Part 1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB 37.2, Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
- .2 CAN/CGSB 37.3, Application of Emulsified Asphalts for Dampproofing or Waterproofing.
- .3 CAN/CGSB 37.5, Cutback Asphalt Plastic Cement.
- .4 CGSB 37-GP-9Ma, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
- .5 CGSB 37-GP-11M, Application of Cutback Asphalt Plastic Cement.
- .6 CAN/CGSB 37.16, Filled, Cutback, Asphalt for Damproofing and Waterproofing.
- .7 CGSB 37-GP-36M, Application for Filled Cutback Asphalts for Damproofing and Waterproofing.

.2 Health Canada

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

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.

.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, 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 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: Provide continuous ventilation during and curing periods for enclosed applications.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 00 – Cleaning and Waste Management.

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

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

.4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC’s.

.5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

Part 2 Products

2.1 MATERIALS

.1 For application and curing at temperatures above 5 degrees C: waterproof emulsion, mineral colloid emulsifier type to CAN/CGSB 37.2.

.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 For applications and curing at temperatures above 0 degrees C but below 5 degrees C: solvent type waterproofing and dampproofing compound of selected asphalts and fibers to CAN/CGSB 37.16.

.1 Package label or bill of lading for bulk hot liquid asphalt must indicate type, flash point, equiviscous temperature range and final blowing temperature.

.3 Primer for applications at temperatures above 0 degrees C but below 5 degrees C: asphalt/solvent cutback to CAN/CGSB 37.9.

.4 Sealing compound: Plastic cutback asphalt cement to CAN/CGSB-37.5. C.

2.2 PRODUCTS:

.1 SEALTIGHT 520 SEALMASTIC waterproofing emulsion by WR Meadows or approved equal in accordance with B7.

Part 3 Execution

3.1 PREPARATION

.1 Before applying dampproofing:

.1 Seal exterior joints between foundation grade beams, joints between concrete floor slab and foundation and around penetrations through dampproofing with sealing compound.

3.2 APPLICATION

.1 Do dampproofing in accordance with CAN/CGSB 37.3, CGSB 37-GP-36M and manufacturer's instructions 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 in accordance with manufacturer's written instructions.

.5 Apply damproofing in accordance with manufacturer's written instructions.

.1 Minimum coverage dampproofing coat: 1.5 m^2/L.

3.3 SCHEDULE

.1 Apply continuous, uniform coating to entire exterior faces of foundation grade beams from 50 mm below finished grade level.

.2 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 American Society for Testing and Materials International, (ASTM).

- .1 ASTM C203 – Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation
- .2 ASTM C209 – Standard Test Methods for Cellulosic Fiber Insulating Board
- .3 ASTM C518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- .4 ASTM C578 - 12b Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- .5 ASTM D1621 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics
- .6 ASTM D2126 – Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging
- .7 ASTM E 84-01, Standard Test Method for Surface Burning Characteristics of Building Materials.
- .8 ASTM E96 – Standard Test Method for Water Vapor Transmission of Materials
- .9 ASTM D1623 – Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
- .10 ASTM C1289, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

.2 Canadian Gas Association (CGA)

- .1 CAN/CGA-B149.1, Natural Gas and Propane Installation Code Handbook.
- .2 CAN/CGA-B149.2, Propane Storage and Handling Code.

.3 Canadian General Standards Board (CGSB).

- .1 CGSB 71-GP-24M, Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.
- .2 CAN/CGSB 51.26-M86,

.4 Underwriters Laboratories of Canada (ULC).

- .1 CAN/ULC-S107, Fire Tests of Roof Coverings.
- .2 CAN/ULC-S701, Standard for Thermal Insulation, Polystrene, Boards and Pipe Coverings.
- .3 CAN/ULC-S702, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
- .4 CAN/ULC-S704, Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.

.5 Canada Green Building Council (CaGBC)

- .1 LEED Canada Reference Guide for Green Building Design and Construction 2009

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. Indicate VOC's insulation products and adhesives.

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

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 00 – Cleaning & Waste Management.

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

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

.4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.

.5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

Part 2 Products

2.1 BOARD INSULATION – EXTERIOR WALLS

.1 Wall Type EW2: Extruded Polystyrene Rigid Insulation (XPS).

.1 To CAN/ULC S701, Type: 4, rigid closed cell type with high density skin.

.2 Compressive strength: to ASTM D1621, minimum 30 Psi.

.3 Board size: 610 mm x 2440 mm and 1220 x 2440mm, thickness as indicated, joints sealed.

.4 Thermal resistance: R 5.0/inch [0.88 RSI/inch] @ 24 degrees C mean temperature.

.5 Manufacturer and Product

.1 Manufacturer: Owens Corning FOAMULAR® C-300 (or approved equal in accordance with B7)

.6 Thicknesses:

.1 As indicated.

2.2 BOARD INSULATION – SURFACE APPLICATION

.1 Below grade on earth: Extruded Polystyrene Rigid Insulation (XPS).

.1 To CAN/ULC S701, Type: 4, rigid closed cell type with high density skin.

.2 Compressive strength: to ASTM D1621, minimum 30 Psi.

.3 Board size: 610 mm x 2440 mm and 1220 x 2440mm, thickness as indicated.

.4 Thermal resistance: R 5.0/inch [0.88 RSI/inch] @ 24 degrees C mean temperature.

.5 Manufacturer and Product

.1 Manufacturer: Owens Corning FOAMULAR® C-300 (or approved equal in accordance with B7)

.6 Thicknesses:

.1 As indicated.

2.3 SUBSTITUTIONS

.1 Refer to Section B7 – Substitutes of Bid Opportunity 668-2017.

2.4 ADHESIVE

.1 Adhesive to manufacturer’s written recommendations.

2.5 ACCESSORIES

.1 Insulation clips: impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self-locking type.

.1 Joint sealing tape: air resistant pressure sensitive adhesive tape as recommended by insulation 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 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 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 Contract Administrator.

3.3 EXAMINATION

.1 Examine substrates and immediately inform Contract Administrator 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 insulation board in accordance with manufacturer's recommendations.

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

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

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

.5 Carefully inspect for continuity of air barrier prior to placement of insulation.

3.5 PERIMETER FOUNDATION INSULATION

.1 Exterior application: Install on exterior face of concrete with fastening clips and cap flashing in accordance with manufacturer’s installation guidelines. Extend boards as indicated on earth.

3.6 CLEANING

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

END OF SECTION

Part 1 General

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

- .1 ASTM C165, Test for Measuring Compressive Properties of Thermal Insulations
- .2 ASTM C423, Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
- .3 ASTM C518, Standard Method for Test for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- .4 ASTM C553, Specification for Mineral (Glass) Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.
- .5 ASTM C665, Specification for Mineral (Glass) Fibre Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- .6 ASTM C1104, Test Method for Determining the Water Vapour Sorption of Unfaced Mineral Fibre Insulation.
- .7 ASTM C1320, Standard Practice for Installation of Mineral (Glass) Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
- .8 ASTM C1338, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.

.2 Canadian Gas Association (CGA)

- .1 CAN/CGA-B149.1HB, Natural Gas and Propane Installation Code Handbook.
- .2 CAN/CGA-B149.2, Propane Storage and Handling Code.

.3 Canadian Standards Association (CSA International).

- .1 CSA B111, Wire Nails, Spikes and Staples.

.4 National Research Council (NRC) of Canada, Institute for Research in Construction (IRC) – Canadian Construction Materials Centre (CCMC):

- .1 CCMC Product Listing Number 05650-L
- .2 Summary Report for Consortium on Gypsum Board Walls: Sound Transmission Results, Internal Report IRC-IR-693
- .3 Gypsum Board Walls: Transmission Loss Data, Internal Report IRC-IR-761
- .4 Summary Report for Consortium on Floors: Sound Transmission Class and Impact Insulation Results, Internal Report IRC-IR-766

.5 Underwriters Laboratories of Canada (ULC).

- .1 CAN/ULC-S702, Thermal Insulation, Mineral (Glass) Fibre, for Buildings
- .2 CAN/ULC-S102, Standard Method for Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .3 CAN/ULC-S102.2, Standard Method for Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies.
- .4 CAN4-S114, Standard Method for Test for Determination of Non-Combustibility in Building Materials
- .5 CAN/ULC-S604, Type A Chimneys

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.

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

Part 2 Products

2.1 INSULATION

.1 Glass Fibre Thermal Batt Insulation for Ceiling Cavity:

.1 To CAN/ULC-S702, Type 1, unfaced blanket thermal insulation

.2 Thermal Resistance: in accordance with manufacturer's tested performances and to requirements of ASTM C518 and the OBC.

.1 Minimum RSI 10.57 (R60)

.3 Surface burning characteristics to CAN/ULC-S102:

.1 Flame spread: 0

.2 Smoke developed: 0

.4 Surface burning characteristics to CAN/ULC-S102.2:

.1 Flame spread: 0

.2 Smoke developed: 0

.5 Smoulder resistance: to ULC S-129

.6 Non-combustible: to CAN4-S114

.7 Formaldehyde free formulation

.8 Does not support mold growth: meets fungal resistance criteria in ASTM C1338

.9 Sizes: As required.

.10 Manufacturer and Product

.1 Manufacturer: Owens Corning

.2 Product: EcoTouch™ PINK™ FIBREGLAS® for Attics

.1 Provide sufficient Thickness to achieve nominal R40.

.2 Acoustic batt insulation:

.1 Non-combustible lightweight, semi-rigid mineral wool batt insulation to ASTM C612 that provides fire resistance to ASTM E136 and sound control to ASTM C423, size and thickness as indicated on drawings.

.1 Acceptable Material: ROXUL Inc., ROXUL SAFE™.

2.2 SUBSTITUTIONS:

.1 Refer to Section B7 – Substitutes of Bid Opportunity 668- 2017.

Part 3 Execution

3.1 WORKMANSHIP - GENERAL

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

.2 Examine existing conditions: ensure adjacent and support materials and products are dry and ready to receive insulation, and that mechanical and electrical services to be covered by the insulation have been inspected.

.3 Do not commence installation until base work has been corrected and inspections completed.

3.2 INSULATION INSTALLATION

.1 Install insulation to maintain continuity of thermal protection to building elements and spaces and for sound attenuation as noted on drawings.

.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 and CSA B149.1 and CSA B149.2 Type B and L vents.

.5 Do not enclose insulation until it has been inspected and approved by Contact Administrator.

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, Fire Endurance Tests of Building Construction and Materials.

.2 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.

.3 CAN/ULC-S705.1, Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Material Specification.

.4 CAN/ULC-S705.2, Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Installer's Responsibilities-Specification.

.3 Canada Green Building Council (CaGBC)

.1 LEED Canada Reference Guide for Green Building Design and Construction 2009

1.2 TEST REPORTS

.1 Submit test reports, verifying qualities of foam sealant meet or exceed requirements of this specification.

.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 Applicators to conform to CUFCA Quality Assurance Program.

1.4 SAFETY REQUIREMENTS

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

.2 Workers must wear gloves, respirators, dust masks, eye protection, protective clothing when applying foam sealant.

.3 Workers must not eat, drink or smoke while applying foam sealant.

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 hours after application to maintain non-toxic, unpolluted, safe Working conditions.

.3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.

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

.5 Dispose of waste foam sealant daily in location designated by Contract Administrator and decontaminate empty drums in accordance with foam sealant manufacturer's instructions.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Apply foam sealant only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 00 – Cleaning & Waste Management.

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

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

.4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.

.5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

Part 2 Products

2.1 MATERIALS

.1 Low expanding, one-component, polyurethane foam sealant, curing to a semi-rigid, closed cell urethane foam providing a RSI of 0.9 per 25.4 mm. To meet the following physical properties:

.1	Density:	25.7 kg/m^3
.2	Compressive Strength Parallel @ 10%:	69-96 psi
.3	Tensile Strength:	103 psi
.4	Water Vapour Transmission:	5.97 perms
.5	Flame Spread:	20
.6	Smoke Development:	70

Part 3 Execution

3.1 APPLICATION

.1 Apply foam sealant to clean surfaces in accordance manufacturer's printed instructions. Surfaces to be free of dust, dirt, oil and other foreign materials.

.2 Cover surfaces not intended to be foamed.

.3 Apply foam sealant to perimeter of openings indicated and to thickness as recommended by manufacturer. Trim excess cured foam from finished area.

.4 Cover exposed urethane foam sealants to protect from adverse effects from ultraviolet light (sunlight).

