

Part 1 General

1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
 - .2 CAN/CGSB 37.3-M89, Application of Emulsified Asphalts for Dampproofing or Waterproofing.
 - .3 CAN/CGSB 37.5-M89, Cutback Asphalt Plastic Cement.
 - .4 CGSB 37-GP-6Ma-83, Asphalt, Cutback, Unfilled, for Dampproofing.
 - .5 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
 - .6 CGSB 37-GP-11M-76(R1984), Application of Cutback Asphalt Plastic Cement.
 - .7 CGSB 37-GP-12Ma-84, Application of Unfilled Cutback Asphalt for Dampproofing.
 - .8 CGSB 37-GP-15M-76(R1984), Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.
 - .9 CAN/CGSB 37.16-M89, Filled, Cutback, Asphalt for Dampproofing and Waterproofing.
 - .10 CAN/CGSB 37.28-M89, Reinforced Mineral Colloid Type, Emulsified Asphalt for Roof Coatings and for Waterproofing.
 - .11 CGSB 37-GP-36M-76, Application of Filled Cutback Asphalts for Dampproofing and Waterproofing.
 - .12 CGSB 37-GP-37M-77, Application of Hot Asphalt for Dampproofing or Waterproofing.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA A123.4-98, Bitumen for Use in Construction of Built-Up Roof Coverings and Dampproofing and Waterproofing Systems.
- .3 Health Canada
 - .1 Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 National Research Council Canada (NRC)/Institute for Research in Construction (IRC)
 - .1 Canadian Construction Materials Centre (CCMC)

1.2 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
- .3 Submit product data sheets for bituminous dampproofing products. Including:
 - .1 Product characteristics.

- .2 Performance criteria.
- .3 Application methods.
- .4 Limitations.
- .4 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence and cleaning procedures.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Provide and maintain dry, off-ground weatherproof storage.
- .3 Store materials on supports to prevent deformation.
- .4 Remove only in quantities required for same day use.
- .5 Store materials in accordance with manufacturer's written instructions.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Ensure emptied containers are sealed and stored safely.
- .5 Fold up metal banding, flatten and place in designated area for recycling.
- .6 Divert unused bituminous dampproofing, sealing compounds and asphalt primer materials from landfill to recycling facility approved by Departmental Representative.

1.5 PROJECT/SITE ENVIRONMENTAL REQUIREMENTS

- .1 Temperature, relative humidity, moisture content.
 - .1 Apply dampproofing materials only when surfaces and ambient temperatures are within manufacturers' prescribed limits.
 - .2 Do not proceed with Work when wind chill effect would tend to set bitumen before proper curing takes place.
 - .3 Maintain air temperature and substrate temperature at dampproofing installation area above 5 degrees C for 24 hours before, during and 24 hours after installation.
 - .4 Do not apply dampproofing in wet weather.
- .2 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.

- .3 Ventilation:
 - .1 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.
 - .2 Provide continuous ventilation during and after dampproofing application. Run ventilation system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of dampproofing installation.

Part 2 Products

2.1 MATERIALS

- .1 Asphalt:
 - .1 For application and curing at temperatures above 5 degrees C: to CAN/CGSB-37.2, CGSB 37-GP-6Ma, CAN/CGSB-37.16, CAN/CGSB-37.28 and CSA A123.4.
 - .1 Package label or bill of lading for bulk hot liquid asphalt must indicate type, flash point, equiviscous temperature range and final blowing temperature.
 - .2 Sealing compound: plastic cutback asphalt cement to CAN/CGSB-37.5.
 - .3 Asphalt primer: to CGSB 37-GP-9Ma, CAN/CGSB-37.2.
 - .4 Patching Compound: fibred mastic compound as recommended by dampproofing manufacturer.
 - .5 Reinforcing fabric: asphalt coated fabric as recommended by dampproofing manufacturer.

Part 3 Execution

3.1 WORKMANSHIP

- .1 Keep hot asphalt:
 - .1 Below its flash point.
 - .2 At or below its final blowing temperature.
 - .3 Within its equiviscous temperature range at place of application.

3.2 PREPARATION

- .1 Before applying dampproofing:
 - .1 Seal exterior joints between foundation walls and footings, joints between concrete floor slab and foundation and around penetrations through dampproofing with sealing compound.

3.3 APPLICATION

- .1 Do dampproofing in accordance with CAN/CGSB-37.3, CGSB 37-GP-12Ma, CGSB 37-GP-36M and CGSB 37-GP-37M except where specified otherwise.

- .2 Do sealing work in accordance with CGSB 37-GP-11M except where specified otherwise.
- .3 Do priming of surface in accordance with CGSB 37-GP-15M except where specified otherwise.
- .4 Apply primer.
- .5 Apply dampproofing in accordance with applicable CGSB application standard.

Material		Application
CAN/CGSB-37.2	use	CAN/CGSB-37.3
CGSB 37-GP-6Ma	use	CGSB 37-GP-12M
CAN/CGSB-37.16	use	CGSB 37-GP-36M
CAN/CGSB-37.28	use	CAN/CGSB-37.3
CSA A123.4	use	CGSB 37-GP-37M

3.4 SCHEDULE

- .1 Apply continuous, uniform coating to entire exterior faces of foundation walls from 50mm below finished grade level to and including tops of foundation wall footings.
- .2 Apply continuous, uniform coating to exterior side of foundation walls enclosing rooms below finished grade. Include exterior portion of interior walls where floors in adjacent rooms are at different elevations.
- .3 Apply two additional coats of dampproofing to vertical corners and construction joints for a minimum width of 230 mm on each side, and all around and for 230 mm along pipes passing through walls.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Gas Association (CGA)
 - .1 CAN/CGA-B149.1-05, Natural Gas and Propane Installation Code Handbook.
 - .2 CAN/CGA-B149.2-05, Propane Storage and Handling Code.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 71-GP-24M-77(R1983), Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S604-M91, Standard for Type A Chimneys.
 - .2 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
 - .3 CAN/ULC-S702-97, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
 - .4 CAN/ULC-S704-03, Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.2 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 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's insulation products and adhesives.
- .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.3 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 29.06 - Health and Safety Requirements.

1.4 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 packaging material for recycling in accordance with Waste Management Plan.

Part 2 Products

2.1 INSULATION

- .1 Extruded polystyrene (XPS): to CAN/ULC-S701. Insulation for installation at below grade foundation walls:
 - .1 Type: 4.
 - .2 Compressive strength: 30 psi.
 - .3 Thickness: 75 mm as indicated.
 - .4 Size: 600 x 2400.
 - .5 Edges: shiplapped or square.
- .2 Rigid Cellular Polyisocyanurate. Insulation for installation at flat roofs:
 - .1 Faced: to CAN/ULC C-S704.
 - .1 Polyisocyanurate core: glass fibre reinforced.
 - .2 2 or 3 layers, R40 minimum insulation value
 - .3 Surfaces:
 - .1 Back: glass fibre reinforced.
 - .2 Facers: non-reflective.
 - .4 Shape: flat.
 - .5 Thickness: as indicated in drawings.
 - .6 Size: 1200 x 2400.
 - .7 Flame spread classification: less than 500.
 - .8 Provide tapered insulation of similar material where indicated for positive drainage and backslopes.

2.2 ADHESIVE

- .1 Adhesive (for polystyrene): to CGSB 71-GP-24.
 - .1 Adhesive as recommended by manufacturer for insulation product installation.
 - .2 Use low VOC compound.

2.3 ACCESSORIES

- .1 Accessories as recommended by manufacturer for insulation product installation.

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 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN4-S604 type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 type B and L vents.
- .5 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.
- .6 Offset both vertical and horizontal joints in multiple layer applications.
- .7 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

3.3 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 RIGID INSULATION INSTALLATION

- .1 Apply adhesive to polystyrene insulation board and substrate in accordance with manufacturer's recommendations.
- .2 Imbed insulation boards into vapour barrier type adhesive, applied as specified, prior to skinning of adhesive.

3.5 PERIMETER FOUNDATION INSULATION

- .1 Exterior application: extend boards 1200 mm minimum below finish grade to base of grade beam and extend out on 80 degree angle minimum 1220 mm. Install on exterior face of perimeter foundation wall with adhesive.

3.6 ROOF INSTALLATION

- .1 Refer to Section 07 52 00 - Modified Bituminous Membrane for installation procedure.

3.7 CLEANING

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

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C553-02, Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .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.
- .2 Canadian Gas Association (CGA)
 - .1 CAN/CGA-B149.1-05, Natural Gas and Propane Installation Code Handbook.
 - .2 CAN/CGA-B149.2-05, Propane Storage and Handling Code.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .4 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S604-M1991, Type A Chimneys.
 - .2 CAN/ULC-S702-1997, Standard for Mineral Fibre Insulation.

1.2 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.

1.3 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 29.06 - Health and Safety Requirements.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

- .3 Collect and separate for disposal packaging material in appropriate on-site bin for recycling in accordance with Waste Management Plan.

