Part 1 General

1.1 SECTION INCLUDES

.1 Cold applied asphalt bitumen dampproofing.

1.2 RELATED SECTIONS

.1 Structural Specifications

.2 Section 07 21 13 – Board, & Semi-Rigid Insulation.

1.3 REFERENCES

.1 ASTM D41-05 - Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.

.2 ASTM D449-03(2008) - Asphalt Used in Dampproofing and Waterproofing.

.3 ASTM D1227-95(2007) - Emulsified Asphalt Used as a Protective Coating for Roofing.

.4 ASTM D1187-97(2002)e1 - Test Method for Asphalt-Base Emulsions for Use as Protective Coatings for Metal.

.5 ASTM D4479-07 - Asphalt Roof Coatings - Asbestos-Free

.6 ASTM D4586-07 - Asphalt Roof Cement, Asbestos-Free

.7 CGSB-37-GP-9Ma-83 - Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.

.8 CAN/CSA-A123.4-04 (R2008) - Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems

.9 NRCA (National Roofing Contractors Association - USA) - Roofing and Waterproofing Manual.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Submission procedures.

.2 Product Data: Provide properties of primer, bitumen, and mastics.

1.5 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Submission procedures.

.2 Installation Data: Manufacturer's special installation requirements indicating special procedures and perimeter conditions requiring special attention.

1.6 QUALITY ASSURANCE

.1 Perform Work in accordance with NRCA Waterproofing Manual.

.2 Applicator Qualifications: Company specializing in performing the work of this section with minimum three (3) years documented experience and approved by the manufacturer.

1.7 ENVIRONMENTAL REQUIREMENTS

.1 Do not proceed with work when wind chill or temperature would adversely effect the bitumen products before proper curing takes place.

.2 Do not apply dampproofing in wet weather.

Part 2 Products

2.1 MANUFACTURERS

.1 Bakor; Product: 710-11 Bituminous Dampproofing, or approved equal in accordance to B7.

2.2 ASPHALTIC MATERIALS

.1 Asphalt: CAN/CSA-A123.4 ASTM 449, Type I.

.1 Solvent-Based Asphalt Mastics: Cold-applied, asbestos-free, non-fibered asphalt compounds for exterior concrete surfaces below grade.

.2 Asphalt Primer: CGSB-37-GP-9Ma, ASTM D41 Type 1, compatible with substrate.

.3 Sealing Mastic: ASTM D4586, asbestos-free asphalt cement for trowel application.

2.3 ACCESSORIES

.1 Protection Board: Rigid insulation specified in Section 07 21 13 - Board & Semi Rigid Insulation.

Part 3 Execution

3.1 EXAMINATION

.1 Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing system.

.2 Verify items which penetrate surfaces to receive dampproofing are securely installed.

3.2 PREPARATION

.1 Protect adjacent surfaces not designated to receive dampproofing.

.2 Clean and prepare surfaces to receive dampproofing to manufacturer's written instructions.

.3 Do not apply dampproofing to surfaces unacceptable to manufacturer or applicator.

.4 Apply mastic to seal penetrations, small cracks, or minor honeycomb in substrate.

3.3 APPLICATION

.1 Prime surfaces to manufacturer's instructions.

.2 Apply bitumen dampproofing with mop, roller, or by spray application in accordance with manufacturer’s instructions best suited for Site application.

.3 Before applying dampproofing, seal cracks and holes around pipes and other services using sealing compound applied in accordance with manufacturer's instructions.

.4 Apply bitumen continuous and uniform, at a rate of 1.5 L/sq m (3.6 gal/100 sq ft), to provide a minimum thickness of 3 mm (1/8 inch).

.5 Apply from 50 mm (2 inches) below finish grade elevation to bottom of grade beams.

.6 Apply two additional coats to all vertical corners and construction joints for a minimum width of 225mm (10 inches) of each side and all around and for 225mm (10 inches) along pipe passing through walls.

.7 Seal items projecting through dampproofing surface with mastic. Seal watertight.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Board insulation at roof and exterior cavity wall construction, and perimeter foundation wall.

.2 Board insulation where indicated on Drawings.

1.2 RELATED SECTIONS

.1 Structural Specifications

.2 Section 04 22 00 – Concrete Unit Masonry.

.3 Section 05 41 00 – Structural Lightweight Framing

.4 Section 06 10 00 – Rough Carpentry

.5 Section 07 26 00 - Vapour Retarders: Vapour retarder materials to adjacent insulation.

.6 Section 07 52 00 - Modified Bituminous Membrane Roofing.

1.3 REFERENCES

.1 ASTM C208-08a - Cellulosic Fibre, Insulating Board.

.2 ASTM C552-07 - Cellular Glass Thermal Insulation.

.3 ASTM C578-09e1 - Rigid, Cellular Polystyrene Thermal Insulation.

.4 ASTM C591-09 - Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation.

.5 ASTM C612-09 - Mineral Fibre Block and Board Thermal Insulation.

.6 ASTM C1126-04 - Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation.

.7 ASTM C1289-08e1 - Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

.8 ASTM E84-09c - Test Method for Surface Burning Characteristics of Building Materials.

.9 ASTM E96/E96M-05 - Test Methods for Water Vapor Transmission of Materials.

.10 ASTM D 1621 - Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.

.11 CAN/ULC-S102-07 - Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

.12 CAN/ULC-S701-05 - Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.13 CAN/ULC-S702-09 - Thermal Insulation, Mineral Fibre, for Buildings.

.14 CAN/ULC-S703-09 - Cellulose Fibre Insulation (CFI) for Buildings.

.15 CAN/ULC-S704-03 - Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

.16 CAN/ULC-S706-09 - Wood Fibre Thermal Insulation for Buildings.

1.4 SYSTEM DESCRIPTION

.1 Materials of This Section: Provide continuity of thermal barrier at building enclosure elements in conjunction with thermal insulating materials in Section 07 21 19.

.2 Materials of This Section: Provide thermal protection to vapour retarder in conjunction with vapour retarder materials in Section 07 26 00.

.3 Materials of This Section: Provide thermal protection to air seal materials at building enclosure elements in conjunction with air barrier materials.

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Coordinate with other work having a direct bearing on work of this section.

.2 Coordinate the work with Section 04 22 00 for installation of vapour retarder.

.3 Coordinate the work with Section 07 52 00 for the installation of Modified Bitumen Membrane Roofing.

1.6 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Submission procedures.

.2 Product Data: Provide data on product characteristics, performance criteria, and limitations.

1.7 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Submission procedures.

1.8 CLOSEOUT SUBMITTALS

.1 Section 01 78 00: Closeout Procedures.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

Part 2 Products

2.1 INSULATION MATERIALS

.1 Extruded Polystyrene Insulation (XPS) **(below grade)**: CAN/ULC-S701, Type 4; cellular type, conforming to the following:

.1 Thermal Resistance @ 24ºC: RSI-0.87 (R-5.0).

.2 Board Thickness: as indicated on Drawings.

.3 Board Edges: Butt edges.

.4 Flame/Smoke Properties: to CAN/ULC-S102.

.5 Product: Styrofoam SM, manufactured by Dow.

.2 Extruded Polystyrene Insulation **(sloped metal roof)**: CAN/ULC-S701, cellular type, conforming to the following:

.1 Thermal Resistance @ 24ºC: RSI-0.87 (R-5.0).

.2 Board Thickness: as indicated on Drawings.

.3 Board Edges: Butt edges.

.4 Flame/Smoke Properties: to CAN/ULC-S102.

.5 Product: Styrofoam Deckmate, manufactured by Dow.

.3 Concrete Faced Insulated Wall Panels: Extruded polystyrene to CAN/ULC-S701-05, Type 4, rigid, closed cell type 4, with 8mm cement facing applied in factory. Thermal resistance aged RSI value of 0.88/25mm (R-5).

.1 Standard of Acceptance:

.1 Tech-Crete: CFI

.4 Semi-rigid mineral Fibre Insulation **(exterior walls)**: CAN/ULC-S702 Type 1 ASTM C612 Type 1VB, non-combustible, water repellent, semi-rigid board, with the following characteristics:

.1 Board Density: 64 kg/cu m (4.0 lb/cu ft).

.2 Thermal Resistance: RSI value/25.4 mm at 24 º C: 0.76 m^2K/W to ASTM C518.

.3 Thickness: As shown on Drawings.

.4 Facing: Unfaced.

.5 Board Edges: Square.

.6 Flame/Smoke Properties: In accordance with CAN/ULC-S102.

.1 Flame spread: 0.

.2 Smoke developed: 5

.7 Standard of Acceptance:

.1 Cavityrock DD; manufactured by Roxul

.5 Acoustical Sound Insulation: Semi-rigid, non-combustible mineral fibre batt insulation, type 1 compliant.

