Part 2 Products

2.1 MATERIALS

.1 Locations: Walls below grade adjacent to sodded and planted areas. Refer to Drawings for typical wall sections.

.2 Primary Waterproofing Membrane for Vertical Foundation Walls: Cold applied elastomeric asphalt emulsion waterproofing membrane in compliance with CGSB 37.2 shall be Aqua-Bloc 720-38 Elastomeric Asphalt Emulsion Waterproofing Membrane as manufactured by Bakor, a one component waterproofing compound compatible with sheet waterproofing membranes and substrates, having the following characteristics:

- .1 Elongation: 2000%,
- .2 Maximum VOC: 10 g/l
- .3 Water vapour permeance: 10 ng/Pa.m².s, ASTM E96,
- .4 Chemical resistance: Alkalis, calcium chloride, mild acid and salt solutions.
- .5 Approved alternate Mel-Rol LM by W.R. Meadows of Canada.

.3 Fabric Reinforcement for Cold Applied Waterproofing: Fabric reinforcement shall be 990-06 Yellow Jacket as supplied by Bakor, a glass reinforcement sheet capable of allowing the membrane to bleed through adequately to provide a monolithic reinforced membrane system.

.4 Prefabricated Drainage Board for Vertical Surfaces: Bakor DB 2000 Prefabricated Composite Drain Board, a polypropylene core board with polypropylene fabric attached, having the following physical properties:

- .1 Flow Rate: 223 L/min/m,
- .2 Compressive Strength: 11,000 psf,
- .3 Thickness: 10 mm

.5 Prefabricated Drainage Board Accessories

- .1 Securement Bars: Continuous 6mm x 20mm (1/4” x 3/4”) HDPE bar for screw attachment.
- .2 Moulding Strip: Continuous 90mm wide “Z” flashing strip to fit over exposed top edge of drain board.
- .3 Drain Board Plugs & Nails: HDPE pre-moulded washer to fit dimples c/w high strength, corrosion resistant concrete nails, UCAN AFH 37 or equal.
- .4 Termination Sealant: Polybitume 570-05 Polymer Modified Sealing Compound as manufactured by Bakor, a polymer modified sealing compound, compatible with sheet waterproofing membrane, substrate and insulation materials, complies with CGSB 37.29, remains flexible with ageing and chemically resistant to alkalis, calcium chloride, mild acid and salt solutions.

Part 3 Execution

3.1 WORKMANSHIP

.1 Keep hot asphalt:

.1 Below its flash point.

.2 At or below its final blowing temperature.

.3 Within its equiviscous temperature range at place of application.

3.2 PREPARATION

.1 Before applying waterproofing:

.1 Seal exterior joints between foundation walls and footings, joints between concrete floor slab and foundation and around penetrations through waterproofing with sealing compound.

.2 Before commencing work, ensure environmental and site conditions are suitable for installation of waterproofing membrane.

.3 The substrate shall be clean and dry, free from surface water, ice, snow or frost, dust, dirt, oil, grease, curing compounds or any other foreign matter detrimental to the adhesion of the waterproofing membrane.

.4 Can be applied to damp or new green concrete. Ensure concrete is smooth and free from voids and honeycombing prior to application of waterproofing membrane.

.5 Voids, cracks, holes and other damages to horizontal or vertical surfaces shall be repaired before application of the membrane.

.6 Notify Consultant and Contractor in writing of unsuitable surfaces and working conditions. Commencement of work shall imply acceptance of surfaces and working conditions.

3.3 MOCK UP

.1 Construct a 3 m x 2 m mock-up area for each separate job condition for inspection by the Consultant prior to proceeding with the work. Mock-up may be part of finished work.

.2 Notify Consultant and allow 24 hours for inspection by Consultant.

3.4 DECK TO VERTICAL JUNCTURES, FOOTINGS/FOUNDATION WALLS, CRACKS IN SLABS AND PROTRUSIONS

.1 Coat penetrations, such as brackets, clips, braces, etc. that are set into the concrete with a 2.3 mm (90 mil) coating of primary waterproofing membrane to the height of the wearing course and around projections to ensure a complete seal prior to coating the entire area.

.2 Penetrations subject to movement should be flashed with fabric reinforcement set into a minimum thickness of 2.3 mm (90 mil) of primary waterproofing membrane to required height on the wall and at least 100 mm (4”) on the slab, embed fabric reinforcement into wet coating followed by second coat.

.3 To all cracks and cold joints less than 3 mm (1/8") apply a coat of primary waterproofing membrane at a minimum thickness of 2.3 mm (90 mil) and reinforce with fabric reinforcement.

.4 To all cracks greater than 3 mm (1/8"), prime area and install self-adhered flashing membrane. Overlap end joint of sheet a minimum 75 mm (3").

.5 At monolithic wall/slab junctures, apply primary waterproofing membrane at a minimum thickness of 2.3 mm (90 mil) to required height on the wall and at least 100 mm (4") on the slab and embed fabric reinforcement into wet primary waterproofing membrane followed by a second coat.

.6 At non-monolithic wall/slab junctures, prime area, trowel-in fillet bead to inside corners and install self-adhered flashing membrane sheet to the required height on the wall and at least 100 mm (4") on the slab. Lap primary waterproofing membrane over a minimum of 50 mm (2").

.7 At footing to foundation wall junctions apply a coat of primary waterproofing membrane at a minimum thickness of 2.3 mm (90 mil) and reinforce with fabric reinforcement followed by second coat.

3.5 WATERPROOFING MEMBRANE VERTICAL APPLICATION

.1 Apply a full and continuous coat of primary waterproofing membrane at approximately 1.5 l/m^2 (3.6 gal. US/100ft^2) and embed fabric reinforcement into coating ensuring no fishmouths or wrinkles are created and allow to set.

.2 Apply second full and continuous coat of primary waterproofing membrane at 1.5 l/m^2 (3.6 gal./100$ft.^2$) and allow to cure.

3.6 WATERPROOFING MEMBRANE HORIZONTAL APPLICATION

.1 Apply a full and continuous coat of primary waterproofing membrane at approximately 1.5 l/m^2 (3.6 gal. US/100ft^2) and embed fabric reinforcement into coating ensuring no fishmouths or wrinkles are created and allow to set.

.2 Apply second full and continuous coat of primary waterproofing membrane at 1.5 l/m^2 (3.6 gal./100$ft.^2$) and allow to cure.

3.7 INSTALLATION OF PROTECTION BOARDS

.1 Protection Boards shall be installed over the waterproofing membrane to prevent damage from materials used in backfilling.

.2 Allow waterproofing to cure dry and apply protection board adhesive in 12mm wide strips spaced at 450 mm o/c to cure waterproofing membrane. Immediately embed protection board and press into adhesive to ensure full contact.

.3 Do not backfill until adhesive has cure dried. Do not use excessive levels of adhesive.

3.8 APPLICATION OF DRAINAGE BOARD VERTICAL

.1 Align and hang drainage up to foundation wall. Position bottom edge of drainage board to be in moderate contact with weeping tile system.

.2 Secure drainage board to foundation wall with nails and washers spaced 450 mm o/c horizontally. Install minimum of 2 rows staggered and spaced 150 mm apart and min 150 from top edge.

.3 Align and install termination strip along top edge with nails spaced 300 mm o/c and seal with termination sealant.

.4 Align and install moulding strip over completed top edge detail.

.5 Overlap end laps, pull back loose fabric to expose drain core and position core of second panel over the overlap flange of first panel.

.6 Bend drain board to create inside corners and cut board to create outside corners, provide 75 mm of extra fabric to wrap corner.

.7 Stagger or offset joints of drain board sheets.

.8 Place all subsequent sheets in an overlapping single fashion.

.9 Backfill bottom edge in conjunction with weeping tile system.

3.9 APPLICATION

.1 Do sealing work in accordance with CGSB 37-GP-11M except where specified otherwise.

.2 Do priming of surface in accordance with CGSB 37-GP-15M except where specified otherwise.

.3 Apply primer.

3.10 SCHEDULE

.1 Apply continuous, uniform coating to entire exterior faces of foundation walls from 50 mm below finished grade level to and including tops of foundation wall footings.

.2 Apply continuous, uniform coating to exterior side of foundation walls enclosing rooms below finished grade. Include exterior portion of interior walls where floors in adjacent rooms are at different elevations.

.3 Apply two additional coats of dampproofing to vertical corners and construction joints for a minimum width of 230 mm on each side, and all around and for 230 mm along pipes passing through walls.

3.11 CLEANING

.1 Promptly as the work proceeds and on completion clean up and remove from site all rubbish and surplus materials resulting from the foregoing work.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 04 21 13 – Masonry.

.3 Section 07 27 10 – Air Barriers.

.4 Section 07 55 00 – Roof insulation.

.5 Section 07 21 19 – Spray in Place Urethane Foam Insulation.

1.2 REFERENCES

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

.1 ASTM E96-[00e1], Test Methods for Water Vapour Transmission of Materials.

.2 Canadian General Standards Board (CGSB).

.1 CGSB 71-GP-24M-[77(R1983)], Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.

.3 Underwriters Laboratories of Canada (ULC).

.1 CAN/ULC-S604-[91], Type A Chimneys.

.2 CAN/ULC-S701-[01], Thermal Insulation, Polystrene, Boards and Pipe Coverings.

.4 Environmental Choice Program (EPC).

.1 CCD-016-[97], Thermal Insulation.

1.3 SUBMITTALS

.1 Product Data:

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

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's insulation products and adhesives.

.2 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

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

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

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

1.5 WASTE MANAGEMENT AND DISPOSAL

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

.2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material [n appropriate on-site bins for recycling.

Part 2 Products

2.1 INSULATION

.1 Extruded polystyrene (XPS): to CAN/ULC-S701.

.1 R20.
.2 Thickness: **100 mm** or as indicated on drawings.
.3 Edges: ship-lapped.
.4 For use at typical cavity wall construction and at miscellaneous detail locations calling for rigid insulation.
.5 Acceptable Material: "**Styrofoam Cavity-Mate**" as manufactured by Dow Chemical Canada Inc.
.6 Acceptable Material: "**Foamular C200**" as manufactured by Celfortec Inc. (Owen Corning).
.7 or approved equal.

.2 Batt insulation: CAN/ULC-S702, Type 1.

.1 Friction fit batt insulation.
.2 For use in steel studs as indicated.
.3 Acceptable Material: 'Mineral Wool' by Roxul
.4 Or approved equal.

2.2 ADHESIVE

.1 Adhesive (for polystyrene): to CGSB 71-GP-24.

.1 Bakor Air Bloc 21.
.2 Compatible with respective rigid insulation, air/vapour and waterproofing membranes and recommended by manufacturers of those products. Use Bakor 230-21 rigid insulation adhesive for rigid insulation in contact with Blueskin air vapour barrier.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 WORKMANSHIP

.1 Install insulation after building substrate materials are dry.

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

.3 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.

.4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN4-S604 type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2

.5 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.

.6 Offset both vertical and horizontal joints in multiple layer applications.

.7 Do not enclose insulation until it has been inspected and approved by Consultant.

3.3 EXAMINATION

.1 Examine substrates and immediately inform Consultant in writing of defects.

.2 Prior to commencement of work ensure:

.1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

3.4 RIGID PERIMETER FOUNDATION INSULATION INSTALLATION

.1 Apply adhesive to polystyrene in accordance with manufacturer's recommendations.

.2 Apply adhesive to insulation board by spot method with daubs 40 mm diameter x 25 mm high at 200 mm o.c. each way

.3 Interior application: extend boards vertically below bottom of finish floor slab as indicated on drawings, installed on inside face of perimeter foundation walls.

.4 Exterior application: extend boards below finish grade as indicated on drawings. Install on exterior face of perimeter foundation wall with adhesive.

.5 Under slab application: extend boards as indicated on drawings. Lay boards on level compacted fill.

3.5 RIGID CAVITY WALL INSULATION INSTALLATION

.1 System Comprised of:

.1 Specified thickness of rigid ship-lapped insulation on Henry-Bakor Blueskin SA air/vapour barrier.

.2 Henry-Bakor Airbloc 21 adhesive to be applied to all sides of insulation and continuous layer to all insulation surfaces in contact with air/vapour barrier. Butter all sides and back to ensure full air barrier integrity. Apply adhesive to polystyrene in accordance with manufacturer's recommendations

.3 Butter Air Bloc 21 at all brick tie penetrations to ensure a complete seal

.4 Install plastic LOC-Wedges at masonry veneer ties to ensure securement to structural wythe or back up wall and in full contact with air/vapour barrier on wall surfaces.

3.6 CLEANING

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

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 04 21 13 - Masonry.

.2 Section 01 45 00 - Quality Control.

.3 Section 01 51 00 - Temporary Utilities.

.4 Section 07 21 13 – Board Insulation.

.5 Section 07 55 00 – Protected Membrane Roofing.

.6 Section 07 62 00 – Sheet Metal Flashing & Trim.

.7 Section 07 27 10 – Air Barriers.

1.2 ALTERNATE PRICE INFORMATION

.1 In relation to Cavity Wall Insulation only, this section is supplied for **INFORMATION ONLY for the purposes of providing the Alternate Price** required in Section 00 22 00 – 'Supplementary Bid Form'. Note that base cavity wall insulation is rigid board as specified in Section 07 21 13 and shown on drawings

.2 Notwithstanding this alternate price, other areas requiring spray foam insulation remain as part of this section.

1.3 REFERENCES

.1 Canadian Urethane Foam Contractors' Association Inc. (CUFCA)

.2 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S101-[1989], Fire Endurance Tests of Building Construction and Materials.

.2 CAN/ULC-S102-[1988(R2000)], Surface Burning Characteristics of Building Materials and Assemblies.

.3 CAN/ULC-S705.1-[01], Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Material Specification.

.4 CAN/ULC-S705.2-[02], Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Installer's Responsibilities-Specification.

1.4 TEST REPORTS

.1 Submit test reports, verifying qualities of insulation meet or exceed requirements of this specification, in accordance with Section 01 45 00 - Quality Control.

.2 Submit test reports in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.

1.5 QUALITY ASSURANCE

.1 Applicators to conform to CUFCA Quality Assurance Program.

1.6 SAFETY REQUIREMENTS

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

.1 Workers must wear [gloves] [respirators] [dust masks] [long sleeved clothing] [eye protection] [protective clothing] when applying foam insulation.

.2 Workers must not eat, drink or smoke while applying foam insulation.

1.7 PROTECTION

.1 Ventilate area in accordance with Section 01 51 00 - Temporary Utilities.

.2 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and [24] hour after application to maintain non-toxic, unpolluted, safe working conditions.

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

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

1.8 WASTE MANAGEMENT AND DISPOSAL

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

.2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling.

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

.4 Dispose of waste foam daily in location designated by Consultant and decontaminate empty drums in accordance with foam manufacturer's instructions and CAN/ULC-S705.2.

.5 Divert metal drums from landfill to metal recycling facility as approved by Consultant and to CAN/ULC-S705.2.

1.9 ENVIRONMENTAL REQUIREMENTS

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

Part 2 Products

2.1 MATERIALS

.1 Insulation: spray polyurethane to CAN/ULC-S705.1.

.1 Density: 30.4 kg/m3 (1.9 lb/ft3) minimum.

.2 Compressive Strength: >185 KPa (per ASTM D1622)

.3 Tensile Strength: > 330 KPa (per ASTM D1623)

.4 Air Barrier Classification:

.1 Type III (NRC) - permeance: 0.02 L/sec/m2 maximum at 75 Pa pressure differential.

.2 Air Barrier System Performance with leakage not exceeding 0.0054 l/m^2 @75 Pa pressure when tested in Accordance with CCMC Air Barrier System Requirements.

.3 All manufacturers/applicators shall submit test data reports prior to acceptance.

.5 Water Permeance: 125 ng/Pa.m2.s @25mm specimen thickness

.6 Submit manufacturer's Material Data Safety Sheets in accordance with and Sections 013300 – Submittal Procedures and 013530 – Health and Safety.