Part 2 Products

2.1 INSULATION

- .1 Blanket mineral fibre: to CAN/ULC S702 and ASTM C553.
 - .1 Type 1: Semi-rigid mineral fibre, manufactured from basaltic rock, unfaced, R-value of minimum 4 per 25 mm, flame spread 5, smoke development 0. Density 32kg/m³.
 - .2 Thickness: 75 mm or as indicated.
- .2 Batt insulation: fibre glass, resin bonded, unfaced, to ASTM C665, Type 1.
- .3 Acoustic batt insulation: fibre glass for sound attenuation, unfaced, to ASTM C423.
- .4 Acoustic soffit insulation: fibre glass for sound attenuation, mylar faced, density of 17.6 kg/m³. Insulation strips to be mylar faced on steel deck perforations side.

2.2 ACCESSORIES

- .1 Insulation clips:
 - .1 Impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.
- .2 Staples: 12 mm minimum leg.
- .3 Tape: as recommended by manufacturer.

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 INSULATION INSTALLATION

- .1 Install insulation to maintain continuity of thermal protection to building elements.
- .2 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .3 Do not compress insulation to fit into spaces.

- .4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN/ULC-S604 Type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 Type B and L vents.
- .5 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

3.3 CLEANING

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

END OF SECTION

Part 1 General

1.1 REFERENCES

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

1.2 TEST REPORTS

- .1 Submit test reports, verifying qualities of insulation meet or exceed requirements of this specification, in accordance with Section 01 45 00 - Quality Control.
- .2 Submit test reports in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.

1.3 QUALITY ASSURANCE

- .1 Perform Work in accordance with Canadian Urethane Foam Contractor's Association - Professional Contractor Quality Assurance Program and requirements for materials and installation.

1.4 SAFETY REQUIREMENTS

- .1 Protect workers as recommended by CAN/ULC-S705.2 and manufacturer's recommendations:
 - .1 Workers must wear gloves, respirators, dust masks, long sleeved clothing, eye protection and protective clothing when applying foam insulation.
 - .2 Workers must not eat, drink or smoke while applying foam insulation.

1.5 PROTECTION

- .1 Ventilate area in accordance with Section 01 51 00 - Temporary Utilities.
- .2 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and 24 hour after application to maintain non-toxic, unpolluted, safe working conditions.
- .3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.

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

1.6 WASTE MANAGEMENT AND DISPOSAL

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

1.7 ENVIRONMENTAL REQUIREMENTS

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

Part 2 Products

2.1 MATERIALS

- .1 Insulation: spray applied, medium density polyurethane foam to CAN/ULC-S705.1. Long term insulation value of minimum R6 per 25 mm. Minimum air barrier performance of 0.02 L / (sm²) @ 75 Pa, water vapour permeance less than 1.05 PERM (60ng/Pa-s-m.).
- .2 Primers: in accordance with manufacturer's recommendations for surface conditions.

Part 3 Execution

3.1 APPLICATION

- .1 Apply insulation to clean surfaces in accordance with CAN/ULC-S705.2 and manufacturer's printed instructions. Use primer where recommended by manufacturer.
- .2 Apply sprayed foam insulation in thickness 100 mm or as indicated.

END OF SECTION

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.
 - .2 CAN/CGSB-19.18M-M87, Sealing Compound, One Component, Silicone Base Solvent Curing.
 - .3 CAN/CGSB-19.24M-M90, Multi-Component, Chemical Curing Sealing Compound.
 - .4 CGSB 19-GP-14M-76, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
- .2 NBCC 2010; Part 5 - Environmental Separation

1.2 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Provide drawings of special joint conditions.
- .2 Submit manufacturer's product data sheets in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Submit manufacturer's installation instructions in accordance with Section 01 33 00 - Submittal Procedures.

1.3 QUALITY ASSURANCE

- .1 Perform Work in accordance with Canadian Urethane Foam Contractor's Association and National Air Barrier Association - Professional Contractor Quality Assurance Program and requirements for materials and installation.
- .2 Provide entire wall surface air/vapour barrier membrane by one trade only, and approved and trained in installation procedures by the membrane manufacturer.
- .3 Each installer must be thoroughly trained and experienced in the installation of air/vapour barrier specified, and can supervise a maximum of two apprentices. Applicators must perform or directly supervise all air/vapour barrier work on the project.
- .4 Assign one applicator as "Designated Applicator" for this project who is to assume overall responsibility for installing and pre-testing all air/vapour barrier membranes on the project prior to inspection and testing by independent testing agency.
- .5 Regulatory Requirements
 - .1 Comply with all safety precautions, manufacturers' instructions, Workplace Hazardous Material Information System, and WCB requirements for materials handling, storage, application and disposal and regarding labeling and provision of material safety data sheets.

.6 Testing

- .1 The Designated Applicator and the Installers/Apprentices will be expected to routinely inspect and test their work as they proceed. The result of their testing and inspection efforts to be recorded in worksheets by the Applicator on the crew and confirmed by the Designated Applicator. These worksheets are to be kept on site and be available for routine inspection by the Departmental Representative. A copy of the worksheets to be submitted to Departmental Representative on a weekly basis. The cost of these requirements is to be borne by the air/vapour barrier membrane trade.
- .2 The Designated Applicator will pre-inspect/test all membranes and make all necessary repairs immediately prior to inspection and testing. He will document repairs made and approvals given.
- .3 The Designated Applicator will cooperate with the independent testing agency by making construction drawings and records available to him, including the air/vapour barrier worksheets, and providing him with other information as requested. The Designated Applicator will assist the air/vapour barrier inspection agency in the performance of his duties by providing him access to scaffolding, swingstages, etc.

1.4 MOCK-UP

- .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 Construct typical exterior wall panel, 1220 mm long by 1200 mm wide, incorporating window and frame and sill, insulation, building corner condition, junction with roof system and junctions of substrate changes illustrating materials interface and seals.
- .3 Locate where directed by Departmental Representative.
- .4 Mock-up may not remain as part of the Work.
- .5 Allow 24 h for inspection of mock-up by Departmental Representative before proceeding with air/vapour barrier Work.

1.5 PRE- INSTALLATION MEETINGS

- .1 Convene one week prior to commencing Work of this section.

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 handle materials in accordance with manufacturer's written instructions.
- .3 Avoid spillage. Immediately notify Departmental Representative if spillage occurs and start clean up procedures.
- .4 Clean spills and leave area as it was prior to spill.

1.7 WASTE MANAGEMENT AND DISPOSAL

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

1.8 PROJECT ENVIRONMENTAL REQUIREMENTS

- .1 Do not install solvent curing sealants or vapour release adhesive materials in enclosed spaces without ventilation.
- .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.
- .3 Maintain temperature and humidity recommended by materials manufactures before, during and after installation.

1.9 SEQUENCING

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

1.10 WARRANTY

- .1 For sealant and sheet materials provide a 24 month warranty period.
- .2 Provide a three year warranty under provisions of Section 01 78 00 - Closeout Submittals.
- .3 Warranty: Include coverage of installed sealant and sheet materials which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

Part 2 Products

2.1 SHEET MATERIALS

- .1 Sheet Seal Type 1: Self-Adhesive bitumen laminated to high-density polyethylene film, nominal total thickness of 1.0 mm.
 - .1 Acceptable material:
 - .1 Blueskin SA_LT by Baker.
 - .2 CCW-705 by Carlisle.
 - .3 Perm-a-barrier wall membrane by Grace.
 - .2 Foam Seal Type 2: Spray-applied medium density spray polyurethane foam insulation/air/vapour barrier.

2.2 SEALANTS

- .1 Sealants in accordance with Section 07 92 00 - Joint Sealants.
- .2 Butyl Sealant Type A : CGSB 19-GP-14M, butyl rubber base, single component, solvent release, non-skinning, Shore "A" Hardness Range of 10 to 30; black colour.

- .3 Sealant Type B: CAN/CGSB-19.13M, single component, chemical curing, capable of continuous water immersion, non-sagging type, Shore "A" Hardness Range of 20 to 35 black colour.
- .4 Polyurethane Sealant Type C: CAN/CGSB-19.24M, multi- component, chemical curing, non-sagging, Shore 'A' Hardness Range of 20 to 35 to, black colour.
- .5 Silicone Sealant Type D : CAN/CGSB-19.18M, single component, solvent curing, non-sagging, Shore 'A' Hardness Range of 35 to 45 to , black colour.
- .6 Primer: Recommended by sealant manufacturer.
- .7 Substrate Cleaner: Non-corrosive type recommended by sealant manufacturer and compatible with adjacent materials.

2.3 ADHESIVES

- .1 Mastic Adhesive Type 1: Compatible with sheet seal and substrate, thick mastic of uniform knife grade consistency.
- .2 Adhesive Type 2: Compatible with sheet seal and substrate, permanently non-curing.

2.4 ACCESSORIES

- .1 Thinner and cleaner for Butyl Neoprene Sheet: As recommended by sheet material manufacturer.
- .2 Attachments: Galvanized steel bars and anchors.

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 adhesive and sealants in accordance with manufacturer's instructions.

3.3 INSTALLATION

- .1 Install materials in accordance with manufacturer's instructions.
- .2 Secure sheet seal Type 1 to substrate with self-adhesive material. Caulk with Type A sealant to ensure complete seal. Position lap seal over firm bearing.
- .3 Lap sheet seal Type 1 onto roof vapour retarder and seal with sealant Type A and adhesive Type 1. Caulk to ensure complete air seal. Position lap seal over firm bearing.
- .4 Install sheet seal Type 1 between windows, louvers and door frames and adjacent wall seal materials with sealant Type A and adhesive Type 1. Caulk to ensure complete seal. Position lap seal over firm bearing.
- .5 Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

3.4 REPAIR

- .1 Patch and repair misaligned or inadequately lapped seams, tears, punctures or fishmouths to the satisfaction of the Departmental Representative.
- .2 Patch defects by bonding an additional layer of air/vapour barrier membrane extending minimum 150 mm in all directions from defect and make air tight. Seal around its edges with mastic.