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).

.1 ASTM D1709 - 09 Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method.

.2 ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.

.3 ASTM E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs.

.4 ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

.5 ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.

.6 ASTM F1249-01 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.

.2 Canadian General Standards Board (CGSB)

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

.3 Underwriters Laboratories Canada (ULC)

.1 CAN/ULC S102, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.2 SUBMITTALS

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

.2 Product Data: Submit manufacturer's printed product literature, specifications and datasheet and include:

.1 Product characteristics.

.2 Performance criteria.

.3 Limitations.

.3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).

1.3 QUALITY ASSURANCE

.1 Use an experienced installer and adequate number of skilled personnel who are thoroughly trained and experienced in the application of the vapor retarder.

.2 Obtain vapor retarder materials from a single manufacturer regularly engaged in manufacturing the product.

.3 Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).

1.4 MOCK-UPS

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

.2 Mock-up will be used to judge workmanship, substrate preparation, and material application.

.3 Allow two (2) working days for inspection of mock-up by Contract Administrator before proceeding with vapour barrier Work.

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

1.5 QUALIFICATIONS

.1 Applicator: Company specializing in performing Work of this section with minimum 5 years documented experience with installation of air/vapour barrier systems. Complete installation must be approved by the material manufacturer.

.2 Applicator: Company who is currently licensed by certifying organization must maintain their license throughout the duration of the project.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 00 – Cleaning and Waste Management.

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

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

.4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.

.5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

Part 2 Products

2.1 SHEET VAPOUR BARRIER

.1 Vapour retarder membrane for interior use:

.1 Polyethylene film: to CAN/CGSB-51.34, minimum 0.15mm (6 mil) thick with a water vapour permeance of not greater than 45 ng/(P·s·m^2), flame spread rating of less than 150 to CAN/ULC S102.

.2 Vapour retarder membrane for under-slab applications:

.1 Vapour retarder membrane manufactured from virgin polyolefin resins, and when tested according to all requirements of ASTM E1745, shall meet the following minimum performance requirements:

.1 Maximum Water Vapour Permeance (ASTM E154 Sections 7, 8, 11, 12,13, by ASTM E96, Method B or ASTM F1249).

.1 As received: 0.0183 perms.

.2 After Wetting and Drying: 0.0210 perms.

.3 Resistance to Plastic Flow and Temperature: 0.0197 perms.

.4 Effect Low Temperature and Flexibility: 0.0212 perms.

.5 Resistance to Deterioration from Organisms and Substances in Contacting Soil: 0.0198 perms.

.2 Puncture Resistance (ASTM D1709): 4,394 grams.

.3 Tensile Strength ASTM E154, Section 9: 52 Lb. Force/Inch.

.4 Acceptable Manufacturer and Product: PERMINATOR 10 mil by W. R. MEADOWS.

2.2 ACCESSORIES

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

.2 Seam Tape for under-slab use: high density polyethylene tape with pressure sensitive adhesive. Minimum width 100 mm.

.3 Sealant for interior use: compatible with vapour retarder, recommended by vapour retarder manufacturer, to Section 07 92 00 - Joint Sealants.

.4 Staples: minimum 6 mm leg.

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

.6 Pipe Collars: construct pipe collars from appropriate vapour retarder material and pressure sensitive tape according to manufacturer's instructions.

Part 3 Execution

3.1 EXAMINATION

.1 The Air Barrier Contractor shall examine substrates, areas, and conditions under which the Air Barrier Assembly will be installed for compliance with requirements.

.2 Verify that surfaces and conditions are suitable prior to commencing Work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

.3 Verify substrate is visibly dry.

.4 Ensure that the following conditions are met:

.1 Surfaces are sound, dry, even, and free of excess mortar or other contaminants

.2 Inspect substrates to be smooth without large voids or sharp protrusions. Inform Contractor if substrates are not acceptable and need to be repaired by the concrete sub-trade.

3.2 INSTALLATION

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

.2 Install sheet vapour retarder on warm side of exterior wall, ceiling, assemblies prior to installation of gypsum board to form continuous retarder.

.3 Install sheet vapour retarder on granular base (floors only).

.4 Use sheets of largest practical size to minimize joints.

.5 Inspect for continuity. Repair punctures and tears with sealing tape before Work is concealed.

3.3 EXTERIOR SURFACE OPENINGS

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

3.4 PERIMETER SEALS

.1 Seal perimeter of sheet vapour barrier as follows:

.1 Apply continuous bead of sealant to substrate at perimeter of sheets.
.2 Lap sheet over sealant and press into sealant bead.
.3 Install staples through lapped sheets at sealant bead into wood substrate.
.4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.5 LAP JOINT SEALS

.1 Seal lap joints of sheet vapour barrier as follows:

.1 Attach first sheet to substrate.
.2 Apply continuous bead of sealant over solid backing at joint.
.3 Lap adjoining sheet minimum 150 mm and press into sealant bead.
.4 Install staples through lapped sheets at sealant bead into wood substrate.
.5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.6 ELECTRICAL BOXES

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

.1 Install moulded box vapour barrier or wrap boxes with film sheet providing minimum 300 mm perimeter lap flange.
.2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

3.7 CLEANING

.1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment in accordance with Section 01 74 00 – Cleaning and Waste Management.

3.8 TESTING

.1 Air leakage testing as directed by Contract Administrator and paid for by Contractor will be performed by professional testing agency for the locations selected at random for penetrations, laps, corners, etc.

.2 Testing will be witnessed by Contract Administrator and test reports will be signed by tester, Site representative and Contractor.

.3 Inform Contract Administrator 48 hours prior to required testing.

.4 If the inspections reveal any defects, promptly remove and replace defective Work at no additional cost to The City or the Contract Administrator

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

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

.2 American Society for Testing and Materials International, (ASTM).

.1 ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

.2 ASTM E2178: Standard Test Method for Air Permeance of Building Materials.

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

.4 E1677 Specification for Air Retarder (AR) Material or System for Low-Rise Framed Building Walls

.5 ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

.6 ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

.7 ASTM E96: Water Vapour Transmission of Materials.

.3 National Building Code of Canada (NBCC)

.1 NBCC, Part 5 - Environmental Separation

.4 Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification.

1.2 SUBMITTALS

.1 Submit documentation from an approved independent testing laboratory certifying the air leakage and vapour permeance rates of the air barrier membranes, including primary membrane and transition sheets, exceed the requirements of the Massachusetts Energy Code and in accordance with ASTM E2178.

.1 Test report submittals shall include test results on porous substrate and include sustained wind load and gust load air leakage results.

.2 Submit copies of manufacturers’ current ISO certification.

.3 Submit manufacturers’ current product data sheets for the air barrier membrane system.

1.3 QUALITY ASSURANCE

.1 Submit document stating the applicator of the primary air/vapour barrier membranes specified in this section is qualified by the manufacturer as suitable for the execution of the Work.

.2 Perform Work in accordance with manufacturer’s written instructions and this specification.

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

.4 Allow access to Work site by the air barrier membrane manufacturer's representative.

.5 Components used shall be sourced from one manufacturer, including sheet membrane, air barrier sealants, primers, mastics, and adhesives.

1.4 QUALIFICATIONS

.1 Applicator: Company specializing in performing Work of this section with minimum 5 years documented experience with installation of air/vapour barrier systems. Complete installation must be approved by the material manufacturer.

.2 Applicator: Company who is currently licensed by certifying organization must maintain their license throughout the duration of the project.

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. Deliver membrane materials in factory wrapped packaging indicating name of manufacturer and product.

.3 Avoid spillage. Immediately notify Contract Administrator if spillage occurs and start clean up procedures.

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

.5 Store roll materials on end in original packaging.

.6 Store primers at temperatures of 5˚C and above to facilitate handling. Keep solvent away from open flame and excessive heat.

1.7 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.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 00 – Cleaning and Waste Management.

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

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

.4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.

.5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

1.9 WARRANTY

.1 Provide a written warranty for Work of this section from Manufacturer for failure due to defective materials and from Contractor for failure due to defective installation workmanship for ten (10) years respectively.

.2 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 SELF ADHERED MEMBRANES

.1 Basis of Design: Primary sheet air/vapour barrier membrane shall be Blueskin® SA LT manufactured by Henry; an SBS modified bitumen, self-adhering sheet membrane complete with a blue engineered thermoplastic film. Membrane shall have the following physical properties:

.1 ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies,

.2 Air leakage: <0.0001 CFM/ft² @1.6 lbs/ft^2 to ASTM E2178 and ASTM E283 and have no increased air leakage when subjected to a sustained wind load of 10.5 lbs/ft^2 for 1 hour and gust wind load pressure of 62.8 lbs/ft^2 for 10 seconds when tested at 1.6 lbs/ft^2 to ASTM E331,

.3 Vapoor permeance: 0.03 perms to ASTM E96 (Desiccant Method),

.4 Membrane Thickness: 0.0394 inches (40 mils),

.5 Low temperature flexibility: -22 degrees F to CGSB 37-GP-56M,

.6 Elongation: 200% to ASTM D412-modifed,

.7 Meets CAN/CGSB-51-33 Type I Water Vapour Permeance requirements

.2 Alternate self-adhering membrane for all window and window sill flashings, door openings, inside and outside corners and other transitions shall be HE200 AM Metal Clad manufactured by Henry; a SBS modified bitumen, self-adhering sheet membrane complete with surface layer of metallic aluminum film that many sealants adhere well to. Membrane shall have the following physical properties:

.1 Peel Adhesion to Primed Steel 15.0 to ASTM D 1000

.2 Vapour Permeance: < 0.014 perms to ASTM E 96

.3 Membrane Thickness: 0.0443 inches (45 mils)

.4 Low temperature flexibility: -15 degrees F to ASTM D146 min

.5 Elongation: 40% to ASTM D412-modifed min

.3 Primer for self-adhering membranes at temperatures above 25 degrees F shall be Aquatac™ Primer manufactured by Henry; a polymer emulsion based adhesive, quick setting. Primer shall have the following physical properties:

.1 Color: Aqua,

.2 Weight: 8.7 lbs/gal,

.3 Solids by weight: 53%,

.4 Water based, no solvent odors,

.5 Drying time (initial set): 30 minutes at 50% RH and 70 degrees F

.4 Adhesive for self-adhering membranes at all temperatures shall be Blueskin® Adhesive manufactured by Henry, a synthetic rubber based adhesive, quick setting, having the following physical properties:

.1 Color: Blue,

.2 Weight: 6 lbs/gal,

.3 Solids by weight: 35%,

.4 Drying time (initial set): 30 minutes

.5 Adhesive with low VOC content for self-adhering membranes at all temperatures shall be Blueskin® LVC Adhesive manufactured by Henry, a synthetic rubber based adhesive, quick setting, having the following physical properties:

.1 Color: Blue,

.2 VOC: <240 g/L,

.3 Solids by weight: 40%,

.4 Drying time (initial set): 30 minutes

.6 Termination Sealant shall be HE925 BES Sealant manufactured by Henry; a moisture cure, medium modulus polymer modified sealing compound having the following physical properties:

.1 Compatible with sheet air barrier, roofing and waterproofing membranes and substrate,

.2 Complies with Fed. Spec. TT-S-00230C, Type II, Class A,

.3 Complies with ASTM C 920, Type S, Grade NS, Class 25,

.4 Elongation: 450 – 550%,

.5 Remains flexible with aging,

.6 Seals construction joints up to 1 inch wide

.7 Insulation adhesive shall be Air-Bloc 21 Insulation Adhesive manufactured by Henry; a synthetic, trowel applied, rubber based adhesive, having the following physical properties:

.1 Compatibility: With air barrier membrane, substrate and insulation,

.2 Air leakage: 0.0026 CFM/ft^2 @ 2.1 lbs/ft^2 to ASTM E283,

.3 Water vapour permeance: 0.03 perms to ASTM E96,

.4 Long term flexibility: CGSB 71-GP-24M

2.2 SPUNBONDED SHEET BARRIERS

.1 Basis of Design: spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont™ Tyvek® CommercialWrap® (or approved equal in accordance with B7) and related assembly components.

.1 Performance Characteristics:

.1 Air Penetration: 0.001 cfm/ft2 at 75 Pa, when tested in accordance with ASTM E2178. Type I per ASTM E1677. ≤0.04 cfm/ft2 at 75 Pa, when tested in accordance with ASTM E2357

.2 Water Vapor Transmission: 28 perms, when tested in accordance with ASTM E96, Method B.

