Part 1 General

1.1 RELATED WORK

.1 Division 3 – Concrete

.2 Section 07 21 00 – Thermal Insulation

.3 Section 07 25 00 – Air/Vapour Barrier Membrane

.4 Division 31 – Earthwork

1.2 REFERENCES

.1 ASTM International

.1 E283 - Standard Test Method for Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors.

.2 E96 - Test Method for Water Vapour Transmission of Materials.

.2 Canadian Government Standards Board

.1 CAN/CGSB 37-GP-56M- 9th Draft, 1997 - Standard for Modified Bituminous Sheet Membranes.

.2 CAN/CGSB 37-GP-5M - Standard for Asphalt Plastic Cement

1.3 QUALIFICATIONS

.1 Waterproofing shall be installed by a manufacturer-approved applicator, with minimum three (3) years related experience in the installation of torch-applied waterproofing membranes and with projects of similar size and scope.

1.4 DELIVERY AND STORAGE

.1 Deliver and store Materials undamaged in original containers with manufacturer's labels and seals intact.

.2 Store roll Materials horizontally in original packaging in a weather protected environment, clear of ground and moisture. Do not double stack. Store rolls, adhesives and primers, and mastics at temperatures of +10°C and above to facilitate handling. Protect rolls from direct sunlight until ready for use. Only the rolls which will be used that day should be removed just prior to installation.

1.5 SAFETY REQUIREMENTS

.1 Do not install primers or modified mastics in an enclosed environment without adequate ventilation.

.2 Provide adequate fire extinguishers as required by applicable codes or other authorities having jurisdiction do to the presence of flammable primers and mastics.

.3 No smoking or open flames are allowed in the vicinity of the product application due to volatile vapours from the flammable products.

Part 2 Products

2.1 WATERPROOFING SYSTEM COMPATIBLITY

.1 All components of the waterproofing system, including membrane, sealants, primer, mastics and adhesives shall be compatible with one another, and shall be supplied by one manufacturer.

2.2 WATERPROOFING MEMBRANE SYSTEM

.1 The waterproofing system shall consist of a torch-applied SBS modified bitumen waterproofing membrane c/w non-woven polyester reinforcement. The membrane will be covered with a thermofusible polypropylene film on both faces, and will have the following physical properties:

.1 Thickness: 2.5mm (98 mils) minimum

.2 Flexibility: pass at -30°C to ASTM D5683/D5683M-95(2011)e1 Standard Test Method for Flexibility of Roofing and Waterproofing Materials and Membranes

.3 Vapour permeance: 2.8 ng/Pa.s.m2 (0.05 perms) to ASTM E96/E96M, "Standard Test Method for Water Vapor Transmission of Materials"

.4 Tensile strength (membrane): 2.24 Mpa to ASTM D412, "Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension"

.5 Tensile strength (film): 34.5 Mpa to ASTM D412

.6 Elongation: 300% to ASTM D412

.7 Puncture resistance: 470 N minimum to ASTM E154, "Standard Test Methods for Water Vapor Retarders used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover"

.8 Acceptable products: IKO Aquabarrier™ TG, Colphene Torch'nStick by Soprema, or Bakor Blueskin TG.

.2 Primer: synthetic rubber based adhesive type, quick setting, conforming to CAN/CGSB 37-GP-5M, and having the following physical properties:

.1 Compatible with sheet waterproofing membrane, and substrate.

.2 Weight: 0.8 kg/l

.3 Solids by weight: 35%

.4 Drying time (initial set): 30 minutes

.5 Acceptable products: IKO Torch Grade MDA solvent based fast dry primer, Elastocol 500 by Soprema, or Bakor equivalent.

.3 Waterproofing Mastic: a black, solvent-based mastic waterproofing compound and sealant containing SBS modified bitumen, fibres and mineral fillers, designed to be used in conjunction with sheet membrane. Mastic to conform to CAN/CGSB 37-GP-5M, and shall have the following characteristics:

.1 Compatible with sheet waterproofing membrane, substrate and insulation Materials

.2 Solids by volume: 60%

.3 Vapour permeance: 2.9 ng/Pa.s.m2, to ASTM E96

.4 Remains flexible with aging

.5 Chemical resistance: alkalis, calcium chloride, mild acid and salt solutions

.6 Acceptable products: IKO Aquabarrier Mastic, Sopramastic by Soprema, or Bakor equivalent.

,4 Termination Sealant: polymer modified sealing compound having the following characteristics:

.1 Compatible with sheet waterproofing membrane, substrate and insulation Materials

.2 Solids by volume: 70%

.3 Vapour permeance: 2.9 ng/Pa.s.m2, to ASTM E96

.4 Complies with CGSB 37.29, "Rubber-Asphalt Sealing Compound"

.5 Remains flexible with aging

.6 Adheres to wet surfaces

.7 Chemical resistance: Alkalis, calcium chloride, mild acid and salt solutions

.8 Acceptable products: by IKO, Soprema, or Bakor.

Part 3 Execution

3.1 EXAMINATION

.1 Verify that surfaces and conditions are ready to accept the Work of this Section. Commencement of Work or any parts thereof shall mean acceptance of the prepared substrate.

3.2 SURFACE PREPARATION

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

.2 All concrete shall have cured for a minimum of seven (7) days, and must be dry before waterproofing membranes are applied. Lightweight structural concrete must be cured a minimum of 14 days.

.3 Voids, ridges, honeycombing and other damaged surfaces, shall be repaired by the trades involved, using Materials compatible with the membrane system to leave a level surface.

.4 All joints or transitions between planes, shall be sharply formed and free of broken edges, loose aggregate, preformed joint fillers, sealants, or back-up Material.

3.3 APPLICATION

.1 Apply Materials in strict accordance with manufacturer's recommendations.

.2 Use appropriate waterproofing membrane as recommended by manufacturer based on air and surface temperature at time of application. Membrane is not to be applied in unsuitable weather conditions, as directed by the manufacturer.

.3 Apply primer using roller or spray at rate recommended by manufacturer. Allow minimum thirty (30) minute open time. Primed surfaces not covered by waterproofing membrane during the same Working Day must be re-primed.

.4 All cracks in concrete 1.5mm to 3mm (1/16" to 1/8") wide to be pre-treated with 1.5mm (1/16") coating of liquid membrane 50mm (2") wide centred on crack, or apply a 150mm (6") wide strip of membrane centred over crack. Provide 75mm (3") end laps.

.5 Horizontal to vertical inside corner transition areas to be pre-treated with liquid membrane fillet extending 19mm (3/4") vertically and horizontally from the corner. Apply a minimum 225mm (9") strip of membrane centred at the joint.

.6 All outside corners to be pre-treated with minimum 225mm (9") strip of membrane reinforcing at the joint.

.7 Where three (3) or more planes come into contact, reinforce with cut section of membrane reinforcing sheet as per manufacturer's instructions.

.8 For vertical & horizontal applications, apply waterproofing membrane to prepared substrate in lengths of 2400mm (8ft) or less. Position for alignment, beginning at the base of the wall. Using a propane torch, soften backside of the membrane by burning off the polypropylene film. Bitumen should be in a semi-molten state to ensure adequate adhesion. Exercise caution to avoid overheating the membrane or its reinforcement during the application of the waterproofing membrane. Apply sufficient hand pressure and use a roller to ensure adhesion to the primed substrate. Terminate membrane using mastic. All laps within 300mm (1ft) of a 90° change in plane to be sealed.

.9 Install successive courses of membrane ensuring to provide 150mm (6") laps at ends,

and 76mm (3") laps at sides. All end and side laps shall be thermofused using a propane torch and trowel.

.10 Continue membrane installation onto the horizontal and vertical planes to tie into all door frames and window sills.

.11 Seal top edge of the membrane to the substrate with modified mastic at the end of each Working Day.

.12 Prior to the installation of the insulation, inspect membrane for punctures or tears. Any location where the membrane's integrity has been breached, repairs are mandatory. The repair patch must extend at least 150mm (6") beyond the damaged area on all sides. Seal the perimeter edges of the repair patch with a bead of modified mastic.

.13 Do not allow membrane to come in contact with coal tar products such as creosote, EPDM membrane or polysulphide based sealants.

.14 Do not install the insulation or otherwise cover the waterproofing membrane until approval is given by the Contract Administrator, and Air/Vapour Barrier Inspections agency

3.4 PROTECTION OF FINISHED WORK

.1 Follow manufacturer's recommendations for the application of protection boards.

.2 The waterproofing membrane is not designed for permanent exposure. Protect membrane from job Site abuse as soon as possible following membrane application.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 07 25 00 – Air/Vapour Barrier Membrane

.2 Section 07 53 33 – EPDM Roofing

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

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM E96-96, Test Methods for Water Vapour Transmission of Materials or latest.

.2 ASTM C208-95, Standard Specification for Cellulosic Fiber Insulating Board or latest.

.3 ASTM C591-94, Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation or latest.

.4 ASTM C726-93, Standard Specification for Mineral Fiber Roof Insulation Board or latest.

.5 ASTM C728-97, Standard Specification for Perlite Thermal Insulation Board or latest.

.6 ASTM C1126-98, Standard Specification for Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation or latest.

.7 ASTM C1289-98, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board or latest.

.8 ASTM C 665-98, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing, or latest.

.9 ASTM C 1320-99, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction, or latest.

.4 Canadian Gas Association (CGA)

.1 CAN/CGA-B149.1-M95, Natural Gas Installation Code or latest.

.2 CAN/CGA-B149.2-95, Propane Installation Code or latest.

.5 Canadian General Standards Board (CGSB)

.1 CGSB 71-GP-24M-77, Adhesive, Flexible, for Bonding Cellular polystyrene Insulation or latest.

.6 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S701-97, Thermal Insulation, Polystrene, Boards and Pipe Coverings or latest.

.2 CAN/ULC-S702-97, Thermal Insulation, Mineral Fibre, for Buildings or latest.

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

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

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste Materials for reuse and recycling.

.2 Remove from Site and dispose of packaging Materials at appropriate recycling facilities.

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

1.4 ENVIRONMENTAL REQUIREMENTS

.1 Apply foamed-in-place insulation only when surfaces and ambient temperatures are within manufacturer's recommended limits.

Part 2 Products

2.1 BLANKET INSULATION

.1 Batt and blanket mineral fibre: to ASTM C 665, Type 1, CFC and formaldehyde free to R-Value/thickness and locations indicated on Drawings:

.2 Mineral fibre thermal/acoustic:

.1 Unfaced, friction fit, rolls, to CAN/ULC-S702: Johns Manville, Roxul and Ottawa Fibre Inc. or approved alternative with 3rd party testing data to support and confirm.

.3 Mineral fibre fire-resistant:

.1 "RXL Safe n' Sound" non-combustible mineral wool fibre insulation made from basalt rock and slag, by Roxul Inc.