3.5 FIELD QUALITY CONTROL

- .1 Commissioning (including site inspection and testing) of air/vapour barrier membrane installation will be carried out by independent testing agency approved by Departmental Representative.
- .2 Testing procedures of air/vapour barrier mockup to include:
 - .1 Air tightness testing in substantial conformance with the procedures found in ASTM E783. Acceptable criteria - maximum air leakage .05L/sec/m² @ 75 pa.
 - .2 Adhesion testing in substantial conformance with the procedures found in ASTM D4541. FIXED-ALIGNMENT ADHESION TESTER, TYPE I to be used for ASTM D4541 membrane adhesion testing. (Com-Ten Portable Fastener Tester is acceptable under Type I). Minimum acceptable bond shall be ≥16 psi. Membrane shall retain 95% of original bond.
 - .3 Air tightness testing in substantial conformance with the procedures found in ASTM E1186.

- .3 Once tested and approved by independent testing agency, mock-up will set a standard of acceptance for all other installations. Following this, review and testing will be performed at random areas during installation.
- .4 Random field testing of air/vapour barrier membrane installation to include:
 - .1 Air tightness testing of membrane seams, lap joints, and seal to all penetrations and in substantial conformance with the procedures found in ASTM E1186.
 - .2 Adhesion testing in substantial conformance with the procedures found in ASTM D4541. FIXED-ALIGNMENT ADHESION TESTER, TYPE I to be used for ASTM D4541 membrane adhesion testing. (Com-Ten Portable Fastener Tester is acceptable under Type I). Minimum acceptable bond shall be ≥ 16 psi. Membrane shall retain 95% of original bond.
- .5 Air/vapour barrier trade will be responsible for all re-testing costs associated with return visits by the independent testing agency as a result of work that has failed inspection or testing procedures.
- .6 Assist independent testing agency with the performance of his duties by providing him access to scaffolding, swing stages, etc.

3.6 PROTECTION OF WORK

- .1 Protect finished Work in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Do not permit adjacent work to damage work of this section.
- .3 Ensure finished Work is protected from climatic conditions.

END OF SECTION

Part 1 General

1.1 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 A167-99(2004), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM A240/A240M-05a, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - .3 ASTM A480/A480M-05, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.
 - .4 ASTM D523-89(R1999), Standard Test Method for Specular Gloss.
 - .5 ASTM D822-01, 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.

1.2 DESIGN REQUIREMENTS

- .1 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.
- .2 Maximum deviation from vertical and horizontal alignment of erected panels: 1 to 1000.
- .3 Wall panels to be designed and installed as a rear ventilated rainscreen system complete with dry reveal joint.

1.3 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 WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
- .3 Shop Drawings:
 - .1 Shop drawings: submit drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, 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 100 x 100 mm samples of wall system, representative of materials, 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.
 - .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.

1.4 QUALIFICATION

- .1 Manufacturer: company specializing in producing composite wall panels with 5 years documented experience with sufficient capacity to produce and deliver required units without causing delay in work.
- .2 Installer: person specializing in composite wall panel installations with 5 years documented experience 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 and 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 by Departmental 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 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section and on-site installation, with contractor's representative and Departmental Representative in accordance with Section 01 32 15- Construction Progress Schedule to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 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.
- .4 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.

Part 2 Products

2.1 MATERIALS

- .1 Composite panels:
 - .1 Thickness: minimum 4 mm.
 - .2 Core: solid thermoplastic resin core.
- .2 Aluminum face sheets:
 - .1 Thickness: minimum two 0.51 mm aluminum skins bonded in continuous process to thermoplastic resin core.
 - .2 Alloy: AA-3003 or AA-5052 conforming to ASTM B209.
- .3 Panel weight: 4 mm: 5.38 kg/m².
- .4 Aluminum extrusions: alloy AA-6063-T5.
 - .1 Recycled Content: 10%.
- .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: one-component, silicone base, solvent curing, colour to match panel.

- .1 Maximum VOC limit 250 g/L to SCAQMD Rule 1168.
- .7 Accessories:
 - .1 Fasteners: stainless steel, concealed in accordance with manufacturer's recommendations.
 - .2 Sub girt system: panel load transfer grids shall be formed from minimum 1.2 mm (18 gauge) full-galvanized steel conforming to ASTM A653 Grade A Zinc coating to Z-275 designation. Transfer grid to be hat bars, Z-bars, adjustable Z-bars or combination clip and Z-bar.
 - .3 Z-bar and girt clips: thermally broken Z-275 galvanized steel clips with plastic isolator.
- .8 Flashings:
 - .1 Corners, jambs and abutments to be designed without flashings. Panel design to include for these connections. Use prefabricated material to match composite sheet where flashing is required.

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.

2.3 PAINTED FINISHES

- .1 Prefinished sheet with factory applied two coat FEVE Fluoropolymer:
 - .1 Class F2S.
 - .2 AAMA 620, second generation thermo-set fluoropolymer, Lumiflon resin coating containing 100 percent FEVE.
 - .3 One colour selected by Departmental Representative from manufacturer's standard range for metallic finish coating.
 - .4 Specular gloss: 30 units +/- in accordance with ASTM D523.
 - .5 Coating thickness: not less than 22 micrometres.
 - .6 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20% to ASTM D822 as follows:
 - .1 Outdoor exposure period 5000 hours.
 - .2 Humidity resistance exposure period 5000 hours.

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 Departmental 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 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.
 - .2 Allow for minimum 3 visits to site for inspection by manufacturer's representative during construction. Schedule site visits as follows:
 - .1 Project startup.
 - .2 50% completion.
 - .3 90% completion.

3.5 CLEANING

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

END OF SECTION

Part 1 General

1.1 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 D2369-03, Test Method for Volatile Content of Coatings.
 - .2 ASTM D2832-92(R1999), Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
 - .3 ASTM D5116-97, Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
- .3 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
- .4 Canadian Standards Association (CSA International).
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .5 Environmental Choice Program (ECP).
 - .1 CCD-045-95, Sealants and Caulking Compounds.

1.2 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 VOC's 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, soffits, fascia, metal furring, and related work.
- .3 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit duplicate 400 x 400mm samples of siding material, of colour and profile specified.
- .4 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.3 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.

1.4 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 Divert used metal cut-offs from landfill by disposal into the on-site metals recycling bin to be removed for disposal at the nearest metal recycling facility.
- .3 Divert reusable materials for reuse at nearest used building materials facility.
- .4 Divert unused caulking, sealants, and adhesive materials from landfill through disposal at hazardous material depot.

Part 2 Products

2.1 STEEL CLADDING AND COMPONENTS

- .1 Hot dipped sheet steel to:
 - .1 ASTM A653/A653M, with minimum:
 - .1 Z275 (G90) galvanized coating, or
 - .2 ZF75 (A25) galvanized coating, or
 - .2 Sheet steel cladding to ASTM A792/A792M, with minimum:
 - .1 AZM150 (AZ50) galvalume coating
- .2 **Prefinished profiled steel wall cladding:**
 - .1 Section properties in accordance with CSA-S136-07.
 - .2 Metal thickness: minimum 0.762 mm (0.030") [22 gauge] base metal thickness.
 - .3 Profile Type 7-175 – 44 mm (1.73") deep profile with angular corrugations, 7 sections per 910mm (35.83") wide panel. Flat sections on top are 23mm (0.89") wide on 130mm (5.12") centres, fastener holes pre-punched, horizontal orientation .
 - .4 Finish coating: Perspectra Plus Series - Silicone Modified Polyester (SMP) coating to finish side.
 - .5 Backer coating: pretreated with backer coat to enhance corrosion resistance and minimize abrasion damage.

- .6 Colour: QC28262 - Black.
- .7 Standard of acceptance: as manufactured by Agway Metals Inc., Brampton, ON (or approved equivalent).

.3 Acoustic Soffit (at PIL Booth Canopy):

- .1 Grade and Resistance: to ASTM A653/A653M standard, SS Grade 230 galvanized steel
- .2 Thickness: SPEC NOTE: Insert metal thickness if different than CGSB 93.4.
- .3 Thickness: 0.762 mm (0.030") [22 gauge] base metal thickness.
- .4 Coating: zinc coating of ZF75 (A25) Galvanneal as designated by ASTM A653M.
- .5 Profile: 38 mm deep roof deck profile with small perforations on angled vertical faces only. Provide sections with interlocking side joints.
- .6 Finish Coating: 8000 Series Polyvinylidene Fluoride (PVDF) to match QC2624 - Bright Silver.
- .7 Insulation strips for use with acoustic steel soffit shall be fibreglass of 17.6 kg/m³ density with mylar coating to perforations side. Insulation strips specially formed to fit neatly into deck profile.