.3 Water Penetration Resistance: 280 cm when tested in accordance with AATCC Test Method 127.

.4 Basis Weight: 2.7 oz/yd2, when tested in accordance with TAPPI Test Method T-410.

.5 Air Resistance: Air infiltration at >1500 seconds, when tested in accordance with TAPPI Test Method T-460.

.6 Tensile Strength: 38/35 lbs/in., when tested in accordance with ASTM D882, Method A.

.7 Tear Resistance: 12/10 lbs., when tested in accordance with ASTM D1117.

.8 Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84. Flame Spread: 10, Smoke Developed: 10.

.2 Accessories

.1 Seam Tape: 3 inch wide, DuPont™ Tyvek® Tape (or approved equal in accordance with B7) for commercial applications.

.3 Fasteners:

.1 Steel Frame Construction: DuPont™ Tyvek® Wrap Cap Screws , as distributed by DuPont (or approved equal in accordance with B7): 1-5/8 inch rust resistant screw with 2-inch diameter plastic cap or manufacturer approved 1-1/4” or 2” metal gasketed washer

.2 Wood Frame Construction: Tyvek® Wrap Caps, as distributed by DuPont (or approved equal in accordance with B7): #4 nails with large 1-inch plastic cap fasteners, or 1-inch plastic cap staples with leg length sufficient to achieve a minimum penetration of 5/8-inch into the wood stud.

.3 Masonry Construction: Masonry tap-con fasteners with Tyvek® Wrap Caps as distributed by DuPont (or approved equal in accordance with B7): 2-inch diameter plastic cap fasteners.

.4 Sealants:

.1 Provide sealants in accordance with Section 07 92 00 - Joint Sealants and as per manufacturers recommendations.

.5 Adhesives:

.1 Provide adhesive as recommended by manufacturer.

.6 Primers:

.1 Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.

.7 Flashing:

.1 DuPont™ FlexWrap™, as distributed by DuPont (or approved equal in accordance with B7): flexible membrane flashing materials for window openings and penetrations.

.2 DuPont™ StraightFlash™, as distributed by DuPont (or approved equal in accordance with B7): straight flashing membrane materials for flashing windows and doors and sealing penetrations such as masonry ties, etc.

.3 DuPont™ StraightFlash™ VF, as distributed by DuPont (or approved equal in accordance with B7): dual-sided straight flashing membrane materials for brick mold and non-flanged windows and doors.

.4 DuPont™ Thru-Wall Surface Adhered Membrane with Integrated Drip Edge (or approved equal in accordance with B7): Thru-Wall flashing membrane materials for flashing at changes in direction or elevation (shelf angles, foundations, etc.) and at transitions between different assembly materials.

.5 Preformed Inside and Outside Corners and End Dams as distributed by DuPont (or approved equal in accordance with B7): Preformed three-dimensional shapes to complete the flashing system used in conjunction with DuPont™ Thru-Wall Flashing.

2.3 SUBSTITUTIONS

.1 Refer to Section B7 – Substitutes of Bid Opportunity 630-2016.

Part 3 Execution

3.1 EXAMINATION

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

.2 All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane. Strike masonry joints flush.

.3 Where curing compounds are used they must be clear resin based without oil, wax or pigments.

.4 Do not proceed with application of air barrier membrane when rain is expected within 24 hours.

.5 Condition materials to room temperature prior to application to facilitate handling.

3.2 PREPARATION

.1 Surfaces must be sound, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane.

.2 New concrete should be cured for a minimum of 14 days and must be dry before air/vapour barrier membranes are applied.

.3 Ensure all preparatory Work is complete prior to applying primary air/vapour barrier membrane.

.4 Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing and fastened into solid backing.

.5 Apply primer at rate recommended by manufacturer to all areas to receive self-adhering sheet air/vapour barrier membrane and or through-wall flashing membrane as indicated on drawings by roller or spray and allow minimum 30 minute open time. Primed surfaces not covered by self-adhering membrane or self-adhering through-wall flashing membrane during the same working day must be re-primed.

3.3 INSTALLATION – SELF ADHERED MEMBRANES

.1 Inside and outside corners

.1 Seal inside and outside corners of sheathing boards with a strip of self-adhering air/vapour barrier membrane extending a minimum of 3 inches on either side of the corner detail.

.1 Prime surfaces as per manufacturers' instructions and allow to dry.

.2 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all end and side laps of membrane.

.3 Roll all laps and membrane with a counter top roller to ensure seal.

.2 Transition areas:

.1 Tie-in to structural beams, columns, floor slabs and intermittent floors, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials as indicated in drawings with self-adhering air/vapour barrier membrane.

.1 Prime surfaces as per manufacturers' instructions and allow to dry.

.2 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Provide minimum 3 inch lap to all substrates.

.3 Ensure minimum 2 inch overlap at all end and side laps of membrane.

.4 Roll all laps and membrane with a counter top roller to ensure seal.

.3 Windows and rough openings

1. Wrap rough openings with self-adhered air/vapour barrier membrane as detailed.

.1 Prime surfaces as per manufacturers' instructions and allow to dry.

.2 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inch overlap at all end and side laps of membrane.

.3 Roll all laps and membrane with a counter top roller to ensure seal.

.4 Through-wall flashing membrane

.1 Apply through-wall flashing membrane along the base of masonry veneer walls and over shelf angles as detailed.

.1 Prime surfaces and allow to dry, press membrane firmly into place, over lap minimum 2 inches at all end and side laps. Promptly roll all laps and membrane to ensure the seal.

.2 Applications shall form a continuous flashing membrane and shall extend up a minimum of 8 inches up the back-up wall.

.3 Seal the top edge of the membrane where it meets the substrate using termination sealant. Trowel-apply a feathered edge to seal termination to shed water.

.4 Install through-wall flashing membrane and extend 1/2 inch from outside edge of veneer. Provide end dam flashing as detailed.

.5 Primary air barrier

1. Apply self-adhering air/vapour barrier membrane complete and continuous to prepared and primed substrate in an overlapping shingle fashion and in accordance with manufacturer's recommendations and written instructions. Stagger all vertical joints.
   - .1 Prime surfaces as per manufacturers' instructions and allow to dry.
   - .2 Align and position self-adhering air/vapour barrier membrane, remove protective film and press firmly into place. Ensure minimum 2 inch overlap at all end and side laps of membrane.
   - .3 Roll all laps and membrane with a counter top roller to ensure seal.
   - .4 At the end of each day's Work seal the top edge of the membrane where it meets the substrate with termination sealant. Trowel apply a feathered edge to seal termination and shed water.

3.4 INSTALLATION - SPUNBONDED SHEET BARRIERS

.1 Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.

.2 Install weather barrier prior to installation of windows and doors.

.3 Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.

.4 Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level.

.5 Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.

.6 Window and Door Openings: Extend weather barrier completely over openings.

.7 Overlap weather barrier

- .1 Exterior corners: minimum 12 inches.
- .2 Seams: minimum 6 inches.

.8 Weather Barrier Attachment:

- .1 Steel or Wood Frame Construction: Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommended fasteners, space 12 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.
- .2 Masonry Construction: Attach weather barrier to masonry. Secure using weather barrier manufacturer recommended fasteners, spaced 12-18 inches vertically on center and 24 inches maximum horizontally. Weather barrier may be temporarily attached to masonry using recommended adhesive, placed in vertical strips spaced 24 inches on center, when coordinated on the project Site.

.9 Apply 4 inch by 7 inch piece of DuPont™ StraightFlash™ or weather barrier manufacturer approved alternate to weather barrier membrane prior to the installation cladding anchors.

.10 Seaming:

.1 Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.

.2 Seal any tears or cuts as recommended by weather barrier manufacturer.

.11 Opening Preparation (for use with non-flanged windows – all cladding types)

.1 Flush cut weather barrier at edge of sheathing around full perimeter of opening.

.2 Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

.12 Flashing (for use with non-flanged windows – all cladding types)

.1 Cut [7-inch] [9-inch] wide DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF a minimum of 12 inches longer than width of sill rough opening. Apply primer as required by manufacturer.

.2 Cover horizontal sill by aligning DuPont™ FlexWrap™ edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by Working in along the sill before adhering up the jambs.

.3 Fan DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges. Mechanical fastening is not required for DuPont™ FlexWrap™ NF.

.4 Apply 9-inch wide strips of DuPont™ StraightFlash™ at jambs. Align flashing with interior edge of jamb framing. Start DuPont™ StraightFlash™ at head of opening and lap sill flashing down to the sill.

.5 Spray-apply primer to top 6 inches of jambs and exposed sheathing.

.6 Install DuPont™ FlexWrap™ DuPont™ FlexWrap™ NF at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.

.7 Coordinate flashing with window installation.

.8 On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C 1193.

.9 Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.

.10 Tape top of window in accordance with manufacturer recommendations.

.11 On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

.13 Thru-Wall Flashing Installation

.1 Apply primer per manufacturer's written instructions.

.2 Install preformed corners and end dams bedded in sealant in appropriate locations along wall.

.3 Starting at a corner, remove release sheet and apply membrane to primed surfaces in lengths of 8 to 10 feet.

.4 Extend membrane through wall and leave ¼ inch minimum exposed to form drip edge.

.5 Roll flashing into place. Ensure continuous and direct contact with substrate.

.6 Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant.

.7 Thru-wall flashing / weather barrier interface at base of wall:

.1 Overlap thru-wall flashing with weather barrier by 6-inches.

.2 Mechanically fasten bottom of weather barrier through top of thru-wall flashing.

.3 Seal vertical and horizontal seams with tape or sealing membrane.

.8 Thru-wall flashing / weather barrier interface at shelf angle:

.1 Seal weather barrier to bottom of shelf angle with sealing membrane.

.2 Apply thru-wall flashing to top of shelf angle. Overlap thru-wall flashing with weather barrier by 6-inches.

.3 Seal bottom of weather barrier to thru-wall flashing with tape or sealing membrane.

.9 Thru-wall flashing / weather barrier interface at window head:

.1 Cut flap in weather barrier at window head.

.2 Prime exposed sheathing.

.3 Install lintel as required. Verify end dams extend 4 inches minimum beyond opening.

.4 Install end dams bedded in sealant.

.5 Adhere 2 inches minimum thru-wall flashing to wall sheathing. Overlap lintel with thru-wall flashing and extend ¼ inch minimum beyond outside edge of lintel to form drip edge.

.6 Apply sealant along thru-wall flashing edges.

.7 Fold weather barrier flap back into place and tape bottom edge to thru-wall flashing.

.8 Tape diagonal cuts of weather barrier.

.9 Secure weather barrier flap with fasteners.

3.5 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.

.4 Damp substrates must not be inhibited from drying out. Do not expose the backside of the substrate to moisture or rain.

.5 Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane.

.6 Air/vapour barrier membrane is not designed for permanent exposure. Good practice calls for covering as soon as possible.

3.6 INSPECTION

.1 Carefully inspect for continuity of air barrier prior to placement of insulation.

.2 Repair all deficient membrane areas.

.3 Misaligned or inadequately lapped seams, punctures or other damage must be repaired with a patch of air barrier membrane extending 50mm in all directions from edge of damaged areas.

.4 Cover membrane immediately after Contract Administrator’s inspection to protect from damage by other trades.

3.7 TESTING

.1 Air leakage testing as directed by Contract Administrator and paid for by Contractor will be performed by professional testing agency for the locations selected at random for penetrations, laps, corners, etc.

.2 Testing will be witnessed by Contract Administrator and test reports will be signed by tester, Site representative and Contractor.

.3 Inform Contract Administrator 48 hours prior to required testing.

.4 If the inspections reveal any defects, promptly remove and replace defective Work at no additional cost to The City or the Contract Administrator

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Requirements for the installation of preformed metal cladding/siding.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 00 – Cleaning and Waste Management.

.3 Section 07 92 00 - Joint Sealing.

1.3 REFERENCES

.1 American National Standards Institute (ANSI).

.1 ANSI B18.6.4-99, Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws.

.2 American Society for Testing and Materials International, (ASTM).

.1 ASTM D2369-10, Test Method for Volatile Content of Coatings.

.2 ASTM D2832-92(2016), Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.

.3 ASTM D5116-10, 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.

.2 CAN/CGSB-93.2-M91, Prefinished Aluminum Siding, Soffits and Fascia, for Residential Use.