.7 Thickness: 50 mm (2.0 in.) .

.8 Acceptable material: Products meeting these specifications by BASF Canada Inc: "Walltite ECO". Installation shall only be by applicators specifically approved by the manufacturer/distributor.

.9 Acceptable material: Heatlok 0240 and Polar Foam 7300, distributed by Demilic Inc., contact Clifford Strassburger, 1-519-896-9307.

.10 Acceptable material: CertaSpray Closed Cell Foam, distributed by Certain Teed Insulation Canada Inc.

.11 Acceptable materials: other manufacturers meeting or exceeding these specifications as approved in writing by the Architect following specification, WMIS and test data submission.

.2 Primers: in accordance with manufacturer's recommendations for surface conditions.

.3 Sheet Air/Vapour Barrier Transition Membrane and Thru-Wall Flashing:

.1 Self adhering SBS modified bitumen membrane reinforced with non-woven fibrous glass:

.1 Thickness: minimum 1.45 mm

.2 Water Vapour Permeance: 0.05 perms max value. (2.8 ng/Pa.m2.s)

.3 Air Permeance: less than 0.01 l/m2 at 75 Pa pressure differentials.

.4 Adhesion: 7 day min. Peel adhesion at 5 deg. C :

.1 to primed Concrete: > 20 N/cm

.2 to selfedge: > 20 N/cm

.3 to primed plywood: > 25 N/cm

.4 to metal: > 30 N/cm

.5 Submit manufacturer's Material Data Safety Sheets in accordance with and Sections 01333 – Submittal Procedures and 013520 – Health and Safety.

.6 Acceptable Material: Blueskin SA by Bakor and Blueskin TW as thru-wall transition at masonry locations.

.2 Overlap typically minimum 150 mm on all adjacent layers/materials or as detailed.

Part 3 Execution

3.1 APPLICATION

.1 Apply insulation to clean surfaces in accordance with CAN/ULC-S705.2 and manufacturer's printed instructions. Use primer where recommended by manufacturer.

.2 Apply sprayed foam insulation in thickness as indicated.

3.2 WORKMANSHIP

.1 Certification

.1 Installation is to be only by certified CUFCA/NECA applicators and manufacturer of the product being applied. Applicator shall provide proof of both approvals.

.2 Examination

.1 Install insulation after building substrata materials are dry, thoroughly clean and capable of providing a firm, uniform bonding surface and temperatures are within the range recommended by product manufacturers.

.2 Verify that surfaces and conditions are suitable to accept work required in this section.

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

.4 Do not commence work until defects have been corrected.

.3 Preparation-Sprayed Insulation:

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

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

.3 Clean work area prior to commencing spray operations.

.4 Preparation-Peel & Stick Membrane:

.1 Prime all surfaces using Blueskin Primer by Bakor or primer specifically approved by membrane manufacturer. Allow primer to dry. Apply primer only to areas to receive membrane within the same working day, or reprime surfaces.

.5 Application-Sprayed Insulation:

.1 Apply insulation to clean surfaces in accordance with CAN/CGSB 51-39-92 and manufacturer's printed instructions. Use primer where recommended by manufacturer. Ensure full adhesion to transition membrane.

.2 Completely fill jambs of all hollow metal frames with insulation and ensure continuous contact with sheet membrane used at head of frames.

.6 Application-Peel & Stick membrane:

.1 Ensure membrane widths capable of sealing to all door opens at heads of frames.

.2 Lap sides and ends a minimum of 100 mm or as per details. Ensure full adhesion as per details.

.3 Position membrane for alignment with release film in place. Roll back, remove release film and press firmly in place. Roll all areas and laps with a steel or polyurethane roller.

.4 Seal ends of membrane to substrate using Polybithume by Bakor. or product approved specifically by membrane manufacturer.

.7 Tolerance

.1 Maximum variation from required thickness for sprayed insulation: 6 mm.

.8 Firestopping

.1 Required in all cavity walls 25 mm air space or greater.

.2 Install firestopping at 20 m intervals maximum horizontally and 3 m maximum vertically, in accordance with OBC requirements and manufacturer's approved method of Roxul AFB and transition membrane protection.

.3 At wall extending more than 1 storey in height, install additional firestopping horizontally at intermediate floor elevation.

3.3 LOCATIONS

.1 Cavity Walls Above Grade: **as an alternate price to Rigid Cavity Installation** – see Section 01 11 00 **-** Supplementary Information Form. Alternate Price to substitute Spray Urethane Foam insulation to all cavity walls,(complete with specified Blueskin Air/Vapour Barrier as transition membrane) and including mineral wool horizontal and vertical fire stopping to perimeter of the building cavity as required by OBC Division B, all in lieu of the specified Rigid Board Insulation system. Spray insulation is to include a 450mm high band of the specified rigid board insulation at the base of the wall cavity below the foamed in place insulation.

.2 On all structural steel in concealed locations exterior to insulated wall assemblies where steel penetrates through thermal barrier of wall forming a "cold bridge, whether shown on drawings or not.

.3 Concealed within Soffit Conditions: Refer to drawings.

.4 Jambs of Hollow Metal Frames: Refer to Section 081115 – Door Schedule.

.5 Behind Metal Siding/composite panels: Refer to Section 074143 **–** Aluminum Composite Panels.

.6 All other miscellaneous locations to ensure integrity of a continuous air/vapour barrier and insulation layer.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation methods providing [primary] air vapour barrier materials and assemblies.

.2 Air/vapour barrier materials to provide continuous seal between components of building envelope and building penetrations.

1.2 RELATED SECTIONS

.1 Section 04 21 13 – Masonry.

.2 Section 07 51 12 – Built-Up Bituminous (BUR) Roofing.

.3 Section 07 46 13 – Preformed Metal Cladding Siding.

.4 Section 07 21 19 – Spray in Place Urethane Foam Insulation.

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

1.3 REFERENCES

.1 Canadian Construction Documents Committee

.1 CCDC 2 - Stipulated Price Contract.

.2 Canadian General Standards Board (CGSB)

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

.2 CAN/CGSB-19.18M-[M87], Sealing Compound, One Component, Silicone Base Solvent Curing.

.3 CAN/CGSB-19.24M-[M90], Multi-Component, Chemical Curing Sealing Compound.

.4 CGSB 19-GP-14M-[76], Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.

.3 NBCC 1995; Part 5 - Environmental Separation

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

1.4 SUBMITTALS

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

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

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

1.5 QUALITY ASSURANCE

.1 Perform Work in accordance with Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification requirements for materials and installation.

.2 Maintain one copy of documents on site.

1.6 QUALIFICATIONS

.1 Applicator: Company specializing in performing work of this section with documented experience with installation of air/vapour barrier systems. Completed installation must be approved by the material manufacturer. .

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

1.7 DELIVERY, STORAGE AND HANDLING

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

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

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

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

1.8 WASTE MANAGEMENT AND DISPOSAL

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

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

1.9 PROJECT ENVIRONMENTAL REQUIREMENTS

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

.2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

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

1.10 SEQUENCING

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

Part 2 Products

2.1 SHEET MATERIALS

.1 Refer to technical data sheets for physical properties of product.

.2 Sheet Seal Type [1]: Self-Adhesive bitumen laminated to high-density polyethylene film, nominal total thickness of 1 to 4 mm as indicated.

.1 Acceptable material: Bakor Blueskin SA, adhesive grade membrane, use 'peel and stick' Blueskin where Air-Bloc 21 not present or equal Blueskin SA or TG or Soprema 'Sopraseal Stick.'

.2 Sealant and Adhesive as recommended by Manufacturer.

.3 Transition membrane adhesive to be Bakor Air-Bloc 21.

.4 Air Barrier Membrane to be Bakor Air-Bloc 21.

.5 Acceptable materials: with same characteristics as above by W.R. Grace and Soprema.

2.2 SEALANTS

.1 Sealants in accordance with Section 07 92 10 - Joint Sealing.

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

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

2.3 ADHESIVES

.1 Adhesive to be 'Air-Bloc 21' by Bakor.

2.4 ACCESSORIES

.1 Thinner and cleaner for As recommended by sheet material manufacturer.

.2 Stick-Clips: Perforated Galvanized steel anchors.

Part 3 Execution

3.1 EXAMINATION

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

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

.3 Report any unsatisfactory conditions to the Consultant in writing.

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

3.2 PREPARATION

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

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

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

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

.5 Prime substrate surfaces to receive adhesive and sealants in accordance with manufacturer's instructions.

3.3 INSTALLATION

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

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

3.4 PROTECTION OF WORK

.1 Protect finished Work in accordance with Section 01 61 00 - Common Product Requirements.

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

.3 Ensure finished Work is protected from climatic conditions.

3.5 SCHEDULES

.1 Wall Air/Vapour Barrier Over Outer Surface of Inner Wythe of Masonry: Trowel seal Type F over masonry unit surface to a thickness of 6 mm, seal masonry anchor penetrations air tight.

.2 Wall Air/Vapour Barrier Over Exterior Surface of Gypsum Sheathing: Place sheet seal Type G over sheathing surfaces with Adhesive Type E. Seal with Type Y sealant.

.3 Window Frame Perimeter: Lap sheet seal Type H from wall air seal surface with 75 mm of full contact over firm bearing to window frame with 25 mm of full contact. Edge seal with Type Z sealant.

.4 Wall and Roof Junction: Lap sheet seal Type J from wall seal material with 150 mm of contact over firm bearing to roof air seal membrane with 100 mm of full contact. Seal with Type X sealant.

.5 Roof System Air/Vapour Barrier Over Steel Deck: Gypsum sheathing, taped joints, apply membrane air seal Type K over sheathing surfaces with Adhesive Type D; edge seal membrane with Type Y sealant.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

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

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 05 31 00 – Steel Deck

.3 Section 06 10 11 – Rough Carpentry.

.4 Section 04 21 13 – Masonry.

.5 Section 07 21 19 – Sprayed in Place Urethane Foam Insulation.

.6 Section 07 41 43 – Aluminium Composite Panels

1.3 REFERENCES

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

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

.2 ASTM A775/A775M - 07b, Standard Specification for Epoxy-Coated Steel Reinforcing Bars

.2 American National Standards Institute (ANSI).

.1 ANSI B18.6.4-1998 (R2005), Screws, Tapping and Metallic Drive, Inch Series, Thread Forming and Cutting.

.3 Canadian General Standards Board (CGSB).

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

.4 Canadian Standards Association (CSA International).

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

.2 CAN/CSA-G40.20/G40.21M-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.

.3 CSA S136-07, Cold Formed Steel Structural Members.

1.4 DESIGN REQUIREMENTS

.1 Design metal siding system in accordance with CSA S136, and to withstand live, dead, lateral, wind, seismic, handling, transportation, and erection loads.

.2 Design metal siding system in accordance with Climatic Design Data contained in Ontario Building Code.

.3 Design metal siding system to limit deflection under design loads, to L/240.

.4 Design metal siding system to prevent restriction of thermal induced movement which would induce deformation such as warping, buckling, and failure of joint seals and fasteners. Design metal siding system to prevent vibration when subject to the effects of wind.

.5 Design miscellaneous, additional structural framing members and sag rods, required to complete metal siding system, where not indicated on Contract Drawings.

1.5 SUBMITTALS

.1 Shop Drawings:

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

.2 Indicate arrangement of sheets and joints, types and locations of fasteners and special shapes and relationship of panels to structural support members or support wall.

.3 Clearly detail and indicate locations of all Z clips, J-closures and edge trims.

.4 Describe in shop drawing details, suitable accommodation for the removal and joining of future cladding as described in 1.2.7 of this section and on drawings.

.2 Samples:

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

.2 Submit duplicate 300 x 300 mm samples of siding material, of colour and profile specified.

.3 Reports: Submit written field inspection and test report results after each inspection.

.4 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.6 QUALITY ASSURANCE

.1 Retain a licensed Professional Engineer, registered in Province of Ontario, to perform following services for metal siding Work:

.1 Design of metal siding Work.

.2 Review, stamp, and sign shop drawings.

.3 Conduct shop and field inspections and prepare and submit inspection reports.

.2 Mock-up:

.1 Fabricate, deliver, and erect one full scale 1200 mm wide x 1800 mm high mock-up panel of metal siding construction, in location acceptable to Consultant.

.2 Demonstrate finish, colours, and quality of workmanship.

.3 Mock-up may form part of final Work, if acceptable to Consultant. Remove and dispose of mock-ups which do not form part of Work.

.3 Pre-installation meeting: Arrange with manufacturer's representative, Contractor, and Consultant to inspect substrates, and to review installation procedures 48 hours in advance of installation.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Stockpile panels tilted to provide water run-off, free from ground contact on firm, level, non-staining supports extending full width of sheet and spaced not more than 450 mm apart. Cover components with opaque polyethylene sheet. Vent to allow air movement.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Divert used metal cut-offs from landfill by disposal removed for disposal at the nearest metal recycling facility.

.2 Divert reusable materials for reuse at nearest used building materials facility.

.3 Divert unused caulking, sealants, and adhesive materials from landfill through disposal at hazardous material depot.

1.9 EXTENDED WARRANTY

.1 Submit a warranty for metal siding system, covering materials and labour and the repair or replacement of defective work in accordance with the Contract, but for five (5) years total.

Part 2 Products

2.1 ACCEPTABLE MANUFACTURERS

.1 Metal siding:

.1 Peerless Enterprises or VicWest Steel Inc.

2.2 MATERIALS – METAL SIDING/SOFFIT

.1 For copings and flashings, provide prefinished metal 24 gauge thickness, colours as specified in Section 076200- Sheet Metal Flashing and Trim.

.2 For metal framing refer to Contract Drawings.

.3 Profile to match **Vicwest 7/8 Corrugated siding**.

.4 Colour: To be selected by Architect for manufacturer’s full colour range.

.5 Structural shapes, plates, sag rods, and similar items: CAN/CSA-G40.20-G40.21-M, Grade 300W.

.6 Hollow structural sections: CAN/CSA-G40.20/G40.21-M Grade 350W, Class H.

.7 Screws: to ANSI B18.6.4, stainless steel Type 304; nylon head colour same as exterior sheet.

.8 Powder actuated fasteners: galvanized, peened ballistic point, plastic cap of same color as exterior sheet.

.9 Sealants: in accordance with Section 079210- Joint Sealers, colour selected by Consultant. Allow for one (1) colour from manufacturers full range to match adjacent metal.

.10 Gaskets: soft pliable arctic grade vinyl, extruded profile.

.11 Touch-up paint: as recommended by panel manufacturer and Baycoat, compatible with prefinished coating.

.12 Isolation coating: alkali resistant bituminous paint or epoxy resin solution.

.13 Insulation: As noted on Drawings and in Section 072113 – Board Insulation, and sections pertaining to Insulation and Sheet Air/Vapour Barrier transition membrane.

2.3 COMPONENTS – METAL SIDING

.1 Exterior sheet: factory preformed coated metal, to profiles and thicknesses as indicated.

.2 Exterior corners: of same profile, material and finish as adjacent siding material, shop cut and brake formed to required angle, concealed corner brace, hairline exposed joint, pop rivet connections with painted head to match siding.

.3 Exposed joint ends of siding sheet shop cut clean and square, backed with tight fitting filler lapping back if joint, exposed components color matched to siding.

.4 Accessories: cap flashings, drip flashings, internal corner flashings, copings and closures for head, jamb, eaves, soffits sill and corners, of same material and finish as exterior siding, brake formed to shape. Exposed cut edges of metal profiles will not be accepted.

.5 Sub-girts: zinc coated to ASTM A653, G90 coating designation, profile as indicated to accept exterior sheet with structural attachment to building frame.

Part 3 Execution

3.1 GENERAL

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

3.2 INSTALLATION

.1 Install cladding in accordance with CGSB 93.5, reviewed shop drawings and manufacturer's written instructions.