.4 Soffit:

- .1 to CGSB 93.4
- .2 Prefinished galvanized sheet with factory applied polyvinylidene fluoride (PVDF) or fluoropolymer resin coating.
- .3 Finish coating: Silicone Modified Polyester (SMP) coating to finish side.
- .4 Colour: Metallic Silver to match canopy fascia.
- .5 Specular gloss: 30 units +/- in accordance with ASTM D523.
- .6 Thickness: 0.61 mm (24 gauge) base metal thickness.
- .7 Profile: flat sheet 'V' crimped for stiffness, vented 0.1m² of opening for every 30 m² of building area, preformed with elongated slits and small perforations, insect screen cover at vents.

.5 Fascia facings and exposed trims:

- .1 to CGSB 93.4
- .2 Thickness: 0.76 mm (22 gauge) base metal thickness.
- .3 Profile: manufacturer's standard as indicated.
- .4 Finish coating: Silicone Modified Polyester (SMP) or Polyvinylidene Fluoride (PVDF) coating to finish side.
- .5 Backer coating: pretreated with backer coat to enhance corrosion resistance and minimize abrasion damage.
- .6 Colour: to match adjacent cladding or as indicated in drawings.
- .7 Gloss: 30 units +/- in accordance with ASTM D523.

.6 Flat metal panels:

- .1 to CGSB 93.4
- .2 Prefinished sheet with factory applied polyvinylidene fluoride or fluoropolymer resin coating.
- .3 Finish coating: Class F1S
- .4 Colour: to match cladding or as indicated in drawings.
- .5 Specular gloss: 30 units +/- in accordance with ASTM D523.
- .6 Thickness: 1.63 mm (14 gauge) base metal thickness. Fasten and adhere panels to plywood substrate for additional rigidity and flatness as required.
- .7 Sub-girts and clips: factory preformed steel sheet, minimum 1.22 mm (18ga) thick formed galvanized steel, ASTM A653m Grade 230 with Z275 zinc coating.
- .8 Z-bar and girt clips: thermally broken Z-275 galvanized steel clips with plastic isolator.
- .9 Insulation: semi-rigid mineral fibre type, 75 mm thick or as indicated in drawings. Refer to Specification Section 07 21 16 for insulation.

2.2 ACCESSORIES

- .1 Flashing, Trim and Closures: edge trim, mitred corner trims, opening flange trims, same colour and gloss as adjacent cladding, with fastener holes pre-punched. Corner trims to be pre-formed with double back exposed edges. Material to match cladding in exposed locations, galvanized material in concealed locations.
- .2 Non-exposed accessories: z-girts or hat channels for supporting and fastening soffits.
- .3 Access doors: matching metal access doors, 610 mm x 610 mm, lockable. Minimum 2 at the main canopy over PIL Booths.

2.3 FASTENERS

- .1 Screws: ANSI B18.6.4. Purpose made, self drilling, stainless steel with washers and matching colour nylon caps. Colour to match cladding except as noted below.
- .2 Exposed screw fastener heads at the Warehouse black cladding to be silver colour.

2.4 CAULKING

- .1 Sealants:
 - .1 Test for acceptable VOC emissions in accordance with ASTM D2369 and ASTM D2832.
 - .2 Concealed: Tape or compound, non-skinning, non-drying, butly rubber.
 - .3 Exposed: Acrylic co-polymer to CGSB 19GP-5M or one part silicone to CGSB CAN2-19.13.

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 cladding in accordance with CGSB 93.5, and manufacturer's written instructions
- .2 Install continuous starter strips, inside and outside corners, edgings, soffit, drip, cap, sill and window/door opening flashings as indicated.
- .3 Install sub girts and support channels in regular spacing with horizontal z-girts at 1220 o.c. and vertical channel spacing as recommended by cladding manufacturer. Screw fasteners to be aligned and true.
- .4 Install outside corners, fillers and closure strips with carefully formed and profiled work.
- .5 Install soffit and fascia cladding as indicated.
- .6 Maintain joints in exterior cladding, true to line, tight fitting, hairline joints.
- .7 Attach components in manner not restricting thermal movement.
- .8 Caulk junctions with adjoining work with sealant. Do work in accordance with Section 07 92 00 - Joint Sealants.
- .9 Install steel acoustic soffit to supporting members with adequate fasteners at 400mm spacing on 2 flute spacings.

3.3 CLEANING

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

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 ASTM International Inc.
 - .1 ASTM C1396/C1396M- 06a, Standard Specification for Gypsum Board.
 - .2 ASTM D41-05, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
 - .3 ASTM D312-00(2006), Standard Specification for Asphalt Used in Roofing.
 - .4 ASTM D6162-00a, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
 - .2 CGSB 37-GP-56M-80b(A1985), Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
 - .3 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
- .3 Canadian Roofing Contractors Association (CRCA)
 - .1 CRCA Roofing Specifications Manual-1997.
- .4 Canadian Standards Association (CSA International)
 - .1 CSA A123.21-04, Standard Test Method for the Dynamic Wind Uplift Resistance of Mechanically Attached Membrane-Roofing Systems
 - .2 CSA-A123.3-05, Asphalt Saturated Organic Roofing Felt.
 - .3 CSA-A123.4-04, Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.
 - .4 CSA A231.1-06, Precast Concrete Paving Slabs.
 - .5 CSA O121-08, Douglas Fir Plywood.
 - .6 CSA O151-04, Canadian Softwood Plywood.
- .5 Factory Mutual (FM Global)
 - .1 FM Approvals - Roofing Products.
- .6 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .7 Underwriters Laboratories' of Canada (ULC)
 - .1 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .2 CAN/ULC-S704-03, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

- .3 CAN/ULC-S706-02, Standard for Wood Fibre Thermal Insulation for Buildings.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Convene pre-installation meeting one week prior to beginning waterproofing Work, with roofing contractor's representative and Departmental Representative in accordance with Section 01 32 15 - Construction Progress Schedule to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide two copies of most recent technical roofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Provide two copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures, and indicate VOC content for:
 - .1 Primers.
 - .2 Asphalt.
 - .3 Sealers.
 - .4 Filter fabric.
- .3 Provide shop drawings:
 - .1 Indicate flashing, control joints, tapered insulation details.
 - .2 Provide layout for tapered insulation.
- .4 Samples: submit two (2) samples of roof top membrane.
- .5 Manufacturer's Certificate: certify that products meet or exceed specified requirements.
- .6 Test and Evaluation Reports: submit laboratory test reports certifying compliance of bitumens and roofing felts and membrane with specification requirements.
- .7 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.
- .8 Manufacturer's field report: in accordance with Section 01 45 00 - Quality Control.
- .9 Reports: indicate procedures followed, ambient temperatures and wind velocity during application.

1.4 QUALITY ASSURANCE

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

1.5 FIRE PROTECTION

- .1 Fire Extinguishers:
 - .1 Maintain one cartridge operated type or stored pressure rechargeable type with hose and shut-off nozzle,
 - .2 ULC labelled for A, B and C class protection.
 - .3 Size 4.5 kg on roof per torch applicator, within 6 m of torch applicator.
- .2 Maintain fire watch for 1 hour after each day's roofing operations cease.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.
- .2 Storage and Handling Requirements:
 - .1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.
 - .2 Provide and maintain dry, off-ground weatherproof storage.
 - .3 Store rolls of felt and membrane in upright position. Store membrane rolls with salvage edge up.
 - .4 Remove only in quantities required for same day use.
 - .5 Place plywood runways over completed Work to enable movement of material and other traffic.
 - .6 Store sealants at +5 degrees C minimum.
 - .7 Store insulation protected from daylight and weather and deleterious materials.
- .3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets crates, padding and packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.
 - .2 Fold up metal banding, flatten and place in designated area for recycling.

1.7 FIELD CONDITIONS

- .1 Ambient Conditions
 - .1 Do not install roofing when temperature remains below -18 degrees C for torch application, or -5 degrees C to manufacturers' recommendations for mop application.
 - .2 Minimum temperature for solvent-based adhesive is -5 degrees C.

- .2 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.

1.8 WARRANTY

- .1 For Work of this Section 07 52 00 - Modified Bituminous Membrane Roofing, provide a CRCA 2 year guarantee and a 10 year roofing system guarantee from the manufacturer.

Part 2 Products

2.1 PERFORMANCE CRITERIA

- .1 Compatibility between components of roofing system is essential. Provide written declaration to Departmental Representative stating that materials and components, as assembled in system, meet this requirement.
- .2 Roofing System: mechanically fastened to CSA A123.21 for wind uplift resistance to meet the equivalent of FM I-90 classification.

2.2 DECK COVERING

- .1 Gypsum board sheathing: to ASTM C1396/C139M Type X, 12.7 mm thick.

2.3 DECK PRIMER

- .1 Asphalt primer: to CGSB 37-GP-9Ma.

2.4 VAPOUR RETARDER

- .1 Two plies of glass felt in hot bitumen spread at rate of 1.2 kg/m².