.2 "Paroc Safing Insulation" by Partek Insulation, as distributed by Steels Industrial Products, basaltic rock fibres bonded into semi-rigid board.

2.2 RIGID INSULATION

.1 Rigid board:

.1 Exterior walls above grade: Extruded polystyrene to CAN/ULC-S701, Type 3, RSI = 0.87/25mm (R5/in.), butt edges. Standard of acceptance: Styrospan, or Styrofoam CavityMate by Dow Chemical Inc., or CelFort 200 by Owen's Corning Celfortec Inc.

.2 Exterior walls below grade: Extruded polystyrene to CAN/ULC-S701, Type 4, RSI = 0.87/25mm (R5/in.), butt edges. Standard of acceptance: Styrofoam SM by Dow Chemical Inc., or Foamular 250 by Owen's Corning.

2.3 FOAMED-IN-PLACE INSULATION

.1 Spray-foam insulation: spray polyethylene to CAN/ULC-S705.1

.2 Primer (if required): in accordance with manufacturer's recommendations for surface conditions.

2.4 ACOUSTIC DECK INSULATION

.1 Trapezoidal shaped, tissue-faced insulation, engineered for placement into perforated decking.

.1 Standard of acceptance: Rockwool Acoustic Infill D60, by Rockwool Ltd., or acceptable "as Equal".

2.5 ADHESIVE

.1 Adhesive (for polystyrene): to CGSB 71-GP-24 or latest, Type Bulldog Wetstick/Bulldog Grip PL 200.

2.6 FASTENERS

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

.2 Performance requirements for installed insulation fasteners:

.1 Pullout Resistance: minimum 200N, perpendicular to applicable substrates and within temperature range of -30C to +40C.

.2 Corrosion Resistance: carbon steel components shall show not more than 15% of the surface rusted, and coatings shall not blisher, peel or crack, when tested to Corrosion Test Procedure of Factory Mutual Research Approval Standard, Class I Roof Covers (4470)

Part 3 Execution

3.1 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 or as required by code, whichever is more stringent.

.5 Cut and trim insulation neatly to fit all 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 cover insulation until it has been inspected and approved by Contract Administrator.

3.2 EXAMINATION

.1 Examine substrates and immediately inform Contract Administrator of defects in writing.

.2 Prior to commencement of Work ensure that substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

3.3 BLANKET INSULATION INSTALLATION

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

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

.3 Do not compress insulation excessively to fit into spaces.

.4 Use mineral fibre fire-resistant insulation where required to maintain fire separations.

.5 In all sound rated walls, ensure that acoustic batt insulation is installed snugly to all penetrations and that acoustic separation is not compromised.

.6 Do not enclose insulation until it has been inspected and approved by Contract Administrator.

3.4 RIGID INSULATION INSTALLATION

.1 Where required, imbed insulation boards into vapour barrier type adhesive, using type and method as recommended by insulation manufacturer.

.2 Leave insulation board joints unbonded over line of expansion and control joints. Bond a continuous 150 mm wide 0.15 mm polyethylene strip over expansion and control joints using compatible adhesive before application of insulation.

3.5 PERIMETER FOUNDATION INSULATION

.1 Exterior application: extend boards full height of foundation as noted. Install on exterior face of perimeter foundation wall with adhesive. Where foundation shoring is required, secure insulation boards to shoring form.

.2 Fasten insulation and ½ inch cement board protection board to foundation wall with Tapcon concrete fasteners with 1 inch dial washers, 6 per 24 inch x 8 foot board.

.3 Use type 4 insulation at exterior face of foundation and underneath the slab at the perimeter.

4. Install rigid insulation to outside face of grade beams, mechanically fastened with manufacturer's "Z"-clips and hardware at 600mm (24") centres.

3.6 FOAMED-IN-PLACE INSULATION INSTALLATION

.1 Install spray-foam insulation to clean surfaces in accordance with CAN/ULC-S705.2, and manufacturer's written recommendations. Use primer where recommended by manufacturer.

.2 Foam insulate all gaps between insulation and envelope, and at penetrations through the building envelope.

3.7 ACOUSTIC DECK INSULATION

.1 Install acoustic deck insulation in perforated metal deck, where noted on Drawings, in accordance with manufacturer's recommendations.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation methods providing 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 05 10 – Common Masonry

.2 Section 06 10 00 – Rough Carpentry

.3 Section 07 13 00 – Sheet Waterproofing

.4 Section 07 21 00 – Thermal Insulation

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

.6 Section 07 92 00 – Joint Sealing

.7 Section 08 11 00 – Steel Doors and Frames

.8 Section 08 11 16 – Aluminum Doors and Frames

.9 Section 08 44 13 – Glazed Aluminum Curtain Walls

1.3 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-19.13M-M(latest), Sealing Compound, One Component, Elastomeric Chemical Curing or latest.

.2 CAN/CGSB-19.18M-M(latest), Sealing Compound, One Component, Silicone Base Solvent Curing or latest.

.3 CAN/CGSB-19.24M-M(latest), Multi-Component, Chemical Curing Sealing Compound or latest.

.4 CGSB 19-GP-14M-(latest), Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing or latest.

.2 Canadian Construction Materials Centre (CCMC), Technical Guide for Air Barrier Systems for Exterior Walls of Low-Rise Buildings

.3 CSA S478 – "Guideline on Durability in Building"

.4 Most recent edition of the NBCC or Provincial Code as applicable to place of Work; Part 5 - Environmental Separation or latest.

.5 Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification or latest.

.6 National Air Barrier Association (NABA)

1.4 QUALITY ASSURANCE

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

.2 Perform Work in accordance with National Air Barrier Association - Professional Contractor Quality Assurance Program and requirements for Materials and installation.

.3 Maintain one copy of documents on Site.

1.5 FIELD QUALITY CONTROL

.1 Inspection and testing of air/vapour barrier membrane application will be carried out by an independent inspection agency acceptable to the Contract Administrator, and paid for by The City.

.2 Notify agency minimum 48 hours prior to commencement of air/vapour barrier membrane application to arrange inspection. Permit agency full access to all portions of Work.

.3 Inspections shall include inspections prior to, during, and upon completion of the installation, including air leakage testing of the installed membrane.

.4 Submit two (2) original copes of each inspection report, complete with photographs, to the Contract Administrator. Submit one (1) copy to the Contractor.

1.6 PRE-INSTALLATION CONFERENCE

.1 A pre-installation conference between Contractor, Air/Vapour Barrier Subcontractor, Contract Administrator, manufacturer's representative, Air/Vapour Barrier Inspection Agency, and any other trades affected by installation of the air barrier membrane must be held prior to the start of the installation of the air barrier membrane system, with the exception of the job mock-up.

1.7 JOB MOCK-UP

.1 Do mock-ups in accordance with Section 01 33 00 – Submittals Procedures.

.2 Construct mock-up of air/vapour barrier installation including typical exterior wall (1500 x 1500mm panel), window frame, jamb and sill, insulation, building corner condition, and junction with roof vapour retarder, illustrating Materials interface and seals.

.3 Mock-up may be part of finished Work, if deemed acceptable.

.4 Allow 72 hours for inspection of mock-up by Contract Administrator before proceeding with remainder of air/vapour barrier Work.

1.8 MANUFACTURER'S APPLICATION GUIDELINES

.1 The membrane manufacturer shall provide "application guidelines" for their Materials. Copies of these guidelines shall be provided to the Contract Administrator and to the applicators. Copes shall be kept on Site during AVB installation for reference.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle Materials in accordance with Section 01 60 00 – Basic Product Requirements.

.2 Deliver, store and handle Materials in accordance with manufacturer's written instructions. Provide raised platforms, waterproof coverings and interior storage as necessary to protect Materials from direct sunlight, chemicals, solvents, precipitation, ground moisture and temperature extremes, as per manufacturer's recommendations.

.3 Do not double stack pallets of air/vapour barrier membrane. Protect rolls from direct sunlight until ready for use.

.4 Adhesives and primers contain solvents and are flammable. Do not store or use near open flame or spark.

1.10 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. Except as explicitly permitted by the membrane manufacturer, no installation Work shall be performed on walls exposed to inclement weather or on frost covered or wet surfaces.

.4 Substrate shall be protected from exposure to moisture following application until building envelope is complete.

.5 Concrete block assemblies shall be cured a minimum of seven (7) days and be free of surface moisture. Allow a minimum of 24 hours drying period following precipitation.

.6 Prior to installation, inspect those areas to receive the air/vapour barrier membrane to ensure that they are clean, dry, sound, smooth and continuous.

1.11 SEQUENCING

.1 Sequence Work to permit installation of Materials in conjunction with related Materials and seals. Coordinate with roofing air/vapour barrier membrane installations to ensure specified laps, connections, intersections, etc. are achieved to ensure continuity of the overall building air/vapour barrier.

.2 Work shall be scheduled to provide an airtight seal at the end of each Working Day on the area worked upon during the day.

1.12 WARRANTY

.1 Provide a three 3 year warranty under provisions of Section 01 78 00 - Closeout Submittals.

.2 Warranty: Include coverage of installed sealant and sheet Materials which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or failure to cure, in accordance with C13, for a period of three (3) years.

1.13 SUBMITTALS

.1 Submit certified copy of test data from recognized independent testing laboratory confirming performance properties of air/vapour barrier membrane.

.2 Submit 300mm x 300mm (12" x 12") samples of air/vapour barrier membrane.

.3 Provide data on Material characteristics, performance criteria, and limitations.

.4 Submit manufacturer's installation instructions, indicating preparation and installation requirements and techniques.

1.14 DURABILITY

.1 Product manufacturers shall certify their products will meet all characteristics required by CSA S478.

Part 2 Products

2.1 AIR/VAPOUR BARRIER MEMBRANE (TORCH-ON)

.1 Acceptable products:

.1 AquaBarrier TG, as manufactured by IKO Industries

.2 Blueskin TG, as manufactured by Bakor

.3 Sopraseal 60 F/F, as manufactured by Soprema

.2 Ensure compatibility with other building membrane components.

.3 Roll width to suit tie locations, where used in cavity wall locations.

.4 Provide suitable primer for substrate to manufacturer's recommendations.

.5 Provide suitable mastic membrane and sealants to seal end laps, terminations, and around protrusions such as masonry ties.

2.2 AIR/VAPOUR BARRIER MEMBRANE (SELF-ADHERED FOR EXISTING WOOD SHEATHING)

.1 Acceptable products:

.1 AquaBarrier SA, as manufactured by IKO Industries

.2 Blueskin SA, as manufactured by Bakor

.3 Sopraseal Stick 1100, as manufactured by Soprema.

.2 To be used where being applied over combustible wall substrates.

2.3 AIR/VAPOUR BARRIER MEMBRANE ACCESSORY PRODUCTS AND MATERIAL COMPATIBILITY

.1 Accessory products including caulks, sealants, primers, etc., which are in direct contact with, or form part of, the air/vapour barrier systems must be chemically and physically compatible with the Materials to which they are applied and must be approved for that use/application by their manufacturer and the manufacturers of the air/vapour barrier Materials they contact.