.2 Supply and install miscellaneous, additional structural framing members, required to complete metal siding system, where not indicated on Contract Drawings.

.3 Maintain joints in exterior siding, plumb, true to line, tight fitting, hairline joints.

.4 Attach metal siding system components to prevent warping, buckling, and deformation induced by restriction of thermal induced movement.

.5 Install sub-girts to masonry walls prior to the installation of the Urethane foam insulation

.6 Install exterior finish siding to internal sub-girts with concealed fasteners.

.7 Coordinate with mechanical Sections as required for ensure metal solar wall system is connected to fan inlet and ventilation system.

.8 Provide notched and formed closures, sealed to arrest direct weather penetration at vertical profiles for exterior siding. Ensure continuity of "pressure equalization" of rain screen principle.

.9 Provide alignment bars, brackets, clips, inserts, shims as required to securely and permanently fasten wall system to building structure.

.10 Supply and install flashing at connection between roof and preformed metal siding.

.11 Touch up marred surfaces with air dry formulation to match pre-finished siding if approved by Consultant, otherwise remove and replace damaged metal siding.

3.3 CONTROL JOINTS

.1 Construct control joints, as indicated.

.2 Use cover sheets, of brake formed profile, of same material and finish as adjacent material.

.3 Use mechanical fasteners to secure sheet expansion joints materials.

.4 Assemble and secure wall system to structural frame so stresses on sealants are within manufacturer's recommended limits.

3.4 CLEANING

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

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

.3 Remove excess sealant with recommended solvent.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM)

- .1 ASTM C 36-[97], Standard specification for Gypsum Board.
- .2 ASTM C 1002-[98], Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.
- .3 ASTM D 1863-[86], Specification for Mineral Aggregate Used on Built-up Roofs.
- .4 ASTM D 2178-[97a], Specification for Asphalt Glass (Felt) Used in Roofing and Waterproofing.
- .5 ASTM D 4601-[97a], Specification for Asphalt Coated Glass Fiber Base Sheet Used in Roofing.

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-37.5-[M89], Cutback Asphalt Plastic Cement.
- .2 CAN/CGSB-37.8-[M88], Asphalt, Cutback, Filled, for Roof Coating.
- .3 CGSB 37-GP-9Ma-[83], Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
- .4 CGSB 37-GP-15M-[84], Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.
- .5 CGSB 37-GP-19M-[76(R1985)]Cement, Plastic, Cutback Tar.
- .6 CGSB 37-GP-21M-[76(R1985)], Tar, Cutback, Fibrated, for Roof Coating.
- .7 CAN/CGSB-37.28-[M89], Reinforced Mineral Colloid Type, Emulsified Asphalt for Roof Coatings and Waterproofing.
- .8 CAN/CGSB-37.29-[M89], Rubber-Asphalt Sealing Compound.
- .9 CAN/CGSB-51.25-[M87], Thermal Insulation, Phenolic, Faced.
- .10 CAN/CGSB-51.26-[M86], Thermal Insulation, Urethane and Isocyanurate, Boards, Faced.
- .11 CAN/CGSB-51.33-[M89], Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
- .12 CGSB 51-GP-38M-[76], Thermal Insulation, Cellular Glass, Pipe Covering, Block and Board.

.3 Canadian Standards Association (CSA)

- .1 CSA A123.2-[M1979(R1992)], Asphalt Coated Roofing Sheets.
- .2 CSA A123.3-[M1979(R1992)], Asphalt or Tar Saturated Roofing Felt.
- .3 CSA A123.4-[M1979(R1992)], Bitumen for Use in Construction of Built-Up Roof Coverings and Dampproofing and Waterproofing Systems.
- .4 CSA A231.1-[1972], Precast Concrete Paving Slabs.
- .5 CAN/CSA-A247-[M86(R1996)], Insulating Fibreboard.
- .6 CSA A284-[1976], Mineral Aggregate Thermal Roof Insulation.

.7 CAN/CSA-ISO[9001] [9002] [9003], Requirements for Quality Assurance, Parts 1, 2 and 3.

.8 CAN/CSA-ISO 14001-[96], Environmental Management Systems - Specifications with Guidance for Use.

.9 CSA O121-[M1978], Douglas Fir Plywood.

.10 CSA O151-[M1978], Canadian Softwood Plywood.

.4 Canadian Roofing Contractors= Association (CRCA)

.1 CRCA Specification.

.5 Underwriters= Laboratories of Canada (ULC)

.1 CAN/ULC-S701-[97], Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.2 CAN/ULC-S702-[97], Standard for Mineral Fibre Thermal Insulation for Buildings.

.3 CAN/ULC-S704-[98], Thermal Insulation, Urethane and Isocyanurate, Boards, Faced.

.4 CAN/ULC-S706-[98], Insulated Fiberboard.

1.2 CO-ORDINATION

.1 Co-ordinate work of this Section with Related Work specified in other Sections to insure construction schedule is maintained and water tightness and protection of the building and finished work is maintained at all times.

.2 Co-ordinate work with other trades and provide materials and methods compatible with other materials and methods in order to maintain air/vapour barrier tightness of the building envelope.

.3 Co-ordinate supply and installation of air seals under all wood blocking with various trades. Also co-ordinate trades for tying in the air/vapour barrier of the roof/wall junction at all walls, perimeter eaves and parapets.

1.3 SUBMITTALS

.1 Submit to the Architect/ Consultant a list of all materials intended for use before they are ordered.

.2 Provide written declaration that all components and materials are compatible with each other and are covered under one common warranty.

.3 Submit samples of materials intended for use in accordance to Section 013300 – Submittal Procedures.

.4 Manufacturer’s Instructions: Provide to indicate special handling criteria, installation sequence, and cleaning procedures.

1.4 PRODUCT DATA

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

1.5 DELIVERY, STORAGE AND HANDLING

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

.2 Provide and maintain dry, off-ground weatherproof storage.

.3 Store materials on supports to prevent deformation.

.4 Remove only in quantities required for same day use.

.5 Store materials in accordance with manufacturers written instructions.

.6 Store insulation protected from sunlight and weather and deleterious materials.

.7 Identification for delivery: indicate on containers or wrappings of and materials:

- .1 Manufacturer's name and brand.
- .2 Compliance with applicable standard.
- .3 Mass where applicable.

.8 Deliver materials in original containers, sealed, with labels intact. Ensure that shelf life of materials has not expired.

.9 Keep material storage on roof to a minimum. Keep covered and protect stored materials from moisture and degrading effects of the sun. Elevate on raised platform minimum 100mm. Remove only those required for day's operation.

.10 Provide WHIMS Material Safety Data Sheets for materials supplied.

.11 At temperature below 5ºC, store membrane roofing, adhesive and sealants that will be affected by temperature in dry heated storage. Remove product immediately prior to installation.

.12 Protect edges of roll goods. Stand on end to prevent flattening.

.13 Deliver fasteners in boxes or kegs and keep in protective storage until used. Do not oil or grease fasteners.

.14 Remove damaged and/or rejected materials from site.

1.6 WASTE MANAGEMENT AND DISPOSAL

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

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

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

.4 Plan and coordinate insulation work to minimize generation waste.

.5 Collect and separate plastic and/or paper packaging for recycling.

.6 Give preference to suppliers who take back mineral fibre insulation waste for reuse or recycling.

.7 Use the least toxic sealants and adhesives necessary to comply with requirements of this section.

.8 Close and seal, tightly, all partly used sealant and adhesive containers and store protected in well ventilated, fire-safe area at moderate temperature.

.9 Place used hazardous sealant tubes and adhesive containers in areas designated for hazardous materials.

.10 Collect, package and store partly used or unused containers of asphalt, sealing compounds, primers and roofing felts for recycling, and return to recycler.

1.7 PROJECT/SITE ENVIRONMENTAL REQUIREMENTS

.1 Temperature, relative humidity, moisture content.

.1 Apply built-up bituminous membranes only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

.2 Do not install built-up bituminous membranes when air and substrate temperature remains below 5EC in accordance with manufacturer's recommendations or when wind chill gives equivalent cooling effect.

.3 Install built-up bituminous membranes on dry substrate, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into system.

.2 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.

.3 Ventilation:

.1 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

.2 Provide continuous ventilation during and after dampproofing application. Run ventilation system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of dampproofing installation.

1.8 QUALIFICATIONS

.1 Contractors must be experienced and approved for application of the materials and system being installed and have been responsible for satisfactory installation similar to that specified.

.2 By submitting this Tender the Contractor represents they have the special qualifications, training and experience for performing the work.

.3 Provide a competent foreman to supervise all work and act as the Contractors representative on site. Employ only experienced and qualified workers and ensure that

workmanship conforms to best trade practices. Replace all work that results from inferior products or workership.

.4 Review contract documents with material manufacturer for products intended for use. Obtain mutual agreement and provide a letter co-signed by the manufacturer, that the details and specifications are appropriate and adequate for the construction and or renovations set out.

.5 In submitting their bid the Contractor reconfirms to be a member in good standing of the Canadian Roofing Contractors' Association and have been established as a roofing Contractor a minimum of five years and have adequate plant, equipment and skilled tradesmen to perform expeditiously and are known to have been responsible for satisfactory installations similar to that specified.

.6 In submitting their bid the Contractor confirms and represents to have the special qualifications for doing the work, and that the details and specifications are in their opinion appropriate and adequate for the construction described.

.7 In submitting their bid the Contractor acknowledges to be a trained and approved applicator for the materials and membrane systems specified.

1.9 SPECIAL PROTECTION

.1 Protect adjacent work, buildings, grounds and other property from damage during roofing operations. Locate garbage removal chutes and equipment away from locations where smoke and dust could be detrimental to the building or its occupants. Protect walls with tarpaulins in chute, hoisting and pumping areas.

.2 Proceed with caution. Use equipment that will not damage or impair the function of the deck.

.3 Do not overload the structure with materials or equipment.

.4 Remove all tools or equipment overnight that could be used to provide access to the building or used by persons intent on doing damage.

.5 Materials such as adhesives, solvents and thinners must be stored in well vented areas away from exists and air intake vents to avoid a build up of poisonous and caustic chemicals.

.6 Store solvent soaked cleaning rags in approved container, in a location to prevent a threat to fire safety or health of the building's occupants or workers. Dispose from site daily.

.7 Co-ordinate work to ensure that special protection against damage from traffic or work performed on top of completed roofing is provided.

.8 Protect roofing used as working platform by plywood sheets installed over work area including hoisting, pumping and traffic zones. Underlay platform with polyethylene when installed directly over bituminous membrane. Remove when not in use, otherwise weight down to prevent removal by wind.

.9 Remove and dispose asphalt mops from roof and site at end of working day. Storage arrangements shall provide free access of air to mops to minimize the possibility of spontaneous combustion. Mops to be stored in safe location to prevent the spread of fire should spontaneous combustion occur.

.10 Disconnect propane burners and torches from heating containers when not in use. Store heating fuel in protected area away from ignition sources and buildings.

.11 Fire Extinguishers: maintain one stored pressure rechargeable type with hose and shut-off nozzle, ULC labelled for A, B and C class protection. Size 10 kg on roof per torch applicator, within 10 m of torching operation.

.12 Maintain fire watch for 1.5 hours after each days roofing operations cease.

1.10 QUALITY CONTROL

.1 The roof inspection and testing shall in no way relieve the roofing contractor from his responsibility or obligation under the terms of the Contract.

.2 If the initial inspection and tests required to establish compliance with the Contract Documents indicate non-compliance with the Contract Documents, subsequent testing or re-inspection occasioned by non-compliance shall be performed. The cost of re-inspection and testing will be borne by the Contractor and deducted from the price of the Contract.

1.11 AIR TIGHTNESS

.1 Co-ordinate work with other trades and provide materials and methods compatible with other materials and methods in order to maintain air/vapour barrier tightness of the building envelope.

.2 Co-ordinate supply and installation of air seals under all wood blocking with various trades. Also co-ordinate trades for tying in the air/vapour barrier of the roof/wall junction at all walls, perimeter eaves and parapets.

1.12 WARRANTY

.1 Provide a written warranty signed and issued in the name of the Owner stating that the Contractor and Sub-Contractor jointly and severally warrant the complete roofing, and sheet metal flashing system against leakage, degradation of materials and thermal value, failure to stay in place, undue expansion, deformation, delamination, buckling, ridging, and splitting or loosening of seams, failure to adhere, deterioration, blistering, dislodged surfacing, and degradation of colour that detracts from performance or visual appearance and defective workmanship. All defects shall be repaired to restore the roof to good condition to the original Drawings and Specifications.

.2 The guarantee period shall be two years from date of Substantial Completion of the Building.

.3 Form of guarantee is enclosed.

.4 In addition to the 2 year specified guarantee provide the material manufacturers extended 10 year watertight warrantee covering labour, material and workmanship. The cost of the extended warrantee shall be included in the overall contract price. All roofing components must be supplied and/or pre-approved by the membrane manufacturer in order to comply with the acceptance criteria of the workmanship warranty.

1.13 SCHEMATIC ROOF DESIGNS

.1 Refer to Parts 2 and 3 for details on materials and installation procedures

.2 Roofs at steel deck:

.1 aggregate and bitumen surfacing
.2 1 ply #15 felt and 4 plies type IV felt and asphalt roofing membrane
.3 fiberboard/ tapered insulation
.4 86 mm polyisocyanurate insulation,
.5 Kraft paper vapour barrier
.6 Steel deck or acoustic deck with flute insulation

Part 2 Products

2.1 COMPATIBILITY

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

2.2 VAPOUR RETARDER

.1 Single layer of a ULC approved asphalt laminated sheet (kraft paper) conforming to CAN/CGSB-51.33-M80, type 2 and ULC approved fire retardant adhesive as manufactured by IKO, Johns Manville or approved equal.

2.3 AIR SEAL

.1 Self-adhering Grade SBS Modified Bitumen minimum thickness 3.0mm, with minimum 180g/sq.m., polyester reinforcement, Type II, Class C, Grade 2 and conforming to CGSB 37-GP-56M as supplied by Bakor, IKO, Johns Manville, Siplast, or Soprema.

2.4 POLYISOCYANURATE ROOF INSULATION

.1 Polyisocyanurate foam rigid insulation boards 3.4" (88 mm) thick. Insulation boards to be Type 3, Class 2, manufactured with HC blowing agent (Pentane) bonded to glass fibre reinforced facers on top and bottom surfaces during the manufacturing process. Standard of acceptance to be E'NRG'Y3 as manufactured by Johns Manville or approved equal. Maximum board size: 1200 mm x 1200 mm. Insulation Boards to meet the following requirements:

.2 Approved and listed by Factory Mutual Global for Class 1-60, 1-75, and 1-90 windstorm classification and meeting FM4470 approval requirements for Class 1 fire as a component in roof deck construction.

.3 Meet the physical property requirements of ASTM C 1289 and CAN/ULC S-704.

.4 Dimensional stability change of less than 2% conforming to ASTM D 2126.

.5 Conformity to CAN/ULC S704 and Can/ULC S770 for Long Term Thermal Resistance in polyisocyanurate insulation.

2.5 TAPERED FIBREBOARD

.1 Tapered high density fibreboard insulation min. 45 psi. meeting the requirements of CAN/CSA A-247-M86 and CAN/ULC-S706. Tapered insulation per the tapered layout.

.1 Acceptable Material: High Density Fibreboard insulation as supplied by Posi-Slope or Accuplane

2.6 OVERLAY FIBREBOARD

.1 Overlay insulation is to be a minimum 13 mm on flat areas. Insulation to be high density fibreboard insulation min. 45 psi. meeting the requirements of CAN/CSA A247-M86 and CAN/ULC-S706. Install overlay insulation as indicated on drawings.

.2 Overlay insulation at parapets and flashings to be torchable 13 mm recover board by Johns Manville or 13 mm Sopraboard by Soprema.