.1 Acoustical Performance: NRC 0.7

.2 Thickness: As shown on Drawings.

.3 Standard of Acceptance:

.1 Roxul AFB

.6 Roof Insulation **(flat roof areas)**:

.1 Refer to Section 07 52 00 - Modified Bituminous Membrane Roofing

2.2 ADHESIVE MATERIALS

.1 Adhesive Type 1: Type recommended by insulation manufacturer for application.

2.3 ACCESSORIES

.1 Sheet Vapour Retarder: Specified in Section 07 26 00.

.2 Tape: Polyethylene self-adhering type, mesh reinforced, 50 mm (2 inch) wide.

.3 Insulation Fasteners: Impaling clip of galvanized steel with washer retainer, to be mechanically fastened to surface to receive board insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

Part 3 Execution

3.1 EXAMINATION

.1 Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive.

.2 Verify substrate surface is flat, free of honeycomb, fins, irregularities and materials or substances that may impede adhesive bond.

3.2 INSTALLATION – ACOUSTIC INSULATION

.1 Refer to Drawings.

3.3 INSTALLATION - FOUNDATION PERIMETER

.1 Install rigid insulation on concrete foundation walls and concrete grade beams using H40 Hilti gun X-1E 6 –50min D152 washer/ fastener spaced 600mm (24”) vertically and horizontally or with purpose made multi-clinch metal strip c/w Gripcon® nail. Set metal strip flush into cut rigid insulation at 600mm (24”) spacing.

.2 Install boards on foundation wall and grade beam perimeter, as best suited to maintain thermal continuity.

.1 Place boards in a method to maximize contact bedding.

.2 Stagger side/ end joints.

.3 Butt edges and ends tight to adjacent board and to protrusions.

.3 Cut and fit insulation tight to protrusions or interruptions to the insulation plane.

3.4 INSTALLATION - EXTERIOR WALLS

.1 Apply adhesive in three (3) continuous beads per board length.

.2 Install boards on wall surface, vertically. Place membrane surface of insulation against adhesive.

.3 Place boards in a method to maximize contact bedding. Stagger end joints. Butt edges and ends tight to adjacent board and to protrusions.

.4 Cut and fit insulation tight to protrusions or interruptions to the insulation plane.

.5 Tape insulation board joints.

3.5 PROTECTION OF FINISHED WORK

.1 Section 01 78 40: MAINTENANCE REQUIREMENTS.

.2 Do not permit work to be damaged prior to covering insulation.

END OF SECTION

1.1 SECTION INCLUDES

.1 Foamed-in-place insulation in roof assembly and at exterior wall crevices requiring a thermal seal.

.2 Foamed-in-place insulation at junctions of dissimilar wall and roof materials to achieve a thermal and air seal.

1.2 RELATED SECTIONS.

.1 Section 07 21 13 – Board & Semi Rigid Insulation

.2 Section 07 26 00 - Vapour Retarders

.3 Section 07 52 00 - Modified Bituminous Membrane Roofing

.4 Structural Specifications

1.3 REFERENCES

.1 ASTM C1029-09 - Spray-Applied Rigid Cellular Polyurethane Thermal Insulation.

.2 ASTM E84-09c - Test Method for Surface Burning Characteristics of Building Materials.

.3 CAN/ULC-S102-07 - Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

.4 CAN/ULC-S705.1-01 - Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Material - Specification.

.5 CAN/ULC-S705.2-05 - Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density, Installer's Responsibilities - Specification.

.6 The Canadian Urethane Foam Contractors Association (CUFCA).

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Coordinate with other work having a direct bearing on work of this section.

.2 Coordinate work to ensure timely placement of insulation within construction spaces.

1.5 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.

.2 Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years documented experience, and licensed and certified by the SPF Quality Assurance Program used by CUFCA.

1.6 REGULATORY REQUIREMENTS

.1 Conform to applicable code for flame and smoke and concealment requirements.

1.7 ENVIRONMENTAL REQUIREMENTS

.1 Do not install insulation when ambient temperature is lower than 21 degrees C (70 degrees F).

Part 2 Products

2.1 MANUFACTURERS

.1 Acceptable manufacturers offering functionally and aesthetically equivalent products.

.1 CertainTeed Corp.; Product: CertaSpray Closed Cell Foam.

.2 BASF; Product: WALLTITE.

2.2 MATERIALS

.1 Insulation: Spray-applied rigid cellular polyurethane:

.1 Thermal Resistance: R-5.8 aged.

.2 Compressive Strength (at yield or 10 % deformation): 25 psi.

.3 Water Vapor Permeability, max, 1.4 perm-inches.

.4 Water Absorption (maximum): 2%.

.5 Tensile Strength (minimum): 23 psi.

.6 Closed cell content (minimum): 88%.

.7 Flame Spread (maximum): 500.

2.3 ACCESSORIES

.1 Primer: As required by insulation manufacturer.

Part 3 Execution

3.1 EXAMINATION

.1 Verify work within construction spaces or crevices is complete prior to insulation application.

.2 Verify that surfaces are clean, dry, and free of matter that may inhibit insulation adhesion.

3.2 PREPARATION

.1 Mask and protect adjacent surfaces from over spray or dusting.

.2 Apply primer if required in accordance with manufacturer's written instructions.

3.3 INSTALLATION

.1 Apply insulation to CAN/ULC-S705.2 and manufacturer's written instructions.

.2 Apply insulation by spray method, to a uniform monolithic density without voids.

.3 Apply to a minimum cured thickness as indicated on the Drawings. Ensure minimum thickness is achieve for product to act as a vapour barrier.

.4 Patch damaged areas.

3.4 FIELD QUALITY CONTROL

.1 Section 01 45 00: Field inspection and testing.

.2 Inspection will include verification of insulation thickness.

3.5 PROTECTION OF FINISHED WORK

.1 Section 01 78 40: Protecting installed work.

.2 Do not permit subsequent construction work to disturb applied insulation.

3.6 SCHEDULES

.1 At locations and in thicknesses as indicated on Drawings.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Sheet and sealant materials for controlling vapour diffusion.

1.2 RELATED SECTIONS

.1 Section 04 22 00 – Concrete Unit Masonry.

.2 Section 07 11 13 - Bituminous Dampproofing.

.3 Section 07 21 13 – Board & Semi-Rigid Insulation.

.4 Section 07 21 19 – Foamed-in-Place Insulation.

.5 Section 07 52 00 – Modified Bituminous Membrane Roofing

.6 Section 07 92 00 - Joint Sealants: Sealants.

.7 Section 08 11 00 - Metal Doors and Frames.

1.3 REFERENCES

.1 ASTM C920-08 - Elastomeric Joint Sealants.

.2 ASTM C1311-10 - Solvent Release Sealants.

.3 ASTM E96/E96M-05 - Test Methods for Water Vapour Transmission of Materials.

.4 CGSB-19-GP-14M-1984 - Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.

.5 CAN/CGSB-19.13-M87 - Sealing Compound, One-component, Elastomeric, Chemical Curing.

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

.7 SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.

1.4 DEFINITION

.1 Vapour Retarder: A material or assembly of materials that resists water vapour diffusion through it.

1.5 SYSTEM DESCRIPTION

.1 Materials and installation methods to provide continuity of vapour retarder:

.1 In conjunction with materials described in Section 07 21 13 and 07 21 19.

.2 To seal gaps between enclosure components and opening frames.

1.6 PERFORMANCE REQUIREMENTS

.1 Vapour Permeability (Perm): Maximum water vapour permeance of 57.4 ng/(Pa•s•m^2) (1.0 perm) measured to CAN/CGSB-51.34, CAN/CGSB-51.33, ASTM E96/E96M.

1.7 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate with other work having a direct bearing on work of this section.

.2 Sequencing:

.1 Sequence Work to permit installation of materials in conjunction with other retardant materials and seals , and air barrier assemblies.

.2 Do not install vapour retarder until items penetrating it are in place.

1.8 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Submission procedures.

1.9 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Submission procedures.

.2 Installation Data: Manufacturer's special installation requirements, including preparation and installation requirements, techniques.

1.10 CLOSEOUT SUBMITTALS

.1 Section 01 78 00: Closeout Submittals.

1.11 QUALITY ASSURANCE

.1 Section 01 45 00: Quality Control.

Part 2 Products

2.1 MATERIALS

.1 Sheet Retarder (for Exterior Walls): Self-adhesive rubberized asphalt bonded to sheet polyethylene, regular temperature, nominal total thickness of 1.5 mm.

.1 Product: BAKOR, manufactured by Blue Skin SA (use appropriate grade depending on outdoor air temperatures at time of installation)

.2 Sheet Retarder (for Flat Roof Assembly): refer to Section 07 52 00.