.3 CAN/CGSB-93.3-M91, Prefinished Galvanized and Aluminum-Zinc Alloy Steel Sheet for Residential Use.

.4 CAN/CGSB-93.4-92, Galvanized and Aluminum-Zinc Alloy Coated Steel Siding Soffits and Fascia, Prefinished, Residential.

.5 CGSB 93.5-92, Installation of Metal Residential Siding, Soffits and Fascia.

.4 Canadian Standards Association (CSA International).

.1 CSA S-136 for the design of Cold Formed Steel Structural Members

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

.5 Canadian Sheet Steel Building Institute

.1 Standard 20M

.6 Environmental Choice Program (ECP).

.1 CCD-045-95, Sealants and Caulking Compounds.

.7 Underwriters' Laboratories of Canada (ULC).

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

1.4 SUBMITTALS

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

.1 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate 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, fascia, metal furring, and related Work.

.3 Samples:

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

.2 Submit duplicate 150 x 150 mm samples of siding material, of colour and profile specified.

.4 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

.1 Manufacturer of wall system, and installer shall demonstrate at least five years' experience in projects similar in scope.

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

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

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

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling and dispose of waste materials in accordance with Section 01 74 00 – Cleaning and Waste Management.

.2 Divert used metal cut-offs from landfill by disposal into the on-site metals recycling bin.

.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 Corrugated siding: to ASTM A653 SQ, Grade 33 (latest revision) with designation Z275 for Pre-painted, Galvanized Material.

.1 Finish coating: Polyvinylidene Flouride – PVDF Fluoropolymer Anti-graffiti Coating.

.2 Colours:

.1 Colour 1: VicWest #QC 16072 “Charcoal”,

.3 Gloss (ASTM D523): 25% - 35%.

.4 Thickness: 22 GA base metal thickness.

.5 Profile: 68mm corrugation pattern, 22 mm deep, to VicWest ‘Corrugated Sheet – 7/8”; Exposed Fastener’.

.2 Fascia facings and exposed trim: to CGSB 93.4, Class plain:

.1 Finish coating: Polyvinylidene Flouride – PVDF Fluoropolymer Anti-graffiti Coating.

.2 Colour: to match VicWest # QC 16072 “Charcoal”.

.3 Gloss (ASTM D523): 25% - 35%.

.4 Thickness: 24 GA base metal thickness.

.5 Profile: manufacturer's standard trims as indicated.

2.2 POLYCARBONATE CLADDING

.1 Corrugated Polycarbonate Liner Panels, 0.047” [1.2 mm] thick, corrugated profile to match corrugated metal cladding product.

.2 Colour: ‘Soft White’

.3 85% Light transmittance, 100% Diffusion, 100% UV protection from UV-A and UV-B radiation. **IMPORTANT** Install with panel edges facing *inward* to ensure UV-protected side is exposed to sunlight.

.4 Weather Resistance: Hail and wind resistant in temperatures from -40°c to +100°c.

.5 Warranty: 10 year commercial warranty against yellowing and a 5 year, prorated warranty against breakage caused by hail..

.6 Acceptable Product: ‘SoftLite - Coverlite’ Corrugated Polycarbonate Sheet by AmeriLux International (or approved equal according to B7).

2.3 ACCESSORIES

.1 Flashing: In accordance with Section 07 62 00. Material to match cladding in exposed locations, galvanized material in concealed locations. Custom fabricated to suit architectural details where standard profile shapes are not suited. Use preformed corner pieces only. Double back exposed edges.

.2 Closures: Metal closures to suit profiles selected, to manufacturer’s recommendations.

2.4 FASTENERS

.1 Fasteners: Galvanized with exposed fasteners colour matched to cladding.

2.5 CAULKING

.1 Sealants:

.1 Concealed: Tape or compound, non-skinning, non-drying, butyl rubber.

.2 Exposed: Either use Acrylic co-polymer to CGSB 19GP-5M or One part silicone to CGSB CAN2-19.13 for all exposed caulking for this system. Either sealant material is acceptable, but must not be mixed or alternated between the two.

2.6 SHEATHING MEMBRANE

.1 Exterior wall sheathing membrane: to CAN2-51.32, spunbonded polyolefin type, non-woven, non-perforated, weather barrier.

.1 Acceptable Material: Dupont™ Tyvek® Commercial Wrap® (or approved equal according to article B7)

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 one layer exterior wall sheathing membrane horizontally as per manufacturer’s instructions, lapping edges at least 150 mm.

.3 Install continuous starter strips, inside corners, edgings, drip, cap, sill and window/door opening flashings as indicated.

.4 Install outside corners, fillers and closure strips with carefully formed and profiled Work.

.5 Install 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 Sealing.

3.3 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers in accordance with Section 01 74 00 – Cleaning and Waste Management.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Requirements for installation of plywood, hardboard and lumber siding.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 00 – Cleaning and Waste Management.

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

.4 Section 07 92 00 - Joint Sealing.

.5 Section 09 91 13 – Exterior Painting

1.3 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).

.1 ASTM D5116-97, Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.

.2 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-11.3-M87, Hardboard.

.2 CAN/CGSB-11.5-M87, Hardboard, Precoated, Factory Finished, for Exterior Cladding.

.3 CAN/CGSB-11.6-M87, Installation of Exterior Hardboard Cladding.

.4 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.

.3 Canadian Standards Association (CSA International).

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

.2 CSA O121-M1978(R1998), Douglas Fir Plywood.

.3 CSA O151-M1978(R1998), Canadian Softwood Plywood.

.4 CAN/CSA-Z808-96, A Sustainable Forest Management System: Guidance Document.

.4 Environmental Choice Program (ECP).

.1 CCD-045-[95], Sealants and Caulking Compounds.

.5 National Lumber Grades Authority (NLGA).

.1 NLGA Standard Grading Rules for Canadian Lumber 2003.

1.4 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 for caulking materials during application and curing.

.2 Samples:

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

.2 Submit duplicate 152 x 152 mm size profile specified.

.3 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

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

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

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Section 01 45 00.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 00 – Cleaning and Waste Management.

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

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in an appropriate on-site bin.

.4 Divert unused metal materials from landfill to metal recycling facility approved by The City.

.5 Divert unused wood materials from landfill to recycling or reuse as approved by The City.

.6 Divert unused caulking material from landfill to official hazardous material collections site.

.7 Do not dispose of unused caulking materials into the sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

.1 Lumber siding: to NLGA Standard Grading Rules for Canadian Lumber.

.1 Drop Siding: V-Match Tongue & Groove, Douglas Fir Grade ‘B’:
“Mostly free of knots with very few defects on exposed side. This is an economical ‘clear’ grade. Characteristics, which may appear on this grade, are: small occasional knots, varied grain, pitch streaks and stain. No knotholes or loose knots are permitted. 140 mm width with min 3mm reveal for expansion.

.2 Accessories: exposed trim, closures, cap pieces of manufacturer's standard, Galvanized finish, as noted.

.3 Fasteners: Types 304 Stainless steel nails to CSA B111, size nails to penetrate solid wood to 32mm at furring, ring thread type with flat head.

.4 Sealants: Varnish, Aliphatic Polyurethane, Clear; Two-Component.

.1 Benjamin Moore, Corotech Aliphatic Acrylic Urethane Semi-gloss #V610 (or approved equal in accordance with B7)

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 one layer of Air Barrier horizontally following manufactures recommendations for affixing, lapping and sealing.

.2 Install vertical furring (and flying battens where stud bay greater than 406mm)

.3 Install sill flashings, wood starter strips, inside corner flashings, edgings and flashings over openings.

.4 Fasten wood siding in straight, aligned lengths to furring, blocking, and battens @ 610 mm on centre maximum using two nails at each fixing location to furring and one (shorter nail @ battens). Intermediate butt joints are not permitted. Stagger butt joints not less than 800 mm and distribute evenly over wall faces. Cut butt joints at 45 degrees. Seal cut surfaces with approved sealant.

.5 Finish & seal as per specification section 09 91 13 – Exterior Painting.

~~.1~~ Apply sealant to backsides and butt-ends of wood siding and trim pieces prior to installation

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 (ASTM):

- .1 ASTM B136 - Standard Method for Measurement of Stain Resistance of Anodic Coatings on Aluminum.
- .2 ASTM B244 - Standard Test Method for Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments.
- .3 ASTM C834 - Standard Specification for Latex Sealants.
- .4 ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- .5 ASTM C1186 - Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets.
- .6 ASTM D1117 - Standard Guide for Evaluating Nonwoven Fabrics.
- .7 ASTM D1730 - Standard Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting.
- .8 ASTM D3359 - Standard Test Method for Measuring Adhesion by Tape Test, Tool and Tape.
- .9 ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- .10 ASTM E96 - Test Methods for Water Vapor Transmission of Materials.
- .11 ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- .12 ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
- .13 ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure.

.2 The Master Painters Institute (MPI).

.3 National Research Council (NRC).

.4 Underwriters Laboratories' of Canada (ULC).

- .1 CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .2 CAN/ULC-S702, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
- .3 CAN/ULC-S704, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
- .4 CAN/ULC-S706, Standard for Wood Fibre Thermal Insulation for Buildings.

.1 Canada Green Building Council (CaGBC)

- .1 LEED Canada Reference Guide for Green Building Design and Construction 2009

1.2 SUBMITTALS

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

.2 Product Data: Manufacturer's data sheets on each product to be used, including:

.1 Installation instructions and recommendations.

.2 Storage and handling requirements and recommendations.

.3 Manufacturer's best practice guide.

.4 Technical data sheet.

.5 Standard CAD drawings

.3 Shop Drawings: Provide detailed drawings of atypical non-standard applications of cladding junctions and penetrations which are outside the scope of the standard details and specifications provided by the manufacturer.

.4 Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

.5 Verification Samples: For each finish product specified, two samples, minimum size 4 by 6 inches (100 by 150 mm), representing actual product, color, and patterns.

1.3 QUALITY ASSURANCE

.1 Installer Qualifications: Minimum of 2 years' experience with installation of similar products.

.2 Mock-Up: Provide a mock-up for evaluation of surface preparation techniques

.1 Finish areas designated by Contract Administrator.

.2 Do not proceed with remaining Work until Workmanship, color, and sheen are approved by Contract Administrator.

.3 Refinish mock-up area as required to produce acceptable Work.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Store products in manufacturer's unopened packaging until ready for installation.

.2 Store siding flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.

.3 Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local Authorities Having Jurisdiction.

1.5 PROJECT CONDITIONS

.1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 00 – Cleaning & Waste Management.

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

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

.4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.

.5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

1.7 WARRANTY

.1 Product Warranty: Limited, non-pro-rated product warranty.

.1 HardiePlank HZ5 Lap Siding for 30 years.

.2 Finish Warranty: Limited product warranty against manufacturing finish defects.

.1 When used for its intended purpose, properly installed and maintained according to James Hardie's published installation instructions, James Hardie's ColorPlus finish with ColorPlus Technology, for a period of 15 years from the date of purchase: will not peel; will not crack; and will not chip. Finish warranty includes the coverage for labor and material.

.3 Workmanship Warranty: Application limited warranty for 2 years.

Part 2 Products

2.1 MANUFACTURER

.1 Acceptable Manufacturer: James Hardie Building Products, Inc (or approved equal in accordance with B7) which is located at: 26300 La Alameda Suite 400 ; Mission Viejo, CA 92691; Toll Free Tel: 866-274-3464; Tel: 949-367-4980; Fax: 949-367-4981; Email: request info (info@jameshardie.com); Web: www.jameshardiecommercial.com

2.2 SIDING

.1 Horizontal Lap Siding: HardiePlank - Select Cedarmill [HZ5] as manufactured by James Hardie Building Products, Inc (or approved equal in accordance with B7):

.1 Type: Embossed wood grain horizontal siding plank 6.25-inch (5-inch exposure) by 12 feet (160 mm by 3660 mm).

.1 Fiber-cement Siding - complies with ASTM C 1186 Type A Grade II.

.2 Fiber-cement Siding - complies with ASTM E 136 as a noncombustible material.

.3 Fiber-cement Siding - complies with ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.

.4 CAL-FIRE, Fire Engineering Division Building Materials Listing - Wildland Urban Interface (WUI) Listed Product.

.5 National Evaluation Report No. NER 405 (BOCA, ICBO, SBCCI, IBC, IRC).

.6 City of Los Angeles, Research Report No. 24862.

.7 Miami Dade County, Florida Notice of Acceptance 07-0418.04.