2.7 PRIMERS

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

.1 Acceptable material: as recommended by manufacturer.

.2 Zinc rich, ready mix to CAN/CGSB-1.181-92.

.1 Acceptable material: as recommended by manufacturer.

2.8 BUILT-UP MEMBRANE

.1 1 Ply #15 felt and 4 plies type IV felt asphalt and felt built-up conventional membrane roof and waterproofing system.

2.9 BITUMEN

.1 Asphalt: to CSA A123.4, Type 2 and 3.

2.10 FELTS

.1 Saturated organic felts: to CSA A123.3 No.15, saturated asphalt.

.1 Acceptable material: Bakor, IKO, Johns Manville or Soprema.

.2 Saturated glass fibre felts: to ASTM D 2178, Type IV-ply sheet.

.1 Acceptable material: Bakor, IKO, Johns Manville or Soprema.

2.11 SEALERS

.1 Plastic cement: asphalt, to CAN/CGSB-37.5.

.1 Acceptable material: as recommended By manufacturer.

.2 Sealing compound: to CAN/CGSB-37.29, rubber asphalt type.

.1 Acceptable material: as recommended by manufacturer.

.3 Sealant: in accordance with Section 07 92 10 - Joint Sealing not contain total of volatile organic compounds in excess of [5] % by weight, asbestos-free sealant, compatible with systems materials, recommended by system manufacturer.

.4 Polyurethane Caulking: 1 part Polyurethane compound for concealed horizontal metal joints, and reglets and exterior uses to CAN/CGSB Standard 19.13-M87. “Dymonic” by Tremco Ltd. or approved equivalent. Use colour to match adjacent materials

.5 Caulking: Silicone to CAN/CGSB 19.18-M87.

2.12 CANT STRIPS

.1 Cut from 75 mm x 75 mm x 38 mm thick fibreboard material to measure 140 mm on slope.

2.13 MEMBRANE FLASHING

.1 Base Sheet Flashing

.1 Self-adhering Grade SBS Modified Bitumen minimum thickness 3.0mm, with minimum 180g/sq.m., polyester reinforcement, Type II, Class C, Grade 2 and conforming to CGSB 37-GP-56M as supplied by Bakor, IKO, Johns Manville, Siplast, or Soprema.

.2 Cap Sheet Flashing

.1 Torch Grade SBS Modified Bitumen minimum thickness 4mm, with minimum 180g/sq.m., non-woven polyester reinforcement, Type 1, Class A, Grade 2, and conforming to CGSB 37-GP-56M as supplied by Bakor, IKO, Johns Manville, Siplast, or Soprema.

.3 Primer for Self Adhering Base Sheet

.1 Synthetic rubber based primer Elastocolle 500 by Soprema or equal.

2.14 FASTENERS

.1 All fasteners for steel, wood, concrete and specialty decks must meet factory mutual approvals.

.2 Use galvanized, copper, aluminum or stainless nails or screws as most compatible with materials being employed. Screws shall be minimum 38mm (1.5") #10 cadmium plated hex head with neoprene and steel washers by Atlas Bolt or approved equal. Rawl lead

shields as required for anchoring. Use fasteners as most generally suitable to Consultant's approval.

.3 General Fasteners: #10 ardox nails of length to penetrate bases minimum 13mm (0.5"). Horizontal Membrane Fasteners: Use ardox 50mm (2.0") nails with minimum 25mm (1.0") solid caps for securing membrane to insulation stops.

.4 Vertical Flashing Fasteners: Nails, Tapgrip or Permagrip fasteners with 25mm (1.0") solid caps. Minimum length 38mm (1.5").

.5 Screws: Minimum 38mm (1.5") #10 cadmium plated hex head with neoprene and steel washers by Atlas Bolt or approved equal. Rawl lead shields as required for anchoring.

.6 Insulation to substrate: fasteners and plates must meet Factory Mutual 4470 Standard for wind uplift and corrosion resistance.

2.15 ROOF GRAVEL

.1 To ASTM D 1863, 10 mm x 16 mm, clean crushed stone, slag or gravel.

2.16 CONCRETE PAVERS

.1 Paving slabs: to CSA A231.1, 600 mm x 600 mm x 38 mm, precast concrete paving slabs welded wire mesh reinforced concrete paver with 6% - 8% air entrainment and to 30 MPa.

.2 Provide from existing roof access to new ladder at Addition and from roof access to new rooftop units providing a complete surround of pavers at each unit. Contractor to calculate number of units from roof plans.

2.17 PAVER PEDESTALS

.1 Pedestals and levelling plates made of high density polyethylene with integral spacer ribs on upper surface.

2.18 VENT STACK FLASHING

.1 SJ-24 pre-insulated spun aluminium with telescoping cap complete with stainless steel vandal proof cap by Thaler Metal Industries Inc. 80mm diameter, installation to conform to Local Plumbing Code. Confirm with Mechanical Section for size, number and location.

2.19 METAL SLEEVES

.1 Fabricate from one-piece 454 gms. (16.0 oz.) copper or 26 gauge stainless steel fabricated minimum 300mm (12.0") high above finished roof surface, with 125mm (5.0") flange as approved by the Consultant. All seams to be continuous and soldered.

2.20 SCUPPERS AND OVERFLOWS

.1 Size and materials as specified or shown, fabricated from 454 gms. (16.0 oz.) copper, 26 gauge stainless steel or 25 gauge PVC coated metal with minimum 125mm (5.0") roof flange and gravel guard to Consultant's approval. Make all seams continuous and watertight by soldering or heat welding.

2.21 BITUMINOUS METAL PAINT

.1 “Gilsonite Asphalt 410-02" by Monsey Bakor Inc. to CGSB1-GP-108 Type II.

2.22 B-VENT FLASHING

.1 MEF-4A by Thaler. Supplied by Mechanical Section and installed as approved by Roofing inspector.

2.23 SOURCE QUALITY CONTROL

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

.2 Submit laboratory test reports certifying compliance of bitumens and roofing felts with specification requirements.

Part 3 Execution

3.1 WORKMANSHIP

.1 Do work in accordance with applicable, standard in Canadian Roofing Contractors Association (CRCA)] Roofing Specifications Manual, except where specified otherwise.

.2 Do priming for asphalt in accordance with CGSB 37-GP-15M.

3.2 HEATING OF ASPHALT

.1 Asphalt to be heated in kettle or tanker sufficiently to provide correct EVT range at point of application.

.2 In cold weather insulate hauling equipment and re-circulation lines to minimize heat loss.

.3 Do not heat asphalt above its Final Blowing Temperature (FBT) in tanker.

.4 Heating asphalt above its FBT may be permissible in kettle as long as asphalt is used up within four hours.

.5 Equip kettle and tanker with working thermometers.

3.3 PLANT AND EQUIPMENT

.1 Do not use direct fired equipment.

.2 Use only kettles equipped with thermometers or gauges in good working order.

.3 Locate kettles in safe place outside of building or, if approved by Consultant, on noncombustible substrate at location to avoid danger of igniting combustible material below. When locating kettles, give consideration to direction of prevailing winds, building fans and air handling units to minimize possibility of smoke and fumes entering surrounding occupied buildings. If wind direction causes smoke and fume problems, relocate kettles on daily basis when directed by Consultant.

.4 Maintain supervision while kettles are in operation and provide metal covers for kettles to smother flames in case of fire. Provide suitable fire extinguishers.

.5 Maintain efficiency of kettles and equipment by frequent cleaning. Remove all carbonized bitumen.

.6 Use only fibreglass roofing mops.

3.4 PROTECTION AND SUBSTRATE EXAMINATION

.1 Review plans, specifications and drawings for the original and any subsequent alterations for the building's construction and interview those involved in the construction of the building. Investigate the location of services that may be installed under or in the deck, built into the structure on or within the assembly. These services are to include but are not limited to mechanical, electrical, communications, lightning protection, cable, security and fire alarms. Ensure that all services are located and protected from damage from work under this contract.

.2 Inspect the surface for soundness and notify the Architect/Consultant in writing of any surface unsound and unsuitable for roofing. Do not commence work until you have documented conditions and obtained a ruling from the Architect/Consultant on the acceptability of surfaces and/or corrective measures required. The cost for any delays due to postponement of work that results from investigating the site problem or obtaining a ruling will be at the Contractor's expense.

.3 Before proceeding with roofing application, ensure that:

.1 All surfaces are clean of debris and free of snow, frost and moisture.

.2 Surface is clean and sufficiently dry to ensure specified adhesion will be obtained.

.3 Surface is sound, constructed smooth in true planes and levels or sloped to drains, in conformity to design intent.

.4 Surfaces are free of cracks that are wider than bridging ability of roofing materials.

.5 Adjacent construction and installation of work of others incorporated when roof is completed.

.6 Preparations have been made for bases on which equipment will be installed.

.7 Existing fasteners are tight and deck irregularities and levels are corrected to provide a suitable surface for new roofing.

.8 Curbs have been built.

.9 Drains have been installed at proper elevations relative to finished roof surface.

.10 Plywood and lumber nailer plates have been installed to walls and parapets as indicated.

3.5 PREPARATION OF STEEL DECK (CHANNEL TYPE)

.1 Install sound absorbing insulation in flutes of acoustical steel roof deck in accordance with deck manufacturer's instructions.

.2 Install sand in flutes of steel deck as indicated on drawings.

3.6 PRIMING CONCRETE DECK

.1 Not applicable to this project.

3.7 DECK SHEATHING

.1 Mechanically fasten sheathing to steel deck with screws spaced [400] mm oc each way.

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

3.8 ASPHALT APPLICATION

.1 Heat asphalt to obtain proper application temperature and viscosity at point of contact. The EVT temperature is the temperature when the asphalt attains a viscosity of 125 centistokes for hand mopping and 75 centistokes for mechanical application. To compensate for wind chill, ambient temperature and shading a tolerance of (±15º C) (±25ºF) is allowed. Keep asphalt in constant use to prevent distillation. If heating temperatures are not supplied on the containers or bills of lading for the asphalt on site heat to no more than 246ºC (475ºF) for Types II and III.

.2 In cold weather, insulate pump pipes and transport bitumen on roof in insulated carriers to minimize temperature fall back between kettle and point of application.

.3 Bitumen shall not be heated to flash point or held at final blowing temperature for more than 4 hours to prevent asphalt fallback.

.4 Unless otherwise specified by Manufacturer literature use the following E.V.T. temperatures.

.1	Mechanical Application	Mop Application
.2	Type II 400ºF (±25ºF)204ºC (±15ºC)	Type II 400 ºF (±25ºF)204ºC (±15ºC)
.3	Type III 450ºF (±25ºF)232ºC (±15ºC)	Type III 425 ºF (±25ºF)218ºC (±15ºC)

.5 Maintain constant supervision of tankers kettles to ensure that bitumen is not overheated. Check temperature of bitumen in kettle at a minimum of 30 minute intervals with an accurate thermometer. Maintain a record of bitumen temperatures.

.6 Do not place kettles on the roof without obtaining written permission from Owner and insurance underwriters. Where permission is granted, in addition to the requirements

outlined in these documents, higher safety and insurance limits may be imposed. Any additional cost to meet these requirements will be at the Contractor's expense.

.7 Install all bitumen in a uniform continuous application insuring good adhesion is achieved. For #15 felts, apply at the rate of not less than 1.0 kgs./m^2 (20 lbs./100ft^2) per ply and for glass felts not less than 1.2 kgs./m^2 (25 lbs./100ft^2) per ply. Insure that bitumen bleeds out from both sides of the roll not less than 13mm (0.5").

.8 Use Type II for slopes up to 127mm/m (1.5"/ft.) (1:8).

.9 Use Type III for slopes greater than 127mm/m (1.5" to 3.0"/ft.) (1:8 to 1:4) and for felt flashings.

3.9 ACOUSTIC DECK INSULATION APPLICATION

.1 Not applicable to this project.

3.10 PRIMER

.1 Prime masonry and concrete surfaces which will be in direct contact with asphalt at the rate of 0.15 L./m^2 (0.33 gal./100 ft^2) to CGSB 37-GP-15M. Ensure that surfaces are tack-free before proceeding.

.2 Limit quantity of primer at deck openings and points of termination to prevent bleedthrough to the building interior.

.3 Broom primer into surface.

.4 Re-prime all surfaces that become contaminated with dust or become marred due to their exposure to roof traffic or weather.

3.11 VAPOUR RETARDER

.1 Install one ply asphalt laminated sheet (kraft paper) conforming to

.2 CAN/CGSB-51.33-M80, Type 2 in adhesive with a ULC approved fire retardant adhesive at a rate prescribed by the manufacturer.

.3 The vapour barrier shall be fully sealed at all overlaps and to adjacent surfaces with the adhesive.

.4 The vapour retarder is to overhang all edges and be carried up verticals a minimum 6" to allow for the formation of a water cut-off and enveloping the insulation.

3.12 VAPOUR RETARDER (CONCRETE GYPSUM BOARD PLYWOOD DECK)

.1 Not applicable to this project.

3.13 AIR SEALS

.1 Install self adhering modified Bitumen air seals under wood blocking, over metal upstands and all points shown on drawings. Overlap with air/vapour barrier of the roof/wall junctions at all wall perimeter eaves and parapets.

3.14 INSULATION

.1 The base insulation shall be 86 mm of Polyisocyanurate insulation mechanically secured to the deck with 4 1/4" Trufast stainless or coated screws and plates to meet the requirements of FM 1-90. (5 fasteners per panel minimum or more as required by FM) At acoustic deck use prefinished screws to match deck color.

.2 Over top of the base insulation a layer of 13 mm high density fibreboard insulation is mopped in type 3 asphalt at a rate of 25# per 100 sq. ft.. At the parapet and flashing, the torchable recover board is to be mechanically secured to the back-up surface through the base layer of insulation.

.3 Insulation boards shall be installed with staggered joints so adjacent boards are butt together without gaps. Boards are to be cut at projections and perimeters to minimize heat loss at these locations. All joints in the 2 layers of insulation are to be off set a minimum of 6" (150 mm).

.4 At all drain locations, the base insulation shall be reduced by 1” (25 mm) in thickness to create an 8'x8' (2440x2440 mm) sump for positive drainage. Install tapered high density fiberboard sump from 1 ½” to ½” over 4’.

.5 Fasteners and plates used to secure the insulation to the roof deck must meet Factory Mutual 4470 Standard for wind uplift resistance I-90 and corrosion resistance. Trufast fasteners and metal plates and/or an equal pre-approved by the Consultant prior to the Tender Closing Date.

3.15 TAPERED INSULATION: APPLICATION

.1 For all locations of tapered insulation, provide shop drawings from tapered insulation Manufacturer for Consultant's review prior to installation.

.2 Where shown on roof plan, install width and thickness of tapered fibreboard insulation shown on drawings over base insulation set in a solid coat of Type III asphalt. Allow for wood blocking to compensate for additional insulation thickness.

.3 At all drain locations, provide tapered fibreboard insulation to form a sump each side of drain to promote positive drainage as shown on drawings.

.4 Ponding water will not be permitted.

3.16 CONVENTIONAL MEMBRANE APPLICATION

.1 Ensure all substrate surfaces are dried by artificial or natural means before installation of membrane.

.2 The roof membrane is to be constructed from 1 ply #15 felt and 4 plies type IV felt with plies overlapping 698mm (27.5"). 3+1 or 2+2 applications are not acceptable.

.3 Roll and squeegee each ply into uniform solid layer of bitumen to obtain complete embedment.

.4 Install felts smooth, free of wrinkles, air pockets, fishmouths and tears. Coinciding end joints are not acceptable.

.5 All fishmouths in membrane are to be cut and worked into bitumen immediately while bitumen is still hot. Repair all fishmouths with an additional ply of glass felt extending minimum 150mm (6.0") in each direction of defect.