.3 Sheet Retarder (for Sloped Metal Roof Assembly):

.1 Self-adhesive Air/Vapour Barrier: composed of bitumen modified with thermoplastic polymers and high-density polyethylene film. The self-adhesive

underface is covered with a silicone release sheet. Water vapour permeability: 0.92 ng/Pa.s.m2 (0.016 Perm)

.1 Acceptable material:

.1 Sopravap'r by Soprema

.4 Foam-In-Place Seal expansion, spray-applied polyurethane foam insulation. Refer to Section – 07 21 19.

2.2 SEALANTS

.1 Acoustical Sealant: Single component, sound dampering, non-hardening, non-skinning; colour dark grey:

.1 Product: Acoustic Sealant, manufactured by Tremco.

.2 Cleaner: Non-corrosive type; recommended by sealant manufacturer; compatible with adjacent materials.

2.3 ADHESIVES

.1 Mastic Adhesive: asphalt type, compatible with sheet barrier and substrate, thick mastic of uniform consistency.

.2 Adhesive: Compatible with sheet barrier and substrate, permanently non-curing.

2.4 ACCESSORIES

.1 Thinner and Cleaner for Butyl Sheet: As recommended by sheet material manufacturer.

Part 3 Execution

3.1 EXAMINATION

.1 Verify condition of substrate and adjacent materials.

3.2 PREPARATION

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

.2 Clean and prime substrate surfaces to receive adhesive/ sealants in accordance with manufacturers' written instructions.

3.3 INSTALLATION

.1 Install materials to manufacturer's written instructions.

.2 Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges or where compatibility with adjacent materials may be in doubt.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation for wall systems comprising fibre reinforced cementitious composite panel.

.1 Fiber cement panels, furring strips and accessories engineered for climate.

.2 Installation of panels to be done by Section 06 20 00.

.3 Design of supporting z-bar framing indicated in Section 05 41 00.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 05 41 00 - Structural Metal Lightweight Framing

.3 Section 06 10 13 – Wood Blocking and Curbing

.4 Section 07 21 13 - Board, and Semi Rigid Insulation

1.3 REFERENCES

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

.1 ASTM A653/A653M-02a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM E96-00e1, Standard Test Methods for Water Vapour Transmission of Materials.

.3 ASTM C1186 - Standard Specification for Flat Fiber-Cement Sheets

.4 ASTM D3359 - Standard Test Method for Measuring Adhesion by Tape Test, Tool and Tape.

.5 ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.

.2 Department of Justice Canada (Jus).

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

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

.1 Material Safety Data Sheets (MSDS).

.4 National Research Council (NRC).

.5 Underwriters Laboratories' of Canada (ULC).

.1 CAN/ULC-S701-01, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.2 CAN/ULC-S702-1997, Standard for Thermal Insulation, Mineral Fibre, for Buildings.

.3 CAN/ULC-S704-2001, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

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

1.4 DESIGN REQUIREMENTS

.1 Design composite building panel wall to provide for thermal movement of component materials caused by ambient temperature range of Winnipeg, MB without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.

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

.3 Design members to withstand dead load and wind loads as calculated in accordance with NBC and applicable Municipal/Territorial regulations, to maximum allowable deflection of 1/180 of span.

.4 Provide for positive drainage of condensation occurring within wall construction and water entering at joints, to exterior face of wall in accordance with NRC "Rain Screen Principles".

.5 Design wall system to accommodate specified erection tolerances of structure.

.6 Maintain following installation tolerances:

.1 Maximum variation from plane or location shown on approved shop drawings: 10 mm/m of length and up to 20mm/100 m maximum.

.2 Maximum offset from true alignment between two adjacent members abutting end to end, in line: 0.75 mm.

1.5 SHOP DRAWINGS

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

.2 Indicate dimensions, wall openings, head, jamb, sill and mullion detail, materials and finish, anchor details, compliance with design criteria and requirements of related work.

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

.1 Preparation instructions and recommendations.

.2 Storage and handling requirements and recommendations.

.3 Installation methods.

.4 Shop Drawings: Provide detailed drawings of atypical non-standard applications of cementitious siding materials which are outside the scope of the standard details and specifications provided by the manufacturer.

1.6 SAMPLES

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

.2 Submit duplicate 200 x 200 mm samples of wall system, representative of materials, finishes and colours.

1.7 QUALITY ASSURANCE

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

1.8 MOCKUPS

.1 Refer to Section 01 45 00.

.1 Provide site mock-up of Fibre Cement Wall Cladding on exterior of building.

.2 Provide approximate 1200mm wide x actual height of wall, illustrating full boards, trims and fasteners, applied finish and condition at corner.

.3 Include z-bars, insulation and vertical siding c/w battens as part of mock-up.

.4 Include self adhesive air/vapour barrier.

.5 Locate where directed by Contract Administrator.

.6 Approved mock-up may remain as part of the Work if acceptable to Contract Administrator.

.7 If not accepted, make necessary changes for Contract Administrator to review.

1.9 DELIVERY, STORAGE, AND HANDLING

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

.2 Store siding on edge or lay 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.

1.10 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.

1.11 WARRANTY

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

.1 HardiPanel HZ5 vertical siding for 30 years.

.2 HardieTrim HZ and HZ5 boards for 15 years.

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

.4 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.

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

Part 2 Products

2.1 FIBRE REINFORCED CEMENTITIOUS COMPOSITE PANEL

.1 Manufacturers approved to bid the work of this division are:

.1 James Hardie Building Products

.2 Other manufacturers wishing to bid the work of this division shall, if necessary, modify their products to meet this specification, and shall submit to the Contract Administrator for review.

.3 Vertical Siding & Back-up Panel:

.1 HardiePanel HZ5 siding as manufactured by James Hardie Building Products, Inc.

.2 Type: Smooth Vertical siding panel to accommodate panels sizes as per architectural drawings. Supply panels of 4 feet by 10 feet (1219 mm by 2540 mm) as required. Thickness: 8mm (5/16”).

.4 Furring Strips:

.1 HardieTrim HZ5 Batten Boards as manufactured by James Hardie Building Products, Inc.

.2 Size: 19mm (3/4”) x 64mm (2 ½”)

.5 Finishes

.1 Factory primed finish for Siding, Back-up Panel Strips and Furring Strips:

.1 Colour: factory primed and ready for painting. Painting to be done by Section 09 91 99.

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

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

.6 Fasteners

.1 For Panels Products:

.1 Purpose made, colour matched nails fasteners, lengths and sizes to suit application, in accordance to manufacturer’s recommendations. Refer to Drawings for details. Colour matched screw fasteners permitted if allowed by panel manufacturer for installation.

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 Architect 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 if indicated on Drawings.

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

3.3 INSTALLATION - HARDIEPANEL HZ5 VERTICAL SIDING

.1 Refer to Drawings for details.

.2 Install in strict accordance with manufacturer's installation instructions.

.3 Maintain clearance between siding and adjacent finished grade.

.4 Fasten exterior vertical siding through Furring Boards and Back-up Panels into building z-bar framing with purpose made stainless steel screws. Refer to Drawings for spacing.

3.4 INSTALLATION - HARDIEPANEL HZ5 VERTICAL BACK-UP PANELS STRIPS

.1 Refer to Drawings for details.

.2 Install in strict accordance with manufacturer's installation instructions.

.3 Maintain clearance between siding and adjacent finished grade.

.4 Secure to building Z-bar framing with purpose made stainless steel, countersunk screw fasteners. Coordinate fastener locations so they do not interfere with main front siding fastener spacings.

3.5 INSTALLATION - HARDIETRIM HZ5 BOARDS (FURRING STRIPS)

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

.2 Secure to cement fibre back up panel with purpose made stainless steel screw fasteners. Coordinate fasten locations so they do not interfere with main front siding fasteners.

3.6 PROTECTION

.1 Protect installed products until completion of project.

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

3.7 CLEANING

.1 Wash down exposed acrylic exterior surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths.

.2 Wash down exposed aggregate exterior surfaces using fine water spray.

.3 Remove excess sealant with recommended solvent.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Insulation.

.2 Modified bituminous membrane roofing, and flashings.

1.2 RELATED SECTIONS

.1 Section 06 10 13 - Wood Blocking and Curbing: Wood nailers.

.2 Section 07 21 13 – Board & Semi-Rigid Insulation.

.3 Section 07 26 00 – Vapour Retarders

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

.5 Mechanical Divisions.

.6 Electrical Specifications.

1.3 REFERENCES

.1 ASTM C208-08a - Cellulosic Fibre, Insulating Board.

.2 ASTM C552-07 - Cellular Glass Thermal Insulation.