.2 Bridging membrane: flexible butyl sheet, standard of acceptance: Firestone Rubbergard Form Flash, or approved "as Equal" in accordance with B7.

.3 Transition membrane:

.1 AquaBarrier TG or AquaBarrier AVB, as manufacturered by IKO Industries

.2 Sopraseal 60 F/F or Sopraseal Stick 1100, as manufactured by Soprema

.3 Blueskin TG or Blueskin SA, as manufactured by Bakor

.4 Membrane backer: Galvanized steel sheet, minimum 0.38mm (0.015") Nominal Base Steel Thickness (NBST), commercial quality, with Z275 designation zinc coating.

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 Contract Administrator 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.

.6 Concrete Blocks:

.1 Unevenness between blocks not to exceed 2.5 mm (100 mils).

.2 Excess mortar in joints to be removed.

.3 Holes and openings must be patched in concrete blocks or mortar joints.

.7 Cast-In-Place Concrete:

.1 Ridges at the frame Work joints shall not exceed 5.0 mm (197 mils) in height.

.2 Surface to be flat, remove any lumps of concrete.

.3 All surfaces must be clean and dry, free from laitance, release form oils etc.

.4 Tie holes are to be filled with appropriate Material.

.5 Ensure concrete is cured and dried for a minimum of 7 days.

.8 Examine Work of other trades for defects and discrepancies and report them to the Contract Administrator in writing. Do not proceed with Work until surfaces are satisfactory.

3.3 INSTALLATION - PRIMER

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

.2 Apply torch-grade primers using a short nap roller or spray equipment. Masks and safety glasses must be worn if spray methods are utilized on the project.

.3 Apply primers at the manufacturer's recommended rate (litres/sq. m.) depending on the surface porosity.

.4 Allow primer to be dry to touch before commencing membrane application. Drying time will depend on ambient temperature.

.5 Primed surfaces not covered by air/vapour barrier membrane during the same Working Day must be re-primed.

3.4 INSTALLATION – AIR/VAPOUR BARRIER MEMBRANE

.1 Install air/vapour barrier membrane at all locations noted in the Contract Documents and/or Architectural Drawings.

.2 Orientation of membrane may depend on substrate type and ease of accessibility. On precast concrete the membrane may be installed either vertically or horizontally, whereas concrete block with brick ties will denote application in the horizontal plane.

.3 Install air/vapour barrier membrane to substrate in manageable lengths, approximately 2.4 metres (8 feet).

.4 Position membrane for installation and begin installation at the base of the wall. Using a propane torch, soften the underside of the membrane by burning off the polypropylene film. The bitumen should be in a semi-molten state to ensure adequate adhesion. Apply sufficient hand pressure and use a roller to ensure adhesion to the primed substrate.

.5 Exercise caution to avoid overheating the membrane or its reinforcement during the application of the air-vapour barrier membrane.

.6 Install successive courses of membrane ensuring that all end laps are 150 mm (6 inches), and all side laps are 76 mm (3 inches). All end and side laps shall be thermofused using a propane torch and trowel.

.7 Cut membrane at approximately 510 mm (20 inch) widths or 660 mm (26 inch) widths respectively if masonry ties are in place at every two or three brick courses.

.8 Apply a trowel coat of modified mastic around all masonry ties.

.9 Continue membrane installation onto the horizontal and vertical planes to tie into all door frames and windows sills.

.10 Seal top edge of the membrane to the substrate with modified mastic at the end of each Workday.

.11 Prior to installation of the insulation, inspect membrane for punctures or tears. Any location where the membrane's integrity has been breached, repairs are mandatory. The repair patch must extend at least 150 mm (6 inches) beyond the damaged area on all sides. Seal the perimeter edges of the repair patch with a bead of modified mastic.

.12 Do not allow membrane to come in contact with coal tar products such as creosote, EPDM membrane or polysulphide based sealants.

.13 Do not install the insulation or otherwise cover the air/vapour barrier membrane until the approval of the air/vapour barrier installation by the Contract Administrator and Inspection Agency.

3.5 PROTECTION

.1 Protect finished Work in accordance with Section 01 51 00 – Temporary Facilities. Do not permit adjacent Work to damage Work of this section.

.2 Close up air barrier membranes as soon as possible after application to protect the membranes from weather, sunlight and damage by other trades.

.3 Do not install membrane, and leave un-insulated, on the cold side of a building shell, which is being heated from the inside.

.4 Insulate over the air barrier membrane immediately after installation or install within heated enclosure and maintain heat until insulation is installed, if expected range of environmental conditions on either side of the membrane could result in dew point temperatures occurring within the wall.

END OF SECTION

Part 1 General

1.1 WORK INCLUDED

.1 Conform to the requirements or Division 1 in addition to the requirements of this section.

1.2 RELATED WORK

.1 The sub trade is responsible for the supply and installation of the following items, including all related labour and Materials necessary to successfully complete the installation of sane whether or not noted on the Contract Documents.

1. Composite building panels
2. Fastening system
3. Closures and related trim
4. Caulking and sealants

1.3 QUALITY ASSURANCE

.1 Manufacture's Qualification: 20 year minimum experience in Manufacturing Glass Fibre Reinforced Concrete Panels.

.2 Provide a written guarantee covering the replacement of defective Work for a period of one year from the expiry of the standard one year Contractor's warranty.

.3 The following will be deemed as defective Work; leakage, failure to stay in place, undue cracking, chipping or adjacent deformations, panel deformation, buckling, spalling, deterioration of surface. Failure of 15% of surface are of panels shall be deemed a total failure of the installation requiring complete re-application of the panels.

.4 In addition, provide a written guarantee from the manufacture regarding defective panel replacement, for a period of 3 years.

1.4 SHOP DRAWINGS

.1 Building panel Shop Drawings shall be submitted to the Contract Administrator for review. No Work shall be fabricated before review of Shop Drawings by the Contract Administrator. Submit Shop Drawings in accordance with Section 01 33 00 – Submittal Procedures.

.2 Indicate on the Drawings all information required to fabricate and install components of the Section. This shall include product and Material standards, dimensions, connection and jointing details, gauges, finishes, etc. ensure that plan and section details of interior and exterior corners, horizontal and vertical joints, fascias and soffits, cut-outs, misc. trim, fastening methods etc., are shown at a minimum 1:5 scale.

Part 2 Products

2.1 PANEL SYSTEM

.1 The following specified products and Materials form the complete building panel system required for this Project. Ensure that only compatible products and Materials are used. Requests for substitution must be made in accordance with B7 Substitutions.

.2 Face Fastened: Wall panels shall be exposed aggregate faced panels, prefabricated on 2" (50mm) rigid insulation and are to be face fastened. They shall consist of inorganic fibre with natural stone and cement.

.3 Back fastened: Panels shall be SYNSTONE simulated slate panels, and are to be back fastened. They shall consist of inorganic fibre with natural stone and cement.

.3 Panels shall be fabricated in the factory to ensure that they are the same size, consistent in colour and free from warps, cracks and other imperfections. The panels shall be Synstone Thermo-shield, Series #1, #2 or #3 depending on location with a nominal overall thickness of 2-1/4"(57mm), 2-3/8"(60mm) or2-1/2"(63mm).

.4 These panels shall meet a maximum flame spread rating of 5 and a maximum developed smoke rating of 25 when tested in accordance to CAN4-S102M. FR designed panels are non-combustible when tested to ASTM E-136-81 (Also CAN4-S114M80). The panel sizes of 48"(122 mm) by 120"(3048 mm) are to be used in order to minimize joints when being installed on the job Site.

.5 Panels shall be glass fibre reinforced concrete Synstone panels as manufactured by Concrete Cladding Systems Ltd., 905.607.8304, supplied and installed as per the manufacturer's latest published data, and as noted on the Drawings and Specifications.

.6 The concrete panel has been designed for a wind load of 25 psf. Based on the recommendation of the Pre-stressed Concrete Institute (PSI), a factor of Safety of 4 to 6 should be used for GFRC Materials. A safety factor of 4 has been used in this design calculation.

2.2 FASTENERS

.1 Consealed Fasteners

.1 All panels are supplied with 5/16 dia. blind weld nuts cast in the panels during manufacturing. 12 gauge galvanized steel hook clips are bolted to the panels with 5/16 dia. bolts and the assembly is hung on 16 gauge galvanized steel "J" girts that are mechanically fastened to the substrate.

.2 Exposed Fasteners

.1 Concrete and brick masonry walls, use 3/16" Tapcons or Drillcrete self tapping concrete anchors. Colour matched fasteners to be flat head and epoxy coated. Minimum 1 ½" effective embedment.

.2 All screws should have sufficient corrosion resistance or be coated with climaseal, or equivalent corrosion resistant products.

.3 The distance between fasteners both vertically and horizontally should not be more than 24"o.c. and also not less than ½" from the panel's edge. Care should be taken that the head of the screw does not penetrate the panel surface. Note that the head of the screw must be colour matched to the panel.

.4 A joint gap of not less that ¼" must be maintained between all panels. All joints should be filled with backing rod and caulking using a high quality sealant.

2.3 SEALANTS

.1 Dow Corning 795 or CWS, one-part silicone, neutral-cure, architectural or Bondaflex Sil 295 NB or Sil 199PG, one-part silicone neutral cure, architectural sealant. Colour as selected by the Contract Administrator from the manufacturer's chart.

Part 3 Execution

3.1 INSTALLATION

.1 All panels are to be installed level, true and plumb and in line as indicated on the Drawings. Tolerances shall be within 2mm. in 3 meters vertically and horizontally, and 3mm. in 3 meters for the diagonal surface alignment.

.2 Panels required to be stored shall be protected from dirt and damage. Keep panels covered at all times to protect from dirty rain water until on the project. Panels which are damaged in any way shall not be accepted or installed.

.3 Synstone Thermo-shield exterior panels are to be pre-drilled with a 3/16" concrete drill bit.

.4 Screws are to be located so that panels can be individually removed without removing adjacent Materials such as flashing

.5 To maintain 1/4" gaps between panels use "Synstone Black Shims" before panels are fastened. Remove before caulking

.6 Site cut one panel to the correct width in a long run of panels to ensure 1/4" gap is maintained between all panels.

.7 During installation immediately remove any dust from the surface of the panels caused from saw cutting or drilling. If not removed could stain panel.

.8 It is recommended that only installers approved by Synstone International Ltd. be allowed to install this system

3.2 CLEAN UP

.1 Clean all panels periodically during the process of reaching substantial completion with approved methods in accordance with manufactures recommendations. Dust from cutting and drilling holes in panels must be removed immediately. Do not use wire brushes, metallic tools or abrasives.

