, which will result in a glossy appearance. The fleece can only hold so much resin and all excess should be rolled forward to the unsaturated fleece, eliminating ponding or excessive build-up of the resin. The correct amount of resin will leave no whiteness in fleece and there will be a slightly fibrous surface texture. The final resin coating should be smooth and uniform.

.4 Approximately 2/3 of the total resin should be applied to the substrate below the fleece reinforcement, and 1/3 of the total resin should be applied over the fleece reinforcement.

.5 Prevent contact between mixed/unmixed resin and new/existing membrane. If any unmixed resin contacts membrane surface remove immediately and clean thoroughly with a cloth rag.

.6 At all fleece seams, allow a 2" (5 cm) overlap for all side joints and a 4" (10 cm) overlap for all end joints.

.7 At membrane tie-offs, clean in-place membrane with MEK (methyl ethyl ketone) solvent or acetone once resin has cured. Allow solvents to fully evaporate before application of new resin.

.4 Disposal of Resin:

.1 Cured resin may be disposed of in standard landfills. This is accomplished by thoroughly mixing all components.

.2 Uncured resin is considered a hazardous material and must be handled as such, in accordance with local, state and federal regulation. Do not throw uncured resin away.

3.5 PROTECTION

.1 Upon completion of waterproofing and flashings(including all associated work, institute appropriate procedures for surveillance and protection of roofing during remainder of construction period. Protect all areas where membrane has been installed.

3.6 CLOSEOUT

.1 Correction of Work:

.1 Work that does not conform to specified requirements including tolerances, slopes, and finishes shall be corrected and/or replaced. Any deficiencies of membrane application, termination and/or protection as noted during the Membrane Manufacturer's inspections shall be corrected and/or replaced at Contractor's expense.

.2 Clean-Up: Site clean-up, including both interior and exterior building areas that have been affected by construction, shall be restored to preconstruction condition.

PART 1 - GENERAL

1.1 REFERENCES

.1 ASTM A755/A755M-03(2008), Steel Sheet, Metallic-Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.

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

.3 Canadian Roofing Contractors Association (CRCA).

1.2 SAMPLES

.1 Submit duplicate 150mm x 150mm samples of sheet metal material, colour and finish.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

.1 Galvalume Plus steel sheet: 24 ga. The core will be formed from Grade 230 (33) steel, having a minimum yield stress of 230 Mpa (33 000 psi) and a maximum allowable stress resistance of 144 Mpa (20 625 psi).

2.2 PREFINISHED STEEL SHEET

.1 Prefinished steel with Galvalume Plus.

2.3 ACCESSORIES

.1 Plastic cement: to CGSB 37-GP-5Ma.

.2 Underlay for metal flashing: No. 15 perforated asphalt felt to CSA A123.3.

.3 Sealants: Tremco Dymonic.

.4 Cleats: of same material, and temper as sheet metal, minimum 50mm wide. Thickness 22 ga.

.5 Fasteners: of same material as sheet metal, to CSA B111, flat head roofing nails of length and thickness suitable for metal flashing application. Colormate screws where exposed.

.1 Nails to be hot dipped galvanized.

.1 Acceptable manufacturers:

.1 Tree Island Industries.

.2 Duchesne.

.6 Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details and as indicated.

.2 Form pieces in 2440mm maximum lengths. Make allowance for expansion at joints.

.3 Hem exposed edges on underside 13mm. Miter and seal corners with sealant.

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

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

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install sheet metal work in accordance with CRCA FL series details and as detailed.

.2 Use concealed fastenings except where approved before installation.

.3 Provide underlay under sheet metal. Secure in place and lap joints 4".

.4 Lock end joints and caulk with sealant.

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Fire stopping and smoke seals within mechanical assemblies (i.e inside ducts, dampers) and electrical assemblies (i.e. inside cable trays) are specified in Mechanical and Electrical sections respectively.

.2 Evaluate UL or other recognized designs only where no ULC or cUL design exists.Fire-stopping shall consist of a ULC or cUL listed firestop system. CFFM will

1.2 REFERENCES

.1 Canadian Forces Fire Marshal (CFFM)
.1 FMD 4003

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

.3 Underwriter's Laboratories of Canada (ULC)
.1 ULC-S115-1995(R2001), Fire Tests of Fire stop Systems.