.3 ASTM C578-09e1 - Rigid, Cellular Polystyrene Thermal Insulation.

.4 ASTM C612-09 - Mineral Fiber Block and Board Thermal Insulation.

.5 ASTM C726-05e1 - Mineral Fiber Roof Insulation Board.

.6 ASTM C728-05(2010) - Perlite Thermal Insulation Board.

.7 ASTM C1002-07 - Steel Self-Piercing, Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

.8 ASTM C1177/C1177M-06 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

.9 ASTM C1289-07 - Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board

.10 ASTM D41-05 - Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.

.11 ASTM D312-00(2006) - Asphalt Used in Roofing.

.12 ASTM D2178-04 - Asphalt Glass Felt Used in Roofing and Waterproofing.

.13 ASTM D2822-05 - Asphalt Roof Cement.

.14 ASTM D6162-00a(2008) - Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.

.15 ASTM D6163-00(2008) - Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements

.16 ASTM D6164-05e1 - Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements

.17 ASTM D6222-08 - Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcements

.18 ASTM D6223/D6223M-02(2009)e1 - Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.

.19 ASTM D6298-05e1 - Fiberglass Reinforced Styrene-Butadiene-Styrene (SBS) Modified Bituminous Sheet with a Factory Applied Metal Surface.

.20 CAN/CSA-A123.4-04 (R2008) - Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.

.21 CSA-O121-08 - Douglas Fir Plywood.

.22 CSA-O151-09 - Canadian Softwood Plywood.

.23 CGSB-37-GP-9Ma-83 - Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.

.24 CAN/CGSB-37-GP-56M-1985- Membrane Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

.25 CAN/ULC-S107-03 - Methods of Fire Tests of Roof Coverings.

.26 CAN/ULC-S701-05 - Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.27 CAN/ULC-S702-09 - Thermal Insulation, Mineral Fibre, Boards for Buildings.

.28 CAN/ULC-S704-03 - Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Fixed.

.29 CAN/ULC-S706-09 - Wood Fibre Thermal Insulation for Buildings.

.30 FM (Factory Mutual) - Roof Assembly Classifications.

.31 Province of Manitoba Roofing Contractors Association – Roofing Specifications Manual.

.32 CRCA (Canadian Roofing Contractors' Association) – CRCA Roofing Specifications Manual.

.33 ULC (Underwriters Laboratories of Canada) - List of Equipment and Materials for:

.1 Building Materials.

.2 Fire Resistance.

1.4 SYSTEM DESCRIPTION

.1 Assembly of components include two (2) ply membrane system, heat-welded, with granulated surface, and insulation.

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Coordinate with other work having a direct bearing on work of this section.

.2 Coordinate the work with the installation of associated metal flashings, as the work of this section proceeds.

.2 Pre-installation Meetings:

.1 Review preparation and installation procedures and coordinating and scheduling required with related work.

.2 The roofing material manufacturer to delegate a representative to visit the work Site at commencement of work.

.3 The Contractor shall permit and facilitate access to the work Site and roofs to said manufacturer's representative at all times.

1.6 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Submission procedures.

.2 Shop Drawings: Indicate setting plan for tapered insulation, layout of seams, direction of laps, base flashing details.

.3 Product Data: Provide product data for membrane, flashing materials, and insulation.

1.7 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Submission procedures.

.2 Installation Data: Manufacturer's special installation requirements, including special precautions required for seaming the membrane.

.3 Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

.4 Field Reports: Indicate procedures followed, ambient temperatures and wind velocity during application.

1.8 CLOSEOUT SUBMITTALS

.1 Section 01 78 00: Closeout Submittals.

1.9 QUALITY ASSURANCE

.1 Perform Work to CRCA Roofing Specifications Manual and manufacturer's written instructions. Maintain one (1) copy of each document on Site.

.2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.

.3 Installer Qualifications: Company specializing in performing the work of this section with minimum five (5) years documented experience and approved by the manufacturer.

1.10 REGULATORY REQUIREMENTS

.1 Conform to applicable code for roof assembly fire hazard requirements.

.2 CAN/ULC-S107: Class A Fire Hazard Classification.

1.11 DELIVERY, STORAGE, AND HANDLING

.1 Deliver products in manufacturer's original containers, dry, undamaged, seals and labels intact.

.2 Store products in weather protected environment, clear of ground and moisture.

.3 Stand roll materials on end.

1.12 ENVIRONMENTAL REQUIREMENTS

.1 Do not apply roofing membrane during inclement weather. Consult manufacture for temperatures requirements prior to membrane application.

.2 Do not apply roofing membrane to damp or frozen deck surface.

.3 Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

1.13 WARRANTY

.1 Contractor's Warranty: Provide Roofing Contractor Association of Manitoba (RCAM) five (5) year warranty on roofing, dated from time of Substantial Performance.

.2 Manufacturer's Warranty: Provide a ten (10) year manufacturer's warranty to include coverage for failure to meet specified requirements, including damage to building resulting from failure to prevent penetration of water.

Part 2 Products

2.1 PERFORMANCE CRITERIA

.1 Compatibility between components of roofing system is essential. Provide written declaration to Contract Administrator stating that materials and components, as assembled in system, meet this requirement.

.2 Roofing System: to CSA A123.21 for wind uplift resistance.

2.2 VAPOR BARRIER

.1 Self-adhesive Air/Vapour Barrier: composed of bitumen modified with thermoplastic polymers and high-density polyethylene film. The self-adhesive underface is covered with a silicone release sheet. Water vapour permeability: 0.92 ng/Pa.s.m2 (0.016 Perm)

.1 Acceptable material:

.1 Sopravap'r by Soprema

2.3 POLYISOCYANURATE INSULATION

.1 Non-Sloped Insulation (top layer): To CAN/ULC-S704, closed-cell polyisocyanurate foam core integrally laminated between two heavy coated-glass facers, 100mm (4") thickness, RSI as indicated.

.1 Acceptable material:

.1 Sopra-Iso Plus by Soprema.

2.4 SLOPED EPS RIGID INSULTATION

.1 Sloped Insulation (bottom layer): Expanded polystyrene (EPS): to CAN/ULC-S701.

.1 Type: 2.

.2 Refer to drawings for location and required slope.

2.5 ROOF MEMBRANES

.1 Base Sheet Membrane: SBS modified bitumen and glass mat reinforcement, nominal thickness 2.5 mm (98.4 mils).

.1 Application: fully adhered.

.2 Top surface: thermofusible plastic film.

.3 Underside: discontinuous self adhesive strips, covered with a release protection film.

.4 Acceptable material:

.1 Colvent 810 Base by Soprema

.2 Base Sheet Flashing: SBS modified bitumen and composite reinforcement, nominal thickness 3mm, (118 mils). Suitable grade dependent on outdoor temperature.

.1 Application: fully adhered

.2 Top surface: thermofusible plastic film

.3 Underside: self-adhesive

.4 Acceptable material:

.1 Sopralene Flam Stick by Soprema

.3 Cap Sheet Membrane: SBS modified bitumen and composite reinforcement, nominal thickness 4.0 mm (157.5 mils).

.1 Application: heat welded with propane torch

.2 Top surface: coloured granulars.

.3 Underside: thermofusible plastic film.

.4 Acceptable material:

.1 Colvent 860 Traffic Cap by Soprema

2.6 MEMBRANE ADHESIVE

.1 Low rise, two component polyurethane adhesive.

.1 Acceptable material:

.1 Duotack by Soprema.

2.7 MEMBRANE PRIMER

.1 This is to be the primer recommended by the membrane manufacturer being used (for self adhering stripping)

2.8 PITCH BOX FILLER

.1 Firestone FillGard Pourable Sealer, or approved equal in accordance with B7.

2.9 PLUMBING VENT FLASHING

.1 These shall be Insulated Stack Jack Flashings (with metal cap not neoprene seal) SJ-20 as manufactured by Thaler.

2.10 METAL FLASHING

.1 Flashing shall be a minimum of 24 gauge in thickness, unless shown otherwise on Drawings. Metal is to be prefinished and is to be chosen from the standard in stock range of Stelco 8,000 series of colors or approved equal in accordance with B7.

Part 3 Execution

3.1 EXAMINATION

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

.2 Verify deck is supported and secured.

.3 Verify deck is clean and smooth, free of depressions, waves, or projections, properly sloped to drains.

.4 Verify deck surfaces are dry and free of snow or ice. Verify flutes of metal deck are clean and dry.

.5 Verify roof openings, curbs, pipes, conduit, sleeves, ducts, and vents through roof are solidly set, and wood nailing strips are in place.

3.2 INSULATION APPLICATION

.1 Install insulation to manufacturer's written instructions.

.2 Place tapered thickness insulation to required slope pattern, to manufacturer's written instructions.