.2 Upon completion of panel installation, remove any excess sealant with solvent approved or recommended by the panel manufacturer. Power wash the complete installation to remove construction dirt. No routine maintenance is required with Synstone panels. If required, the panels may be cleaned with mild detergent and water or plain water.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 06 10 00 – Rough Carpentry

.2 Section 07 21 00 – Thermal Insulation

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

.4 Section 07 92 00 – Joint Sealing

1.2 QUALIFICATIONS

.1 The Work shall be performed by a firm trained and approved as an applicator agent of the manufacturer.

1.3 QUALITY ASSURANCE

.1 Review details related to installation of roofing system and notify Contract Administrator in writing of conditions unacceptable for installation of specified Materials. Absence of such notice will be construed as an acceptance of area to be roofed.

.2 Upon completion, have the installation inspected by an authorized representative of the manufacturer in the presence of the City's representative.

1.4 SUBMITTALS

.1 Submit in duplicate latest edition of manufacturer's product data, details and installation recommendations. Submit Shop Drawings for prefabricated Work.

1.5 PRODUCT HANDLING

.1 All Materials: handle and store in a manner which will prevent their damage. Store in original containers and clearly mark with supplier's name and product name.

.2 Store uncured flashing products in a cool (under 21°C) and dry area to avoid premature curing.

.3 Store all other Materials in a protected dry area where temperature maintained between 10°C to 27°C

1.6 JOB CONDITIONS

.1 Weather: do not proceed with Work under conditions of inclement weather such as precipitation or high winds, or when such conditions appear imminent. Work at temperatures below 5°C may require the use of a heat gun for Work involving uncured EPDM flashing.

.2 All surface: dry and free from dust and debris.

.3 Solvent Materials and cleaners: do not use near sparks or open flames. Properly ventilate areas where solvent-base Materials are in use to avoid concentration of vapours.

1.7 EXTENDED WARRANTY

.1 Warranty: 15 year labour and Material standard warranty shall be issued by manufacturer to the City through the Subcontractor warranting the EPDM membrane and all roof systems in accordance with manufacturer published warranty.

.2 The roofing Subcontractor shall pay fees for this extended warranty to the manufacturer of EPDM membrane, before proceeding with Work. The receipt confirming payment shall be presented to the City and the Contract Administrator through the Contractor's office.

1.8 PROTECTION

.1 Fire: protect all Materials against contact with extreme heat, sparks, and open flames during storage and installation.

.2 Incompatible Materials: protect all Materials against contact with incompatible Materials including, but not limited to, petroleum distillates, organic solvents, and solvent-based roof cement.

Part 2 Products

2.1 GENERAL

.1 All elements of the EPDM Roofing System shall be products of the system manufactured with the system trademark. Materials used in conjunction with the system which are not products of this manufacturer shall be approved in writing by the system manufacturer.

2.2 EPDM ROOFING SYSTEM

.1 EPDM membrane: 1.2 mm (0.45") EPDM sheet furnished in rolls, with a uniform talc-gree surface and following physical properties:

Property Tested	Test Method	Test Results S.I. Units
Colour	Visual	Black
Specific Gravity	ASTM-D-297-79	1.27
Tensile before heat aging	ASTM-D-412-75	9.7MPa
Tensile after 7 days @ 240°F	ASTM-D-573-78	11.0 MPa
Elongation before heat aging	ASTM-D-412-75	320%
Elongation after 7 days @ 240°F	ASTM-D-473-78	200%
Tear Resistance	ASTM-D-624-73	29.7 KN/m
Ozone Resistance	ASTM-D-1149-78	No Degradation
Low Temperature brittleness	ASTM-D-746-79	Exceed -45°C
Operating Temperature range		-45°C + 115°C
Water Vapour transmission	ASTM-E-96-72 Method BW	3.7 x 10(3) Metric Perm-cm
Shore Hardness	ASTM-D-2240-75	60 + -4 Pts

2.3 RELATED PRODUCTS

.1 Flashing: 1.2 mm cured and 1.5 mm uncured EPDM or Neoprene furnished in rolls 152 mm through 1.22 m x 30.48 m.

.2 Bonding adhesive: compatible with Materials to which the membrane is to be bonded, furnished by membrane manufacturer.

.3 Splicing cement: furnished by membrane manufacturer.

.4 Lap sealant: compatible with Materials with which it is sued, shall be trowel or gun consistency, furnished by membrane manufacturer.

.5 Water cut-off mastic: compatible with Materials with which it is used, furnished by membrane manufacturer.

.6 Moulded pipe flashing: compatible with Materials with which it is used, furnished by membrane manufacturer.

.7 Night stop: compatible with Materials with which it is used, furnished by membrane manufacturer.

.8 Lap primer: as supplied by membrane manufacturer.

.9 Pourable sealer: compatible with Materials with which it is used, furnished by membrane manufacturer.

.10 Mechanical nailing strips and fasteners: nailing strips and fasteners furnished by membrane manufacturer.

.11 Insulation fasteners: furnished by membrane manufacturer.

.12 Roof insulation: The insulation manufacturer's specifications shall be followed and in addition, shall be in compliance with roofing system general requirements

.1 Polystrene insulation: to CGSB 51-GP-20M:

Base Bid:

.1 Type 1 (expanded), R-3.57/inch, square edges sloped as per Drawings.

.13 Vapour Retardant and Substrate:

.1 Asphalt saturated felts: 6 or 10 mil polyethylene.

.2 Exterior gypsum sheathing board c/w water resistant paper surfaces: to CSA A82.27-M1979.

.14 Ballast: No. 4, washed and well rounded.

2.4 ACCEPTABLE PRODUCTS

.1 Roof Insulation:

.1 Base Bid: Polystrene Type 1:

.1 Plasti-Span or AMC Styrobar 16.

.2 Approved equal in accordance with B7 Substitutions.

.2 Roofing System:

.1 Lexcan Industrial Supply Ltd. EPDM Roofing System.

.2 Genflex EPDM Roofing System

.3 Or Contract Administrator approved equal in accordance with B7 Substitutions.

Part 3 Execution

3.1 INSPECTION OF SUBSTRATE

.1 Prior to start installation, examine all roof areas included in this Work. Notify the Contract Administrator of any unacceptable conditions. These include, but are not limited to, uneven deck surfaces, improperly installed curbs or nailers, surfaces with fins or sharp projections, and surfaces contaminated with incompatible Materials. Do not begin Work until these conditions have been corrected. Protect membrane in high traffic areas, eg. Work by other trades, application of gravel, etc.

.2 Inform the City's appointed Roofing Inspector of roofing application schedule before proceeding with Work.

3.2 SHEATHING

.1 Install gypsum board sheathing to steel deck using continuous beads of adhesive on each flute.

.2 Lay boards with long side at right angle to flutes, stagger end joints, provide full support at ends.

.3 Cut sheathing cleanly and accurately to roof breaks and protrusions to provide a smooth surface.

.4 Mechanically fasten sheathing around perimeter of roof deck to distance of 200 mm in from edges using 8 fasteners with washers @ 6" o.c.

3.3 APPLICATION OF VAPOUR RETARDANT

.1 Vapour retardant application:

.1 Loose lay 10mil polyethylene to CRCA specifications.

.2 Extend vapour retardant undercant strips and blockings and lap over air/vapour barrier of wall construction to provide continuity of building air/vapour envelope.

.3 Glaze top surface of vapour retardant if placing of insulation does not follow immediately.

3.4 INSULATION

.1 Install insulation loose laid over substrate.

3.5 INSTALLATION OF EPDM LOOSE LAID SYSTEM

.1 Membrane:

.1 If possible install Roofing Membrane by starting at high point of roof and Working to lowest point.

.2 Position membrane over approved Substrate without stretching.

.3 Allow membrane to relax one-half hour before splicing or fastening.

.4 Position adjoining sheet of membrane in same manner and overlap edges a minimum of 76 mm.

.2 Splicing:

.1 Fold top sheet back about 300 mm. Clean both mating surfaces at splice area using clean rags with heptane, unleaded or white gas.

.2 Apply primer at a rate of 43.5 m/litre net coverage (two sides) to both mating surfaces.

.3 Apply splicing cement to both mating surfaces using a 76 mm or 102 mm x 127 mm thick paint brush at a rate of approximately 11.5 m of 76 mm splice per litre. Brush cement on smooth in a circular motion obtaining 100% coverage. Do not allow to glob or puddle. Allow cement to dry until tacky but not to string or stick to a dry finger touch.

.4 Roll top sheet toward splice area until the cemented area is nearly touching cement on bottom sheet along entire length of splice. Allow top sheet to fall freely into place, avoiding stretching and wrinkling.

.5 Roll splice with a 50 mm wide steel roller, using positive pressure, toward outer edge of splice.

.6 Solvent clean the splice edge, extending at least 25 mm onto top and bottom membranes.

.7 Apply bead of Lap Sealant completely coveting splice edge. Feather Lap Sealant with a specially preformed putty knife or trowel as supplied by manufacturer. Complete Lap Sealant application on all splices by end of each Working day.

3.6 FLASHING APPLICATION

.1 Use flashing Material in the longest pieces practicable.

.2 Complete splice between flashing and main roof sheet before bonding flashing to vertical surface. Main roof sheet shall extend at least 100 mm up the parapet, attached with nailing strips, fastened 300 mm o.c. maximum.

.3 Apply bonding adhesive to both flashing and surface to which it is being bonded at a rte covering approximately 5.57m2 of finished surface.

.4 After the bonding adhesive has dried to the point where it does not string or stick to a dry finger touch, roll the flashing into the adhesive. Take care to assure that the flashing does not bridge where there is any change of direction (e.g. where the parapet meets the roof deck.)

.5 Nail installed flashing at top of flashing every 300 mm on centre maximum under metal counterflashing or cap flashing.

3.7 BALLAST APPLICATION

.1 Before spreading ballast, check the membrane thoroughly to verify that laps have been sealed and system is free of damage.

.2 Ballast No. 3 Stone. Ballast weight will be applied as follows:

.1 Field 10 lbs/sq.ft.

.2 Permeter 12 lbs/sq.ft. – 9 ft. strip all around

.3 Corners 15 lbs/sq.ft. – 9 ft. x 9 ft. square

.3 Apply precast pavers on 25 mm x 100 mm Type 2 rigid insulation strips on each side of paver, to allow for water movement.

3.8 NIGHT STOP

.1 Temporarily seal membrane to deck or abutting roof membrane with mastic recommended by membrane manufacturer.

3.10 CLEAN UP

.1 Applicators shall remove all debris related to this Work from the project Site.

END OF SECTION

Part 1 General

1.1 WORK INCLUDED

.1 The Work included under this section shall conform to the industry standard and be accepted by the local construction and trade associations.

1.2 RELATED WORK

.1 Section 01 33 00 – Submittal Procedures

.2 Division 04 – Masonry

.3 Section 06 10 00 – Rough Carpentry

.4 Section 07 53 33 – EPDM Roofing

.5 Section 07 92 00 – Joint Sealing

.6 Mechanical Specifications

.7 Electrical Specifications

1.3 EXISTING CONDITIONS/PROTECTION

.1 Exercise care when working on or about roof surfaces to avoid damage or puncturing membrane or flexible flashings.