1.3 DEFINITIONS

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

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

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

.4 Tightly Fitted; (ref: NBC Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of noncombustible construction or have "0" annular space in buildings of combustible

construction.
.1 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

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

.3 Shop Drawings:
.1 Submit shop drawings to show locations, proposed material, reinforcement, anchorage, fastenings and method of installation.
.2 Construction details should accurately reflect actual job conditions.

.4 Samples:
.1 Submit duplicate 300 mm x 300 mm samples showing actual fire stop material proposed for project.

.5 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
.1 Test reports: in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.
.1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.
.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
.3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

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

1.5 QUALITY ASSURANCE

.1 Single Contractor Responsibility: One installer shall install all fire stopping on all rated separations. Individual trades shall not firestop their own service penetrations.

.1 Fire stopping and smoke seals within mechanical and electrical assemblies are the responsibility of Mechanical and Electrical sections respectively.

.2 Qualifications:

.1 Installer: company specializing in fire stopping installations of ULC fire stopping systems, approved by manufacturer.

.2 The firestop installer shall have been registered in good standing with the Firestop Contractors International Association (FCIA) or CFFM-approved equivalent for at least 2 years prior to contract award.

.3 Manufacturer's Obligations:

.1 The manufacturer shall play an active role in the installation of their product during the period of this contract.

.2 The manufacturer shall be represented at all relevant meetings by a trained and qualified technical representative.

.3 The technical representative shall be approved by the DCC Representative.

.4 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with contractor's representative and DCC Representative to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

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

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

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

.2 The project shall be divided into "Sectors of Work".

.3 Twice during progress of each Sector of Work at 25% and 60% complete.

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

.5 After each site visit provide a written report to the DCC Representative within five (5) working days.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:
.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
.3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, and ULC markings.

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

PART 2 - PRODUCTS

2.1 MATERIALS

.1 All fire stop materials shall be from one manufacturer.

.2 Fire stopping and smoke seal systems: in accordance with ULC-S115.
.1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN- ULC-S115 and not to exceed opening sizes for which they are intended and conforming to specified special requirements described in PART 3.
.2 Fire stop system rating: F.

.3 Service penetration assemblies: systems tested to ULC-S115-1995(R2001).

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

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

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

.7 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.

.8 Primers: to manufacturer's recommendation for specific

material, substrate, and end use. VOC limit for primers to meet Green Seal Standard GS-11 and Green Seal Standard GS-03 and SCAQMD Rule 1113.

.9 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

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

.11 Sealants for vertical joints: non-sagging. VOC limit for sealants to meet content limits for VOC of the SCAQMD Rule 1168.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 PREPARATION

.1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
.1 Ensure that substrates and surfaces are clean, dry and frost free.

.2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.

.3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.

.4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.3 INSTALLATION

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

.2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

.3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.

.4 Tool or trowel exposed surfaces to neat finish.

.5 Remove excess compound promptly as work progresses and upon completion.

3.4 SEQUENCES OF OPERATION

.1 Proceed with installation only when submittals have been reviewed by DCC Representative.

.2 Install floor fire stopping before interior partition erections.

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

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

.1 Ensure pipe insulation installation precedes fire stopping.

3.5 FIELD QUALITY CONTROL

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

.2 Manufacturer's Field Services:

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

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

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

3.6 CLEANING

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

.2 Progressive cleaning: Remove excess materials and debris and clean adjacent surfaces immediately after application.

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

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

3.7 SCHEDULE

.1 Fire stop and smoke seal at:
.1 Penetrations though any membrane forming part of a fire separation.
.2 Head of wall joints; tops of fire-resistance rated partitions.
.3 The point of intersection between dissimilar fire separation assemblies (i.e. between concrete block and gypsum).
.4 Structural penetrations.
.5 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
.6 Openings and sleeves installed for future use through fire separations.
.7 Around mechanical and electrical assemblies, including electrical outlet boxes, penetrating fire separations or any membrane forming part of an assembly required to have a fire resistance rating.

.2 Smoke seal only at:
.1 Penetrations through all partitions and walls specified as separations without ratings.
.2 Tops of all partitions and walls specified as separations without ratings.

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
.2 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
.3 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.

.2 Department of Justice Canada (Jus)
.1 Canadian Environmental Protection Act, 1999 (CEPA).

.3 General Services Administration (GSA) - Federal Specifications (FS)
.1 FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.