.3 Fully adhere rigid insulation to roof deck, and to hold each layer of insulation together. Apply adhesive to manufacturer's specifications. Fasteners not allow without the consent of the Contract Administrator.

.4 Lay boards with edges in moderate contact without forcing.

.5 Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

.6 Apply no more insulation than can be covered with membrane in same day.

3.3 MEMBRANE APPLICATION

.1 Apply membrane and primer to manufacturer's written instructions.

.2 Apply membrane; lap and seal edges and ends permanently waterproof.

.3 Apply membrane smooth, free from air pockets, wrinkles, or tears. Ensure full bond of membrane to substrate.

.4 Extend membrane up parapets and onto vertical surfaces as shown on Drawings.

.5 Seal membrane around roof protrusions and penetrations.

.6 Provide waterproof cut-off to membrane at end of day's operation. Remove cut-off before resuming roofing.

3.4 FLASHINGS AND ACCESSORIES

.1 Apply flexible sheet base flashings to seal membrane to vertical elements.

.2 Secure to nailing strips at 100 mm (4 inches) on centre.

.3 Coordinate installation of roof drains, curbs and related flashings.

.4 Seal flashings and flanges of items penetrating or protruding through the membrane.

3.5 FIELD QUALITY CONTROL

.1 Section 01 45 00: Field inspection testing.

.2 Require Site attendance of roofing and insulation material manufacturers during installation of the Work.

.3 Monitor and report installation procedures, unacceptable conditions to Contract Administrator.

.4 Correct identified defects or irregularities.

3.6 CLEANING

.1 Section 01 74 00: Cleaning installed work.

.2 In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.

.3 Repair or replace defaced or disfigured finishes caused by work of this section.

3.7 PROTECTION OF FINISHED WORK

.1 Section 01 78 40: Protecting installed work.

.2 Protect building surfaces against damage from roofing work.

.3 Where traffic must continue over finished roof membrane, protect surfaces.

.4 During roofing work, exposed surfaces of finished walls shall be protected with tarps in order to prevent damage. Contractor shall assume full responsibility for any damage.

END OF SECTION

Part 1 SECTION INCLUDES

.1 Materials and installation for standing seam metal roofing, including on exterior walls.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures

.2 Section 01 45 00 - Quality Control

.3 Section 05 41 00 – Structural Metal Lightweight Framing

.4 Section 07 21 13 – Board and Semi-Rigid Insulation

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

.6 Section 07 92 00 - Joint Sealing

1.3 SCOPE OF WORK

.1 Supply and install standing seam metal roofing, fascia board cover, gable board cover, and snow guards as specified herein.
.2 Supply and install rigid insulation and Z supports to sloped roof and exterior walls.
.3 Supply and install rainware including gutters and downspouts for metal roof.
.4 Supply and install standing seam metal panels on vertical walls as indicated on the drawings.
.5 Fabricate metal closures and membrane waterproofing to all roof mounted mechanical equipment and roof vents to make watertight.
.6 Refer to Section 05 41 00 for requirements of both metal roof panel and exterior wall metal panel support systems to be designed by a registered professional engineer, licensed to practice in Manitoba.

1.4 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 Standards Association (CSA International).

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

.5 Department of Justice Canada (Jus).

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

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

.1 Material Safety Data Sheets (MSDS).

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

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

.8 Transport Canada (TC).

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

1.5 SUBMITTALS

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

.2 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures, etc.

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

.4 Submit product data sheets for insulation. Include:

.1 Product characteristics.

.2 Performance criteria.

.3 Limitations.

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

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

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

.8 Submit 300 x 300mm (min.) samples of each sheet metal material.

1.6 QUALITY ASSURANCE

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

.2 Fabricate 300 x 300 mm sample roofing panel using identical project materials and methods to include typical seam and submit to Contract Administrator for approval prior to proceeding with the work.

1.7 MOCK-UP

.1 Provide a 1200mm wide, full height section of exterior metal wall panel, including mitre joint at roof eave. Locate at outside corner of building and include all trims, flashings and closures.

.2 Mock-up will be used:

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

.3 Locate where directed by Contract Administrator.

.4 Allow 24 hours for inspection of mock-up by Contract Administrator before proceeding with sheet metal flashing work.

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

1.8 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.
.4 If the roof system is to be designed as a shear diaphragm, then the factored shear design loads “Q” and the flexibility factors “F” must be shown on the structural drawings.

.2 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.

Part 2 Products

2.1 PREFINISHED STEEL SHEET

.1 Prefinished galvanized steel sheet with factory applied polyvinylidene fluoride based on Kynar 500® resin, (PVF2), formulated by a Pennwalt licensed manufacturer's approved applicator.
- .1 Steel sheet to be 22ga. 0.76mm rhickness, grade C, G-90, hot dipped galvanized, as per ASTM A446.
- .2 **Colour**: QC 18262 – Black from Agway Metals. Provide a 20 year exposure warranty to the The City.
- .3 **Coating**: coating system shall provide minimum 1.1 mil dry film thickness, consisting of primer and minimum 0.75 mil dry film colour coat.
- .4 Use for roof & wall panels, and all related flashing, and caps and rainware.
  - .1 Standard of Acceptance:
    - .1 AR Standing Seam Roof, Type AR-35 by Agway Metals or approved equal by Schedule B.

.2 Insulation: as specified in Section 07 21 13.

.3 Concealed Clips & Fasteners:
- .1 Thermally responsive clips to be fabricated from a minimum of 0.61 mm (0.018") steel, with minimum Z275 galvanized coating designed to accommodate expansion and contraction of the roof sheet. Design of clips to be by Manufacturer.
- .2 Roof Fasteners: As specified by Manufacturer, to resist wind uplift and sliding snow forces.

.4 Weather Resistant Barrier:
- .1 To be applied over roof z-bars in accordance with manufacturer's recommendations. Refer to Drawings.
  - .1 Standard of Acceptance:
    - .1 Titanium UDL 30 synthetic roofing underlayment

.5 Snow Guard:
- .1 Supply and install purpose made, pre-finished metal snow guard, engineered to support sliding snow loads. Colour of metal to match roof panels.

2.2 ACCESSORIES

.1 Isolation coating: alkali resistant bituminous paint.

.2 Flashings: In accordance to Section 07 62 00. Formed from same materials as the roof / wall panel sheet. Custom fabricated to suit architectural details as required.

.3 Plastic cement: to CAN/CGSB-37.5.

.4 Sealant: Asbestos-free sealant, compatible with systems materials, recommended by system manufacturer. Refer to Section 07 92 00 - Joint Sealing.

.5 Rubber-asphalt sealing compound: to CAN/CGSB-37.29.

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

.7 Fasteners: concealed.

.8 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

.9 Solder: to ASTM B32.

.10 Flux: rosin, cut muriatic acid, or commercial preparation suitable for materials to be soldered.

.11 Touch-up paint: as recommended by sheet metal roofing manufacturer.

2.3 FABRICATION

.1 Fabricate aluminum sheet metal in accordance with AA ASM-35.

.2 Form individual pieces in maximum lengths possible. Make allowances for expansion at joints.

.3 Hem exposed edges on underside 12 mm, mitre and seal.

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

.5 Apply minimum 0.2 mm dry film thickness coat of plastic cement to both faces of dissimilar metals in contact.

.6 Protect metals against oxidization by back-painting with isolation coating where indicated.

Part 3 Execution

3.1 INSTALLATION

.1 Architectural Sheet Metal Manual specification shall govern for material and workmanship not otherwise specified herein. The work shall be done by qualified journeymen having a record of experience with similar applications. The quality of the work shall meet or exceed the industry standards for this type of construction. Manufacturer shall provide trained metal craftsmen to supervise performance of installation activities.

.2 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.

.3 Install the seam-cap at all side laps as shown on the approved shop drawings. Add sealant as required.

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

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

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

.7 Flash roof penetrations with material matching roof panels and make watertight.

.8 Install rigid insulation in two (2) layers as indicated on Drawings. Tightly butt against support z-bars and ensure no gaps between successive boards. Stagger joints between layers.

3.2 WALL PANELS

.1 Install wall panels in same method as sloped roof.

.2 Support clips to be placed at manufacturer's recommended spacing to secure panels for wind design loads and to avoid dimpling.

.3 Install drip flashings and closures laminated such that all exposed faces are prefinished in colour to match wall panels.

3.3 CLEAN UP

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

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

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

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Metal parapet, sill, lintel flashings, metal scuppers, rainware, and metal fascia panels.

1.2 RELATED SECTIONS

.1 Section 07 11 13 - Bituminous Dampproofing.

.2 Section 07 44 56 – Mineral Fiber Reinforced Cementitious Panels

.3 Section 07 52 00 - Modified Bituminous Membrane Roofing

.4 Section 07 92 00 - Joint Sealants.