.2 Place plywood panels on roof surfaces to Work of this section and on access routes. Keep in place until completion of Work.

Part 2 Products

2.1 SHEET MATERIALS

.1 Flashings and Bent Closures: 0.6 mm (24 ga.) core steel, shop pre-coated.

.2 Flashing colour at windows and parapets: as selected by Contract Administrator from standard 8000 series colours.

.3 Flashings at tyndall stone: Galvalume

.4 Fascia: shop pre-coated steel to same thickness as .1 above – colour by Contract Administrator.

.5 Eavestroughs and downspouts: pre-coated steel of 24 gauge, unless otherwise noted as per Drawings. Colour as selected by Contract Administrator from standard colours.

.6 Pipe Sleeves: pre-coated steel of 24 gauge as per Drawings. Colour as selected by Contract Administrator from standard colours.

.7 Vents: pre-coated steel of 24 gauge as per Drawings. Colour as selected by Contract Administrator from standard colours.

2.2 ACCESSORIES

.1 Fastener:

.1 Screws: Prefinished steel with fiberglass reinforced nylon head and soft neoprene washer, at exposed locations. Finish exposed fasteners to be same colour as flashing and fascias.

.2 Nails: Of same Material as sheet metal to CSA B111, flat head roofing nails of length and thickness suitable for metal flashing application.

.3 Washers: of same Materials as sheet metal, 1mm (0.04") thick, with rubber packing.

.2 Sealant: in accordance with Section 07 92 00 – Joint Sealing. Colours to be selected by Contract Administrator.

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

.4 Isolation coating: alkali-resistant bituminous paint.

.5 Underlay for metal flashing: No. 15 perforated asphalt felt to CAN/CSA-A123.3.

.6 Cleats: of same Material and temper as sheet metal, minimum 50mm (2") wide. Thickness same as sheet metal being secured.

.7 Solder: to ASTM B32, "Standard Specification for Solder Metal", fifty percent (50%) tin and fifty percent (50%) lead.

.8 Flux: Rosin, cut hydrochloric acid, or commercial preparation suitable for Materials to be soldered.

.9 Touch-up paint: as recommended by prefinished Material manufacturer.

2.3 FABRICATION

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

.2 Fabricate cleats, clips, and starter strips of same Material as sheet, inter-lockable with sheet.

.3 Form pieces in longest practical lengths, 2440mm (8ft.) maximum. Make allowance for expansion at joints.

.4 Hem exposed edges on underside 13 mm; miter and seam corners with sealant.

.5 Form Material with flat lock seam.

.6 Seal all joints with silicone.

.7 Fabricate corners from one piece with minimum 450 mm long legs; solder for rigidity, seal with silicone sealant.

.8 Fabricate vertical faces with bottom edge formed outward 6 mm and hemmed to form drip.

.9 On exposed faces, return drip edge hem back to form interlock with concealed clip. Provide continuous clips at all exposed faces.

.10 Fabricate flashings to allow toe to extend 50 mm over roofing. Return and brake edges.

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

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

Part 3 Execution

3.1 INSPECTION

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

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

.3 Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

.1 Field measure Site conditions prior to fabricating Work.

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

3.3 INSTALLATION

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

.2 Secure flashings in place using concealed continuous clip fasteners at all visible flashings. Use exposed fasteners only in locations not ordinarily visible (e.g. - inside parapet walls). All exposed fasteners must be on vertical surfaces.

.3 Apply plastic cement compound between metal flashings and felt flashings.

.4 Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

.5 Seal metal joints watertight.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 – Submittals Procedures

.2 Section 01 45 00 – Quality Control

.3 Section 01 77 00 – Closeout Procedures

.4 Section 02 07 20 – Selective Site Demolition

.5 Division 03 – Concrete

.6 Division 04 – Masonry

.7 Section 05 12 00 – Structural Steel

.8 Section 05 21 00 – Structural Joist Framing

.9 Section 07 92 00 – Joint Sealing

.10 Section 09 22 16 – Non-Structural Metal Framing

.11 Section 09 29 00 – Gypsum Board

.12 Section 09 51 30 – Acoustical Ceiling Panel

.13 Section 09 90 00 – Painting

.14 Mechanical Specifications

.15 Electrical Specifications

1.2 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

.1 Provide firestop systems in accordance with NBCC and NFPA 101 consisting of a Material, or combination of Materials that are compatible with each other and installed to maintain the integrity of the new or existing Fire Resistance Rating of the fire separation by maintaining an effective barrier against the spread of flame, smoke, heat and/or hot gases through penetrations, blank openings, construction joints, or at perimeter fire containment in or adjacent to the Fire Separation in accordance with the requirements of the National Building Code of Canada.

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

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

.4 Only tested ULC or cUL firestop systems shall be used in specific locations as follows and also as indicated in the schedule of firestop locations, Item 3.5:

.1 New or existing service penetrations for the passage of duct, cable tray, conduit, piping, electrical bus ways and raceways, empty/blank openings through new or existing vertical fire separations (walls and partitions), horizontal that have a fire separation (floor/ceiling assemblies), and vertical service fire separation shaft walls and partitions.

.2 Openings between structurally separate sections of walls or floors that have a fire separation.

.3 New or existing joints (gaps) between the bottom of walls (gypsum board to floor system).

.4 New or existing wall-to-wall joints (gaps) (gypsum board to concrete or concrete block walls or control/expansion joints for masonry, concrete or gypsum board).

.5 New or existing joints (gaps) between the top of walls and ceilings or floor and roof assemblies, slip joint or concrete shrinkage joint detail.

.6 Floor expansion joints (floor to floor, floor to wall).

.7 Control or expansion joints in vertical and horizontal fire separations.

.8 Mechanical and electrical recessed boxes through fire resistant membranes.

.9 Systems installed to allow and be designed to accommodate movement (expansion) in all joints as indicated on architectural/structural Drawings/specifications and plumbing pipes and sprinkler pipes that require movement during the activation of these systems.

.10 Openings around structural members, which penetrate horizontal and vertical fire separations and their fire resistant membranes.

.11 Fire-rated cable pathway devices.

.12 Marriage joints between fire rated duct wrap to fire rated floor and wall assemblies.

.3 All fire separations to have a Fire Resistance Rating to them as indicated on Drawings. All Non-rated Fire Separations to be assigned a 1-hour Fire Resistance Rating and a F-Rating of 1 hour minimum. Both sides of a non-rated fire separation to have a tested fire and smoke stop system applied, to match or exceed the F-rating, as indicated.

.4 All multiple service penetration through a fire separation must have a minimum space equal to the same size of the smallest pipe or greater, minimum 50mm, between pipes to be considered an individual services penetration. Penetrations where the space between penetrating items is less than 50mm will be classified as a multi-penetrations and a square or rectangular opening shall be constructed around the penetrations with a fire and smoke stop system applied to the entire opening.

1.3 REFERENCES

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

.1 ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials.

.2 ASTM E119, Standard Test Methods for Fire Tests of Building Construction and Materials.

.3 ASTM E595, Standard Test Method for Total Mass Loss and Collected Volatile Condensable Materials from Outgassing in a Vacuum Environment.

.4 ASTM E814, Standard Test Method for Fire Tests of Penetration Firestop Systems.

.5 ASTM E1399, Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems.

.6 ASTM E1966-07(2011), Standard Test Method for Fire-Resistive Joint Systems.

.7 ASTM E2174-10ae1, Standard Practice for On-Site Inspection of Installed Fire Stops.

.8 ASTM E2307, Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus.

.9 ASTM E2393, Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.

.2 Canadian Electrical Code

.3 Firestop Contractors International Association (FCIA).

.1 FCIA Manual of Practice (MOP).

.4 International Firestop Council (IFC).

.1 Recommended Guidelines for Performing Destructive Testing for Installed Penetration Firestop Systems, Fire-Resistive Joint Systems, or Perimeter Fire Barrier Systems.

.2 Inspection Guidelines for Penetration Firestop Systems and Fire-Resistive Joint Systems in Fire Resistance Rated Construction.

.3 Engineering Judgment Guidelines.

.1 Evaluating Firestop Systems in Engineering Judgments (EJs).

.2 Perimeter Fire Barrier Systems.

.3 Fire Resistant Duct Enclosure Systems for Ventilation Ducts.

.4 Fire Resistant Duct Enclosure Systems for Commercial Kitchen Exhaust Ducts.

.5 National Building Code of Canada, 2010 (NBCC).

.6 National Fire Protection Association (NFPA).

.1 NFPA 101®: Life Safety Code®, 2012 Edition

.7 National Research Council Canada (NRC).

.1 Best Practice Guide on Fire Stops and Fire Blocks and their Impact on Sound Transmission, June 2007.

.8 Standard for approval of Accredited or Qualified Firestop Contractor :

.1 ULC – Qualified Firestop Contractor Program

.2 UL – Qualified Firestop Contractor Program

.3 FM 4991 – Approval Standard for Approval of Firestop Contractors

.9 Underwriter's Laboratories (UL).

.1 UL 1479, Fire Tests of Through-Penetration Firestops.

.2 UL 2079, Tests for Fire Resistance of Building Joint Systems.

.10 Underwriter's Laboratories of Canada (ULC).

.1 CAN/ULC S101-07, Standard Methods of Fire Endurance Tests of Building Construction and Materials.

.2 CAN/ULC S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

.3 CAN/ULC S115-11, Standard Method of Fire Tests of Fire Stop Systems.

.4 ULC List of Equipment and Materials Firestop Systems and Components 2010 Edition.

1.4 DEFINITIONS

.1 Firestops: specially tested Materials or combination of Materials used to establish or re-establish the integrity of a fire rated wall, floor, ceiling or roof assembly or other partition after the structure has been breached for the through-penetration of building service items or to close off openings left due to construction methods to prevent or limit the spread of fire, heat, gasses and smoke.

.2 Through penetration: opening or foreign Material, pipes, conduits, ducts, cable trays, cable, wire, structural components or any other element passing completely through an opening in a fire rated barrier/assembly such that the full thickness of the rated Material(s) is breached either in total or in part.

.3 Membrane penetration: any penetration (as indicated in 1.11.2) of a fire rated barrier that breaches one side but does not pass completely through to the other side, including recessed electrical devices.

.4 System: the combination of specific Materials and/or devices, including the penetrating item(s) required to complete the firestop, as tested by an independent third party test facility.

.5 Barrier/Assembly: a wall, floor, ceiling or roof assembly or other partition with a fire-smoke rating of 0,1, 2, 3 or up to 4-hours.

.6 Fire Resistive Joint: any joint or opening, whether static or dynamic, within or between adjacent sections of fire rated interior or exterior walls, floors, ceilings or roof decks.