.6 Do not gang roll felts during application as this will result in the displacement of bitumen. Keep rolls minimum 2.0 metres (6.5 ft.) apart during application. Protect new membrane from wheel and foot traffic until bitumen is set.

.7 Install felts with the slope to prevent slippage of the roll due to gravitational forces starting at low point in continuous application to top of cants.

.8 Ensure that felts at inside and outside corners fit tight to all verticals without gaps. Seal membrane at top of cants with a continuous light coat of asphalt as work progresses. Cut membrane at all changes in plane to assure proper bond to surfaces.

.9 Extend felts to the top of cants at all vertical surfaces in a continuous operation to provide waterproof seal while bitumen is still hot. Secure membrane at 212mm (8.5") o.c. in center of insulation stop at the toe of the cant strip while bitumen is still hot prior to installing membrane flashings. Locate fasteners 38mm (1.5") from edge of overlapping plies. Glaze coat all felts with asphalt after securing membrane to insulation stops.

.10 Avoid coinciding end joints where possible. Terminating felts and cross strippings in ends is not acceptable. Use equipment and application techniques approved by Consultant.

.11 Install an additional two plies of fibreglass felt in solid bitumen to reinforce defects and lap joints where the membrane changes direction. Install an additional two plies of fibreglass felt in and 600mm (2'-0") beyond drainage sump and drainage channels.

.12 Install an additional 180gm/m^2 mop grade modified bitumen base sheet extending 200mm (8.0") beyond all areas where walkways, observation platforms or other apparatus are to be installed. Set base sheet in solid coating of Type III asphalt prior to gravelling area.

.13 Flashing application.

.1 Prior to installing the flashings, the roofing supervisor and foreman shall check, and approve the condition of the substrate. If required corrective action must be taken to rectify problem areas to the satisfaction of all parties. The start of work shall be deemed to constitute acceptance of the conditions governing the contract.

.2 Ensure substrate is dry before installation of membrane.

.3 At curbs, joints, parapets and verticals install 1 ply of base sheet flashing self-adhered to points shown extending 150mm beyond the toe of the cant and extending up and over to points shown. Ensure that membrane achieves solid contact and is left free of wrinkles, air pockets, fishmouths and tears. Overlap all end joints and corners minimum 150mm and ensure a positive watertight seal. Install in one meter lengths, cut from across the roll.

.4 Install 1 ply of granular surfaced cap sheet flashing, torched in place, extending 300mm beyond the toe of the cant, extending up and over to points shown. Work membrane into place with wet sponge to ensure that a permanent watertight seal is achieved. Leave finished product free of buckles, air pockets, fishmouths and tears.

.5 Prepare all overlaps with heat and trowel to fully embed the granules and obtain a continuous flow of bitumen.

.6 Overlap all end joints minimum 150mm. Install in 1 metre lengths cut from across the roll. Offset side laps of cap sheet roofing and cap sheet flashings by 50%.

.7 At inside and outside corners, carry first ply around onto opposite plane, minimum 150mm. Trim overlapping ply flush to corner. Fold over and secure cap sheet to outside faces and top of curbs with nails and caps at 225mm o.c. Secure the top of the membrane flashings at all vertical walls at 225mm o.c. with caps and fasteners most generally suitable. Seal the tops of all flashings and points of termination with modified sealant.

.14 Bituminous Surfacing

.1 Do not install bitumen and aggregate surface until membrane and membrane flashings are complete, inspected and accepted. Insure membrane and flashings asphalt have set prior to gravelling operation.

.2 Prior to installation of bituminous and aggregate surface carefully inspect and repair all defects and deficiencies in the membrane and flashings that was not corrected during the initial installation.

.3 Pour hot bitumen flood coat over entire surface without skips at a rate of not less than 3 kg./m^2 (60 lbs./100 ft^2). Apply full covering of gravel at the rate of not less than 24 kg./m^2 (500 lbs./100 ft^2). If skips are found, sweep back gravel and reflood area.

.4 Remove all loose gravel and embed a second full coat of bitumen and aggregate 5.0 metres (15'-0") at all outside corners of the building and 600mm (2'-0") back from all roof openings.

.5 Provide a double pour of asphalt and gravel at locations where ponding depth exceeds 6mm (0.25") to disburse water to nearest drain. Contractor is to include to repour 5% of the total roof area in the original bid.

.6 Repeat application of bitumen and aggregate over entire roof for total aggregate mass of 48 kg/m^2 (10.0 lbs./ft^2).

.7 Check areas with broom to ensure proper embedment of aggregate. Clean and repour all areas as required to obtain a minimum 40% of adhesion of aggregate into bitumen.

3.17 CANTS

.1 Install fibre cants over rigid insulation.

.2 Apply hot bitumen to receiving surface and embed cant firmly by hand.

.3 Angle cut cants to fit tightly on back and bottom where roof to wall angle varies from 90E.

3.18 ROOF DRAINS

.1 Ensure roof drains are properly secured and set to permit positive roof drainage. Lower or extend mechanical services required to conform to specified requirements and design intent.

.2 Coat drain flange to receive roofing solid with modified mastic and install 1 ply #15 felt in the sump as an underlay to the membrane laid with a solid coat of hot bitumen. Lay membrane roofing including the cap sheet continuously through sump and over roof drain flange. Neatly trim felts to interior face and seal inside face with modified mastic.

.3 Set clamp ring in solid bed of modified asphalt sealant and secure clamp ring as dictated by drain design immediately after membrane is installed. Tighten bolts to ensure a permanent watertight seal. Install drain screen and gravel guards to details and manufacturer instructions.

3.19 PLUMBING VENTS, STACKS AND SLEEVES

.1 Inspect and clean soil pipes of debris to insure they are open. Make all roof penetrations air/water tight by installing a flexible membrane extending minimum 150mm beyond pipe onto overlay. Cut hole in membrane and pull over pipe to provide tight fit, tighten with clamp and seal with caulking. Alternatively at projections foam deck at pipes with polyurethane foam.

.2 Trim bitumen membrane 25mm from openings to prevent bitumen from dripping.

.3 Set metal flashings on top of completed membrane roofing.

.4 Set and cover flanges to receive roofing solid with modified sealant.

.5 Flash all flanges with three plies of felt laid solid with bitumen. Install first ply 25mm from upturn, and continue 150mm onto roof, second ply 225mm and third ply 300mm beyond flange.

.6 Coat finished surface of membrane immediately upon installation.

.7 Co-ordinate work with appropriate section to ensure that pipes are adjusted to flashing heights by either cutting down or extending pipes with matching materials attached with mechanical couplers. Ensure pipe is minimum 25mm higher than flashing sleeve. Insulate all sleeves, except unit heater stacks, with loosely packed glass fibre insulation. Seal openings between flashings and pipes with caulking sloped to shed water

.8 Install telescoping caps on soil pipes sealed solid with caulking to prevent condensation traps. Install vandal proof caps to manufacturer's requirements.

.9 Roofing Contractor to supply and install all sleeves, caps and rain collars on mechanical equipment. Unit heaters, etc. Design and fabricate collars to match material to which it is to be attached. Solder rain collars up to .559 mm and weld .711mm or heavier.

.10 Replace all damaged flashings and poorly fitting collars.

.11 Protect exposed surface during roofing operation and clean surfaces free of bitumen before leaving site.

3.20 CONCRETE PAVERS

.1 Install concrete pavers where shown to requirements of Summary of Work, drawings and details.

.2 Install paver on a 38mm (1.5") thick layer of extruded polystyrene insulation underscored in both directions at 150mm (6.0") o.c. to allow for drainage and venting. Cut insulation 38mm (1.5") smaller on all sides than paver so overhang protects insulation from direct sunlight. Build up gravel at edge of paver for additional protection to insulation.

.3 When bolting wood or equipment to pavers pre-drill holes through paver and install bolt from underside through to top and secure equipment with washers and nuts. Countersink bolt heads to protect membrane.

.4 Gas line supports including concrete paver bases shall be supplied by Division 15

.5 Quantity: as shown on drawings and to be site verified by the Consultant

3.21 ROOFING NEW TO EXISTING

.1 Applicable to new cuts in existing roofing at new mechanical unit penetrations. Refer to drawings for locations.

.2 Make good existing roof, membrane flashing, and metal flashing. Scrape back existing roof surface minimum 18 inches (450 mm) along the entire perimeter involved, repair surface as required, due to scraping operations. Provide all cant strips, expansion joint filler, new roof membrane, membrane flashings, and provide new roof surfacing all as detailed and/or directed by authorized owner's representative.

.3 Materials for the reinstatement of existing roof must be compatible with existing materials.

.4 Make good existing roofing, flashing membrane and sheet metal counter flashings to the satisfaction of owner's authorized representative.

.5 Special job conditions are anticipated and will require full co-operation and co-ordination. Provide all miscellaneous materials and labour as directed.

3.22 FIELD QUALITY CONTROL

.1 Inspection and testing of BUR application will be carried out in accordance with Section 011100 – Summary of Work, section 1.43.

3.23 PROTECTION OF COMPLETED WORK

.1 Ensure membrane is undamaged before application of protection board.

.2 Apply protection board to cover membrane at locations as indicated.

3.24 CLEANING

.1 Keep the premises free from accumulation of waste materials or rubbish at all times. Stock piling of debris on the roof will not be permitted.

.2 Leave roof clean of debris and bitumen left by spills and machine tracking.

.3 Leave grounds and building free of debris and bitumen spread by pedestrian traffic where applicable. Rake out excessive piles of aggregate and trim to neat, even surface.

.4 Clean surfaces and penetrations of all contaminants and touch up to the satisfaction of the Owner. Include roof top equipment, curbs, soil stacks, sleeves, gas lines, vents, drains, ladders and walls.

.5 Check drains to ensure they are functional and where required remove all debris by vacuum.

.6 At the completion of the work remove all rubbish, tools, equipment and surplus materials.

.7 Be responsible to repair and pay all costs and fees required to rectify damage caused by work of this Contract with materials and finish to match original.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 06 10 11 – Rough Carpentry.

.3 Section 07 46 13 – Preformed Metal Siding.

.4 Section 07 51 12 – Built-Up Bituminous (BUR) Roofing.

.5 Section 07 21 13 – Board Insulation.

.6 Section 07 41 43 – Aluminium Composite Panels.

1.2 REFERENCES

.1 The Aluminium Association Inc. (AA)

.1 Aluminium Sheet Metal Work in Building Construction-[2000].

.2 AA DAF45-[97], Designation System for Aluminium Finishes.

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

.1 ASTM A167-[99], Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.2 ASTM A240/A240M-[02], Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

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

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

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

.6 ASTM A792/A792M-[02], Standard Specification for Steel Sheet, 55% Aluminium-Zinc Alloy-Coated by the Hot-Dip Process.

.7 ASTM B32-[00], Standard Specification for Solder Metal.

.8 ASTM B370-[98], Standard Specification for Copper Sheet and Strip for Building Construction.

.9 ASTM D523-[89(1999)], Standard Test Method for Specular Gloss.

.10 ASTM D822-[01], Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.3 Canadian Roofing Contractors Association (CRCA)

.1 Roofing Specifications Manual [1997].

.4 Canadian General Standards Board (CGSB)

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

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

.3 CAN/CGSB-93.1-[M85], Sheet Aluminium Alloy, Prefinished, Residential.

.5 Canadian Standards Association (CSA International)

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

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

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

1.3 QUALIFICATIONS

.1 Applicator to be of local recognized standing with proven record of satisfactory installations and to be approved by the Architect. Applicator must have, at least, five (5) years of proven experience in this work.

.2 Supply and install sheet metal flashings in accordance with, and to the standards of the CRCA FL Series details.

1.4 SAMPLES

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

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

1.5 SHOP DRAWINGS

.1 Submit Shop Drawings in accordance with Section 013330 – Submittal Procedures.

1.6 WASTE MANAGEMENT AND DISPOSAL

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

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

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

.4 Divert unused metal materials from landfill to metal recycling facility as approved by Consultant.

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

1.7 EXTENDED WARRANTY

.1 Submit a warranty for metal flashing and trim, covering materials and labour and the repair or replacement of defective work in accordance with Section 01006 Stipulated Sum Contract, PBE -1994, but for five (5) years total.

Part 2 Products

2.1 PREFINISHED STEEL SHEET

.1 Galvanized steel sheet with factory applied Stelco or Dofasco 8,000 Series coating. Two colours to be used for this project:

- .1 Colour "Type-1" for Metal Flashing: colour for exact match to the existing building. Allow for selection from manufacturer's complete range. Location: new addition.
- .2 Colour "Type-2" for Metal Flashing: colour for exact match of Curtain Wall. Allow for metallic series colour for exact match or if dictated limited quantity of material required

.2 Metal thickness to be 24 gauge. Where exposed face of flat faced flashing and trim exceeds 250 mm, provide details to lap two layers providing on intermediate lock joint to achieve total depth required for exposed surface.

.3 Isolation coating to CGSB 1-GP-108C.

.4 Plastic cement to CGSB 37-GP-5M.

.5 Sealant compound of one (1) part polysulphide polymer base.

.6 Cleats of same material, and temper as sheet metal, minimum 50 mm wide, 45 mm thick.

.7 Fasteners: of same material as sheet metal to CSA B111-1974. Flat head roofing nails of length and thickness suitable for metal flashing application.

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

Part 3 Execution

3.1 INSTALLATION

.1 Install sheet metal work to CRCA Specifications and complete as soon as possible following application of roof membrane.

.2 Use concealed fastenings except where approved before installation.

.3 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock forming tight fit over hook strips, except where otherwise shown.

.4 Lock end joints and caulk with sealant.

.5 Flashings to be anchored into reglets or folded over continuous strips at maximum 300 mm centers.

.6 Supply and assist in the installation of reglets where required for metal flashings.

.7 Use isolation coating where galvanized metal is in contact with concrete, masonry or mortar.

.8 Form flashing over control and expansion joints to Architect's approval.

.9 Install plastic pans, where shown around items projecting through roof membrane to CRCA Specification FL-119. Fill pans with plastic cement.

.10 Install fasteners and cleats in sufficient numbers and proper size to prevent metal from lifting or tearing under 125 km/h winds.

.11 Contractor must inform roofing inspector 48 hours prior to start of any work. Roofing inspector has authority to reject incorrect procedure, inferior work and materials.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S101, 1989.

.2 CAN/ULC-S102, 1988.

1.2 TEST REPORTS

.1 Submit product data including certified copies of test reports verifying fireproofing applied to substrate as constructed on project will meet or exceed requirements of Specification.

.2 Submit test results in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.

.3 For assemblies not tested and rated, submit proposals based on related designs using accepted fireproofing design criteria.

1.3 SAMPLES

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

.2 Submit duplicate 300 x 300 mm size sample of exposed fireproofing for approval of texture and colour.

1.4 PROTECTION

.1 At outdoor temperatures less than 5EC, ensure that a 5EC air and substrate temperature is maintained during and for 24 hours after application. Ensure that natural ventilation to properly dry the fireproofing during and subsequent to its application is provided. In enclosed areas lacking openings for natural ventilation, ensure that interior air is circulated and exhausted to the outside.

.2 Provide temporary enclosures to prevent spray from contaminating air beyond application area.

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

Part 2 Products

2.1 MATERIALS

.1 **Sprayed fireproofing**: ULC certified cementitious or fireproofing qualified for use in ULC Designs to provide 1 hour fire resistance rating to **all floor supporting structural steel members**. Contractor to state ULC Design compliance in data submissions in accordance with Section 01 33 00 – Submittals.

.1 Acceptable Material: "W.R. GRACE", Type MK-6.

.2 Acceptable Material: "CAFCO/ISOLATEK INTERNATIONAL" Type LD-C/F or Type 300,5B OR 400.

.3 Acceptable Material: AD Fire Protection systems, AD Type 5.

.2 Curing compound: type recommended by fireproofing manufacturer, qualified for use in ULC Designs specified.

.3 Sealer: type recommended by fireproofing manufacturer, qualified for use in ULC Design specified.