.5 Section 09 91 99 - Painting for Minor Works.

.6 Mechanical Divisions – Heating, Ventilating, and Air-Conditioning (HVAC).

.7 Electrical Specifications: Flashing sleeves and collars for electrical items protruding through roofing membrane.

1.3 REFERENCES

.1 ASTM A167-99(2009) - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.2 ASTM A653/A653M-09 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.3 ASTM B32-08 - Solder Metal.

.4 ASTM B101- 07 - Lead-Coated Copper Sheet and Strip for Building Construction.

.5 ASTM B209M-07 - Aluminum and Aluminum-Alloy Sheet and Plate.

.6 ASTM D2178-04 - Asphalt Glass Felt Used in Roofing and Waterproofing.

.7 ASTM D4586-07 - Asphalt Roof Cement, Asbestos-Free.

.8 ASTM D226-06 - Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.

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

.10 CCBDA (Canadian Copper & Brass Development Association) - Copper in Architecture Handbook.

.11 Province of Manitoba Roofing Contractors Association – Roofing Specifications Manual.

.12 NRCA (National Roofing Contractors Association - USA) - Roofing and Waterproofing Manual.

.13 SMACNA (Sheet Metal and Air Conditioning Contractors' National Association) - Architectural Sheet Metal Manual.

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Coordinate with other work having a direct bearing on work of this section.

1.5 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Submittal Procedures.

.2 Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.6 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Submittal Procedures.

.2 Installation Data: Manufacturer's special installation requirements.

1.7 CLOSEOUT SUBMITTALS

.1 Section 01 78 00: Closeout Submittals.

1.8 QUALITY ASSURANCE

.1 Perform Work to NRCA standard details and requirements. Maintain one (1) copy of each document on site.

.2 Fabricator Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.

.3 Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years documented experience.

1.9 DELIVERY, STORAGE, AND PROTECTION

.1 Section 01 61 00: Common Product Requirements.

.2 Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

.3 Prevent contact with materials which may cause discolouration or staining.

Part 2 Products

2.1 SHEET MATERIALS

.1 Pre-Coated Galvanized Steel: ASTM A653/A653M, Z275 (275 g/m^2), (G90 (0.90 oz/ft^2) zinc coating designation; 22 gauge unless indicated otherwise on Drawings.

.2 Galvanized Steel: ASTM A653/A653M, Z275 (G90) zinc coating designation; 0.6 mm (24 gauge) unless otherwise indicated on Drawings.

2.2 ACCESSORIES

.1 Fasteners: Same material and finish as flashing metal.

.2 Primer: Zinc chromate type.

.3 Protective Backing Paint: Bituminous.

.4 Sealant: Type specified in Section 07 92 00.

.5 Bedding Compound: Rubber-asphalt type.

2.3 FABRICATION

.1 Form sections true to shape, accurate in size, square, and free from distortion or defects.

.2 Fabricate cleats of same material as sheet, minimum 100 mm (4 inches) wide, interlockable with sheet.

.1 Shop fabricate metal flashing and trim components to the maximum length possible, forming metal work with clear, sharp, straight and uniform bends and rises. Hem exposed edges of flashings 12mm (1/2") to the underside.

.2 Form flashing components from single full width sheet. Provide shop fabricated mitred corners, joined using closed end pop rivets and joint sealant.

.3 Fabricate related sheet metal work in accordance with approved shop drawings and applicable standards.

.4 Provide linear sheet metal items in minimum 3000mm (10') sections except as otherwise noted on Drawings. Form flashing using single pieces for the full width. Provide shop fabricated, mitred and joined corners.

2.4 RAINWARE

.1 Fabricate 100 x 100mm (4" x 4") open face downspout conductor with 300mm (12") long angled discharge at splash pad. Close face of conductor for top 1200mm (4'-0") and base 1200mm (4'-0"). Fasten through back of open face to substrate. Strap anchors not allowed. Fastener to be 6mm (1/4") diameter by 65mm (2 1/2") long expansion type ZAMAC rivet spaced 1200mm (4'-0")(maximum).

.2 Inside exposed faces to be finished with prefinished material with same colour as outside exposed faces. Fabricate with two ply metal to achieve prefinished inside faces.

Part 3 Execution

3.1 EXAMINATION

.1 Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets in place, and nailing strips located.

.2 Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

.1 Install starter and edge strips, and cleats before starting installation.

.2 Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.

3.3 INSTALLATION

.1 Install all prefinished metal flashing and trim such that liner face is not exposed to view. Where liner face is exposed, prepaint to match prefinished exposed face, or fabricate 2-ply installation.

.2 Oil-canning or crimping at fasteners securing metal flashing or trim, will not be acceptable. Contract Administrator to review upon completion.

.3 Install butt joints and lapped joints at locations acceptable to the Contract Administrator.

.4 Separate dissimilar metals by painting each metal surface in area of contact with a bituminous coating, by applying rubberized asphalt underlayment to each metal surface, or by other permanent separation as recommended by manufacturers of dissimilar metals.

.5 Install plumb, straight, and true to adjacent work in continuous lengths without flashings, closures or horizontal laps.

.6 Install parapet flashing, miscellaneous flashing, and closure caps as per drawings to provide a water tight roof system.

.7 Seal all metal joints weathertight.

3.4 FIELD QUALITY CONTROL

.1 Section 01 45 00: Field inspection.

.2 Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

3.5 SCHEDULES

.1 Refer to drawings.

.2 Colour of all pre-finished metal (interior and exterior) to be selected by Contract Administrator from Standard Architectural Stock Colours.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.

1.2 DEFINITIONS

.1 Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in, or construction joints between fire rated wall and floor assemblies.

1.3 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

Only tested firestop systems shall be used in specific locations as follows:

1. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.

2. Safing slot gaps between edge of floor slabs and curtain walls.

3. Openings between structurally separate sections of wall or floors.

4. Gaps between the top of walls and ceilings or roof assemblies.

5. Expansion joints in walls and floors.

6. Openings and penetrations in fire-rated partitions or walls containing fire doors.

7. Openings around structural members which penetrate floors or walls.

1.4 RELATED WORK OF OTHER SECTIONS

1. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including Mechanical and Electrical specification divisions.

1.5 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 ASTM D6904, "Standard Practice for Resistance to Wind Driven Rain for Exterior Coatings Applied on Masonry"

.9 ASTM C 679, "Standard Test Method for Tack-Free Time of Elastomeric Sealants"

.10 All major building codes: NBC, with Manitoba Ammendments

.11 NFPA 101 - Life Safety Code

.12 Canadian Electrical Code

1.6 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 Fire-Test-Response Characteristics: Provide through-penetration fire stop systems and fire-resistive joint systems that comply with specified requirements of tested systems.

.3 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 R, S & T below.

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

.5 Firestop Systems do not reestablish 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.

.6 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

1.7 SUBMITTALS

.1 Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of ULC or cUL firestop systems to be used and manufacturer's installation instructions to comply with Section 01 33 00.

.2 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.

.3 Submit material safety data sheets provided with product delivered to job-site.

1.8 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 Installation Responsibility: assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single sole source firestop specialty contractor.

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

FM 4991 Approved Contractor
UL Approved Contractor
Hilti Accredited Fire Stop Specialty Contractor

.4 Firm with not less than 3 years of experience with fire stop installation.

1.9 DELIVERY, STORAGE, AND HANDLING

.1 Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and ULC or cUL label where applicable.

.2 Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.

.3 Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements.

.4 Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

.5 Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

.1 Do not use materials that contain flammable solvents.

.2 Scheduling

1. Schedule installation of CAST IN PLACE firestop devices after completion of floor formwork, metal form deck, or composite deck but before placement of concrete.

2. Schedule installation of Drop-In firestop devices after placement of concrete but before installation of the pipe penetration. Diameter of sleeved or cored hole to match the listed system for the device

3. Schedule installation of other firestopping materials after completion of penetrating item installation but prior to covering or concealing of openings.

.3 Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

.4 Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

.5 During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

2. Provide components for each firestopping 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 Firestopping Materials are either "cast-in-place" (integral with concrete placement) or "post installed." Provide cast-in-place firestop devices prior to concrete placement.

.4 Provide a round fire-rated cable management device whenever cables penetrate fire rated walls, where frequent cable changes and additions may occur. The fire-rated cable management device shall consist of a corrugated steel tube with zinc coating, contain and inner plastic housing, intumescent material rings, and inner fabric smoke seal membrane. The length of the sleeve shall be 12.4 inches. The fire-rated cable management device shall contain integrated intumescent firestop wrap strip materials sufficient to maintain the hourly rating of the barrier being penetrated. The fire-rated cable management device shall contain a smoke seal fabric membrane or intumescent firestop plugs sufficient to achieve the L-Rating requirements of the barrier type. Install device per the manufacturer's published installation instructions.