.7 Perimeter Fire Barrier System: perimeter joint protection that provides fire resistance to prevent passage of fire from floor to floor within the building at the opening between the exterior wall assembly and floor assembly.

.8 Fireblocking: Building Materials installed to resist the free passage of flame, smoke and noxious gases to other areas of the building through concealed spaces.

.9 Intumescent: Materials that expand with that to seal around objects threatened by fire.

.10 F-Rating: the time a firestop, penetrating item, building, Material, firestop Material, can withstand direct flame without a burn through as tested to CAN4-S115-M2005/ULC-S115-M2005 or ASTM E814/UL 1479.

.11 T-Rating: the amount of time a through-penetration firestop limits the temperature rise on the cold side-outside the test furnace – as tested to CAN4-S115-M2005/ULC-S115-M2005 or ASTM E814/UL 1479.

.12 L-Rating Air Leakage Test: introduced by Underwriters Laboratories on August 9, 2004 for systems tested and listed in accordance with ANSI/UL 1479. Not exceeding 0.01524 cu. m/s per square meter of penetration opening at 74.7Pa at both ambient and elevated temperatures (204^{o} C).

.13 W-Rating Washout Test: system tested in accordance with UL1479.

.14 Non-Rated Fire Separations: to be a separation that prevents the passage of fire and smoke for time period that allows the fire suppression system to be activated and contain the fire. For the purpose of this project, all Non-Rated Fire Separations as indicated on Drawings to be assigned a minimum time of 60-minutes Fire Resistance Rating and shall be fire stopped on both sides of the fire separation.

.15 Single Penetration: one service penetration through a fire separation.

.16 Multi-Penetration: two or more service penetration through a fire separation where the minimum space between pipes must exceed 50mm and where sizes of pipe are larger than 50mm, the space must be larger than the largest pipe between. (Example, one – 100mm

diameter pipe and one – 150mm diameter pipe, the space between pipes must be greater than 150mm or otherwise the penetration will be considered a multi-penetration, when passing through a fire rated gypsum board partition. These gypsum board partitions must be framed out on all four sides with studs to match the ULC Design Wall System and the annular space must be boarded with rated gypsum board to match the ULC Design Wall System.

1.5 QUALITY ASSURANCE

.1 Work is to be undertaken by experienced Site Supervisor in their trade of Material or system being used with a minimum of five (5) working years of experience utilizing that Material/system, and shall provide a list of not less than five (5) successfully completed projects of similar scale and type. Firestop Subcontractor to provide a copy of their proposed Site Supervisor's curriculum vitae.

.2 All Workers shall be certified by the Manufacturer of the products and systems proposed for the Installation of this product. Proof of this certification will be required 48-hours after award of the project.

.3 Firestop Subcontractor to be a member of the Firestop Contractors International Association (FCIA) and International Firestop Council (IFC) and be in good standing with this association for a minimum of two (2) years. Firestop Subcontractor to provide within 48 hours after award of the project, proof of their good standing with the association of the FCIA.

.4 Manufacturer shall ensure that their Fire Protection Professional who will be working on the project, will have a minimum five (5) years' experience on the manufacturers design systems.

.5 Manufacturers shall provide a letter in writing within 48 hours after award of the project that the Engineered Judgements shall be provided by their Fire Protection Professional(s) as required to suit building conditions. All Engineered Judgements shall conform to IFC guidelines and the manufacturer shall be a member in good standing with the IFC or FCIA. Proof of membership to the IFC or FCIA shall be submitted within 48 hours after award of the project.

.6 A Manufacturer's Qualified National or Local representative to be on-Site during initial mock-up installation of firestop systems to ensure the mock-ups have been installed, based on the approved firestop systems and to train appropriate Subcontractor personnel in proper selection and installation procedures.

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

.8 For those firestop applications that exist for which no ULC or cUL tested system is available through a manufacturer, a Manufacturer's Engineered Judgment derived from similar ULC or cUL system designs or other tests will be submitted to local Authorities Having Jurisdiction for their review and approval prior to installation. Engineered Judgment Drawings must follow requirements set forth by the International Firestop Council Guidelines.

.9 A single source of Manufacturer Product shall be used on this Project. Materials of different manufacturers shall not be acceptable, unless otherwise indicated in this Section.

.10 Manufacturer to provide a written letter within 48-hours after the award of the project that if their systems are exposed in finished areas that their installed products can be primed and painted over to match the architectural finishes within those areas. If the Manufacturer deems that alternative methods may be required to allow their systems to

be primed/painted over, they shall notify the Firestop Subcontractor prior to bid closing to allow the Firestop Subcontractor to alter their bid prior to closing. Firestop Subcontractor to include any additional; costs within their bid to suit this application.

1.6 DESCRIPTION

.1 This section specifies firestopping Material and/or systems intended to act as a fire stop and smoke seal system to protect against the passage of fire, hot gases and toxic smoke within fire separation for the Fire Resistance Rating of a wall, floor, ceiling or roof assemblies for any through-penetration item, membrane penetration poke-through termination device, blanks, gaps, voids or any un-penetrated joint or opening, to form a draft-tight barrier within or between construction assemblies and act to retard the passage of flame, smoke and toxic gases.

1.7 FIRESTOP SYSTEMS (SHOP DRAWINGS)

.1 Submit Firestop Systems, product data and Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00. Also provide the following product data on each proposed product:

.1 Technical data on out-gassing; off-gassing and age testing.

.2 Curing time.

.3 Chemical compatibility to other construction Materials.

.2 Provide Certification by the Manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOC's) and are non-toxic to building occupants.

.1 According to ASTM E595.

.2 Test Method: Environmental Protection Association, EPA Method 24.

.3 Indoor Environmental Quality: Volatile Content: below 250 g/l.

.4 **DO NOT** use silicone firestops.

.3 Manufacturer through the firestop Subcontractor shall provide a certificate indicating or verifying the following:

.1 Firestopping Material to be free of asbestos, PCB, ethylene glycol, and lead, and c cannot incorporate nor require the use of hazardous solvents.

.2 documentation from UL that firestopping Material has passed UL accelerated aging and environmental exposure test for UL 1479 and ASTM E814 test standards for firestopping Materials. Verify on-Site to Contract Administrator prior to firestopping installation on all phases of construction.

.3 Documentation from the manufacturer indicating life expectancy of each product that will be installed on this project

.4 Firestop Systems shall show proposed Material, including technical data, reinforcement, anchorage, fastenings and method of installation. Submitted systems shall include illustrations from a qualified third party testing agency that is applicable for each firestop configuration.

.5 Manufacturer may submit product data for Materials and prefabricated devices, provided that descriptions are sufficient for identification at job Site. Include Manufacturer's printed instructions for installation.

.6 Provide ULC or cUL Firestop Systems complete with product literature and MSDS sheets on each system for each application, for each area as indicated.

.7 When more than one product is specified for the Firestop System or more than one backing/daming Material is indicated, the Firestop Subcontractor shall circle the item that they have chosen to use on this project, prior to submitting their firestop systems (Shop Drawings).

.8 Provide a list (matrix) of products, identifying the following for each.

.1 Product Name.

.2 Shelf Life.

.3 Life Expectancy.

.4 Temperature Range for installation.

.5 Humidity Range for installation.

.6 Curing Time.

.7 If required, alternative method to allow paint and primer to be applied over the installed system when exposed to finished areas.

.9 Where there is no specific tested Firestop Systems by the Manufacturer and research from all other manufacturers has determined that no system is available for particular firestop configuration, the Firestopping Subcontractor shall obtain from the Manufacturer an Engineered Judgment (EJ) for submittal. Each EJ shall come with a Drawing of the proposed system, a description of the system, Project Name and Room Name/Number that the EJ is located in, copies of all referenced Firestop Systems and signed/dated by the Manufacturer's Fire Protection Engineer. All EJ's must comply with the International Firestop Council (IFC) Guidelines for evaluating firestop systems Engineer Judgment. Note: Once the EJ has been reviewed, the Contractor shall submit the EJ to the Authority Having Jurisdiction (AHJ) for their acceptance, prior to installing the EJ. The Firestop Subcontractor must receive written approval by the AHJ.

.10 Engineering Judgments (EJ's)

.1 EJ's shall be issued in lieu of tested systems when a tested Firestop System is not available for the current on Site conditions.

.2 EJ's shall be issued only by firestop manufacturer's qualified technical personnel or, in concert with the manufacturer, by a knowledgeable registered Professional Engineer, or Fire Protection Engineer, or an independent testing agency that provides listing services for firestop systems.

.3 EJ's shall be based upon interpolations of previously tested firestop systems that are either sufficiently similar in nature or clearly bracket the conditions upon which the judgment is to be given. Additional knowledge and technical interpretations based upon accepted engineering principles, fire science and fire testing guidelines (e.g. ASTM E2031 – Standard Guide for Extension of Data from Fire Endurance Tests) may also be used as further support data.

.4 EJ's shall be based upon full knowledge of the elements of the construction to be protected and understanding of the probable behaviour of that construction and the recommended firestop system protecting it were they to be subjected to the appropriate Firestop Standard Fire Test method for the required fire rating duration.

.5 EJ's shall be limited to the specific conditions and configurations upon which the Engineering Judgment was rendered and should be based upon reasonable performance expectations for the recommended firestop system under those conditions.

.6 EJ's shall be accepted only for a single specific job and location and should not be transferred to any other job or location without thorough and appropriate review of all aspects of the next job or location's circumstances.

.7 EJ's shall be accepted in jurisdictions that permit Alternative Methods per applicable Model Building Code.

.11 Submit Firestop Systems (Shop Drawings) as follows:

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

.2 Bind Shop Drawings in a minimum of seven (7) vinyl hard covered Acco Customized three D-ring binders for 215 x 280mm size paper. Note: Binders not to be more than 2/3 full.

.3 Enclose title sheet, labelled "Fire Stop Systems", project name, date and installation company name and Manufacturer of products name. Insert title in front and spine of binder.

.4 Include a Table of Contents at the front of each binder. Provide a Table of Contents at the front of each binder.

.5 Provide a matrix list of each proposed Firestop System and corresponding service penetration type or joint type in a matrix spreadsheet schedule. This matrix shall include all sizes of all penetration and joint annular space requirements, and also shall indicate floor and wall system, including rating for each.

.6 Provide a list of each proposed ULC Firestop System with approximate total quantity or amounts of each system per floor on separate sheet.

.7 Each penetration or joint shall be numbered corresponding to the exact same number of the plate penetration no. that is identified in Item No. 2.1.12.

.8 Organize each floor, wall and ceiling area indicating each room number, labelled with tabs of celluloid covers fastened to hard paper dividing sheets.

.9 Provide copies of all fire stop system ULC or cUL Design No. Systems for each penetration or joint type for all areas located.

.10 Provide product data, MSDS and all other technical data information required as indicated in Item No. 1.8.1 to 1.8.10.

.11 Provide copies of the following documents:

.1 Manufacturer certificates of each Worker that will be installing on the project.