2.5 MEMBRANE

- .1 Base sheet: to CGSB 37-GP-56M combination of polyester and glass fibres to ASTM D6162.
 - .1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer prefabricated sheet, glass reinforcement, having nominal weight of g/m².
 - .2 Type 1 & 2.
 - .3 Class C - plain surfaced.
 - .4 Grade 1 - standard service.
 - .5 Top and bottom surfaces:
 - .1 Sanded/sanded or sanded/polyethylene.
 - .6 Base sheet membrane properties: to CGSB 37-GP-56M.
 - .1 Strain energy (longitudinal/transversal): 8.1/8.8 kN/m.
 - .2 Breaking strength (longitudinal/transversal): 17.0/18.0 N/5 cm.
 - .3 Ultimate elongation (longitudinal/transversal): 60/70 %.
 - .4 Tear resistance: 85N.

- .5 Cold bending at -30 degrees C: no cracking.
- .6 Softening point: 110 degrees C.
- .7 Static puncture resistance: > 400.
- .8 Dimensional Stability: -0.3 / 0.3 %.
- .7 ULC certification: Class A.
- .2 Cap sheet membrane: to CGSB 37-GP-56M combination of polyester and glass fibres to ASTM D6162.
 - .1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer, prefabricated sheet, glass reinforcement, having nominal weight of 180 g/m².
 - .2 Type 1 & 2, fully adhered.
 - .3 Class A-granule surfaced.
 - .1 Colour for granular surface: white.
 - .4 Grade 1-standard service.
 - .5 Bottom surface sanded polyethylene.
 - .6 Cap sheet membrane properties: to CGSB 37-GP-56M.
 - .1 Strain energy (longitudinal/transversal): 13.0/10.0 kN/m.
 - .2 Breaking strength (longitudinal/transversal): 25.0/16.0 kN/m.
 - .3 Ultimate elongation (longitudinal/transversal): 63/73%.
 - .4 Tear resistance: 80N.
 - .5 Cold bending at -30 degrees C: No cracking.
 - .6 Softening point: 110 degrees C.
 - .7 Static puncture resistance: > 400.
 - .8 Dimensional Stability: -0.2 / 0.2 %.
 - .9 Colour: White, "Energy Star" compliant, as selected by Departmental Representative from manufacturer's standard range of colours.
 - .7 ULC certification: Class A.

2.6 ADHESIVE

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

2.7 OVERLAY BOARD

- .1 Overlay Board: 12.7 mm thick asphalt based recovery board with non-woven glass facers, as recommended by the membrane manufacturer or asphalt impregnated fiberboard.
 - .1 Install over insulation to provide torch safe surface.

2.8 BITUMEN

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

2.9 POLYISOCYANURATE INSULATION

- .1 To CAN/ULC-S704, Refer to Section 07 21 13 - Board Insulation.

2.10 SEALERS

- .1 Plastic cement: asphalt, to CAN/CGSB-37.5.
- .2 Sealing compound: to CAN/CGSB-37.29, rubber asphalt type.
- .3 Sealants: Caulking - see Section 07 92 00 - Joint Sealants.

2.11 WALKWAYS

- .1 Walkways to consist of one additional ply of cap sheet membrane. Colour to be different from field membrane as selected by Departmental Representative

2.12 CARPENTRY

- .1 Refer to Section 06 10 00.01 - Rough Carpentry - Short Form.

2.13 FASTENERS

- .1 Covering to steel deck: No. 10 flat head, self tapping, Type A or AB, cadmium plated screws. Recommend FM Approved screw and plate assemblies.
- .2 For securing overlay board: minimum 1.22 mm (18 gauge) hardened carbon steel fasteners as recommended by roofing system manufacturer.
- .3 Insulation to deck: coated insulation fasteners and galvanized plates must meet FM Approval for wind uplift and corrosion resistance, as recommended by insulation manufacturer.

2.14 SPLASH PADS

- .1 Provide precast concrete splash pads, 300 mm x 600 mm to be installed under rain water leaders at membrane roofs.

2.15 FLASHINGS AND PANS

- .1 Pre-moulded roof vent stack covers, curb flashings, drain pans, sealant compounds as recommended by roofing manufacturer.

Part 3 Execution

3.1 QUALITY OF WORK

- .1 Do examination, preparation and roofing Work in accordance with CRCA Roofing Specification Manual.
- .2 Do priming in accordance with manufacturers written recommendations.

- .3 The interface of the walls and roof assemblies will be fitted with durable rigid material using sheet metal, plywood or glass mat gypsum substrate providing connection point for continuity of air barrier.
- .4 Assembly, component and material connections will be made in consideration of appropriate design loads, with reversible mechanical attachments.

3.2 EXAMINATION OF ROOF DECKS

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

3.3 PROTECTION OF IN-PLACE CONDITIONS

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

3.4 DECK SHEATHING

- .1 Mechanically fasten to steel deck Gypsum Board Sheathing with reversible mechanical attachments screws to steel deck's upper rib surfaces, spaced 400 mm on centre each way.

- .2 Place with long axis of each sheet transverse to steel deck ribs, with end joints staggered and fully supported on ribs.

3.5 VAPOUR RETARDER (GYPSUM BOARD DECK)

- .1 Embed two ply of felts glass in hot bitumen spread at rate of 1.2 kg/m² for glass asphalt.

3.6 EXPOSED CONVENTIONAL MEMBRANE ROOFING APPLICATION

- .1 Insulation: mechanically attached / adhesive application:
 - .1 Adhere insulation to laminated vapour barrier using solvent-based adhesive.
 - .2 Place boards in parallel rows with ends staggered, and in firm contact with one another.
 - .3 Cut end pieces to suit.
 - .4 Apply adhesive in continuous ribbons at 300 mm on centre.
- .2 Tapered insulation application:
 - .1 Mop insulation to vapour retarder and top layer of insulation to bottom layer with hot asphalt at rate of 1 kg/m².
 - .2 Install tapered insulation as second insulation layer, in accordance with shop drawings. Stagger joints between layers 150 mm minimum.
- .3 Overlay Board: mechanically fastened /adhesive application:
 - .1 Mechanically fasten insulation and overlay board using reversible mechanical attachments.
 - .2 Fasten as per manufacturer's written recommendations.
 - .3 Number and pattern of screws to meet Factory Mutual requirements to meet FM I-90 uplift requirements.
 - .4 Place boards in parallel rows with end joints staggered. Cap joints approximately 25 mm.
 - .5 Cut ends to suit and apply adhesive in continuous ribbons at 300 mm on centre.
- .4 Base sheet application:
 - .1 Starting at low point of roof, perpendicular to slope, unroll base sheet, align and reroll from both ends.
 - .2 Unroll and embed base sheet in uniform coating of asphalt applied at rate of 1.2 kg/m², at 230 degrees C.
 - .3 Unroll and torch base sheet onto substrate taking care not to burn membrane or its reinforcement or substrate.
 - .4 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.
 - .5 Application to be free of blisters, wrinkles and fishmouths.
- .5 Cap sheet application:
 - .1 Starting at low point on roof, perpendicular to slope, unroll cap sheet, align and reroll from both ends.
 - .2 Unroll and embed cap sheet in uniform coating of asphalt applied at rate of 1.2 kg/m², EVT at point of contact.

- .3 Unroll and torch cap sheet onto base sheet taking care not to burn membrane or its reinforcement.
- .4 Lap sheets 75 mm minimum for side laps and 150 mm minimum for end laps. Offset joints in cap sheet 300 mm minimum from those in base sheet.
- .5 Application to be free of blisters, fishmouths and wrinkles.
- .6 Do membrane application in accordance with manufacturer's recommendations.
- .6 Flashings:
 - .1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.
 - .2 Torch base and cap sheet onto substrate in 1 metre wide strips.
 - .3 Lap flashing base sheet to membrane base sheet minimum 150 mm and seal by mopping or torch welding.
 - .4 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and torch weld.
 - .5 Provide 75 mm minimum side lap and seal.
 - .6 Properly secure flashings to their support, without sags, blisters, fishmouths or wrinkles.
 - .7 Do work in accordance with manufacturer's recommendations, Section 07 62 00 - Sheet Metal Flashing and Trim.
- .7 Roof penetrations:
 - .1 Install roof drain pans, vent stack covers and other roof penetration flashings and seal to membrane in accordance with manufacturer's recommendations and details.

3.7 WALKWAYS

- .1 Install walkway membrane in accordance with manufacturer's instructions and as indicated.
 - .1 Apply primer to cap sheet membrane and torch apply, ensuring selvage edge is removed.

3.8 FIELD QUALITY CONTROL

- .1 Inspections:
 - .1 Inspection and testing of roofing application will be carried out by testing laboratory designated by Departmental Representative.
 - .2 Departmental Representative will pay for tests as specified in Section 01 45 00 - Quality Control.
 - .3 Inspection and testing of roofing application will be carried out by testing laboratory designated by Departmental Representative.
 - .4 Costs of tests will be paid under cash allowance by Owner.

3.9 CLEANING

- .1 Remove bituminous markings from finished surfaces.