Part 3 Execution

3.1 PREPARATION

.1 Discuss fireproofing methods and final product with principal building inspector prior to application to ensure that finished installation will be acceptable. Record in writing all materials and methods to be employed to achieve final approval of installation.

.2 Substrate shall be free of material, which would impair bond.

.3 Verify that painted substrate [s] are compatible and have suitable bonding characteristics to receive fireproofing.

.4 Remove incompatible materials.

.5 Ensure that items required to penetrate fireproofing are placed before installation of fireproofing.

.6 Ensure that ducts, piping, equipment, or other items which would interfere with application of fireproofing are not positioned until fireproofing work is completed.

3.2 APPLICATION

.1 Apply bonding adhesive or primer to substrate if recommended by manufacturer.

.2 Apply fireproofing to correspond with tested assemblies, or acceptable calculation procedures to provide following fire resistance ratings.

.3 Apply fireproofing over substrate, building up to required thickness to cover substrate with monolithic blanket of uniform density and texture.

3.3 INSPECTION AND SITE TESTS

.1 Inspection and testing of fireproofing will be carried out by Testing Laboratory designated by Consultant.

.2 Cost of testing will be paid from Cash Allowance specified in Section 011100 – Summary of Work, section 1.29.

.3 Arrange for final inspection of the work of this section by municipal building inspector.

3.4 PATCHING

.1 Patch damage to fireproofing caused by testing or by other trades before fireproofing is concealed, or if exposed, before final inspection.

3.5 LOCATIONS- SPRAYED FIREPROOFING

.1 Fireproofing is required on all structural steel supporting floor loads. Refer to structural drawings.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Fire stopping and smoke seals within mechanical assemblies (i.e. inside ducts, dampers) and electrical assemblies (i.e. inside cable trays) are specified in Division 26 and 33 respectively.

1.2 REFERENCES

.1 Underwriters Laboratories of Canada (ULC)

.1 ULC-S115-[1995], Fire Tests of Firestop Systems.

1.3 SAMPLES

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

.2 Submit duplicate 300 x 300 mm samples showing actual firestop material proposed for project.

1.4 PRODUCT DATA

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

.2 Submit manufacturer's product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site. Include manufacturer's printed instructions for installation.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

1.6 SYSTEM DESCRIPTION

.1 Firestopping Materials: CAN4-S115M ASTM E814 to achieve a fire protection rating as noted on Drawings.

.2 It is the intent of this Section that in conjunction with Divisions 26 and 33 a competent, single source be responsible for the firestopping and smoke seals of the entire project.

1.7 QUALITY ASSURANCE

.1 Manufacturer: Company specializing in manufacturing products of this Section with minimum five years documented experience.

.2 Applicator: Approved, licensed and supervised by the manufacturer of firestopping materials. Company with minimum five years documented experience.

.3 Product: Manufactured under ULC Follow-up Program. Each container or package shall bear ULC label.

1.8 REGULATORY REQUIREMENTS

.1 Conform to applicable code for fire protection ratings.

.2 Provide certificate of compliance for authority having jurisdiction indicating approval.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Deliver and store materials in a dry, protected area, off ground in original, undamaged, sealed containers with manufacturer's labels and seas intact.

1.10 PROJECT AND SITE CONDITIONS

.1 Application temperature and ventilation as per Manufacturer's instructions.

1.11 SEQUENCING AND SCHEDULING

.1 Sequence work to permit installation of firestopping and smoke seal materials to be installed after adjacent work is complete and before closure of spaces.

Part 2 Products

2.1 MATERIALS

.1 A/D Firebarrier Firestop Systems, by A/D Fire Protection Systems Inc., capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN4-S115 and not to exceed opening sizes for which they are intended.

.2 Mineral Wood Backing Insulation: ULC labeled, preformed non-combustible material (A/D Firebarrier Mineral Wool) by A/D Fire Protection Systems Inc.

.3 Retainers: Clips to support mineral wool.

.4 Firestopping Sealant: ULC labeled, single component silicone bases, A/D Silicone Firebarrier Sealant by A/D Fire Protection Systems Inc.

.5 Firestopping Seal: ULC labeled, single component water-base seal, A/D Firebarrier Seal by A/D Fire Protection Systems Inc.

.6 Firestopping Foam: ULC labeled, two components silicone foam, A/D Firebarrier RTV Foam by A/D Fire Protection Systems Inc.

.7 Firestopping Mortar: ULC labeled, non-combustible fibre reinforced, foamed cement mortar, A/D Firebarrier Mortar by A/D Fire Protection Systems Inc.

.8 Damming Material: In accordance with tested assembly being installed as applicable and as acceptable to authorities having jurisdiction.

Part 3 Execution

3.1 PREPARATION

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

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

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

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

.5 Verify that openings are ready to receive the Work of this Section.

.6 Confirm compatibility of surfaces to receive firestopping and smoke seal materials.

.7 Beginning of installation means acceptance of existing surfaces and substrate.

3.2 INSTALLATION

.1 Install firestopping in wall cavities in accordance with the OBC 3.1.11., in cavities 25mm and greater, spaced 3.0m max. vertically and 20m max. horizontally.

.2 Install fire stopping and smoke seal material and components in accordance with ULC certification and manufacturer's instructions.

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

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

.5 Tool or trowel exposed surfaces to a neat finish.

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

.7 Apply in sufficient thickness to achieve rating to uniform density and texture.

.8 Protect installed material until cured or set.

3.3 INSPECTION

.1 Notify Consultant when ready for inspection and prior to concealing or enclosing firestopping materials and service penetration assemblies.

3.4 SCHEDULE

.1 Firestop and smoke seal at:

.1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.

.2 Top of fire-resistance rated masonry and gypsum board partitions.

.3 Intersection of fire-resistance rated masonry and gypsum board partitions.

.4 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.

.5 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.

.6 Openings and sleeves installed for future use through fire separations.

.7 Around Mechanical and Electrical assemblies penetrating fire separations.

.8 Refer to Drawings for horizontal and vertical fire stop locations and for typical firestopping detail at cavity wall, for top of wall fire separation assembly and for fire separation locations.

3.5 CLEAN UP

.1 Remove excess materials and debris and clean adjacent surfaces immediately after application.

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

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials, preparation and application for caulking and sealants.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

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

.3 Section 08 11 14 – Steel Doors and Frames.

.4 Section 04 21 13 - Masonry.

.5 Section 07 46 13 – Preformed Metal Siding.

1.3 REFERENCES

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

.1 ASTM C919-[02], Standard Practice for Use of Sealants in Acoustical Applications.

.2 Canadian General Standards Board (CGSB)

.1 CGSB 19-GP-5M-[1984], Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).

.2 CAN/CGSB-19.13-[M87], Sealing Compound, One-component, Elastomeric, Chemical Curing.

.3 CGSB 19-GP-14M-[1984], Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).

.4 CAN/CGSB-19.17-[M90], One-Component Acrylic Emulsion Base Sealing Compound.

.5 CAN/CGSB-19.24-[M90], Multi-component, Chemical Curing Sealing Compound.

.3 Department of Justice Canada (Jus)

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

.4 General Services Administration (GSA) - Federal Specifications (FS)

.1 FS-SS-S-200-[E(2)1993], Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.

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

.1 Material Safety Data Sheets (MSDS).

.6 Transport Canada (TC)

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

1.4 SUBMITTALS

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

.2 Manufacturer's product to describe.

.1 Caulking compound.

.2 Primers.

.3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

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

.1 Instructions to include installation instructions for each product used.

1.5 DELIVERY, STORAGE, AND HANDLING

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

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

1.6 WASTE MANAGEMENT AND DISPOSAL

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

.2 Collect and separate for disposal of paper, plastic, polystyrene, corrugated cardboard, or packaging material [in appropriate on-site bins] for recycling.

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

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

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

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

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

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

1.7 PROJECT CONDITIONS

.1 Environmental Limitations:

.1 Do not proceed with installation of joint sealants under following conditions:

.1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.

.2 When joint substrates are wet.

.2 Joint-Width Conditions:

.1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:

.1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 ENVIRONMENTAL REQUIREMENTS

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

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

1.9 WARRANTY

.1 Submit a warranty that caulking work will not leak, crack, crumble, melt, shrink, run, lose adhesion or stain adjacent surfaces, in accordance the General Conditions of the Contract, but for two (2) years total. Contractor shall supply all labour, materials, tools and equipment to repair and/or replace any work judged to be defective by the Consultant and sealant manufacturer at no additional cost to the owner for a period of 2 years from the date of Substantial Completion.

.2 Submit a manufacturer’s warranty against defects in materials and workmanship covering the components of the sealant for a period of ten (10) years. The manufacturer shall supply a non-pro-rated warranty covering labour, materials, tools and equipment to repair and/or replace any materials defects at no additional cost, for a period of 10 years

Part 2 Products

2.1 SEALANT MATERIALS

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

.2 When low toxicity caulks are not possible, confine usage to areas which off gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.

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

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Primers: type recommended by sealant manufacturer.

.2 Joint Fillers:

.1 General: compatible with primers and sealants, outsized 30 to 50%.

.2 Polyethylene, urethane, neoprene or vinyl: extruded closed cell foam, Shore A hardness 20, tensile strength 140 to 200 kPa.

.3 Neoprene or butyl rubber: round solid rod, Shore A hardness 70.

.4 Polyvinyl chloride or neoprene: extruded tubing with 6 mm minimum thick walls.

.5 Bond breaker: pressure sensitive plastic tape which will not bond to sealants.

.6 Sealant Type A: One component, chemical curing, conforming to CAN2-19.13-M82, Class C-2-25-B-N; multi-component, chemical curing, conforming to CAN2-19.24-M80, Type 2, Class B.

.7 Sealant Type B: Multi-component, chemical curing mildew resistant conforming to CGSB 19-GP-22M.

.8 Sealant type C: Multi-component, acrylic emulsion base, conforming to CGSB 19-GP-17M.

.9 Sealant type D: One component, polyurethane base, chemical curing, conforming to CAN2-19.13-M82, Class C-1-25-B-N; or multi-component, chemical curing, conforming to CAN2-19.24-M80, type 1.

.10 For exterior aluminum to masonry, aluminum to wood and aluminum to metal joints: high performance, single component modified elastomeric joint sealant conforming to CAN2-19.24-M80. Acceptable Materials: Sonolastic Ultra by Degussa.

.11 For interior aluminum to masonry, aluminum to wood and aluminum to metal joints: high performance, single component low odour sealant conforming to CAN/CGSB-19.13-M87. Acceptable materials: Spectrem 2 by Tremco.

.3 Color of Sealants: to be selected by Consultant. Allow for a total of two (2) colours for Type A, two colours for Type B, two colours for Type C and one colour for Type D. Locations as directed on site by Consultant.

.4 Joint cleaner: xylol, methylethyl-ketone or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.

.5 Vent tubing: 6 mm inside diameter extruded polyvinyl chloride tubing.

2.3 JOINT CLEANER

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

.2 Primer: as recommended by manufacturer.

Part 3 Execution

3.1 PROTECTION

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

3.2 SURFACE PREPARATION

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

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

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

.4 Ensure joint surfaces are dry and frost free.

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

3.3 PRIMING

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

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

3.4 BACKUP MATERIAL

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

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

3.5 MIXING

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

3.6 APPLICATION

.1 New Work:

.1 Remove dust, paint, loose mortar and other foreign matter. Dry joint surfaces.

.2 Remove rust, mill scale and coatings from ferrous metals by wire brush, grinding or sandblasting.

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

.4 Prepare concrete, masonry, glazed and vitreous surfaces to sealant manufacturer's instructions.

.5 Examine joint sizes and correct to achieve depth ratio 1/2 of joint width with minimum width and depth of 6 mm, maximum width 25 mm.

.6 Install joint filler to achieve correct joint depth.

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

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

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

.2 Sealant.

.1 Apply sealant in accordance with manufacturer's written instructions.

.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.3 Apply sealant in continuous beads.

.4 Apply sealant using gun with proper size nozzle.

.5 Use sufficient pressure to fill voids and joints solid.

.6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.7 Tool exposed surfaces before skinning begins to give slightly concave shape.

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

.9 Apply sealant to joints between window or door frames to adjacent building components around perimeter of every external window or door opening, to control joints in masonry walls and where indicated. In masonry cavity construction, vent caulked joints from cavity to 3 mm beyond external face of wall by inserting vent tubing at bottom of each joint and maximum to 1500 mm o.c. vertically. Position tube to drain to exterior.

.10 Apply sealant to close gaps at all junctures of all interior walls meeting exposed ceilings. Provide required foam backer rods to ensure integrity of sealant bead when applied to juncture. Tool finish smooth to receive paint finish.

.11 Use sealants specified in the following locations:

.1 Type A: Joints between windows or door frames and adjacent building components; control and expansion joints and all other locations where sealing is required, except in locations designated for Type B, C and D. Ensure that sealant chosen (from the several specified under "MATERIALS") for each location is recommended by manufacturer for use on surfaces encountered.

.2 Type B: Joints between splash backs and walls.

.3 Type C: Joints between interior metal door frames and partitions.

.4 Type D: Joints in horizontal surfaces between concrete slabs.

.3 Curing.

.1 Cure sealants in accordance with sealant manufacturer's instructions.

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

.4 Cleanup.

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

.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

3.7 WORK INCLUDED

.1 Work shall include but not limited to the following areas:

.1 exterior and interior hollow metal frames and screens; both sides;

.2 exposed control and expansion joints in masonry walls, masonry corners, joints in front of steel lintels bearing on exterior brick jambs;

.3 joints at all washroom vanities, hair dryers, hand dryers, electrical panels, access doors and adjacent surfaces. (Use sanitary caulking.)

.4 joints between masonry and concrete surfaces.

.5 joints between gypsum board and masonry, or other materials.

.6 joints between louvres and other surfaces.

.7 exterior siding, prefinished metal fascia, flashing and trim.

.8 penetrations through roofs, floors and walls other than firestopping

.9 at all other locations on drawings, except as noted below.

.2 Sealing of joints to the underside of exposed precast slab to be by precast installer.

.3 Sealing of all joints at top of walls meeting exposed flat or sloped precast ceilings to be included in this section.

3.8 REQUIRED INSPECTION

.1 Contractor to engage exterior sealant manufacturer's representative to review in order to provide manufacturer's warranty. Manufacturer's representative shall review substrate conditions as prepared on site and prior to the application of the sealant. If requested, manufacturer to supply a written copy of this warranty.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 07 92 10 - Joint Sealing: Caulking of joints between frames and other building components.

.3 Section 08 71 10 - Door Hardware - General: Supply of finish hardware, including weatherstripping and mounting heights.

.4 Section 09 91 23 - Interior Painting.

.5 Section 09 91 13 - Exterior Painting.

1.2 REFERENCES

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

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

.2 ASTM B29-[92(1997)], Specification for Refined Lead.

.3 ASTM B749-[97], Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.181-[99], Ready-Mixed Organic Zinc-Rich Coating.

.2 CGSB 41-GP-19Ma-[84], Rigid Vinyl Extrusions for Windows and Doors.

.3 Canadian Standards Association (CSA International)

.1 G40.20/G40.21-[98], General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CSA W59-[M1989(R2001)], Welded Steel Construction (Metal Arc Welding) (Metric Version).

.4 Canadian Steel Door Manufacturers' Association, (CSDMA).

.1 CSDMA, Specifications for Commercial Steel Doors and Frames, [1990].

.2 CSDMA, Recommended Selection and Usage Guide for Commercial Steel Doors, [1990].

.5 National Fire Protection Association (NFPA)

.1 NFPA 80-[99], Standard for Fire Doors and Fire Windows.

.2 NFPA 252-[99], Standard Methods of Fire Tests of Door Assemblies.

.6 Underwriters' Laboratories of Canada (ULC)

.1 CAN4-S104-[80(R1985)], Fire Tests of Door Assemblies.