.2 FCIA and/or IFC certificate(s) indicating that the Firestop Subcontractor and the Manufacturer are in good standing with the association(s) for the last two (2) years.

.3 Manufacturer Fire Protection Professional has a minimum of five (5) years experience in designing firestop systems and Engineering Judgments.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Deliver Materials undamaged in manufacturer's clearly labelled, unopened containers, identified with brand, type, and ULC or cUL label, complete with batch number, manufacturing date and shelf life expiry date.

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

.3 Store Materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.

.4 Comply with recommended procedures, precautions or remedies described in Material Safety Data Sheets (MSDS) as applicable.

.5 Do not use damaged or expired Material.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Do not install firestopping when ambient or substrate temperatures are outside limits permitted by Manufacturers or when substrates are wet, due to rain, frost, condensation, or other causes.

.2 Maintain minimum temperature before, during and for three (3) days after installation of Materials as required by Manufacturer's written instructions.

.3 Ventilate firestopping per Manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.

.4 During installation, provide masking and drop sheets to prevent firestopping Materials from contaminating any adjacent surfaces.

.5 Do not use Materials that contain flammable solvents.

.6 Water based products are unacceptable in wet areas or areas that may be subject to occasional flooding or as indicated on Drawing documents.

1.10 PRECONSTRUCTION MEETING

.1 The "Standard Construction Project Firestop Guideline" shall be reviewed in a meeting approximately two weeks after the award of the Project with the Firestop Subcontractor and all affected Sub-trades.

.2 After Firestop Systems (Shop Drawings) are reviewed by the Contract Administrator and one week prior to the mock-up installation, the Firestop Subcontractor shall request that a mandatory pre-construction meeting be held.

.3 All Subcontractors that are affected, such as the masonry, fireproofing, intumescent coating hollow metal frame, gypsum board/steel stud, acoustical tile, floor base, painter, mechanical and electrical shall be in attendance, along with Firestopping Subcontractor, Contract Administrator(s) and the City's Representative.

.4 Each Subcontractor shall receive one copy of the Firestop Systems (Shop Drawings) as copied and distributed by the Contractor.

.5 Standard installation procedures shall be reviewed, scheduling/sequencing of other Work around or that affects the outcome of the installation, precautions, annular opening sizes, wall/floor service single and multi – preparations, joints and perimeter joints shall be reviewed to ensure that all Subcontractors and the Contractor understand the full complexity of the firestop installation, based on the approved Firestop Systems (Shop Drawings).

.6 Contract Administrator shall be responsible for taking minutes of initial meeting and distributing these minutes to the Firestop Subcontractor.

.7 Project meetings shall be held according to Section 01 31 19 – Project Meetings.

1.11 WARRANTY

.1 Manufacturers shall warrant Work of this Section against defects and deficiencies in the product Material for a period of two (2) years from date of Substantial Performance of the

Work, in accordance with General Conditions of Contract. Promptly correct any defects or deficiencies, which become apparent within warranty period to the satisfaction of the Contract Administrator and the City, and at no expense to the City.

.2 Fire stop system Subcontractor hereby warrants Workmanship on Material installation for period of two (2) years from date of Substantial Performance, in accordance with General Conditions of Contract. Promptly correct any defects or deficiencies, which become apparent within warranty period to the satisfaction of the Contract Administrator and the City, and at no expense to the City.

Part 2 Products

2.1 MATERIALS

.1 Firestopping and smoke-seal systems**:** in accordance with CAN4-S115-M2005 or ASTM E814.

.1 Asbestos-free Materials and systems capable of maintaining an effective barrier against the passage of flame, smoke, water and toxic gases in compliance with requirements of CAN4-S115-M2005 or ASTM E814, and not to exceed opening sizes for which they are intended, in accordance with ULC or cUL Design Numbers or other Firestop Systems acceptable to local Authority Having Jurisdiction.

.2 Firestopping Materials/systems shall be flexible to allow for movement of building structure (refer to architectural and structural) and penetrating item(s) without affecting the adhesion or integrity of the system.

.2 Firestop Methods:

.1 Method 1: non-combustible, semi-rigid, felt; minimum density 65 kg per cu/m^2; depth 100 mm, length 1200 mm; width as required. Blanket type fire-stop to be listed, and labelled in accordance with file Guide 40-U19.13. Impale - clips; galvanized wire or 25 mm x 0.65 mm thick galvanized steel Z-clips with dimensions to match location of fire stop Material and width of opening being sealed.

.2 Method 2: as per Method 1, without impale - clips.

.3 Method 3: Hose stream UL/cUL (Underwriters Laboratories USA) labelled.

.4 Method 4: Hose stream, fluid, gas and fire resistant elastomeric seal or non-shrink foam cement mortar proprietary certified assembly of a listed manufacturer.

.5 Methods 1 to 4: Methods used can be as per manufacturer's instructions, provided that their system employed meets or exceed the requirements of ULC/CAN4-S115-M2005 or ASTM E814.

.3 Mechanical or Electrical service: penetration assemblies; certified in accordance with CAN4-S115-M2005 or ASTM E814 and listed in the ULC Guide No. 40 U19.

.4 Service - penetration fire-stop components: Certified in accordance with CAN4-S115-M2005 or ASTM E814 and listed in the ULC Guide No. 40 U19.

.5 Fire-resistance rating of installed fire-stopping assembly not less than fire-resistance rating of surrounding substrate assembly (floor or wall) in accordance with the NBC.

.6 Fire-stopping and smoke-seals at openings intended for re-entry such as cables; elastomeric seal or non-shrink foam cement mortar: do not use cementitious or rigid seal at such locations.

.7 Firestopping and smoke-seals at openings around penetrations for pipes, ductWork and other mechanical items requiring sound and vibration control: elastomeric seal; do not use a cementitious or rigid seal at such locations.

.8 Primers: to manufacturer's recommendation for specific Material, substrate, and end-use.

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

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

.11 Sealants for vertical joints: non-sagging and having a flame-spread of not more than 25 and a maximum smoke development classification of 100 for walls and 50 for ceilings.

2.2 PRODUCT SYSTEMS

.1 Single source responsibility: obtain firestop systems for each kind of penetration and construction condition indicated from a single manufacturer.

.1 Materials of different manufacturers shall not be intermixed on the project, unless the Firestop System for existing condition on the Project cannot be found utilizing the Prime Manufacturer. In lieu of providing an Engineer Judgment, the Firestop Subcontractor must research all other manufacturers to provide a Firestop System for this condition that has been tested. If a tested system is found by utilizing a different Manufacturer, the system and the product shall be used to suit the condition on Site. Firestop Subcontractor to avoid overlapping new product onto main product/firestopping Material.

.2 Acceptable Firestop Manufacturers:

.1 AD Fire Protection Systems Inc. as distributed by:
Anchor Construction Industrial Products Ltd.
108 Parklane Avenue, Winnipeg, Manitoba R2R 0K2
Phone: (204) 633-0064

.2 Hilti Fire Stop Systems as distributed by:
120 Bannister Road,
Winnipeg, Manitoba R2R 0S3
Phone: (800) 363-4458

.3 Rectorseal, Biofireshield or Meta Caulk as distributed by:
Canadian Thermal Technologies
44 Higgins Avenue,
Winnipeg, Manitoba R3B 0A5
Phone: (204) 943-5622

.4 STI, Specified Technologies Inc., Spec Seal Firestop Products, as distributed by:
Nu-West Construction Products Inc.
750 Marion St.
Winnipeg, Manitoba R2J 0K4
Phone: (204) 977-3522

2.3 ACCEPTABLE FIRE STOP APPLICATORS

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

.2 Total Fire Stop Systems Limited
Box 464
Stony Mountain, Manitoba R0C 3A0
Phone: (204) 344-5696

.3 Western Construction Services Ltd.
300 Dawson Road N.,
Winnipeg, Manitoba R2J 0S7
Phone: (204) 956-9475

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

Part 3 Execution

3.1 EXAMINATION

.1 Verify substrate conditions, previously installed are acceptable for product installation in accordance with manufacturer's instructions and approved firestop systems for each condition.

.2 Ensure that opening/annular space does not exceed the maximum and minimum size or dimensions that is indicated on the approved Firestop System.

.3 Verify that all joints, service penetrating elements and supporting devices/hangers have been properly installed as indicated on Approved Firestop Systems. All temporary lines and markings have been removed to meet the approved Firestop Systems for each condition has been identified.

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

.5 Ensure no additional items have been installed through opening that does not appear on the approved Firestop System.

.6 Ensure areas that are to be firestopped are accessible for proper application and conditions are suitable for installation of a firestop system. All areas must also be accessible for inspection.

.7 Report in writing to the Contract Administrator any defective surfaces or conditions affecting the firestop system installation, immediately and prior to commencing any installations.

.8 Proceed only when defected surfaces or conditions have been corrected.

.9 Ensure temperature within the areas of installation meets or exceeds the minimum temperature range for the products that will be installed in those areas, as based on the manufacturer's recommendations for a minimum two days prior and three days after installation.

.10 Beginning of installation means acceptance of Site conditions.

3.3 PREPARATION

.1 Protect adjacent Work areas and finish surfaces from damage during product installation.

.2 Provide drop sheets or other satisfactory coverings for protection of adjacent areas in accordance with safe and good Work practices.

.3 In areas to be fire stopped ensure that substrate and service penetrations are clean, dry and frost free.

.4 Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of Work. Remove tape as soon as it is possible to do so without disturbing the firestopping seal with substrates.

.5 Remove all existing Material from around annular space and existing service penetration and/or along existing joint to suit Manufacturer's recommendation and the requirements, as indicated in the Firestop System.

.6 Ensure substrate is structurally stable. Remove all loose Material from opening and joint. Provide new Material to down-size or to make surface flush and structurally sound to accept new Firestop System.

.7 Score and enlarge annular space around service penetrations and along joints to suit Manufacturer's requirements and Firestop System.

.8 Down-size oversized openings with appropriate Material to match existing, such as rated gypsum board, firestop mortar or some other method that maintains the continuity of the horizontal and/or vertical fire separation and the new installed Firestop System.

.9 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of Materials.

.10 Prepare surfaces in contact with firestopping Materials and smoke-seals to manufacturer's instructions.

.11 Maintain insulation around pipes and ducts penetrating fire separation. Confirm that fire stop system has been tested with actual pipe or duct insulation penetrating fire separation that is indicated in the approved ULC or cUL Firestop System.

.12 Replace or repair damaged insulation and cover (jacket) around existing penetration at horizontal or vertical fire separation a minimum 300mm past the separation. Tie/tape new insulation and cover (jacket) into existing with appropriate Material.

.13 Surfaces to which firestop Materials are to be installed, shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.

.14 Ensure that multi-penetration openings have been framed and boarded out, all around the annular space prior to prepping the substrate and service penetrations.

.15 Maintain the temperature and humidity conditions during and after installation as per manufacturers' recommendations.