- .2 In areas where finished surfaces are soiled caused by work of this section, consult manufacturer of surfaces for cleaning advice and complying with their documented instructions.
- .3 Repair or replace defaced or disfigured finishes caused by work of this section.
- .4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Place materials defined as hazardous or toxic in designated containers.
 - .2 Clearly label location of salvaged material's storage areas and provide barriers and security devices.
 - .3 Ensure emptied containers are sealed and stored safely.
 - .4 Divert unused aggregate materials from landfill to local facility for reuse as reviewed by Departmental Representative.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 The Aluminum Association Inc. (AAI)
 - .1 AAI-Aluminum Sheet Metal Work in Building Construction-2002.
 - .2 AAI DAF45-03, Designation System for Aluminum Finishes.
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A167-99(2004), Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM A240/A240M-07e1, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - .3 ASTM A606-04, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
 - .4 ASTM A653/A653M-07, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .5 ASTM A792/A792M-06a, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - .6 ASTM B32-04, Standard Specification for Solder Metal.
 - .7 ASTM D523-89(1999), Standard Test Method for Specular Gloss.
 - .8 ASTM D822-01(2006), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .3 Canadian Roofing Contractors Association (CRCA)
 - .1 Roofing Specifications Manual 1997.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
 - .2 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.
- .5 Canadian Standards Association (CSA International)
 - .1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt.
 - .2 AAMA/WDMA/CSA 101/I.S.2/A440-2008, Standard/Specification for Windows, Doors, and Unit Skylights.
 - .3 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .6 Green Seal Environmental Standards
 - .1 Standard GS-03-93, Anti-Corrosive Paints.
 - .2 Standard GS-11-97, Architectural Paints.
 - .3 Standard GS-36-00, Commercial Adhesives.
- .7 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

- .1 Material Safety Data Sheets (MSDS).
- .8 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule #1113-04, Architectural Coatings.
 - .2 SCAQMD Rule #1168-05, Adhesives and Sealants.

1.2 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature for sheet metal flashing systems materials, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two copies WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 43 - Environmental Procedures.
- .3 Shop Drawings:
 - .1 Shop drawings: submit drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.
- .4 Samples:
 - .1 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, finishes and colours.
- .5 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
 - .1 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.
 - .2 Manufacturer's Field Reports: submit to manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3, FIELD QUALITY CONTROL.

1.3 QUALITY ASSURANCE

- .1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section and on-site installation, with contractor's representative and Departmental Representative in accordance with Section 01 32 15 - Construction Progress Schedule to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:

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

Part 2 Products

2.1 SHEET METAL MATERIALS

- .1 Zinc coated steel sheet: 0.76 mm (22 ga) thickness, commercial quality to ASTM A653/A653M, with Z275 designation zinc coating.

2.2 PREFINISHED STEEL SHEET

- .1 Prefinished steel with factory applied polyvinylidene fluoride or silicone modified polyester.
 - .1 Class F2S.
 - .2 2 colours to match wall cladding and canopy fascia panels from manufacturer's standard range.
 - .3 Specular gloss: 30 units +/- in accordance with ASTM D523.
 - .4 Coating thickness: not less than 22 micrometres.
 - .5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D822 as follows:
 - .1 Outdoor exposure period 2500 hours.
 - .2 Humidity resistance exposure period 5000 hours.

2.3 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CAN/CGSB 37.5.
 - .1 Maximum VOC limit 50 g/L to SCAQMD Rule 1168 or to GSES GS-36.
- .3 Underlay for metal flashing: dry sheathing to CAN/CGSB-51.32 self adhesive bituminous air barrier membrane or roof membrane flashings.
- .4 Sealants:
 - .1 Maximum VOC limit 50 g/L to SCAQMD Rule 1168 or to GSES GS-36.
- .5 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide.
- .6 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.
- .7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .8 Solder: to ASTM B32.
- .9 Flux: rosin, cut hydrochloric acid, or commercial preparation suitable for materials to be soldered.
- .10 Touch-up paint: as recommended by prefinished material manufacturer.

- .1 Maximum VOC limit 50 g/L to Standard GS-11 to SCAQMD Rule 1113.

2.4 FABRICATION

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

2.5 METAL FLASHINGS

- .1 Form flashings, copings and fascias to profiles indicated of minimum 0.76 mm thick (22 ga.) prefinished aluminum.

2.6 PANS

- .1 Form pans to receive roofing plastic from 1.22 mm thick aluminum sheet metal with minimum 75 mm upstand above finished roof and 100 mm continuous flanges with no open corners.
 - .1 Make pans minimum 50 mm wider than member passing through roof membrane.

2.7 DOWNPIPES

- .1 Form downpipes from 1.22 mm thick prefinished aluminum sheet metal.
- .2 Sizes and profiles as indicated.
- .3 Provide goosenecks, outlets, strainer baskets and necessary fastenings.
- .4 300 x 600mm splash pans to be concrete pads in exposed locations.

2.8 SCUPPERS

- .1 Form scuppers from 1.22 mm thick galvanized, prefinished steel sheet metal.
- .2 Sizes and profiles as indicated.
- .3 Provide necessary fastenings.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

- .1 Install sheet metal work in accordance with CRCA FL series details.
- .2 Use concealed fastenings except where approved before installation.
- .3 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs.
 - .1 Flash joints using S-lock forming tight fit over hook strips, as detailed.
- .4 Lock end joints and caulk with sealant.
- .5 Install surface mounted reglets true and level, and caulk top of reglet with sealant.
- .6 Insert metal flashing under cap flashing to form weather tight junction.
- .7 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25 mm. Lead wedge flashing securely into joint.
- .8 Caulk flashing at cap flashing with sealant.
- .9 Install pans, where shown around items projecting through roof membrane.

3.3 DOWNPIPES

- .1 Install downpipes and provide goosenecks back to wall.
 - .1 Secure downpipes to wall with straps at 1800 mm on centre; minimum two straps per downpipe.
 - .2 Connect downpipes to drainage system and seal joint with plastic cement.
- .2 Install splash pans as indicated.

3.4 SCUPPERS

- .1 Install scuppers as indicated.

3.5 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.

3.6 CLEANING

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

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

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A167-99, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM A500-03, Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- .2 Canadian Standards Association (CSA International).
 - .1 CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA-W47.1-92(R2001), Certification of Companies for Fusion Welding of Steel Structures.
 - .4 CSA-W55.3-65(R1998), Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
 - .5 CSA S16.1 "Steel Structures for Buildings".
 - .6 CSA S136 "Design of Steel Structural Members, Light Gauge".
 - .7 CAN/CSA-Z91-02 "Health and Safety Code for Suspended Equipment Operations".
 - .8 .CAN/CSA-Z271-98 "Safety Code for Suspended Elevating Platforms".
- .3 Master Painters Institute (MPI).
 - .1 Architectural Painting Specification Manual.
- .4 The Society for Protective Coatings (SSPC).
 - .1 SP -2, Hand-Tool Cleaning.
- .5 Manitoba Health and Safety Regulations
 - .1 Workplace Safety and Health Regulation (217/2006) Part 14-Fall Protection.

1.2 SYSTEM DESCRIPTION

- .1 Personal Restraint Assembly: Posts, steel rope loops, and attachments to resist lateral forces of 22.5 kN at any point and in all directions, without damage, fracture or permanent set.

1.3 SUBMITTALS

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

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures sealed by the Professional Structural Engineer registered or licensed in the Province of Manitoba and experienced in design of this Work.
- .2 Indicate component profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
- .3 Indicate welded connections using standard welding symbols include net weld lengths.

1.5 QUALITY ASSURANCE

- .1 Submit design data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit Test Reports and substantiating engineering data and test results of previous tests by independent laboratory which purport to meet performance criteria, and other supportive data.
- .3 Design structural support framing components and site inspect the installation by a Professional Structural Engineer experienced in design of this Work and licensed the Province of Manitoba.
- .4 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.
- .5 Co-ordinate the Work with installation of roofing assembly and sheet metal work.

1.6 WELDERS' QUALIFICATIONS

- .1 Welders Certificates: furnish welders' qualifications to Departmental Representative.
- .2 Welding qualifications to be in accordance with CSA B51.
- .3 Employ qualified and licensed welders possessing certificates for each procedure to be performed from authority having jurisdiction.
- .4 Each welder to possess identification symbol issued by authority having jurisdiction.
- .5 Certification of companies for fusion welding of steel structures to be in accordance with CSA-W47.1.
- .6 Manufacturer Qualifications: company specializing in manufacturing Products specified in this section with minimum three years documented experience.

1.7 WASTE MANAGEMENT AND DISPOSAL

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

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

1.8 SITE CONDITIONS

- .1 Prior to start of work verify existing site conditions.
- .2 Verify dimensions, tolerances, and method of attachment with other work.

Part 2 Products

2.1 MATERIALS

- .1 Materials:
 - .1 Steel Sections and Plates: CSA G40.20M/G40.21.
 - .2 Steel Tubing: ASTM A500, Grade B.
 - .3 Steel Rings: Type 304 stainless steel with yield strength of 240 MPa (35 Ksi).
U-bar to be not less than 19 mm diameter material with 38 mm eye opening.
 - .4 Securement Bolts: mild steel, Type 300W with yield strength of 300 MPa (44Ksi), hot dipped galvanized to CSA G164.
 - .5 Bolts, Nuts, and Washers: mild steel, Type 300W with yield strength of 300 MPa (44 Ksi), hot dipped galvanized to CSA G164 or Type 304 stainless steel with yield strength of 240 MPa (35 Ksi).
 - .6 Gaskets Under Anchors: neoprene pads, compatible with roof membrane, cut to size.
 - .7 Base plate and all other sections: galvanized mild steel with yield strength of 300 MPa (44 Ksi). Thickness and securement to suit application.
- .2 Welding Materials: CSA-W47.1 for materials being welded.
- .3 Shop Primer: Epoxy, anti-corrosive type, two coats.
- .4 Flashings: Seamless spun aluminum flashing (for steel pier anchors): Type 6061-T6 alloy to ASTM B221 with deck flange flashed in to CRCA recommendations. Seal top of aluminum flashing with detachable watertight stainless steel cap.