.2 CAN4-S105-[85(R1992)], Fire Door Frames Meeting the Performance Required by CAN4-S104.

.7 CAN/ULC-S701-[01], Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.8 CAN/ULC-S702-[97], Thermal Insulation, Mineral Fibre, for Buildings.

.9 CAN/ULC-S704-[01], Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

1.3 DESIGN REQUIREMENTS

.1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35°C to 35°C.

.2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.

1.4 WORK INCLUDED

.1 A single manufacturer shall fabricate products included within the scope of this Section.

.2 Manufacturer shall be a member in good standing of the Canadian Steel Door Manufacturers Association (CSDMA).

.3 Supply only of steel frame products including frames, transom frames, sidelight and window assemblies with provision for glazed, paneled or louvered openings, fire labeled and non-labeled, as scheduled or detailed by the Consultant.

.4 Supply only of flush steel doors with provision for glazed, paneled or louvered openings, insulated and un-insulated, fire labeled, with or without temperature rise ratings and non-labeled, as scheduled or detailed by the Consultant.

.5 Supply only of steel panels, similar in construction to steel doors, with flush or abetted bottoms for steel frames, transom frames, sidelight and window assemblies, fire labeled and non-labeled, as scheduled or detailed by the Consultant.

1.5 RELATED WORK

.1 Building-in of frame product into unit masonry, previously placed concrete, structural or steel or wood stud walls.

.2 Supply and installation of wood, plastic or composite core doors.

.3 Supply and installation of builders' hardware except as specified for acoustic assemblies.

.4 Drilling and tapping for surface mounted or non-templated builders' hardware.

.5 Caulking of joints between frame product and other building components.

.6 Supply and installation of gaskets or weather-strip.

.7 Supply and installation of louvers or vents.

.8 Supply and installation of glazing materials.

.9 Site touch-up and painting.

.10 Wiring for electronic or electric hardware.

.11 Field measurements.

.12 Fasteners for frame product in previously placed concrete, masonry or structural steel.

.13 Steel lintels, posts, columns or other load-bearing elements.

.14 Field welding.

1.6 SHOP DRAWINGS

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

.2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, or louvred, arrangement of hardware and fire rating and finishes.

.3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing and fire rating finishes.

.4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.

.5 Submit test and engineering data, and installation instructions.

1.7 REQUIREMENTS

.1 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104M [NFPA 252] for ratings specified or indicated.

1.8 WASTE MANAGEMENT AND DISPOSAL

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

.2 Divert unused paint and sealant materials from landfill to official hazardous material collections site approved by Consultant.

.3 Do not dispose of unused paint and sealant materials into sewer systems, into lakes, streams, onto ground or in other locations where it will pose health or environmental hazard.

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

.5 Damaged or broken glazing materials are not recyclable. These materials must not de disposed of with materials destined for recycling.

1.9 TESTING AND PERFORMANCE

.1 Door constructions covered by this specification shall be certified as meeting Level "A" (1,000,000 cycles) and Twist Test Acceptance Criteria (deflection not to exceed 6.4 mm /13.6kg force, total deflection at 136.1kg force not to exceed 63.5 mm and permanent deflection not to exceed 3.2 mm) when tested in strict conformance with ANSI-A250.4-1994. Test shall be conducted by an independent nationally recognized accredited laboratory.

.2 Fire labeled product shall be provided for those openings requiring fire protection and temperature rise ratings, as determined and scheduled by the Architect. Doors, frames, transom frames and sidelight assemblies shall be tested in strict accordance with CAN4-S106. Product shall be listed by Underwriters Laboratories of Canada under an active Factory Inspection Program and shall be constructed as detailed in Follow-Up Service procedures issued to the manufacturer.

.3 Should any door or frame specified by the Architect to be fire rated, not qualify for labeling due to design, hardware, glazing or any other reason, the Consultant shall be so advised before manufacturing commences.

.4 Core materials for exterior doors shall attain a thermal resistance rating of RSI 1.06 (R6.0) when tested in accordance with ASTM C177 or ASTM C518.

.5 Product shall be manufactured by a firm experienced in the design and production of standard and custom commercial steel door and frame assemblies, the integration of builders' or electronic hardware and glazing materials and their impact on the scope of work.

.6 Manufacturer shall be assessed and registered as meeting the requirements of Quality Systems under ISO 9001.

.7 Product quality shall meet standards set by the Canadian Steel Door Manufacturers Association.

1.10 TEST REPORTS

.1 All alternates to this specification shall be submitted to the Architect for acceptance ten (10) days prior to bid date, complete with test reports from independent, nationally recognized testing authorities, certifying that:

.1 Steel door and frame assemblies furnished under this section meet the acceptance criteria of ANSI-A250.4-1994, Level "A".

.2 Insulated door cores furnished in exterior doors under this Section meet the specified thermal resistance rating.

.2 All reports shall include name of testing authority, date of test, location of test facility, descriptions of test specimens, procedures used in testing and indicate compliance with acceptance criteria of the test.

1.11 WARRANTY

.1 All steel door and frame product shall be warranted from defects in workmanship for a period of one (1) year from date of shipment.

.2 All steel door and frame product shall be warranted against rust perforation for a period of ten (10) years when the installed and finish painted with a commercial quality paint to the manufacturers recommendations.

.3 Finish paint adhesion on all door and frame product shall be warranted for a period of ten (10) years when the product has been properly cleaned and finish painted with a commercial quality paint applied as recommended by the paint manufacturer. This warranty shall not exceed that provided by the paint manufacturer.

Part 2 Products

2.1 MATERIALS

.1 Doors shall be fabricated from tension leveled steel to ASTM A924-M97, galvanized to ASTM A653-M97, Commercial Steel (CS), Type B, coating designation ZF75, known commercially as paintable Galvanneal.

.1 Acceptable Manufacturer: Flemming

.2 Acceptable Alternate Manufacturer: Trillium Steel Doors Limited, or others meeting these exact specifications outlined in this section and accepted in writing during the tender period.

.2 Door Cores:

.1 Honeycomb:

.1 Structural small cell (25.4 mm maximum) kraft paper “honeycomb”. Weight: 36.3 kg per ream (minimum), density: 16.5 kg/m^3 (minimum), sanded to the required thickness.

.2 Polystyrene:

.1 Rigid extruded, fire retardant, closed cell board, density 16kg/m^2, thermal values: RSI 1.06 minimum, conforming to ASTM C578.

.3 Temperature Rise Rated (TRR):

.1 Solid slab core of non-combustible, inorganic composite to limit temperature rise on the “unexposed” side of door to 250°C at 30 or 60 minutes, as required by governing building code requirements and determined and scheduled by the Architect.

.4 Adhesives:

.1 Honeycomb Cores and Steel Components: Heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement or ULC approved equivalent.

.5 Interlocking Edge Seams:

.1 Resin reinforced polychloroprene (RRPC), fire resistant, high viscosity, sealant/adhesive or UL approved equivalent.

.6 Polystyrene Cores:

.1 Heat resistant, epoxy based, low viscosity, contact cement.

.7 Primer:

.1 Rust inhibitive touch-up only.

.8 Exterior Top Caps:

.1 Rigid polyvinylchloride (PVC) extrusion.

2.2 DOOR FABRICATION

.1 This section is based on doors and frames as manufactured by Fleming. Doors and frames by other manufacturers are acceptable subject to be similar to the one specified and meeting the terms of this section.

.2 Doors shall be swinging, 44.4 mm thick of the types and sizes indicated on the Architect's schedules or drawings.

.3 Exterior doors shall be lock seam, flush.

.4 Face sheets for exterior doors shall be fabricated from (16) gauge steel.

.5 Longitudinal edges of exterior doors shall be fully welded, ground smooth with no visible seams.

.6 Face sheets of interior doors shall be fabricated from 18 gauge steel, except for heavy traffic doors (noted **HT** in Door Schedule) face sheet to be 16 gauge.

.7 Longitudinal edge of heavy traffic doors (noted **HT** in Door Schedule) shall be mechanically interlocked, fully welded, ground smooth with no visible seams. Do not fill seams.

.8 Interior doors shall be stiffened, insulated and sound deadened with honeycomb core laminated under pressure to each face sheet.

.9 Stiffened, insulated and sound deadened with Fleming's propriety core where Temperature Rise Rated (TRR) fire labeled doors are specified on the Architect's schedules.

.10 Longitudinal edges of interior doors shall be mechanically interlocked, adhesive assisted with edge seams and tack-welded every 150 mm and filled flush.

.11 Door faces of all steel doors shall be fabricated without visible seams, free of scale, pitting, coil brakes, buckles and waves.

.12 Formed edges shall be true and straight with a minimum radius for the thickness of steel used.

.13 Lock and hinge edges shall be beveled 3 mm in 50 mm unless builders' hardware or door swing dictates otherwise.

.14 Top and bottom of doors shall be provided with inverted, recessed, 16 gauge steel end channels, welded to each face sheet at 150 mm on center maximum.

.15 Exterior doors shall be provided with factory installed flush PVC top caps. Fire labeled exterior doors shall be provided with factory installed flush steel top caps.

.16 Unless ineligible due to design, size, hardware or glazing specified on the Architects' or hardware Suppliers' schedules or details, fire labeled doors shall be provided for those openings requiring fire protection ratings and temperature rise ratings, as determined and scheduled by the Architect.

.17 Exterior doors and high traffic doors shall be internally reinforced with 20 gauge continuous; interlocking steel stiffeners at 150mm O.C. max, with voids between stiffeners filled and insulated with 24kg/m3 density loose batt type fiberglass material to suit fully welded design.

.18 Doors shall be factory blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templates provided by the hardware supplier.

.19 Doors shall be factory blanked and reinforced only for mortised hardware that is not fully templated.

.20 Doors shall be factory reinforced only for surface mounted hardware.

.21 Templated holes 12.7mm diameter and larger shall be factory prepared, except mounting and through bolt holes, which shall be by the contractor responsible for installation on site, at the time of application. Templated holes less than 12.7mm diameter shall be factory prepared only when required for the function of the device (for knobs, levers, cylinders, thumb or turn pieces) or when these holes over-lap function holes.

.22 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.

.23 Hinge and pivot reinforcements shall be 10 gauge steel minimum high frequency type reinforcing.

.24 Hinge reinforcements for acoustic doors and doors in excess of 2450mm rabbet height shall be 10 gauge minimum with each cutout provided with 114.3mm heavy weight (4.6mm) high frequency type.

.25 Lock, strike and flush bolt reinforcements shall be 12 gauge steel minimum.

.26 Reinforcements for concealed closers and holders shall be 12 gauge steel minimum.

.27 For surface mounted hardware, reinforcements shall be 16 gauge steel minimum.

.28 All pairs of fire labeled doors shall be provided with 12 gauge steel surface mounted flat bar astragal, shipped loose for application on site, by the contractor responsible for installation.

.29 Pairs of doors up to 2450mm x 2450mm, to 1½ hour fire rating maximum shall be provided without astragals. Lock edge seam of such doors shall be tacked-welded and ground smooth. All other fire labeled pairs shall be provided with 12 gauge steel surface

mounted flat bar astragal, shipped loose for application on site, by the contractor responsible for installation.

.30 Where electrically or electronically operated hardware is specified on the Architects' schedules or details of the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on the templates, shall be provided and interconnected with CSA Approved 12.7mm diameter conduit and connectors.

.31 Prepare doors to receive security door contacts – refer to electrical drawings for locations. Door contacts to be installed at 100 mm from the latch side door edge.

2.3 GLAZING

.1 Where 6mm thick glazing materials are specified on the Architects schedules or details, doors shall be provided with 20 gauge steel glazing trim and snap-in glazing stops.

.2 Where other that 6mm glazing is specified on the Architect's schedules or details, doors shall receive 20 gauge steel trim and screw fixed glazing stops. Screws shall be #6 x 32mm oval head scrulox (self-drilling) type at 300mm on center maximum.

.3 Glazing trim and stops shall be accurately fitted, butted at corners, with removable glazing stops located on the 'push' side of the door.

.4 Provide 27 mm "Pyrostop Glazing" for window screen type W-12, as distributed by Technical Glass Products 1-800-426-0279 to conform to 60 min. ULC rating.

2.4 LOUVER

.1 Where specified on the Architect's schedules or details, non-labeled doors shall be prepared on accordance with the louver manufacturer's details.

.2 Where specified on the Architect's schedules or details, fire labeled doors shall be prepared for UL listed sight-proof fusible link louvers in accordance with the louver manufacturer's details.

.3 Louvers shall be supplied and installed by others.

2.5 FINISHING

.1 Remove weld slag and splatter from exposed surfaces.

.2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth uniform surfaces.

.3 On exposed surfaces where zinc coating has been removed during fabrication, doors shall receive a factory applied touch-up primer.

.4 Primer shall be fully cured prior to shipment.

2.6 PANELS

.1 Panels shall be fabricated form the same materials, construction and finished in the same manner as doors as specified in Section 2.1.

2.7 PRIMER

.1 Touch-up prime CAN/CGSB-1.181.

2.8 PAINT

.1 Field paint steel doors and frames in accordance with Section[s] 09 91 22 – Painting. Protect weatherstrips from paint. Provide final finish shall be free of scratches or other blemishes.

2.9 FRAMES FABRICATION GENERAL

.1 Steel:

.1 Frame product shall be fabricated from tension leveled steel to ASTM A924-M97, galvanized to ASTM A653-M97, Commercial Steel (CS), Type B, coating designated ZF75, known commercially as paintable Galvanneal.

.2 Primer:

.1 Rust inhibitive touch up only.

.3 Miscellaneous:

.1 Door Silencers: GJ-64, Single Stud rubber/neoprene type

.2 Thermal Breaks: Rigid polyvinylchloride (PVC) extrusion

.3 Fiberglass: Loose batt type, density: 24kg/m^3 (minimum), conforming to ASTM C665.

.4 General:

.1 All steel frame product shall be as manufactured by Fleming of the types, sizes and profiles indicated on the Architects' schedules or details.

.2 Exterior frames shall be thermally broken, Fleming *Therma-Frame* Series, fabricated from 16 gauge steel.

.3 Exterior frame product shall be supplied profile welded (PW)

.4 Interior and exterior sections of thermally broken frames shall be separated by a continuous PVC thermal break.

.1 Thermally broken sections shall not be assembled by means of screws, grommets or other fasteners and welds shall not cause thermal transfers between interior and exterior surfaces of the frame sections.

.2 Closed sections (mullions and center rails) of thermally broken frames shall be factory insulated with 24kg/m^3 loose batt type fiberglass material.

.5 Insulation of open sections (jambs, heads and sills) on exterior frame product shall be provided and installed by the contractor responsible for installation.

.6 Interior frames shall be Fleming F-Series, fabricated from 16 gauge steel.

.7 Interior frame product shall be supplied profile welded (PW)

.8 Knocked-down and knocked-down drywall frames shall not be acceptable.

.9 Jambs, heads, mullions, sills and center rails shall be straight and uniform throughout their lengths.

.10 Frame product shall be square, free of defects, wraps or buckles.

.11 Corner joints shall be profile welded (PW) (continuously welded on the inside of the profiles' faces, rabbets, returns and soffit intersections with exposed faces filled and ground to a smooth, uniform, seamless surface)"

.12 Joints at mullions, transom bars, sills or center rails shall be coped accurately, butted and tightly fitted, with faces securely welded, matching corner joint faces.

.13 All steel mullions will be fabricated from the same materials as specified for the steel frames. Steel mullions will be fabricated as a fully assembled three piece unit consisting of a front, back and full height one piece attachment clip as per Fleming F Series. The attachment clip will completely fill the stop area of the mullion on both sides and span the void between each side forming a grid channel like structure. Mullions used as hinge mullions or strike mullions between doors will be filled with grout by the general contractor either prior to or following installation of the frame. The head of the frame shall have an opening sufficient for the grout to be poured in to the mullion.