.8 US Department of Housing and Urban Development Materials Release 1263d.

.9 California DSA PA-019.

.10 City of New York M EA 223-93-M.

.11 Florida State Product Approval FL889.

.12 Texas Department of Insurance Product Evaluation EC-23.

2.3 ACCESSORIES:

.1 Window & door trim and vertical corner trim to be HardieTrim 4/4 Back Grooved Boards (or approved equal in accordance with B7).

.1 Contractor to use Flat Tabs and Corner Tabs to install all trim boards with concealed fastening.

.2 Sheathing is non-fastener equivalent to OSB or Plywood sheathing, therefore additional furring strips may be required to ensure that the Flat and Corner Tabs are fastened properly to the structure.

.2 Soffit panelling to be HardieSoffit Panels – Vented Cedarmill and Non-Vented Cedarmill (or approved equal in accordance with B7), 6mm thickness.

.1 Contractor to use longest lengths of material available to reduce number of joints.

.2 Contractor to ensure that the manufacturer-specified maximum span capacity is not exceeded. Additional framing/ blocking may be required to accommodate.

.3 Contractor use 305mm wide soffit panels. The panels are to be installed oriented parallel to the exterior walls. The inner course(s) of soffit panel is/are to be non-vented and the outer course of soffit panel is to be vented.

2.4 FASTENERS

.1 Wood Framing:

.1 Blind nailing: Siding nail, corrosion-resistant, galvanized. Sized and profiled as per manufacturer's recommendations.

.2 11ga. Roofing nail, corrosion-resistant, galvanized. Sized and profiles as per manufacturer's recommendations.

.2 Metal Framing:

.1 Metal Framing: corrosion resistant, galvanized self-drilling, corrosion resistant, screws. Sizes as per manufacturer's recommendations for metal z-girt framing.

.3 Masonry Walls (CMU):

.1 Masonry Walls: Aerico Stud Nail, ET&F ASM No.-144-125, 0.14 inch (3.6 mm) shank by 0.30 inch (7.6 mm) head by 2 inches (51 mm) long corrosion resistant nails.

2.5 FINISHES

.1 Factory Finish:

.1 Product: ColorPlus Technology by James Hardie.

.2 Definition: Factory applied finish; defined as a finish applied in the same facility and company that manufactures the siding substrate.

.3 Process:

.1 Factory applied finish by fibre cement manufacturer in a controlled environment within the fibre cement manufacturer's own facility utilizing a multi-coat, heat cured finish within one manufacturing process.

.2 Each finish color must have documented color match to delta E of 0.5 or better between product lines, manufacturing lots or production runs as measured by photospectrometer and verified by third party.

.4 Protection: Factory applied finish protection such as plastic laminate that is removed once siding is installed

.5 Accessories: Complete finishing system includes pre-packaged touch-up kit provided by fibre cement manufacturer. Provide quantities as recommended by manufacturer.

.6 HardiePlank Lap Siding colour to be selected from the manufacturer's standard range of prefinished colours for the Manitoba – Saskatchewan region.

.1 Specific standard manufacturer's prefinished colour is TBD, Contract Administrator to provide selected colour from sample range provided by Contractor.

2.6 SUBSTITUTIONS

.1 Refer to Section B7 – Substitutes of Bid Opportunity 668-2017.

Part 3 Execution

3.1 EXAMINATION

.1 Do not begin installation until substrates have been properly prepared.

.2 If framing preparation is the responsibility of another installer, notify Contract Administrator of unsatisfactory preparation before proceeding.

.3 Minimum 20 gauge 3-5/8 inch (92 mm) C-Stud 16 inches maximum on center or 16 gauge 3-5/8 inches (92 mm) C-Stud 24 inches (610 mm) maximum on center metal framing complying with local building codes, including the use of water-resistive barriers and/or vapor barriers where required. Minimum 1-1/2 inches (38 mm) face and straight, true, of uniform dimensions and properly aligned.

.1 Install water-resistive barriers and claddings to dry surfaces.

.2 Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.

.3 Protect siding from other trades.

3.2 PREPARATION

.1 Clean surfaces thoroughly prior to installation.

.2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

.3 Install a water-resistive barrier is required in accordance with local building code requirements.

.4 The water-resistive barrier must be appropriately installed with penetration and junction flashing in accordance with local building code requirements.

3.3 INSTALLATION - HARDIEPLANK HZ5 LAP SIDING and HARDIETRIM BACKGROOVED BOARDS

.1 Install materials in strict accordance with the latest edition of the manufacturer's installation instructions.

.2 Specific framing and fastener requirements refer to Tables 2 and 3 in National Evaluation Service Report No. NER-405.

.3 Factory Finish Touch Up: Apply touch up paint to cut edges in accordance with manufacturer's printed instructions.

.1 Touch-up nicks, scrapes, and screw heads in pre-finished siding using the manufacturer's touch-up kit pen.

.2 Touch-up of screws shall be performed after application, but before plastic protection wrap is removed to prevent spotting of touch-up finish.

.3 Use touch-up paint sparingly. If large areas require touch-up, replace the damaged area with new pre-finished siding. Match touch up color to siding color through use of manufacturer's branded touch-up kits.

3.4 FINISHING

.1 Finish unprimed siding with a minimum one coat high quality, alkali resistant primer and one coat of either, 100 percent acrylic or latex or oil based, exterior grade topcoats or two coats high quality alkali resistant 100 percent acrylic or latex, exterior grade topcoat within 90 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.

.2 Finish factory primed siding with a minimum of one coat of high quality 100 percent acrylic or latex or oil based exterior grade paint within 180 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.

3.5 PROTECTION

.1 Protect installed products until completion of project.

.2 Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation for sheet metal roofing including:

.1 Air/vapour barrier
.2 Roof panel and support system
.3 Accessories including associated flashings, closures, sealants

.2 Related Work not included:

.1 Flashings associated with other trades.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 45 00 - Quality Control.

.3 Section 01 74 00 - Waste Management and Cleaning.

.4 Section 07 62 00 – Sheet Metal Flashing and Trim.

.5 Section 07 92 00 - Joint Sealing.

1.3 REFERENCES

.1 Aluminum Association (AA).

.1 AA DAF-45-[R03], Designation System for Aluminum Finishes - 9th Edition.
.2 AA ASM-35-[October 2000], Specifications for Aluminum Sheet Metal Work in Building Construction, Section 5.

.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 A240/A240M-[02a], Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
.3 ASTM A653/A653M-[02a], Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
.4 ASTM A792/A792M-[02], Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process.
.5 ASTM B32-[00e1], Standard Specification for Solder Metal.
.6 ASTM B370-[98], Standard Specification for Copper Sheet and Strip for Building Construction.
.7 ASTM D523-[89(1999)], Standard Test Method for Specular Gloss.
.8 ASTM D822-[01], Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.3 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-37.5-[M89], Cutback Asphalt Plastic Cement.

.2 CAN/CGSB-37.29-[M89], Rubber-Asphalt Sealing Compound.

.3 CAN/CGSB-51.32- [M77], Sheathing, Membrane, Breather Type.

.4 CAN/CGSB-93.1-[M85], Sheet Aluminum Alloy, Prefinished, Residential.

.4 Canadian Sheet Steel Building Institute (CSSBI):

.1 Standards 10M, 20M and B11

.5 Canadian Standards Association (CSA International).

.1 CAN/CSA A123.3-[98], Asphalt Saturated Organic Roofing Felt.

.2 CAN/CSA S136 for the design of Cold Formed Steel Structural Members

.6 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act (CEPA), 1999.

.7 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.8 National Research Council Canada (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC).

.1 CCMC-[2002], Registry of Product Evaluations.

.9 Transport Canada (TC).

.1 Transportation of Dangerous Goods Act (TDGA), 1992.

1.4 DESIGN REQUIREMENTS

.1 Design roof system to resist:

.1 Snow loads and snow build-up and rain load, expected in this geographical region NBCC climatic data, 50 year probability.

.2 Wind loads, positive and negative, expected in this geographical region NBCC climatic data, 50 year probability.

.3 Dead load of roof system.

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

.3 Thermal movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, overstressing of components, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.

.1 Temperature Change (Range): 20 deg C, ambient; 40 deg C, material surfaces.

1.5 WIND REQUIREMENTS

.1 The roof panel shall be UL-90 rated in accordance with UL 580 test for wind uplift performance of roof assemblies.

.2 The roof panel shall have FM 1-90 windstorm resistance approval.

1.6 SUBMITTALS

.1 Submit proof of manufacturer's CCMC Listing and listing number to Contract Administrator.

.2 Submit samples of standard coloured metal roof sheet for review by the Contract Administrator prior to fabrication.

.3 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures and general maintenance for incorporation into a manual as per Section 01 78 00 – Closeout Submittals.

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

.5 Submit product data sheets for all components of the metal roofing system. Include:

.1 Product characteristics.

.2 Performance criteria.

.3 Limitations.

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

.1 Indicate arrangement of pre-finished Roof Sheet, including joints, types and locations of supports, fasteners, flashing, gutters, mitres, and all metal components related to the roof installation. Include for Structural Liner, Thermal Barrier, Membrane Air/Vapour Barrier, Insulation, as part of the roof system.

.2 Drawings shall be signed and sealed by a Professional Engineer, registered in the Province of Manitoba, attesting to the ability of the metal panels assembly to withstand the specified loads.

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

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

.9 Submit duplicate 100 x 100mm samples of each sheet metal material.

1.7 PRODUCT DELIVERY, HANDLING AND STORAGE

.1 Store components and materials in accordance with panel manufacturer’s recommendations and protect from elements.

.2 Protect prefinished steel during fabrication, transportation, site storage and erection, in accordance with CSSBI Standards.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 00 – Cleaning and Waste Management.

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

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

.4 Separate for recycling and place in designated containers Metal and Plastic waste in accordance with Waste Management Plan.

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

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

.7 Ensure emptied containers are sealed and stored safely.

.8 Divert unused metal materials from landfill to metal recycling facility as approved by Contract Administrator.

.9 Unused paint, caulking, and sealing compound materials must be disposed of at an official hazardous material collections site as approved by Contract Administrator.

.10 Unused paint, caulking, and sealing compound materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

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

1.9 QUALITY ASSURANCE

.1 Fabricate 450 x 450 mm sample roofing panel using identical project materials and methods to include typical seam.

.2 Manufacturer of roof system and installer shall demonstrate at least five years' experience in projects similar in scope.

.3 Refer to Section B7 – Substitutes of Bid Opportunity 630-2016 regarding proposed substitutions.

1.10 GUARANTEE

.1 For Work in this section, warranty by installer against defects or deficiencies in materials or workmanship shall be for a period of one year from date of substantial completion.

1.11 WARRANTY

.1 Provide a manufacturer's written warranty: Furnish panel manufacturer's written warranty covering failure of factory-applied exterior finish within the warranty period. Warranty period for finish: 40 years after the date of Substantial Completion. The values below are based on normal environments and exclude any aggressive atmospheric conditions.

.1 WeatherXL™ (Siliconized Polyester - SMP) will not crack, chip, or peel (lose adhesion) for forty (40) years from date of installation (40.5 yrs from application). This does not include minute fracturing that may occur during the normal fabrication process. WeatherXL™ (Siliconized Polyester - SMP) will not chalk in excess of a number six (6) rating, in accordance with ASTM D-4214-98 method D659 at any time for thirty (30) years from date of installation (30.5 yrs from application); will not change colour more than eight (8.0) Hunter ΔE units as determined by ASTM method D-2244-02.

.2 Manufacturer of roof system and installer shall demonstrate at least five years' experience in projects similar in scope.

Part 2 Products

2.1 MATERIALS

.1 Roof System: Tradition 100-4 on Solid Substrate by Vicwest

.1 Underlayment: Membrane shall be Ice and Water Shield by W.R.Grace (or approved equal according to B7).

.2 Clip System:

.1 Thermally responsive clips to be fabricated from a minimum of 0.91mm (0.036") steel with minimum Z275 galvanized coating designed to accommodate expansion and contraction of the roof sheet.

.2 Roof fasteners: As specified by manufacturer to resist wind uplift and sliding snow forces.

.3 Prefinished Roof Sheet, exposed to exterior.

.1 Profile: Tradition 100-4, with I-style ribs at 400mm spacing.

.2 Panel: Z275 galvanized sheet steel conforming to ASTM A653M structural quality Grade 230 having a nominal core thickness 0.76mm (0.030").