2.2 FABRICATION

- .1 Fit and shop assemble items in largest practical sections, for delivery to site.
- .2 Fabricate items with joints tightly fitted and secured.
- .3 Continuously seal joined members by intermittent welds and plastic filler.
- .4 Grind exposed joints flush and smooth with adjacent finish surface.
 - .1 Make exposed joints butt tight, flush, and hairline.
 - .2 Ease exposed edges to small uniform radius.
- .5 Exposed Mechanical Fastenings: screws or bolts; consistent with design of component.

- .6 Furnish and install components required for anchorage of fabrications.
- .7 Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3 FABRICATION TOLERANCES

- .1 Squareness: 3 mm maximum difference in diagonal measurements.
- .2 Maximum Deviation From Plane: 1.5 mm from 1m.

2.4 FINISHES

- .1 Prepare uncoated steel (restraint post) surfaces: SSPC-SP 2, no more than 4 hours before applying epoxy primer.
- .2 Concealed steel anchors, clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- .3 Do not prime surfaces in direct contact with concrete or where field welding is required.
- .4 Concealed Structural Components and Anchors: galvanize after fabrication to CAN/CSA-G164 to minimum 600 g/sq m galvanized coating.

Part 3 Execution

3.1 EXAMINATION

- .1 Section: verification of existing conditions before starting Work.
- .2 Verify dimensions, tolerances, and method of attachment with other work.

3.2 PREPARATION

- .1 Supply and install steel items required to be cast into concrete or attached to steel framing as clean uncoated metal, with setting templates to appropriate sections.

3.3 INSTALLATION

- .1 Install items plumb and level, accurately fitted, free from distortion or defects.
- .2 Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- .3 Field weld components as indicated on shop drawings. Perform field welding.
- .4 After erection, apply primer in accordance with MPI Painting Manual to: welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.4 ERECTION TOLERANCES

- .1 Maximum Variation from Plumb 3mm.

3.5 PROTECTION OF FINISHED WORK

- .1 Protect finished Work from damage.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .2 Underwriter's Laboratories of Canada (ULC)
 - .1 Test method: ULC-S101 - Standard Methods of Fire Endurance Tests of Building Construction and Materials (latest edition).
 - .2 Test standard: ULC-S115 - Fire Tests of Fire Stop Systems (latest edition).
- .3 National Building Code of Canada (NBC)
 - .1 NBC (2010), Section 3.1.9. - Building Services in Fire Separations and Fire Rated Assemblies, Subsection 3.1.9.1. – Fire Stops.

1.2 DEFINITIONS

- .1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.
- .2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.
- .3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.

1.3 REQUIREMENTS

- .1 Provide appropriate firestopping at all joints in rated assemblies and fire separations, and around all penetrations through them including mechanical, electrical and structural.
- .2 The firestopping material/system shall be appropriate for each specific application as tested to the requirements of the latest editions of ULC-S101 & ULC-S115, and identified with a ULC listed system number, or a documented Engineering Judgment by a qualified professional.

1.4 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Manufacturer's specifications and technical data for each material including composition and limitations, documentation of ULC or UL firestop systems to be used and manufacturer's installation instructions to comply with Section 01 33

- 00. Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
- .2 Manufacturer's engineering judgment identification number and drawing details when no ULC or UL system is available for application. Engineered judgment must include both project name and contractor's name who will install firestop system as described in drawing.
- .3 Shop Drawings:
 - .1 Submit shop drawings to show location, proposed material, reinforcement, anchorage, fastenings and method of installation.
 - .2 Construction details should accurately reflect actual job conditions.
- .4 Samples:
 - .1 Submit duplicate 300 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 Qualifications:
 - .1 Installer: company or person specializing in fire stopping installations with 5 years documented experience approved by manufacturer. All firestopping work to be by one installation contractor that is a member in good standing with the Firestop Contractors International Association. (FCIA).
- .2 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with contractor's representative and Departmental Representative in accordance with Section 01 32 15 - Construction Progress Schedule.
 - .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.
- .3 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.

- .1 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.
- .2 Twice during progress of Work at 25% and 60% complete.
- .3 Upon completion of Work, after cleaning is carried out.

1.6 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, ULC markings.
- .2 Storage and Protection:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .3 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.

Part 2 Products

2.1 MATERIALS

- .1 Fire stopping and smoke seal systems: in accordance with CAN-ULC-S115.
 - .1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN-ULC-S115 and not to exceed opening sizes for which they are intended and conforming to specified special requirements described in PART 3.
- .2 Service penetration assemblies: systems tested to CAN-ULC-S115.
- .3 Service penetration fire stop components: certified by test laboratory to CAN-ULC-S115.
- .4 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.
- .5 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.
- .6 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.
- .7 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
- .8 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

- .9 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .10 Sealants for vertical joints: non-sagging.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 PREPARATION

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

3.3 INSTALLATION

- .1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.
- .2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .4 Tool or trowel exposed surfaces to neat finish.
- .5 Remove excess compound promptly as work progresses and upon completion.

3.4 SEQUENCES OF OPERATION

- .1 Proceed with installation only when submittals have been reviewed by Departmental Representative.
- .2 Install floor fire stopping before interior partition erections.

- .3 Metal deck bonding: fire stopping to precede spray applied fireproofing to ensure required bonding.
- .4 Mechanical pipe insulation: certified fire stop system component.
 - .1 Ensure pipe insulation installation precedes fire stopping.

3.5 FIELD QUALITY CONTROL

- .1 Inspections: notify Departmental Representative when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.
- .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 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

3.7 SCHEDULE

- .1 Fire stop and smoke seal at:
 - .1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.
 - .2 Edge of floor slabs at curtain wall and precast concrete panels.
 - .3 Top of fire-resistance rated masonry and gypsum board partitions.
 - .4 Intersection of fire-resistance rated masonry and gypsum board partitions.
 - .5 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
 - .6 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
 - .7 Openings and sleeves installed for future use through fire separations.
 - .8 Around mechanical and electrical assemblies penetrating fire separations.
 - .9 Electrical outlet boxes installed within fire separation require fire stopping as required by the NBCC (3.1.9).
 - .10 Rigid ducts: greater than 129 cm²: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C919-02, Standard Practice for Use of Sealants in Acoustical Applications.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
 - .2 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
 - .3 CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
 - .4 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
 - .5 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.
- .3 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .4 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.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .6 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.2 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturer's product to describe.
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- .3 Submit 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.

1.3 QUALITY ASSURANCE/MOCK-UP

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct mock-up to show location, size, shape and depth of joints complete with back-up material, primer, caulking and sealant.

.3 Mock-up will be used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.4 Locate where directed.

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

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

1.4 DELIVERY, STORAGE, AND HANDLING

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

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

1.5 WASTE MANAGEMENT AND DISPOSAL

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

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

.3 Collect and separate for disposal packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

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

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

.6 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.

- .7 Divert unused joint sealing material from landfill to official hazardous material collections site approved by Departmental Representative.
- .8 Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.
- .9 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 use of approved portable supply and exhaust fans.

Part 2 Products

2.1 SEALANT MATERIALS

- .1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.
- .2 When low toxicity caulks are not possible, confine usage to areas which offgas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize offgas time.
- .3 Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

- .1 Polysulfide Two Part.
 - .1 Self-Levelling to CAN/CGSB-19.24, Type 1, Class B.
- .2 Polysulfide Two Part.
 - .1 Non-Sag to CAN/CGSB-19.24, Type 2, Class B.
- .3 Urethanes Two Part.
 - .1 Self-Levelling to CAN/CGSB-19.24, Type 1, Class B.
- .4 Urethanes Two Part.
 - .1 Non-Sag to CAN/CGSB-19.24, Type 2, Class B.
- .5 Urethanes One Part.
 - .1 Self-Levelling to CAN/CGSB-19.13, Type 1.
- .6 Urethanes One Part.
 - .1 Non-Sag to CAN/CGSB-19.13, Type 2, MCG-2-25, MCG-2-40.
- .7 Silicones One Part.
 - .1 To CAN/CGSB-19.13.
 - .2 Mildew resistant: to CGSB-19GP22M.
- .8 Acrylic Latex One Part.
 - .1 To CAN/CGSB-19.17.
- .9 Acoustical Sealant.
 - .1 To CAN/CGSB-19.21-M87.
- .10 Aviation Fuel Resistant.
 - .1 To FS-SS-S-200E, Type 2.
- .11 Preformed Compressible and Non-Compressible back-up materials.
 - .1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
 - .1 Extruded open closed cell foam backer rod.
 - .2 Size: oversize 30 to 50%.
 - .2 Neoprene or Butyl Rubber.
 - .1 Round solid rod, Shore A hardness 70.
 - .3 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.
 - .4 Bond Breaker Tape.
 - .1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT SELECTION