.14 Mullions shall be fabricated with continuous 20 gauge galvanneal steel internal reinforcing clips.

.15 Frame product shall be fabricated with integral door stops having a minimum height of 16mm.

.16 Glazing stops shall be formed 20 gauge steel, 16mm height channel, accurately fitted, butted at corners and fastened to frame sections with #6 x 32mm oval head scrulox (self-drilling) type screws at 300mm on center maximum.

.17 Where required due to site access, as indicated on the Architects' schedules or details, when advised by the contractor responsible for co-ordination or installation, or when shipping limitations so dictate, frame product shall be fabricated in sections for splicing in the field.

.1 Field spliced jambs, heads and sills shall be provided with 16 gauge steel splice plates securely welded into one section, extending 100mm minimum each side of splice joint.

.2 Field splices at closed sections (mullions or center rails) shall be 16 gauge steel splice angles securely welded to the abutting member. Face of splice angle shall extend 100mm minimum into closed sections when assembled.

.3 Field splice joints shall be welded, filled and ground to present a smooth uniform surface by the contractor responsible for installation after assembly.

.18 Each door opening shall be provided with two (2) temporary steel jamb spreaders welded to the base of the jambs or mullions to maintain proper alignment during shipping and

handling. Spreaders shall be removed by the contractor responsible for installation prior to anchoring of frame to floor.

.19 Each door opening shall be prepared for GJ-64 or equivalent, single stud door silencers, three (3) for single door openings, two (2) for double door openings. Silencers shall be shipped loose for installation by the contractor after finish painting.

.20 Unless ineligible due to design, size, hardware or glazing specified on the Architects' or Hardware Suppliers' schedules or details, fire labeled frame product shall be provided for those openings required fire protection ratings as determined and scheduled by the Architect.

.21 Hardware Preparations:

.1 Frame product shall be blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templated provided by the hardware supplier.

.2 Frame product shall be factory blanked and reinforced only for mortised hardware that is not fully templated.

.3 Frame product shall be reinforced only for surface mounted hardware.

.4 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.

.5 Frames shall be prepared for 114.3mm standard weight hinges (minimum).

.6 Hinge and pivot reinforcements shall be 10 gauge steel minimum reinforcing, high frequency type shall be provided.

.7 Hinge reinforcements for acoustic frames and frames in excess of 2450mm rabbet height shall be 10 gauge minimum with each cutout provided with 114.3mm heavy weight (4.6mm) high frequency type.

.8 Strike reinforcements shall be 16 gauge steel minimum.

.9 Reinforcements for surface mounted hardware, concealed closers and holders and flush bolts shall be 12 gauge steel minimum.

.10 Mortised cutouts shall be protected with 22 gauge steel minimum guard boxes.

.11 Where electrically or electronically operated hardware is specified on the Architects schedules or details or the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on templates, shall be provided and inter-connected with CSA Approved 12.7mm diameter conduit and connectors.

.12 Prepare frames to receive security door contacts – refer to electrical drawings for locations. Door contacts to be installed at 100 mm from the latch side door edge.

.22 Anchorage:

.1 Frame product shall be provided with anchorage appropriate to floor, wall and frame construction.

.2 Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb, except as indicated below.

.3 Frame product installed in unit masonry partitions shall be provided with 4.0mm diameter steel wire anchors, 18 gauge steel adjustable stirrup and strap or "T" type anchors as conditions dictate.

.4 Where frame product is installed prior to construction of the adjacent wall, each jamb shall be provided with 16 gauge steel floor anchors. Each anchor shall be provided with two (2) holes for mounting to the floor and shall be securely welded to the inside of the jamb.

.5 Floor anchors for thermally broken exterior frames shall be designed so as not to permit thermal transfers from exterior to interior surfaces of the frame sections.

.6 Frame product installed in drywall partitions shall be provided with 20 gauge steel snap-in or "Z" type stud type anchor.

.7 Jambs of frames in previously placed concrete, masonry or structural steel shall be punched and dimpled to accept machine bolt anchors, 6.4mm diameter, located not more than 150mm from the top and bottom of each jamb. Anchor preparations and guides shall also be located immediately above or below the intermediate hinge reinforcings and directly opposite on the strike jamb. Each preparation shall be provided with 16 gauge anchor bolt guides.

.8 Anchor bolts and expansion shell anchors for the above preparations shall be provided by the contractor responsible for installation.

.9 After sufficient tightening of the anchor bolts, the heads shall be welded do as to provide a non-removable application. Welded bolt head and dimple shall be filled and ground to present a smooth uniform surface by the contractor responsible for installation, prior to finish painting.

.10 Where indicated on the Architects' schedules or details, channel extensions shall be provided from the top of the frame assembly to the underside of the structure above. Extensions shall be fabricated from 12 gauge steel formed channel, mounting angles welded to inside of frame head and adjusting brackets. Formed channels, adjusting brackets and fasteners shall be shipped loose. Channels shall be mechanically connected to mounting angles and adjusting brackets with supplied fasteners, on site, by contractor responsible for installation.

.23 Finishing:

.1 Remove weld slag and spatter from exposed surfaces.

.2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth and uniform surfaces.

.3 On exposed surfaces where zinc has been removed during fabrication, frame product shall receive a factory applied touch-up primer.

.4 Primer shall be fully cured prior to shipment.

2.10 SIZES AND TOLERANCES

.1 All sizes and tolerances shall be in accordance with the Canadian Steel Door Manufacturers Association "Recommended Dimensional Standards for Commercial Steel Doors and Frames" as follows:

.1 Widths of door openings shall be measured from inside of frame jamb rabbet with a tolerance of +1.6mm, -0.8mm.

.2 Heights of door openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame with a tolerance of ± 1.2mm.

.3 Unless builders' hardware dictates otherwise, doors shall be sized so as to fit the above openings and allow a 3mm clearance at jambs and head. A clearance of 19mm between the bottom of the door and the finished floor (exclusive of floor coverings) shall be provided. Tolerances on door sizes shall be ± 1.2mm.

.4 Manufacturing tolerances on formed frame profiles shall be ± 0.8mm for faces, door stop heights and jamb depths. Tolerances for throat openings and door rabbet shall be ± 1.6mm and ± 0.4mm respectively. Hardware cutout dimensions shall be as per template dimensions, +0.4mm, -0.

2.11 HARDWARE LOCATIONS

.1 Hardware preparations in frame product shall be as noted below and locations on doors shall be adjusted for clearances specified in 2.4.

.2 Top of upper hinge preparation for 114.3mm hinges shall be located 180mm down from head, transom mullion or panel as appropriate. The top of the bottom hinge preparation for 114.3mm hinges shall be located 310mm from finished floor as defined in 2.4.3. Intermediate hinge preparations shall be spaced equally between top and bottom cutouts. For dutch door frames, top and bottom hinge locations shall be as above, with the tops of intermediate hinges located at 930mm and 1403mm from finished floor.

.3 Strike preparations for unit, integral, cylindrical and mortise locks and roller latches shall be centered 950mm from finished floor. Strikes for deadlocks shall be centered at 1200mm from finished floor. Strikes for panic or fire exit hardware shall be located as per device manufacturer's templates.

.4 Push and/or pulls on doors shall be centered 950mm from finished floor.

.5 Preparations not noted above shall be as per hardware manufacturer's templates.

.6 Hardware preparation tolerances shall comply with the ANSI A115 series standards.

Part 3 Execution

3.1 SITE AND PROTECTION OF MATERIALS

.1 The contractor responsible for installation shall remove wraps or covers from door and frame product upon delivery at building site.

.2 All materials shall be thoroughly inspected upon receipt and all discrepancies, deficiencies and/or damages shall be immediately reported in writing to the supplier, All damage shall be noted on the carriers' Bill of Landing.

.3 Contractor responsible for installation shall ensure all materials are properly stored on planks or dunnage in a dry location. Product shall be stored in a vertical position, spaced with blocking to permit air circulation between them. Materials shall be covered to protect them from damage from any cause.

.4 Contractor shall notify the supplier in writing of any errors or deficiencies in the product itself before initiating any corrective work.

3.2 INSTALLATION GENERAL

.1 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.

.2 Install doors and frames to CSDMA Installation Guide.

.3 Install doors and frames in accordance with the Door and Hardware Institute "Installation guide for doors and hardware".

.4 Set frame product plumb, square, aligned, without twist at correct elevation.

.5 Frame Product Installation Tolerances:

.1 Plumbness tolerance, measured through a line from the intersecting corner of vertical members and the head to the floor, shall be $\pm$ 1.6mm.

.2 Squareness tolerance, measured through a line 90^0 from one jamb at the upper corner of the product, to the opposite jamb, shall be $\pm$ 1.6mm.

.3 Alignment tolerance, measured on jambs, through a horizontal line parallel to the plane of the wall, shall be $\pm$ 1.6mm.

.4 Twist tolerance, measured at face corners of jambs, on parallel lines perpendicular to the plane of the wall, shall be $\pm$ 1.6mm.

.6 Fire labeled product shall be installed in accordance with NFPA-80.

.7 Secure anchorages and connections to adjacent construction.

.8 Brace frame product rigidly in position while building-in. Remove temporary steel shipping jamb spreaders. Install wood spreaders at mid points of frame rabbet height and at floor level to maintain frame widths. Provide vertical support at center of head for openings exceeding 1250mm in width. Remove wood spreaders after product has been built-in.

.9 Frame product in unit masonry shall be fully grouted in place.

.10 Install doors maintaining clearances outlined in Section 2.4.

.11 Install louvers and vents.

.12 Adjust operable parts for correct clearances and function.

.13 Steel surfaces shall be kept free of grout, tar or other bonding materials or sealers.

.14 Any grout or other bonding material shall be cleaned from products immediately following installation.

.15 Exposed field welds shall be finished to present a smooth uniform surface and shall be touched-up with a rust inhibitive primer.

.16 Exposed surfaces that have been scratched or otherwise marred during shipment, installation or handling shall be touched-up with a rust inhibitive primer.

.17 Finish paint in accordance with Section 099116 and 099123.

.18 Install glazing materials and door silencers.

3.3 INSPECTION

.1 In accordance with Section 011100- Summary of Work, upon assignment of an inspection agency the following inspections shall be performed for hollow metal frames, screens and doors:

.1 review of shop drawings for compliance with specification

.2 shop inspection during production. Should inspection notification not be given suitable to review fabrication, destructive testing of one or more doors will be undertaken either in the shop or on site at no additional cost to the owner. Doors destroyed for invasive inspection shall be replaced as part of the contract price.

.2 Upon notification of initial door installation, contractor shall notify inspector to witness installation practice and at periodic points for duration of installation period.

.3 Scope of inspections shall include shop inspection during fabrication & installation and operation of hardware at site.

3.4 FINISH REPAIRS

.1 Touch up with primer finishes damaged during installation.

.2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

3.5 GLAZING

.1 Install glazing for doors and frames in accordance with Section 08 80 50 - Glazing.

END OF SECTION

Part 1 General

1.1 GENERAL NOTES

.1 Find the Door Schedule on the following pages.

.2 This schedule MUST be read in conjunction with a complete set of drawings and a complete Hardware Schedule.

.3 Refer to the 800 series of AD Drawings for door and frame types and details.

1.2 ABBREVIATIONS CODE

.1 1. The following abbreviations are used in the Door Schedule.

	Code	Reference
.3	DC	Door Contact (security)
.4	P	Paint
.5	HM	Hollow Metal
.6	FRG	Fire Rated Glazing
.7	TG	Tempered Glass
.8	45 MIN	45 minute fire rating
.9	HT	Heavy Traffic – see spec for welded seams, special reinforcing.
.10	B/F	Barrier-Free
.11	WD	Laminate Faced Wood Door
.12	P.LAM	Plastic Laminate Finish on Wood Door
.13	ALUM.	Aluminum
.14	ANNO.	Anodized Finish

1.3 DOOR SCHEDULE

.1 Door Schedule designation “DC” refers to “Door Contacts” used in the security system. Refer to Electrical Drawings and Division 16 Specifications for locations, zoning and description of system.

END OF SECTION

Allan A. Martin Sr. P.S. Door Schedule

DOOR #	DOOR								FRAME					REMARKS
	WIDTH	HEIGHT	FIRE	H.T.	TYPE	MAT'L	FIN	GLASS	TYPE	MAT'L	FIN	DC	GLASS	
A100 A	950	2150	-	-	A	HM	PAINT	-	1	HM	PAINT	Y	-	EXTERIOR DOOR AND FRAME
A101 A	950	2150	1HR	-	A	HM	PAINT	-	1	HM	PAINT	-	-	OH DOOR STOP, ELECTRIC STRIKE, CLOSER, PUSH LOCK, BARRIER FREE PUSH BUTTONS AND COMBINATION B.F. PUSH BUTTON w/ LUMINATED OCCUPIED SIGN INSTALLED AT 1675mm (5'-6") A.F.F.. ELECTRICAL CONTRACTOR TO PROVIDE LOW VOLTAGE WIRING PER HARDWARE SCHEDULE, CONTRACTOR TO COORDINATE.
A102 A	2x1000	2150	-	-	B	CW	PAINT	-	1	CW	PAINT	-	-	THERMALLY BROKEN CURTAIN WALL DOOR & FRAME, DOOR PANIC HARDWARE BARRIER FREE PUSH BUTTONS ELECTRICAL CONTRACTOR TO PROVIDE LOW VOLTAGE WIRING PER HARDWARE SCHEDULE, CONTRACTOR TO COORDINATE.
A102 B	950	2150	1HR	Y	B	HM	PAINT	TP	2	HM	PAINT		TP	ELECTOMAGNETIC HOLD OPEN DEVICES. REFER TO ELECTRICAL DRAWINGS
A104 A	2X950	2150	-	-	A	HM	PAINT	-	3	HM	PAINT		-	
A105 A	950	2150	-	-	A	HM	PAINT	-	1	HM	PAINT	Y	-	EXTERIOR DOOR AND FRAME
A201 A	950	2150	1HR	-	A	HM	PAINT	-	1	HM	PAINT	-	-	
A202 A	950	2150	1HR	-	A	HM	PAINT	-	1	HM	PAINT	-	-	OH DOOR STOP, ELECTRIC STRIKE, CLOSER, PUSH LOCK, BARRIER FREE PUSH BUTTONS AND COMBINATION B.F. PUSH BUTTON w/ LUMINATED OCCUPIED SIGN INSTALLED AT 1675mm (5'-6") A.F.F.. ELECTRICAL CONTRACTOR TO PROVIDE LOW VOLTAGE WIRING PER HARDWARE SCHEDULE, CONTRACTOR TO COORDINATE.

Allan A. Martin Sr. P.S. Door Schedule

DOOR	DOOR								FRAME					REMARKS
#	WIDTH	HEIGHT	FIRE	H.T.	TYPE	MAT'L	FIN	GLASS	TYPE	MAT'L	FIN	DC	GLASS	
A203 A	2X950	2150	1HR	Y	B		PAINT	TP	4	HM	PAINT		TP	ELECTOMAGNETIC HOLD OPEN DEVICES. REFER TO ELECTRICAL DRAWINGS

NOTES:

1. NEW HOLLOW METAL FRAMES (HM) ARE TO BE FILLED SOLID WITH GROUT, TYPICAL.

2. ELECTRICAL CONTRACTOR SHALL PROVIDE CONDUIT AND PULL STRINGS AT ALL DOORS REQUIRING ELECTRICAL DEVICES. HARDWARE SHALL SUPPLY AND INSTALL LOW VOLTAGE WIRING AND SUPPLY AND INSTALL DEVICES (IN WORKING CONDIDITON) SEE HARDWARE SCHEDULE AND ELECT. DWGS.

3.ALL NEW EXTERIOR HM DOORS AND FRAMES TO BE INSULATED.

4. ALL DOORS/ FRAMES (NEW OR EXISTING) TO BE PAINTED ON BOTH SIDES.