.4 Snap Cap

.1 Provide 25mm high snap caps for full length of the roof panel and retained by panel clips, fabricated from Z275 galvanized sheet steel conforming to ASTM A653M structural quality Grade 230 having a minimum nominal core thickness 0.61mm (0.024"). Finish and colour to match roof sheet.

2.2 PANEL FINISHES

.1 Structural Deck coating – paint exposed interior surface white.

.2 Prefinished Roof Sheet coating: Prepainted with WeatherXL™ Series, one side.

.1 Colour: Prefinished Roof sheet colour to be selected from manufacturer's standard colour range.

2.3 ACCESSORIES

.1 Flashing: In accordance with Section 07 62 00. Formed from same materials as the roof sheet. Custom fabricated to suit architectural details, as required.

.2 Closures: Foam and metal closures to suit profiles selected, to manufacturer's recommendations.

.3 Sealants: In accordance with manufacturer's recommendations and Section 07 92 00.

2.4 FABRICATION

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

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

.3 Provide roof sheet and all accessories in longest practicable length to minimize field lapping of joints.

Part 3 Execution

3.1 EXAMINATION

.1 Examination Work of other Sections upon which Work of this Section depends.

.2 Report all discrepancies to Contract Administrator before beginning Work on the roof system.

3.2 INSTALLATION

.1 Roof Materials:

.1 Underlayment: Install underlayment fully adhered to solid substrate according to manufacturer’s recommendations. Ensure all joints are properly lapped and sealed. Tie in with barriers on adjacent surfaces to ensure airtight construction. Provide a continuous seal around all openings in the metal roof system.

.2 Clip: Attach metal roofing clips using fasteners as recommended by the manufacturer, to suit the substrate.

.2 Roof Panel Insulation

.1 Install exterior prefinished roof panels on panel support clips, using manufacturer's proper construction procedure. Ensure metal roofing sheet side-lap is positively retained by clips and proper sheet coverage is maintained.

.2 Install the snap-cap at all sidelaps as shown on the approved shop drawings. Mitre snap-cap as required to resist water entry.

.3 Where indicated on approved shop drawings, secure the end-lap of metal roofing sheets in accordance with the manufacturer’s specifications and details to provide a weather-tight seal. Exposed fasteners to match colour of roof sheet.

.4 Provide notched and formed closures, sealed against weather penetration, at changes in pitch and at ridges and eaves, where required.

.5 Install all companion flashing, gutters and ventilators as shown on the approved shop drawings. Use concealed fasteners when possible. Exposed fasteners to match colour of roof sheet.

3.3 CLEAN-UP

.1 Remove protective film from panels.

.2 Clean exposed panel surfaces in accordance with manufacturer’s instructions.

.3 Repair and touch up with colour matching high grade enamel minor surface damage, only where permitted by the Contract Administrator and only where appearance after touch up is acceptable to the Contract Administrator.

.4 Replace damaged panels and components that, in the opinion of the Contract Administrator, cannot be satisfactorily repaired.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 The Aluminum Association Inc. (AA)

.1 Aluminum Sheet Metal Work in Building Construction-2000.

.2 AA DAF45-97, Designation System for Aluminum Finishes.

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

.1 ASTM A591/A591M-98, Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications.

.2 ASTM A606-01, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.

.3 ASTM A653/A653M-01a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.4 ASTM A792/A792M-02, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.5 ASTM B32-00 Standard Specification for Solder Metal.

.6 ASTM D523-89(1999), Standard Test Method for Specular Gloss.

.3 Canadian Roofing Contractors Association (CRCA)

.1 Roofing Specifications Manual 1997.

.4 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.

.2 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.

.3 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.

.5 Canadian Standards Association (CSA International)

.1 CSA A123.3-98, Asphalt Saturated Organic Roofing Felt.

.2 CSA-A440-00/A440.1-00 - A440-00, Windows / Special Publication A440.1-00. User Selection Guide to CSA Standard A440-00, Windows.

.3 CSA B111-1974(R1998), Wire Nails, Spikes and Staples.

1.2 SAMPLES

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

.2 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, colour and finish products

1.3 DELIVERY, STORAGE, AND HANDLING

.1 Storage and Handling Requirements:

.1 Store materials off ground and under cover in a dry, well ventilated enclosure.

.2 Stack preformed material in manner to prevent twisting, bending and rubbing.

.3 Provide protection for galvanized and prepainted surfaces.

.4 Prevent contact of dissimilar metals during storage and protect from acids, flux, and other corrosive materials and elements.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 00 – Cleaning and Waste Management.

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

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

.4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.

.5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

Part 2 Products

2.1 SHEET METAL MATERIALS

.1 Aluminum-zinc alloy coated steel sheet: to ASTM A792/A792M, commercial quality, grade 33 with AZ150 coating, regular spangle surface, 0.70 mm (24 gauge) and 1.61 mm (16 gauge) base metal thicknesses. Pre-painted to CGSB –GP-71.

2.2 PREFINISHED STEEL SHEET

.1 Prefinished sheet with factory applied polyvinylidene fluoride.

.1 Class F1S

.2 Colours:

.1 To match metal roofing system (Section 07 61 13) and Preformed Metal Siding (07 46 13) where exposed.

.2 Where concealed, use galvanized finish

.3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.

.4 Coating thickness: not less than 22 micrometres.

.5 Resistance to accelerated weathering for caulk 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.

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

.4 Sealants: Section 07 92 00 – Joint Sealants.

.5 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

.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.

2.4 FABRICATION, GENERALLY

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

.2 Fabricate aluminum flashings and other sheet aluminum Work in accordance with Aluminum Association Aluminum Sheet Metal Work in Building Construction.

.3 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.

.4 Hem exposed edges on underside 12 mm. 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.

.7 Maximum Joint Spacing:

.1 Parapet Face Flashings: 1200 mm.

.2 Cap Flashing 300 mm and Greater in Width: 1200 mm.

.3 All Other Flashings: 2400 mm.

.8 Construct flashing joints to allow for flashing movement, using flat "S" lock seams.

.9 Maintain minimum of 22 mm lap at all joints. Provide 25 mm anchor projection of "S" locks.

.10 At inside and outside corners, mitre the joint, and use upstanding seams, 25 mm minimum height and 22 mm minimum lap.

.11 Maintain minimum 1:5 slope on horizontal surfaces of flashings, parapets and control joints.

.12 Fabricate cap flashing to have a drip leg minimum 110 mm high.

.13 Fabricate cap and counter flashings to lap 100 mm over base flashings.

2.5 FABRICATION, ROOF ACCESSORIES

.1 Form sheet steel roof drain sleeves, air-stops etc. from 0.70 mm (24 gauge) galvanized steel.

.2 Form gum boxes from 0.70 mm (24 gauge) galvanized steel, with 75 mm minimum upstand and 100 mm one piece flanges. Solder joints. Make pans wider than member passing through roof membrane by 50 mm minimum all sides.

.3 Fabricate roof scuppers from 0.70 mm (24 gauge), prepainted galvanized sheet steel with one piece deck flange, minimum 150 mm. Contour scuppers to cant strips.

.4 Fabricate air/firestop below control joint box from 0.70 mm (24 gauge) galvanized steel.

.5 Fabricate roof drain sleeves as detailed on drawings, from 0.70 mm (24 gauge) galvanized steel.

Part 3 Execution

3.1 EXAMINATION

.1 Examine surfaces to receive flashings. Notify the Contract Administrator of surfaces which are considered unacceptable to receive the Work of this Section.

.2 The commencement of flashing Work will imply unconditional acceptance of the surfaces and substrates to which the flashing is to be fastened.

.3 Verify that the following are located and installed as detailed on drawings:

.1 Plywood and lumber nailer plates to walls and parapets.

.2 Control joints.

3.2 PROTECTION OF EXISTING WORK

.1 Protect the Work of other Sections from damage by the Work of this Section.

.2 Place protection to the requirements and satisfaction of this Section before performing the Work of other Sections.

3.3 FLASHING INSTALLATION, GENERAL

.1 Install sheet metal Work in accordance with CRCA FL series details.

.2 Install flashings not later than seven days after installation of the membrane on any particular section of the roof.

.3 Use 0.80 mm thick x 150 mm long anchor clips on fascia faces, and screws or annular ringed nails on the opposite face.

.4 Use exposed fastenings in approved locations. Install anchors using annular ringed nails.

.5 Fasten flashings of 1.2 m length and shorter, through the extended "S" locks. Fasten flashings over 1.2 m length, through the extended "s" locks, and at mid-length with a 150 mm long, 0.80 mm thick galvanized steel clip.

.6 Fasten flashings at maximum 600 mm O.C.

.7 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.

.8 Lock end joints and caulk with sealant.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 The Aluminum Association Inc. (AA)

.1 Aluminum Sheet Metal Work in Building Construction.

.2 AA DAF45, Designation System for Aluminum Finishes.

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

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

.2 ASTM A792/A792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.3 ASTM D523, Standard Test Method for Specular Gloss.

.4 ASTM D822, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.3 Canadian General Standards Board (CGBS)

.1 CAN/CGSB-37.5, Cutback Asphalt Plastic Cement.

.4 Canadian Standards Association (CSA International)

.1 CSA B111, Wire Nails, Spikes and Staples.

.5 Canadian Roofing Contractors Association (CRCA)

.1 Roofing Specifications Manual.

1.2 SUBMITTALS

.1 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, colour and finish.

.2 Clearly indicate bending, folding, jointing, fastening installation details.

1.3 DELIVERY AND STORAGE

.1 Store products off ground and under cover in a dry, well ventilated enclosure.

.2 Stack pre-formed material in manner to prevent twisting, bending and rubbing.

.3 Provide protection for galvanized and pre-coated surfaces.

.4 Prevent contact of dissimilar metals during storage. Protect from acids, flux, and other corrosive materials and elements.

Part 2 Products

2.1 MATERIALS

.1 Rainwater leaders, splash pans, hoppers, downspouts and scuppers: 16 GA. [1.5 mm] thick sheet aluminum, bent to profile as indicated on drawings.

.1 Colour: paint rainwater leaders, splash pans, hoppers, downspouts and scuppers to match prefinished metal corrugated panels [Vicwest #QC 16072 "Charcoal"].

.2 Trough Supports: continuous aluminum with a perforated aluminum cover that covers the complete trough to prevent debris from getting stuck in the trough and downpipe.

.3 Downspout: 100 mm x 150 mm profile unless otherwise noted, open face type, single piece length.

.4 Downspout straps: 0.72 mm thick aluminum.

.5 Sealant: As per Section 07 92 00 – Joint Sealing.

.6 Elbows and tees: Aluminum same as trough.

.7 Provide goosenecks, hoppers, sloped outlets, strainer baskets and necessary fastenings.

.8 Provide rain water leader to provide transition to downspout as required.

2.2 FABRICATION

.1 Fabricate sheet aluminum Work in accordance with Aluminum Association Aluminum Sheet Metal Work in Building Construction.

.2 Fabricate eavestrough in continuous length up to a maximum length of 12 metres.

.3 Form eavestrough to profiles as indicated on drawings.

Part 3 Execution

3.1 INSTALLATION

.1 Install sheet metal Work to CRCA Specifications.

.2 Install eaves troughs and secure to building at 750 mm on centre with eaves trough spikes through spacer ferrules. Slope eaves troughs to downpipes as indicated. Seal joints watertight.

.3 Install trough supports/debris catchers to provide a continuous slope to drain all water from the trough.

.4 Cut opening in the trough to receive the downpipes.

.5 Install the trough and snap in to the supports (no exposed screws or nails permitted). Install elbows and tees as required. Provide for expansion joints to prevent warping where required.

.6 Install aluminum downpipes and provide goosenecks back to wall. Secure downpipes to wall with straps at 1,200 mm o.c. designed to match the pipe profile and fasten to building with aluminum or stainless steel screws, minimum 2 straps per downspout.

.7 Install splash pans at end of down pipes spilling out on roof. Seal joint between splash pan and roofing with plastic cement

.8 Install splash pads at end of down pipes spilling out to grade as indicated.

.9 When Work is completed, provide a water test to ensure there are no leaks and that all the water runs from the trough.