- .1 Perimeters of exterior openings where frames meet exterior facade of building (i.e. stone, block, precast masonry): Sealant type: 4 or 6.
- .2 Expansion and control joints in exterior surfaces of exterior walls: Sealant Type 6
- .3 Expansion and control joints in exterior surfaces of poured-in-place concrete walls: Sealant type: 4 or 6.
- .4 Exterior joints in horizontal wearing surfaces (as itemized): Sealant type: 1.
- .5 Seal interior perimeters of exterior openings as detailed on drawings: Sealant type: 8.
- .6 Interior control and expansion joints in floor surfaces: Sealant type: 3.
- .7 Perimeters of interior frames, as detailed and itemized: Sealant type: 8.
- .8 Perimeter of bath fixtures (e.g. sinks, tubs, urinals, stools, waterclosets, basins, vanities): Sealant type: 7.
- .9 Exposed interior control joints in drywall: Sealant type: 8.
- .10 Under thresholds of exterior doors – Sealant type: 8.
- .11 At junction of suspended gypsum board ceilings and adjacent walls: Sealant type: 8.
- .12 As itemized in other Sections

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.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Aluminum Association (AA).
 - .1 DAF-45-03, Designation System for Aluminum Finishes.
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A167- 99, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM D412- 98a(2002)e1, Test Methods for Vulcanized Rubber Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.
 - .3 ASTM D2240- 02b, Test Method for Rubber Property - Durometer Hardness.
 - .4 ASTM D2628- 91(1998), Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements.
- .3 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.40- 97, Anti-corrosive Structural Steel Alkyd Primer.
 - .2 CAN/CGSB-1.122- 99, Anticorrosive Vinyl Primer.
 - .3 CAN/CGSB-1.132- M90, Zinc Chromate Primer, Low Moisture Sensitivity.
 - .4 CAN/CGSB-1.213- 95, Etch Primer (Pretreatment Coating) for Steel and Aluminum.

1.2 DESIGN REQUIREMENTS

- .1 Joint movement: design to permit unrestricted lateral & vertical movement of up to +/-50% of joint width.
- .2 Service Temperature: design exterior expansion joint cover assemblies to accommodate joint movements within service temperature range of -35 degrees C to 65 degrees C.

1.3 PRODUCT DATA

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

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate lengths, fasteners, accessories, anchors, seals, butt joints and locations & finishes and profiles required for each condition.

1.5 SAMPLES

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

- .2 Submit duplicate 150 mm long samples of each type, colour and finish for expansion joint cover assemblies.

1.6 QUALITY ASSURANCE

- .1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 Manufacturer's Instructions: manufacturer's installation instructions.
- .3 Manufacturers Field Services: submit 2 copies of manufacturers field reports.

1.7 PRE-INSTALLATION MEETINGS

- .1 Conduct pre-installation meeting one week prior to commencing work of this section and on-site installations, to verify project requirements, coordinate with other subtrades, establish condition and completeness of substrate, review manufacturer's installation instructions and manufacturer's warranty requirements.

1.8 DELIVERY AND STORAGE

- .1 Deliver products in original intact labelled containers and store undercover in a dry location until installed.
- .2 Store off ground, protect from weather and construction activities.

1.9 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products

2.1 MATERIALS

- .1 Aluminum extrusions: alloy and temper to suit project requirements.
- .2 Stainless steel brake formed or roll formed sections: to ASTM A167, type 304 finish.
- .3 Vinyl-acrylic extrusions: high impact vinyl acrylic in integral colour from manufacturer's standard range.
- .4 Flexible inserts:
 - .1 Factory-bonded, reinforced, elastomer: durometer hardness to ASTM D2240; ultimate elongation 50% to ASTM D412 method A.
 - .2 Extruded filler strips: flexible vinyl or neoprene to ASTM D2628 to manufacturer's standard. Colour from manufacturer's standard range.
- .5 Primer: to CAN/CGSB-1.40, CAN/CGSB-1.122, CAN/CGSB-1.132 & CAN/CGSB-1.213.

.6 Accessories:

- .1 Substrate seal: continuous, flexible vinyl seals to provide watertight juncture along base of joint covers.
- .2 Butt joint seal: to provide watertight seal between lengths of joint covers.
- .3 Spring clips: stainless steel.
- .4 Waterstop: continuous flexible vinyl.
- .5 Exposed fasteners: to match rigid joint cover finish.
- .6 Concealed fasteners and anchors: galvanized steel or stainless steel.
- .7 Extruded filler strip, adhesives and water stops.
- .8 Chemical fasteners and anchors: provide chemical anchoring as per manufacturers specifications to avoid joint face spalling.
- .9 Epoxy levelling bed: minimum 6 mm epoxy levelling bed under metal rails.
- .10 Elastomeric concrete: shop poured filler to allow multidirectional movement and maintain cohesion and adhesion.

2.2 ALUMINUM FINISHES

- .1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System For Aluminum Finishes.
 - .1 Clear anodic finish.

2.3 FABRICATION

- .1 Fabricate expansion joint covers, square, true, straight and accurate to required sizes and profiles.
- .2 Fabricate in maximum practical lengths to minimize joints.
- .3 Shop assemble covers ready for installation where practicable.
- .4 Fabricate joint cover assemblies with anchors, levelling nuts, filler inserts and shop applied protection as required for a complete installation to suit installation and project requirements.
- .5 Provide acceptable means of anchorage, such as anchor clips, expansion bolts and shields, welded studs or toggles.
- .6 Factory fabricate terminations and transitions.

2.4 COVER PLATE

- .1 Floor joint cover plate: stainless steel material, 2.5 mm thick with smooth face, with clear finish.

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 Set work plumb, square, level, free from distortion.
- .2 Secure work accurately to structure in manner not restricting joint movement.
- .3 Maintain continuity of air barrier and vapour retarder.
- .4 Seal butt joints to manufacturer's instructions to provide watertight joints using sealant.
- .5 Protect cover plates during construction. Remove shop protection prior to final inspection.
- .6 Ensure sound and clean substrates before installation.

3.3 FIELD QUALITY CONTROL

- .1 Have manufacturer of products supplied under this Section review Work involved in handling, installation/application, protection and cleaning of its products, and submit written reports in acceptable format to verify compliance of Work with Contract.
- .2 Manufacturer's field services: 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 at stages listed:
 - .1 After delivery and storage of products, and when preparatory Work on which Work of this Section depends is complete, but before installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of Work, after cleaning is carried out.
- .4 Obtain reports within three days of review and submit.

3.4 CLEANUP

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .2 Remove traces of primer, caulking, epoxy and filler materials; clean expansion joint covers.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Canadian Standards Association (CSA International).
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .2 Environmental Choice Program.
 - .1 CCD-046-95, Adhesives.

1.2 SYSTEM DESCRIPTION

- .1 Design Requirements:
 - .1 Design prefabricated roof expansion joints to maintain soundness of roofing membrane and protect building roof expansion joints from weather and moisture infiltration.
 - .2 Design prefabricated wall expansion joints to maintain soundness of wall membrane and protect building wall expansion joints from weather and moisture infiltration.

1.3 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 VOC's 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 size and description of components, attachment devices, substrate details and construction details.
- .3 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit duplicate 500 mm long sample of expansion joint complete with attachments, fastened to plywood backing to show joint details and end termination (end cap) details.
- .4 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 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty 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.

Part 2 Products

2.1 MATERIALS

- .1 Exterior roof cover: of continuous 2 mm thick fibre reinforced neoprene bellows with joint width of 150mm or 100mm for both roof to roof construction and roof to wall construction, preformed end caps and change in direction components. Butt joints sealed with site applied flexible splice covers.
- .2 Exterior vertical seals: thermoplastic rubber primary seals extruded in Santoprene retained in extruded aluminum side frames complete with independent continuous PVC back seal. Installation to include factory heat welded transitions where applicable to ensure a watertight system. Primary seal minimum 3.2mm thick with multi-movement grooves designed to remain in place throughout movement of the joint to +/-100% of the joint width.
- .3 Cover insulation: closed cell flexible foam of neoprene with independent continuous PVC back seal.
- .4 Flanges, edge frame and flashing: neoprene and 0.5 mm thick perforated galvanized steel. Side frames mounted on butyl caulk tape with anchors at maximum 610mm on centre.
- .5 Bond adhesive: CCD-046 type as recommended by product manufacturer.
- .6 Roof nails: standard type to CSA B111.
- .7 Anchors: manufacturer's standard to suit roof deck, curb and wall construction.
- .8 Acceptable roof to roof and roof to wall neoprene bellows: C/S Exterior Seal, type BRJ and BRJW, colour black by C/S Group. Transitions BRJ/SF or BRJW/SF to suit.
- .9 Acceptable vertical seals: C/S Exterior Seal, type SC, standard colour by Conspec Systems, Inc..

2.2 FABRICATION

- .1 Factory assemble, preform crown shape with prefabricated corner, tee and crossover intersections and splicings and roof to fascia transitions.
- .2 All roof cover transitions to vertical wall covers to be supplied by the same manufacturer.

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 Ensure roofing membrane or other weathering surfaces are applied over wood nailers as indicated.
- .2 Ensure continuity of building envelope air barrier and vapour retarder systems.
- .3 Apply adhesive for joining expansion joints cover in curb and cant construction.
- .4 Fasten expansion joint cover strip as indicated at 400 mm on centre.

3.3 CLEANING

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

END OF SECTION