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

.5 Transport Canada (TC)
.1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.3 SUBMITTALS

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

.2 Manufacturer's product data to describe.
.1 Caulking compound.
.2 Primers.
.3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

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

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

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

.6 Submit manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.
.1 Instructions to include installation instructions for each product used.

1.4 DELIVERY, STORAGE AND HANDLING

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

1.5 WASTE MANAGEMENT AND DISPOSAL

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

.2 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.

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

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

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

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

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

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

1.6 PROJECT CONDITIONS

.1 Environmental Limitations:
.1 Do not proceed with installation of joint sealants under following conditions:
.1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.
.2 When joint substrates are wet.

.2 Joint-Width Conditions:
.1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:
.1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.7 ENVIRONMENTAL REQUIREMENTS

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

.2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.3 Ventilate area of work as directed by General Contractor by use of approved portable supply and exhaust fans.

PART 2 - PRODUCTS

2.1 SEALANT MATERIALS

.1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.

.2 Use only no or low VOC content materials. When low toxicity caulks are not possible, confine usage to areas which offgas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize offgas time.

.3 Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Type 1 - Urethanes One Part.
.1 Self-leveling.
.2 Acceptable material:
.1 Tremco Tremflex S/L.
.2 Vulkem 45.
.3 Sonneborn SL 1.

.2 Type 2 - Urethanes One Part.
.1 Non-Sag to CAN/CGSB-19.13, Type 2, MCG-2-25 colour to be selected.
.2 Acceptable material:
.1 Tremco Dymonic.
.2 Vulkem 116.
.3 Sonneborn NP 1.

.3 Type 3 - Silicones One Part.
.1 To CAN/CGSB-19.22 (mildew resistant).
.2 Acceptable material:
.1 Tremco Proglaze.
.2 Dow 786.
.3 Sonneborn Omniplus.

.4 Type 4 - Acrylic Latex One Part.
.1 To CAN/CGSB-19.17.
.2 Acceptable material:
.1 Tremco 100 latex.
.2 Sonneborn Sonolac.

.5 Type 5 - Acoustical Sealant.
.1 To CAN/CGSB-19.21.
.2 Acceptable material:
.1 Tremco acoustical sealant.
.2 Sonneborn Acoustical.

.6 Preformed Compressible and Non-Compressible back-up materials.
.1 Neoprene or Butyl Rubber.
.1 Round solid rod, Shore A hardness 70.
.2 High Density Foam.
.1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m³ density, or neoprene foam backer, size as recommended by manufacturer.
.3 Bond Breaker Tape.
.1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT SELECTION

.1 Primeters of exterior openings where frames meet exterior facade of building: Sealant Type 2.

.2 Coping joints and coping-to-facade joints: Sealant Type 2.

.3 Seal interior perimeters of exterior openings as detailed on drawings: Sealant Type: 4.

.4 Interior control and expansion joints in floor surfaces: Sealant Type: 2

.5 Perimeters of interior frames and trim: Sealant Type: 4.

.6 Perimeter of washroom fixtures (eg urinals, waterclosets, basins, vanities, etc: Sealant Type 3.

2.4 JOINT CLEANER

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

.2 Primer: as recommended by manufacturer.

PART 3 - EXECUTION

3.1 PROTECTION

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

3.2 SURFACE PREPARATION

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

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

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

.4 Ensure joint surfaces are dry and frost free.

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

3.3 PRIMING

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

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

3.4 BACKUP MATERIAL

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

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

3.5 MIXING

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

3.6 APPLICATION

.1 Sealant.

.1 Apply sealant in accordance with manufacturer's

written instructions.
.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
.3 Apply sealant in continuous beads.
.4 Apply sealant using gun with proper size nozzle.
.5 Use sufficient pressure to fill voids and joints solid.
.6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
.7 Tool exposed surfaces before skinning begins to give slightly concave shape.
.8 Remove excess compound promptly as work progresses and upon completion.

.2 Curing.
.1 Cure sealants in accordance with sealant manufacturer's instructions.
.2 Do not cover up sealants until proper curing has taken place.

.3 Cleanup.
.1 Clean adjacent surfaces immediately and leave Work neat and clean.
.2 Remove excess and droppings, using recommended cleaners as work progresses.
.3 Remove masking tape after initial set of sealant.

.4 Defective work: shall include, but not be restricted to, joint leakage, cracking, crumbling, melting, runny, loss of adhesion, loss of cohesion, or staining of adjoining or adjacent work or surfaces. Contractor to make good any defective sealant work.