3.2 CLEANING

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

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA B272-93 - Prefabricated Self-Sealing Roof Vent Flashings]

.2 CRCA (Canadian Roofing Contractors Association)

.3 NRCA (National Roofing Contractors Association)

.4 SPRI (Single Ply Roofing Institute)

.5 CUFCA (Canadian Urethane Foam Contractor's Association) and CGSB-51-GP 46MP Manual for "Installers of Spray Polyurethane Foam Thermal Insulation" and ASTM C1029-90 "Spray Applied Rigid Cellular Polyurethane Thermal Insulation"

.6 Canada Green Building Council (CaGBC)

.1 LEED Canada Reference Guide for Green Building Design and Construction 2009

1.2 SUBMITTALS

.1 Manufacturer's descriptive literature for each product, including section or other type details.

.2 Manufacturer's written installation instructions.

.3 Shop drawings and samples, when required, in accordance with Section 01 33 00 – Submittal Procedures.

1.3 QUALITY ASSURANCE

.1 Roof accessories manufacturer to have minimum 5 years documented experience in the design and fabrication of roofing specialties and accessories.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 00 – Cleaning & Waste Management.

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

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

.4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.

.5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

1.5 WARRANTY

.1 Warrant products installed under this section of Work to be free of leaks, condensation and defects in materials and/or manufacture for a period of 20 years when installed in accordance with the manufacturer's written instructions.

Part 2 Products

2.1 ACCEPTABLE MANUFACTURER

.1 Provide products as manufactured by Thaler Metal Industries, 1-800-387-7217 Mississauga, Ontario, Canada (or approved equal in accordance with B7).

.1 20 year warranty against leaks, condensation and defects in materials and/or manufacture, as applicable;

.2 Compliance with CSA B272-93 (Prefabricated Self-Sealing Roof Vent Flashings)

.3 Air barrier design using EPDM seals only;

.4 Maintenance free design;

.5 Materials and sizes options, and thickness;

.6 Injection molded urethane insulation to CGSB-51-GP 46MP and ASTM C1029-90, as applicable;

.7 Treated deck flange, as applicable;

.8 Written installation instructions.

2.2 MANUFACTURED UNITS

.1 Removable Cap STACK JACK Flashing (Insulated)

.1 Vent stack flashing:

.1 Thaler SJ-27-A, 18" (457 mm) high Removable Cap STACK JACK Flashing (Insulated);

.1 .064" (1.6 mm) mill finish 1100-0T alloy aluminum

.2 Diameter sizes to suit, see Mechanical. Confirm with Contract Administrator prior to ordering.

.3 To CSA B272-93

.4 With removable cap, pre-molded urethane insulation liner, and EPDM Base Seal;

.5 PVC coated deck flange

.6 SS vandal proof cap.

2.3 SUBSTITUTIONS

.1 Refer to Section B7 – Substitutes of Bid Opportunity 668-2017.

Part 3 Execution

3.1 EXAMINATION

.1 Report to the Contractor in writing, defects of Work prepared by other trades and other unsatisfactory Site conditions.

.2 Verify Site dimensions.

.3 Commencement of Work will imply acceptance of prepared Work.

3.2 INSTALLATION

.1 Install flashing in accordance with manufacturer's printed instructions.

.2 Torch membrane until bitumen is fluid and set flange into fluid. Flash in flange with two overlapping layers of ModBit and seal with asphalt sealer. Do not overheat (melt) EPDM Base Seal.

3.3 FIELD QUALITY CONTROL

.1 Comply with the requirements of Section 01 45 00 - Quality Control.

3.4 ADJUSTING

.1 Verify that all manufactured units have been installed in accordance with specifications and details, and will function as intended. Adjust any items where necessary to ensure proper operation.

3.5 CLEANING

.1 Clean manufactured units using materials and methods approved by manufacturer. Do not use cleaners or techniques which could impair performance of the roofing system.

END OF SECTION

Part 1 **DESCRIPTION: This Section specifies specific construction consisting of any device intended to close off an opening or penetration during a fire and/or materials that fill an opening in a wall or floor assembly where penetration is by cables, cable trays, conduits, ducts, pipes and any poke through termination device, such as electrical outlet boxes along with their means of support through the wall or the floor opening and is intended to be used in specifications for buildings conforming to Part 3 and Part 9 of NBC.**

Part 2 **General**

2.1 **REFERENCES**

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC)

.1 ULC-S115-1995, Fire Tests of Fire stop Systems.

1.1 **REFERENCES**

.1 Test Requirements: CAN/ULC-S115-11, "Standard Method of Fire Tests of Through Penetration Fire Stops".

.2 Underwriters Laboratories of Canada (ULC) of Scarborough runs CAN/ULC-S115-11 under their designation of ULC-S115-11 and publishes the results in their "FIRE RESISTANCE RATINGS DIRECTORY" that is updated annually.

Underwriters Laboratories (UL) of Northbrook, IL runs ASTM E-814 under their designation of UL 1479 and publishes the results in their "FIRE RESISTANCE DIRECTORY" that is updated annually. UL tests that meet the requirements of ULC-S115-M are given a cUL listing and are published by UL in their “Products Certified for Canada (cUL) Directory.

Omega Point Laboratories runs ASTM E-814 and publishes the results annually in their “Omega Point Laboratories Directory”

.3 Test Requirements: UL 2079, “Tests for Fire Resistance of Building Joint Systems”. These test requirements provide more guidelines for testing moving joints than that given in CAN4-S115-M. UL tests that meet the requirements of ULC-S115-M are given a cUL listing and are published by UL in their “Products Certified for Canada (cUL) Directory

.4 Inspection Requirements: ASTM E 2174, “Standard Practice for On-site Inspection of Installed Fire Stops.”

.5 Test Requirements: ASTM E 2307, “Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus”

.6 International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments

.7 CAN/ULC-S102-M, Standard Test Method for Surface Burning Characteristics of Building Materials.

.8 All major building codes: NBC, OBC, BCBC, and ABC.

.9 NFPA 101 - Life Safety Code

.10 Canadian Electrical Code

2.2 SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets.

.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 Engineering judgment

.1 Manufacturer's engineering judgment identification number and drawing details when no ULC or cUL system is available for an application. Engineered judgment must include both project name and contractor’s name who will install firestop system as described in drawing.

2.3 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer: company specializing in fire stopping installations with 5 years documented experience approved by manufacturer.

.2 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section 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 QUALITY ASSURANCE

.1 A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.

.2 Firestop System installation must meet requirements of CAN/ULC-S115-11 or UL 2079 tested assemblies that provide a fire rating as shown in Section 2.03 Clauses P, Q & R below.

.3 Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.

.4 Firestop Systems do not re-establish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.

.5 For those firestop applications that exist for which no ULC or cUL tested system is available through a manufacturer, a manufacturer's engineering judgment derived from similar ULC or cUL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council.

2.4 INSTALLER QUALIFICATIONS

.1 Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having the necessary training to install manufacture’s products per specified requirements. A supplier’s willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

.2 The work is to be installed by a contractor with at least one of the following qualifications:

.1 FM 4991 Approved Contractor
.2 UL Approved Contractor
.3 Hilti Accredited Fire Stop Specialty Contractor

.3 Installer shall have not less than 3 years experience with fire stop installation.

2.5 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.

Part 3 Products

3.1 MATERIALS

.1 Use only firestop products that have been ULC or cUL tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements and fire-rating involved for each separate instance.

.2 Fire stopping and smoke seal systems: in accordance with CAN-S115.

.1 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN-S115 and not to exceed opening sizes for which they are intended.

.2 Firestop system rating: as indicated on drawings.

.3 Service penetration assemblies: certified and tested by ULC or cUL in accordance with CAN-S115.

.4 Service penetration firestop components: certified and tested by ULC or cUL in accordance with CAN-S115.

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

.6 Non-curing, re-penetrable intumescent sealants, caulking or putty material for use with flexible cables or cable bundles.

.7 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal. Consult with Contract Administrator and damper manufacturer prior to installation ULC or cUL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.

.8 Intumescent sealants or caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe. No silicone based firestop are allowed to be applied on plastic pipes.

.9 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

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

.11 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.

.12 Sealants for vertical joints: non-sagging.

PART 2 PRODUCTS

3.2 FIRESTOPPING, GENERAL

.1 Provide fire stopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the fire stopping under conditions of service and application, as demonstrated by the fire stopping manufacturer based on testing and field experience.

.2 Provide components for each fire stopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

.3 Fire stopping Materials are either “cast-in-place” (integral with concrete placement) or “post installed.” Provide cast-in-place fire stop devices prior to concrete placement.

.4 Penetrations in Smoke Barriers: Provide fire stopping with ratings determined in accordance with ULC S115.

.1 L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at both ambient and elevated temperatures.

.5 Mold Resistance: Provide penetration fire stoppping with mold and mildew resistance rating of 0 as determined by ASTM G21.

3.3 ACCEPTABLE MANUFACTURERS

.1 Subject to compliance with through penetration firestop systems and joint systems listed in the U.L.C Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory, provide products of the following manufacturers as identified below:

.1 Hilti (Canada) Corporation, Mississauga, Ontario
1-800-363-4458
www.hilti.ca

3.4 SUBSTITUTIONS

.1 Refer to Section B7 – Substitutes of Bid Opportunity 668 - 2017

3.5 MATERIALS

.1 Use only firestop products that have been ULC or cUL tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

.2 Pre-Installed firestop devices for use with non-combustible and combustible pipes (closed and open systems), conduit and/or cable bundles penetrating concrete floors and/or gypsum walls, the following products are acceptable:

.1 Hilti Cast-In Place Firestop Device (CP 680-P)

.1 Add Aerator Adaptor when used in conjunction with aerator system.

.2 Hilti Tub Box Kit (CP 681) for use with tub installations.

.3 Hilti Cast-In Place Firestop Device (CP 680-M) for use with non-combustible penetrants.

.4 Hilti Speed Sleeve (CP 653) for use with cable penetrations.

.5 Hilti Firestop Drop-In Device (CFS-DID) for use with non-combustible and combustible penetrants.

.6 Hilti Firestop Block (CFS-BL)

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.3 Re-penetrable, round cable management devices for use with new or existing cable bundles penetrating gypsum or masonry walls, the following products are acceptable:

.1 Hilti Speed Sleeve (CP 653) with integrated smoke seal fabric membrane.
.2 Hilti Firestop Sleeve (CFS-SL SK)
.3 Hilti Retrofit Sleeve (CFS-SL RK) for use with existing cable bundles.
.4 Hilti Gangplate (CFS-SL GP) for use with multiple cable management devices.
.5 Hilti Gangplate Cap (CFS-SL GP CAP) for use at blank openings in gangplate for future penetrations.

.4 Sealants or caulking materials for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:

.1 Hilti Intumescent Firestop Sealant (FS-ONE MAX)
.2 Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
.3 Hilti Fire Foam (CP 620)
.4 Hilti Flexible Firestop Sealant (CP 606)
.5 Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)

.5 Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:

.1 Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
.2 Hilti Flexible Firestop Sealant (CP 606)
.3 Hilti Intumescent Firestop Sealant (FS-ONE MAX)
.4 Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)

.6 Sealants, caulking or spray materials for use with fire-rated construction joints and other gaps, the following products are acceptable:

.1 Hilti Firestop Joint Spray (CFS-SP WB)
.2 Hilti Firestop Silicone Joint Spray (CFS-SP SIL)
.3 Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
.4 Hilti Flexible Firestop Sealant (CP 606)

.5 Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)

.7 Pre-formed mineral wool designed to fit flutes of metal profile deck; as backer for spray material.