.5 Penetrations in Fire Resistance Rated Walls: Provide firestopping with ratings determined in accordance with CAN/ULC-S115-11

F-Rating: Not less than the fire-resistance rating of the wall construction being penetrated.

.6 Penetrations in Horizontal Assemblies: Provide firestopping with ratings determined in accordance with CAN/ULC-S115-11.

F-Rating: Minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
T-Rating: when penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
W-Rating (if applicable): Class 1 rating in accordance with water leakage test per UL 1479.

.7 Penetrations in Smoke Barriers: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.

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

.8 Mold Resistance: Provide penetration firestopping with mold and mildew resistance rating of 0 as determined by ASTM G21.

.9 Rain and water resistance: provide perimeter joint sealant tested in accordance with ASTM D 6904 with less than 1 hour tack free time as tested in accordance with ASTM C 679.

2.2 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:

Basis of Design:

.1 Hilti (Canada) Corporation,
1-800-363-4458

2.3 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 Approved firestop product assemblies to include all materials, sealants, foams, mineral wool and other devices, which are purpose-made for all firestop conditions, including but not limited to:

.1 Cable penetrations (all types)
.2 Pipe penetrations (all types)
.3 Ductwork penetrations (all types)
.4 Combustible material penetrations (all types)
.5 Construction joints (all types)
.6 Metal deck profile closures
.7 Structurally separated walls and floor assemblies
.8 Electrical box enclosures

.3 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.

.4 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.

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

2.04 ACCEPTABLE FIRESTOP CONTRACTORS

.1 National Firestop Ltd.
405 Gunn Road, PO Box 16, Grp 514 RR5
Winnipeg, Mb. R2C 2Z2
Ph. 204-777-0100

2. Total Firestop Systems Ltd.
Box 464
Stony Mountain, Mb., R0C 3A0
Ph. 204-344-5696

3. Secure Firestop
B-580 Dobbie Avenue
Winnipeg, Mb., R2K 1G4
Ph. 204-667-8859

4. Western Construction Services Ltd.
300 Dawson Road North
Winnipeg, Mb., R2J 0S7
Ph. 204-956-9475

.5 Penta Protective Coatings
39 Merit Crescent
West St. Paul, Mb., R2P 2W5
Ph. 204-992-2603

PART 3 - EXECUTION

3.1 PREPARATION

.1 Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion. Verify penetrations are properly sized and in suitable condition for application of materials.
2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
5. Do not proceed until unsatisfactory conditions have been corrected.

3.2 COORDINATION

1. Coordinate construction of openings, penetrations and construction joints to ensure that the fire stop systems are installed according to specified requirements.

2. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire-resistive joint systems are installed according to specified requirements.

.3 Coordinate fire stopping with other trades so that obstructions are not placed in the way prior to the installation of the fire stop systems.

.4 Do not cover up through-penetration fire stop and joint system installations that will become concealed behind other construction until each installation has been examined by the building inspector.

3.3 INSTALLATION

1. Regulatory Requirements: Install firestop materials in accordance with ULC Fire Resistance Directory or UL Products Certified for Canada (cUL) Directory or Omega Point Laboratories Directory.

2. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.

    1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
    2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of ULC or cUL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
    3. Protect materials from damage on surfaces subjected to traffic.

3.4 FIELD QUALITY CONTROL

.1 Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.

.2 Keep areas of work accessible until inspection by applicable code authorities.

.3 Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, “Standard Practice for On-Site Inspection of Installed Fire Stops” or other recognized standard.

.4 Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

.5 Manufacturer’s Field Services: During Installation, provide periodic destructive testing inspections to assure proper installation/application. After installation is complete, submit findings in writing indicating whether or not the installation of the tested system identified was installed correctly.

3.5 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.

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

A Sequential Location Number
The Project Name
Date of Installation
Detailed description of the penetrations location
Tested System or Engineered Judgment Number
Type of assembly penetrated
A detailed description of the size and type of penetrating item
Size of opening
Number of sides of assemblies addressed
Hourly rating to be achieved
Installers Name

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

A Sequential Location Number
The Project Name
Date of Installation
Detailed description of the Construction Joints location
Tested System or Engineered Judgment Number
Type of Construction Joint
The Width of the Joint
The Lineal Footage of the Joint
Number of sides addressed
Hourly rating to be achieved
Installers Name

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

.4 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 inspection agency.
4. Date of Installation.
5. Through-Penetration firestop system manufacturer's name.
6. Installer's Name.

.5 Permanently attach identification labels to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeking to remove or change penetrating items or firestopping.

3.6 ADJUSTING AND CLEANING

.1 Remove equipment, materials and debris, leaving area in undamaged, clean condition.

.2 Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

3.7 LABOR USE TO INSTALL FIRESTOP SYSTEMS

.1 If firestopping is not assigned to a single-source firestop specialty contractor, the installation of each scope of work is to be performed jurisdictionally correct per existing trade agreement.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Preparing substrate surfaces.

.2 Sealant and joint backing.

.3 Structural sealant for glazing assemblies.

1.2 RELATED SECTIONS

.1 Section 04 22 00 – Concrete Unit Masonry.

.2 Section 07 11 13 - Bituminous Dampproofing: Sealants required in conjunction with dampproofing.

.3 Section 07 26 00 - Vapour Retarders: Sealants required in conjunction with vapour retarder.

.4 Section 07 84 00 - Firestopping: Sealants required in conjunction with firestopping.

.5 Section 07 52 00 - Modified Bituminous Membrane Roofing

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

.7 Section 08 11 00 –Metal Doors and Frames.

1.3 REFERENCES

.1 ASTM C509-06 - Elastomeric Cellular Preformed Gasket and Sealing Material.

.2 ASTM C834-10 - Latex Sealants.

.3 ASTM C919-08 - Use of Sealants in Acoustical Applications.

.4 ASTM C920-08 - Elastomeric Joint Sealants.

.5 ASTM C1184-05 - Structural Silicone Sealants.

.6 ASTM C1193-09 - Guide for Use of Joint Sealants.

.7 ASTM C1311-10 - Solvent Release Sealants.

.8 ASTM C1330-02(2007) - Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.

.9 ASTM C1401-09a - Guide for Structural Sealant Glazing.

.10 ASTM E330-02 - Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

.11 CGSB-19-GP-5M-1984 - Sealing Compound, One Component, Acrylic Base, Solvent Curing.

.12 CGSB-19-GP-14M-1984 - Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.

.13 CAN/CGSB-19.13-M87 - Sealing Compound, One-component, Elastomeric, Chemical Curing.

.14 CAN/CGSB-19.17-M90 - One-Component Acrylic Emulsion Base Sealing Compound.

.15 CAN/CGSB-19.22-M89 - Mildew-Resistant Sealing Compound for Ceramic Tiles.

.16 CAN/CGSB-19.24-M90 - Multi-component, Chemical Curing Sealing Compound.

.17 SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.

1.4 SCOPE OF WORK

.1 Caulking shall be provided where required to prevent entry of water into the structure.

.2 Caulking shall be provided between masonry, siding, or other cladding materials and the adjacent door and window frames or trim, including sills unless, such locations are completely protected from the entry of water. Caulking shall also be provided at vertical joints between different cladding materials unless the joint is suitably lapped or flashed to prevent the entry of water.

.3 Caulking shall be provided at all masonry control joints.

.4 Caulk perimeter of all interior pressed steel door and window frames, fire hose cabinets, access door flanges, etc.

1.5 PERFORMANCE REQUIREMENTS

.1 Sealant Design: Design structural sealant to withstand specified loads without breakage, loss, failure of seals, product deterioration, and other defects.

.2 Design installed sealant to withstand:

- .1 Dead loads and live loads caused by positive and negative wind loads acting normal to plane of wall as calculated in accordance with the National Building Code.
- .2 Movement from ambient temperature range of 49 degrees C (120 degrees F).
- .3 Movement and deflection of structural support framing.
- .4 Water and air penetration.

1.6 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

- .1 Coordinate with other work having a direct bearing on work of this section.
- .2 Coordinate the work with all sections referencing this section.

1.7 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Submittal Procedures

.2 Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, colour availability.

.3 Samples: Submit two (2) samples, 300 mm (12 inch) in size illustrating sealant colours for selection.

1.8 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Submittal Procedures.

.2 Installation Data: Manufacturer's special installation requirements.

.1 Indicate special procedures, surface preparation, perimeter conditions requiring special attention, field quality control testing.

1.9 QUALITY ASSURANCE

.1 Perform work to sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

.2 Perform structural sealant application work to ASTM C1401.

.3 Perform acoustical sealant application work to ASTM C919.