1. Hilti Speed Plugs (CP 777)
2. Hilti Speed Strips (CP 767)

.8 Intumescent sealants or caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:

1. Hilti Intumescent Firestop Sealant (FS-ONE MAX)

.9 Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:

.1 Hilti Intumescent Firestop Sealant (FS-ONE)
.2 Hilti Fire Foam (CP 620)
.3 Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
.4 Hilti Flexible Firestop Sealant (CP 606)

.10 Non curing, re-penetrable intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:

.1 Hilti Firestop Putty Stick (CP 618)
.2 Hilti Firestop Plug (CFS-PL)

.11 Wall opening protective materials for use with cUL. / ULC listed metallic and specified non-metallic outlet boxes, the following products are acceptable:

.1 Hilti Firestop Putty Pad (CP 617)
.2 Hilti Firestop Box Insert

.12 Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems) tested to 50 Pa. differential, the following products are acceptable:

.1 Hilti Firestop Collar (CP 643N)
.2 Hilti Firestop Collar (CP 644)
.3 Hilti Wrap Strips (CP 648E/648S)

.13 Materials used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:

.1 Hilti Firestop Mortar (CP 637)
.2 Hilti Firestop Block (CFS-BL)
.3 Hilti Fire Foam (CP 620)
.4 Hilti Firestop Board (CP 675T)

.14 Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:

.1 Hilti Firestop Block (CFS-BL)
.2 Hilti Firestop Board (CP 675T)

.15 Sealants or caulking materials used for openings between structurally separate sections of wall and floors, the following products are acceptable:

.1 Hilti Firestop Joint Spray (CFS-SP WB)
.2 Hilti Elastomeric Firestop Sealant (CP 601S)
.3 Hilti Flexible Firestop Sealant (CP 606)
.4 Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)

.16 For blank openings made in fire-rated wall or floor assemblies, where future penetration of pipes, conduits, or cables is expected, the following products are acceptable:

.1 Hilti (CFS-BL) Firestop Block (for walls and floors)
.2 Hilti (CFS-PL) Firestop Plug (for walls and floors)
.3 Hilti (CP 680) Cast-In Place Firestop Device (for floors only)

.17 For penetrations through a Fire Separation wall provide a firestop system with a "F" Rating as determined by ULC or cUL as indicated below:

Fire Resistance Rating of Separation	Required ULC or cUL "F" Rating of Firestopping Assembly
30 minutes	20 minutes
45 minutes	45 minutes
1 hour	45 minutes
1.5 hours	1 hour
2 hours	1.5 hours
3 hours	2 hours
4 hours	3 hours

For combustible pipe penetrations through a Fire Separation provide a firestop system with a "F" Rating as determined by ULC or cUL which is equal to the fire resistance rating of the construction being penetrated.

.18 For penetrations through a Fire Wall or horizontal Fire Separation provide a firestop system with a "FT" Rating as determined by ULC or cUL which is equal to the fire resistance rating of the construction being penetrated.

.19 Provide a firestop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction joint assembly.

3.6 ACCEPTABLE FIRESTOP CONTRACTORS

.1 National Firestop Ltd.

405 Gunn Road, PO Box 16 Grp 514 RR5
Winnipeg, Manitoba R2C 2Z2
Phone: (204) 777-0100

.2 Total Fire Stop Systems Ltd.

Box 464
Stony Mountain, Manitoba R0C 3A0
Phone: (204) 344-5696

.3 Secure Firestop.

B-580 Dobbie Avenue,
Winnipeg, Manitoba R2K 1G4
Phone: (204) 667-8859

.4 Western Construction Services Ltd.

300 Dawson Road North,
Winnipeg, Manitoba R2J 0S7
Phone: (204) 956-9475

Part 4 Execution

4.1 MANUFACTURER'S INSTRUCTIONS

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

4.2 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.

4.3 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.

4.4 SEQUENCES OF OPERATION

.1 Proceed with installation only when submittals have been reviewed by Contract Administrator.

4.5 FIELD QUALITY CONTROL

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

4.6 IDENTIFICATION & DOCUMENTATION

.1 The firestop contractor is to supply documentation for each single application addressed. This documentation is to identify each penetration and joint location on the entire project.

.1 The Documentation Form for through penetrations is to include:

.1 A Sequential Location Number
.2 The Project Name
.3 Date of Installation
.4 Detailed description of the penetrations location
.5 Tested System or Engineered Judgment Number
.6 Type of assembly penetrated
.7 A detailed description of the size and type of penetrating item
.8 Size of opening
.9 Number of sides of assemblies addressed
.10 Hourly rating to be achieved
.11 Installers Name

.2 The Documentation Form for Construction Joints is to include:

1. A Sequential Location Number
2. The Project Name
3. Date of Installation
4. Detailed description of the Construction Joints location
5. Tested System or Engineered Judgment Number
6. Type of Construction Joint
7. The Width of the Joint
8. The Lineal Footage of the Joint
9. Number of sides addressed
10. Hourly rating to be achieved
11. Installers Name

.1 Copies of these documents are to be provided to the general contractor at the completion of the project.

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

.1 The words: "Warning -Through Penetration Firestop System-Do Not Disturb. Notify Building Management of Any Damage."
.2 Contractor's Name, address, and phone number.
.3 Through-Penetration firestop system designation of applicable testing and inspecting agency.
.4 Date of Installation.
.5 Through-Penetration firestop system manufacturer's name.
.6 Installer's Name.

4.7 CLEANING

.1 Proceed in accordance with Section 01 74 00 – Cleaning and Waste Management.

.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.

4.8 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 Rigid ducts: greater than 129 cm^2: 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 RELATED SECTIONS

.1 Section 01 35 20 – Leadership in Energy and Environmental Design Sustainable Requirements.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

.1 ASTM C919, Standard Practice for Use of Sealants in Acoustical Applications.

.2 Canadian General Standards Board (CGSB)

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

.3 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act (CEPA).

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.5 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act (TDGA).

.6 Canada Green Building Council (CaGBC)

.1 LEED Canada Reference Guide for Green Building Design and Construction 2009

1.3 SUBMITTALS

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

.1 Submit WHIMIS MSDS – Material Safety Data Sheets in accordance with Section 01 33 00 Submittal Procedures - Shop Drawings, Product Data, and Samples, with the VOC levels highlighted.

.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.

1.4 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 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.

1.6 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

.1 Meet the requirements per Section 01 35 20 Leadership in Energy and Environmental Design – Sustainable Requirements.

.1 Adhesives and sealants must conform to following standard:

.1 State of California’s South Coast Air Quality Management District (SCAQMD) Rule #1168, June 2006.

.2 The VOC content of the adhesives, sealants, and sealant primers used must be less than the VOC content limits of the State of California’s South Coast Air Quality Management District (SCAQMD) Rule #1168 (effective date of January 2007). The following are the VOC limits from Rule 1168:

.1 Architectural Sealants – 250 g/L

.2 Non-membrane Roof Sealant – 300 g/L

.3 Roadway – 250 g/L

.4 Other Sealants – 420 g/L

.5 Non-porous Architectural Sealant Primer – 250 g/L

.6 Porous Architectural Sealant Primer – 775 g/L

.7 Modified Bituminous Sealant Primer – 500 g/L

.8 Other Sealant Primer – 750 g/L

.9 Indoor Carpet and Carpet Pad Adhesives – 50 g/L

.10 Wood Flooring Adhesives – 100 g/L

.11 Rubber Floor Adhesives – 60 g/L

.12 Subfloor Adhesives – 50 g/L

.13 Ceramic Tile Adhesives – 65 g/L

.14 VCT and Asphalt Tile Adhesives – 50 g/L

.15 Gypsum Board and Panel Adhesives – 50 g/L
.16 Cove Base Adhesive – 50 g/L
.17 Multipurpose Construction Adhesives – 70 g/L
.18 Structural Glazing Adhesive – 100 g/L
.19 PVC Welding – 510 g/L
.20 CPVC Welding – 490 g/L
.21 ABS Welding – 325 g/L
.22 Plastic Cement Welding – 250 g/L
.23 Adhesive Primer for Plastic – 550 g/L
.24 Contact Adhesive – 80 g/L
.25 Special Purpose Contact Adhesive – 250 g/L
.26 Structural Wood Member Adhesive – 140 g/L
.27 Sheet Applied Rubber Lining Operations – 850 g/L
.28 Top and Trim Adhesive – 250 g/L
.29 Metal to Metal Adhesive – 30 g/L
.30 Plastic Foams Adhesive – 50 g/L
.31 Porous Material Adhesive (except wood) – 50 g/L
.32 Wood Adhesive – 30 g/L
.33 Fiberglass Adhesive – 80 g/L
.34 Duct Sealants – 250 g/L

.3 Laminate Adhesives must contain no urea-formaldehyde.

1.7 QUALITY ASSURANCE

.1 Perform the Work by experienced and skilled mechanics thoroughly trained and competent in the use of caulking and sealing equipment and the specified materials with at least five years experience.

.2 Arrange with the caulking and sealant manufacturers for a visit at the job Site by one of their technical representatives before beginning the caulking and sealing installation to discuss with the Contractor and the Contract Administrator the procedures to be adopted, to analyse Site conditions and inspect the surfaces and joints to be sealed, in order that type of sealant recommendations may be made for typical joint configuration.

.3 Discuss the following items and provide a written report indicating:

.1 Sealants and caulking materials selected for use from those specified;
.2 Surface preparation requirements;
.3 Priming and application procedures;
.4 Verification that sealants and caulking are suitable for purposes intended and joint design;
.5 Sealants and caulkings are compatible with other materials and products with which they come in contact including but not limited to sealants provided under other Sections, insulation adhesives, bitumens, block, concrete, metals and metal finishes.
.6 Verification that sealant and caulking are suitable for temperature and humidity conditions at time of application and will not stain adjacent surfaces;
.7 Recommended sealant for each type of joint configuration;
.8 Joint design;
.9 Anticipated frequency and extent of joint movement.

.10 Number of beads to be used in the sealing operation;

.11 Suitability of durometer hardness and other properties of material to be used.

.12 Weather conditions under which Work will be done.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 00 – Cleaning & Waste Management.

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

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

.4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.

.5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

Part 2 Products

2.1 SEALANT MATERIALS

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

.2 When low toxicity caulks are not possible, confine usage to areas which off-gas to the exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.

.3 Sealants and Caulking compounds must:

.1 Meet or exceed all applicable governmental and industrial safety and performance standards; and

.2 Be manufactured and transported in such a manner that all steps fo the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the Fisheries Act and the Canadian Environmental Protection Act (CEPA).

.4 Sealant and caulking compounds must not be formulated or manufactured with: aromatic solvents, fibrous talc or asbestos, formaldehyde, halogenated solvents, mecury, lead, cadium, hexavalent chromium, barium or their compounds, except barium sulphate.

.5 Sealant and caulking compounds must no contain a total of volatile organic compound (VOC's) in excess of 5% by height as calculated from records of the amounts of constituents used to make the product.

.6 Sealant and caulking compounds must be accompanied by detailed instructions for proper application so as to minimize health concerns and maximize performance, and information describing proper disposal methods.

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

.8 When low toxicity caulks are not possible, confine usage to areas which off-gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.

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

.10 Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Urethanes One Part.

.1 Non-Sag to CAN/CGSB-19.13, Type 2.

.2 Silicones One Part.

.1 To CAN/CGSB-19.13, mildew resistant.

.3 Acoustical Sealant.

.1 To ASTM C919.

.4 Preformed Compressible and Non-Compressible back-up materials.

.1 Polyethylene, Urethane, Neoprene or Vinyl Foam.

.1 Extruded closed cell foam backer rod.

.2 Size: oversize 30 to 50 %.

.2 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/m^3 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, Sealant type CAN/CGSB- 19.13.

.2 Expansion and control joints in exterior surfaces of poured-in-place concrete walls: Sealant type CAN/CGSB – 19.13.

.3 Control and expansion joints in exterior surfaces of unit masonry walls: Sealant type: CAN/CGSB – 19.13.

.4 Seal interior perimeters of exterior openings as detailed on drawings: Sealant type: CAN/CGSB – 19.13.

.5 Control and expansion joints on the interior of exterior surfaces of unit masonry walls. Sealant Type CAN/CGSB -19.13.

.6 Interior control and expansion joints in floor surfaces: Sealant type CAN/CGSB -19.13.

.7 Perimeters of interior frames, as detailed and itemized: Sealant type CAN/CGSB -19.13.

.8 Interior masonry vertical control joints (block-to-block, block-to-concrete, and intersecting masonry walls): Sealant type CAN/CGSB -19.13.

.9 Perimeter of bath fixtures (e.g. sinks, tubs, urinals, stools, waterclosets, basins, vanities, counters, plastic laminate and adjacent wall finish, etc.): Sealant type CAN/CGSB – 19.13, mildew resistant.

.10 Exposed interior control joints in drywall: Sealant type: CAN/CGSB -19.13.

.11 Acoustical Sealant ASTM C919.

2.4 JOINT CLEANER

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

.2 Primer: as recommended by manufacturer.

Part 3 Execution

3.1 PROTECTION

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

3.2 SURFACE PREPARATION

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

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

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

.4 Ensure joint surfaces are dry and frost free.

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

3.3 PRIMING

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

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

3.4 BACKUP MATERIAL

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

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

3.5 MIXING

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

3.6 APPLICATION

.1 Sealant.

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

.2 Curing.

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

.3 Cleanup.

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

END OF SECTION