.4 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.

.5 Applicator Qualifications: Company specializing in performing the work of this section with minimum three (3) years documented experience.

1.10 ENVIRONMENTAL REQUIREMENTS

.1 Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.11 WARRANTY

.1 Section 01 78 00: Closeout Submittals.

.2 Warranty: Include coverage for installed sealants and accessories which fail to achieve air tight seal and water tight seal, exhibit loss of adhesion or cohesion, or do not cure.

.3 Provide manufacturer's twenty (20) year material warranty for installed silicone sealant.

.4 Defective work shall include, but not be restricted to joint leakage, cracking, crumbling, melting, running, loss of adhesion, loss of cohesion, or staining of adjoining or adjacent work or surfaces.

Part 2 Products

2.1 MATERIALS

.1 Sealant Colour: to be selected by the Contract Administrator from full range.

.2 Primers: To be type recommended by sealant manufacturer.

.3 Joint backing material: shall be extruded polyolefin foam.

.1 Standard of Acceptance:

.1 Tremco Sof Rod.

.4 Bond Breaker: Where joint configuration does not allow for proper depth/width ration (See Section 3.2.5) - a pressure sensitive plastic tape, such as 3M #266 or #481 shall be placed on the back of the joint which will not bond to the sealant.

.5 Joint Cleaner: Xyol, methylethylketone, or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.

2.2 SEALANTS

.1 Type 1: Sealant for all locations except where another type is specified in this section. Multi-component, polyepoxide urethane sealant. To meet specified requirements of CGSB Specification CAN2.19-24-M80.

.1 Standard of Acceptance:

.1 Tremco Dymeric 511
.2 Sonolastic NP-2
.3 Permapol RC-2.
.4 Morton Thiokol
.5 Sikaflex 2CNS/SL
.6 Bostik Chem-Calk 500

.2 Type 2: Sealant for construction joints in lieu of Type 1 where pre-approved by Contract Administrator. One part elastomeric sealants: to meet specified requirements of NSC/CGSB 25-B-N moisture curing hybrid polyurethane.

.1 Standard of Acceptance:

.1 Tremco Dymonic.
.2 Sonolastic 150.
.3 Permapol RC-1.
.4 Morton Thiokol.
.5 Sikaflex 1A.
.6 Bostik Chem-Calk900.

.2 Type 3: Sealant for glass to glass, sloped glazing systems, glass to metal, and metal to metal joints. One part low modulus silicone elastomeric sealant to meet specified requirements of NSC/CGSB Specification CAN2-19.13-M82.

.1 Standard of Acceptance:

.1 Dow Corning 795
.2 Tremco Spectrum 2.

.3 GE Silglaze 2800.

.4 GE Silpruf 2000.

.3 Type 4: Polyurethane sealant for exterior and interior horizontal traffic joints.

.1 Standard of Acceptance:

.1 Tremco THC-900.

.2 Permapol RC-2Sl.

.3 Sonolastic SL2.

.4 Sikaflex 2CSL.

.5 Bostik Chem-Calk 550

.4 Type 6: Use at all perimeter joints and openings in sound rated drywall systems and sealing polyethylene air/vapour barriers. One part acoustical sealant to meet specified requirements of CGSB Specification 19-GP-21M.

.1 Standard of Acceptance:

.1 Tremco Acoustical sealant.

.2 Gibson Homans 2210.

.5 Type 7: Sealant for finishing interior construction joints subject to minimal movement and not otherwise specified in this section. One part paintable latex.

.1 Standard of Acceptance:

.1 Tremco Latex 100.

.2 Bulldog Acrylic Latex

.6 Type 8: Sealant for sealing gutters and rainware. One part high quality synthetic rubber blended with a synthetic resin for metal to metal and metal to plastic joints.

.1 Standard of Acceptance:

.1 Tremco Gutter Seal.

.2 Type 9: Sealant for masonry joints including control joints, reglets, etc.: Ultra-low modulus, one part silicone joint sealant. 790 or moisture curing hybrid polyurethane 150.

.1 Standard of Acceptance:

.1 Sonolastic 150.

2.3 STRUCTURAL SEALANT

.1 Structural Silicone Sealant: ASTM C1184, ASTM C920, Grade NS, Class A, Use NT; single component, neutral curing, non-sagging, non-staining, fungus resistant non-bleeding;

.1 Colour: To be selected by Contract Administrator from Standard Colour Range.

.2 Elongation Capability 25%.

.3 Service Temperature Range -54 to 82 degrees C (-65 to 180 degrees F).

.4 Shore A Hardness Range 40.

2.4 ACCESSORIES

.1 Primer: Non-staining type, recommended by sealant manufacturer to suit application.

.2 Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

.3 Joint Backing: ASTM C1330; round, closed cell polyethylene foam rod; oversized 30% to 50% larger than joint width.

.4 Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

.5 Masking tape: Non-staining, non-absorbent type compatible with sealant and adjacent surfaces.

.6 Setting Blocks and Spacers: Compatible with silicone sealant and recommended by sealant manufacturer.

Part 3 Execution

3.1 EXAMINATION

.1 Verify that substrate surfaces and joint openings are clean, dry, and free of frost and ready to receive work.

.2 Verify that joint backing and release tapes are compatible with sealant.

.3 Verify at the Site that joints and surfaces have been provided and that joint conditions will not adversely affect execution, performance, or quality of the completed work; and that they can be put into acceptable condition by means of preparation specified in this section.

.4 Ascertain that sealers and coatings applied to sealant substrates are compatible with sealant used and that full bond between sealant and substrate is attained. Request samples of the sealed or coated substrate from their fabricators for testing of compatibility and bond, if necessary.

.5 Verify that specified environmental conditions are ensured before commencing work.

.6 Ensure that releasing agents, coatings or other treatments have either not been applied to joint surfaces or that they are entirely removed.

.7 Defective work resulting from application to unsatisfactory joint conditions will be considered the responsibility of those performing the Work of this Section.

3.2 PREPARATION

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

.2 Clean and where required prime joints to sealant manufacturer's written instructions.

.3 Perform preparation to sealant manufacturer's written instructions.

.4 Protect elements surrounding the work of this section from damage or disfiguration.

.5 Remove dust, paint, loose mortar, and other foreign matter and dry joint surfaces.

.6 Remove dust silt, scale, and coatings from ferrous metals by wire brush, grinding, or sandblasting.

.7 Remove oil, grease and other coatings from non-ferrous metals with joint cleaner.

.8 Joints to be caulked are to be a minimum of 6mm (1/4 inch) to a maximum of 40mm (1 ½ inch). Examine joint sizes to achieve proper width/depth ratio per manufacturer's recommendations for specified sealant.

.9 Install joint filler or apply bond breaker tape to achieve correct joint depth.

.10 Where necessary to prevent staining, mask adjacent surfaces with tape prior to priming and/or caulking.

.11 Prime sides of joints to sealant manufacturer's instructions immediately prior to caulking.

.12 Before any caulking or sealing is commenced, a test of the material shall be made for indications of staining or poor adhesion.

3.3 INSTALLATION

.1 Install sealant to sealant manufacturer's written instructions.

.2 Measure joint dimensions and size materials to achieve required width/depth ratios.

.3 Install joint backing to achieve a neck dimension no greater than 1/3 of the joint width.

.4 Install bond breaker where joint backing is not used.

.5 Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

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

.7 Tool joints concave unless detailed otherwise.

3.4 STRUCTURAL SEALANT INSTALLATION

.1 Site install glass panels specified in Section 08 80 50 to aluminum curtain wall framing specified in Section 08 44 13.

.2 Joint Design: Install sealant as follows:

.1 Glueline Thickness: 6 mm (1/4 inch) minimum.

.2 Structural Bite: 6 mm (1/4 inch) minimum and equal to or greater than glueline thickness.

.3 Fill joint with standard sealant application procedures, install backer rod or bond breaker tape to avoid three-sided sealant adhesion.

.3 Prepare substrates and apply silicone sealant to manufacturer's written instructions and reviewed Shop Drawings.

.4 Bond glass to metal support members with structural silicone sealant using 2-sided method as detailed on Drawings.

.5 Install sealant without gaps, twisting, stretching, or puncturing backing material. Ensure uniform depth to achieve correct profile, coverage, and performance.

.6 Use temporary glass supports to retain glass panels while sealant is applied and allowed to cure.

.7 Provide concave, smooth, uniform, sealant finish. Eliminate air pockets and ensure complete contact on both sides of joint opening.

3.5 CLEANING

.1 Clean adjacent soiled surfaces.

3.6 PROTECTION OF FINISHED WORK

.1 Remove masking tape and excess sealant.

.2 Protect sealants until cured, remove temporary glass supports.

END OF SECTION