.16 Remove pipe riser clamp to suit installation of firestop system. Provide temporary support until system has been installed.

3.4 INSTALLATION

.1 Install firestopping Material and components in accordance with manufacturer's instructions and rated system as tested to ULC/CAN4-S115-M2005, and ULC or cUL Firestop Systems.

.2 Verify on-Site to Contract Administrator prior to firestopping installation on all phases of construction, that firestopping Material is not damaged or frozen or has not exceeded Manufacturer's expiry date indentified on product or packaging. All firestopping Materials must be installed prior to expiration of shelf life.

.3 Coordinate with other Subcontractors to assure that all pipes, conduit, cable, and other items, which penetrate fire separations have been permanently installed prior to

installation of firestop systems. All hangers, clamps, holding devices, etc. have been installed, leveled and completed by other trades prior to installing firestop systems.

.4 Schedule the Work to assure that fire separations and all other construction that conceals penetrations are not erected prior to the installation of fire and smoke stop systems.

.5 Seal holes or voids made by through-penetrations, poke-through termination devices, and un-penetrated openings or joints to ensure that both continuity and integrity of fire-separation are maintained.

.6 Provide temporary forming as required. Remove forming Material only after firestop system has gained sufficient strength and after initial curing as per manufacturer's instructions.

.7 Tool or trowel exposed surface to a neat finish.

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

.9 Refer to Mechanical and Electrical Sections and Drawings for further information.

.10 Seal all voids between new fire rated wall assemblies and new or existing building walls to form a draft-tight barrier and act to retard the passage of flame, toxic gases and smoke.

.11 Install firestop Material to obtain fire resistance rating not less than the fire resistance rating of surrounding floor and wall assembly.

3.5 SCHEDULE OF FIRESTOP LOCATIONS

.1 Firestop and smoke-seal includes but not limited, to the following locations:

.1 Provide appropriate Firestop System when exposed to view, architectural finish, traffic, moisture, heat, movement and physical damage.

.2 Service and structural penetrations through new or existing fire separations such as rated masonry, concrete, and gypsum board partitions/walls, floors and roof assemblies.

.3 Openings through structural floors or walls that are fire separations.

.4 Wall to wall joints between new or existing rated masonry, concrete and/or rated gypsum board partitions.

.5 Joints at head of wall between new or existing rated masonry wall and/or rated gypsum board partition connecting to rated floor system or roof structure. Allow for independent movement at head of wall joint.

.6 Joints at bottom of wall between new or existing rated gypsum board edge to top of rated floor system.

.7 Control and sway joints in fire separation through new or existing masonry and gypsum board partitions and walls.

.8 Openings and sleeves installed for future use through fire separations and unused openings and sleeves constructed as part of Work.

.9 Mechanical and electrical recessed devices penetrating or partially penetrating fire separations.

.10 Between edge of fire-resistant floor or roof assemblies and exterior wall assemblies.

.11 Between floors, walls, ceilings and roof assemblies at horizontal and vertical fire resistant ratings at floor expansion joints.

.12 Rigid ducts: fire stopping to consist of bead of fire stopping Material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

.13 Marriage joints between the fire rated duct wrap to fire rated floor, wall, or roof separations.

.14 Cables entering into a fire-rated pass-thru device at fire-rated walls and floor assemblies at end of cable trays or otherwise indicated on electrical Drawings and specifications.

.15 Where indicated on Drawing and specification documents.

.16 Refer to Drawings for fire separation fire resistance ratings and assigned times along with firestop F, T, W, and L rating locations.

.17 Firestopping of Existing Fire Separations.

.1 Install firestopping at all new service penetrations and joints in existing fire separations.

.2 Install new firestopping in existing fire rated wall and floor assemblies affected by removal of existing services or systems as part of Work of this Contract leaving unprotected openings.

.3 Patch and restore integrity of existing fire separations at openings in existing fire rated walls resulting from the demolition of doors, windows, ceilings, abutting walls, etc.

.4 Install firestopping and/or restore openings (i.e. not required for new services or systems, or openings replaced with services of a smaller size) in existing fire rated wall and floor assemblies remaining after the demolition and removal of mechanical pipes and or ducts and electrical services as part of Work of this Contract.

.5 Where breeches are discovered in existing fire separations (from past projects), Contractor to advise the City and Contract Administrator.

3.6 INSTALLING FIRESTOP JOINT SYSTEMS

.1 Install joint fillers to provide support of firestop Materials during application and at the position required to provide the cross-sectional shapes and depths of installed firestop Material relative to joint widths that allow optimum sealant movement capability and develop fire-resistance rating required.

.2 Install systems by proven techniques that result in firestop Materials as recommended by the manufacturer:

.1 directly containing and fully wetting joint substrates.

.2 completely filling recesses provided for each joint configuration,

.3 providing uniform, cross-sectional shapes and depths relative to joint width that optimize movement capability.

.4 Tool non-sag firestop Materials immediately after their application and prior to the time skinning begins. Form smooth, uniform beads of configuration indicated or required to:

.1 produce fire-resistance rating

.2 to eliminate air pockets

.3 to ensure contact and adhesion with sides of joint

3.7 INSTALLATION OF ASSEMBLY IDENTIFICATION PENETRATION PLATE

.1 Install adjacent to all through wall/floor service penetrations/joints that are firestopped and at joint penetrations. Provide one assembly identification plate per penetration opening and one assembly identification plate at every 6000mm along wall/floor joints.

.2 Penetration/joint plate shall be completely filled out and installed prior to requesting substantial performance.

.3 Clean substrate prior to applying penetration/joint plate.

.4 Securely apply penetration/joint plate to substrate, by providing adequate adhesive.

.5 Install all plates 50mm away from penetration or joint.

3.8 INSTALLATION OF FIRE SEPARATION (BARRIER) MARKINGS

.1 Install/paint barrier markings parallel with ceiling, approximately 400mm above finished ceiling.

3.9 REPAIRS AND MODIFICATIONS

.1 Identify damaged or re-entered seals requiring repair or modification.

.2 Remove loose or damaged Materials. If penetrating items are to be added, remove sufficient Material to insert new elements. Cause no damage to the balance of the seal.

.3 Ensure that surfaces to be sealed are clean and dry. Install Materials in accordance with manufacturers specified installation and repair requirements. Use only Materials approved by manufacturer as suitable for repair of original seal. Do not mix different manufacturer's products.

3.10 MANUFACTURER'S FIELD QUALITY

.1 Representative from Manufacturer shall perform periodic observations of firestopping systems:

.1 Examine firestop penetration seals for proper installation, labelling, adhesion and curing as may be appropriate for the respective seal Material.

.2 Keep areas of Work accessible and notify Contract Administrator, code authorities and/or designated inspectors of Work completion released for Contract Administrator review.

.3 Document completion and observation as required.

3.11 CONTRACT ADMINISTRATOR REVIEW

.1 The Contract Administrator shall review all submitted Firestop Systems (Shop Drawings) prior to start up meeting (Refer to item No. 1.7)

.2 The Contract Administrator to provide an agenda for a start up meeting, will chair the meeting, record meeting minutes and distribute. (Refer to item No. 1.10)

.3 The Contract Administrator shall provide random General Reviews during the course of the project.

.4 The Contract Administrator shall perform Exploratory Reviews (Destructive Test) based on ASTM E2174, and E2393 during the course of construction where the system will be cut out by the Firestopping Subcontractor as directed by the Contract Administrator and removed to ensure the firestop system installed meets or exceeds the Firestop System as identified. (Contractor to include these costs in their base bids.)

.5 Firestopping Subcontractor shall include for a minimum of 2% Exploratory Review of each Firestop System for each area of 900m2 (based on ASTM E2174) for such exploratory reviews per approved Firestop Systems. Perimeter Joints shall have a minimum cut test every 15 meters (based on ASTM E2393). Bottom and top of wall joints, wall to wall joints and building expansion joints shall have a minimum Exploratory Review every 15 meters.

.6 The Firestopping Subcontractor shall do all cutting and removal of the systems during mock-up and exploratory reviews for visual determination of the thickness, depth and/or width of the system from the Contract Administrator and local manufacturer's Representative. Once the review is completed and accepted, the Firestopping Subcontractor shall replace the firestop system with new. All costs for cutting, removing and replacement shall be included in base bid.

.7 All Exploratory Reviews (cut tests) must meet the Firestop Systems minimum thickness, depth and/or widths of the annular requirements. These reviews will be performed 30 days after the installation to allow for curing of the product as a minimum. The Contract Administrator will not accept the installed system to be below the system's minimum requirements (depth and width). Shrinkage of the product installation must be factored into all installations on this Project.

.8 The Contract Administrator shall perform random reviews of the Firestop Subcontractor's General Performance during their visits, such as:

.1 Construction photographs.

.2 Product storage, handling and delivery.

.3 Penetration/Joint plate installation.

.4 Protection of installed systems.

.9 All noted items indicated in firestop reviews must be reviewed by the Firestop Subcontractor and responded by written letter back to the Contract Administrator on the direction the Firestop Subcontractor has or will be taking:

.1 Start-up Meetings.

.2 Firestop System (Shop Drawing) Review.

.3 General Reviews.

.4 Product Reviews.

.5 Destructive Reviews.

.6 Substantial Performance Reviews.

.10 All scheduled reviews shall be performed by the Contract Administrator as indicated and agreed to by the Firestop Subcontractor and can only be cancelled a minimum of 72-hours prior to the review. All other cancellations less than 72-hours shall be back-charged.

3.11 CLEAN-UP

.1 Clean off excess fill Materials adjacent to openings as Work progresses by methods and with cleaning Materials recommended by firestopping manufacturer and that do not damage Materials in which openings occur. Leave finished Work in neat, clean condition with no evidence of spillovers or damage to adjacent surfaces.

.2 Protect firestopping during the curing period from contact with contaminating substances.

.3 Remove temporary dams after initial set of fire stop and smoke seal Materials.

.4 Remove equipment and debris from Site.

.5 Provide final protection and maintain conditions during and after installation that ensure firestopping systems are without damage or deterioration at time of Substantial Performance of the Work. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping systems immediately and install new Materials to produce firestopping systems complying with specified requirements.

Part 1 General

1.1 RELATED WORK

.1 Section 03 30 00 – Cast-In-Place Concrete

.2 Section 04 05 10 – Common Masonry

.3 Section 06 40 00 – Architectural WoodWork

.4 Division 07 – Thermal and Moisture Protection

.5 Section 08 11 00 – Steel Doors and Frames

.6 Section 08 11 16 – Aluminum Doors and Frames

.7 Section 08 14 00 – Wood Doors

.8 Section 08 44 13 – Glazed Aluminum Curtain Walls

.9 Division 09 – Finishes

1.2 REFERENCES

.1 CAN/CGSB-19.1-M87, Putty, Linseed Oil Type or latest.

.2 CAN/CGSB-19.2-M87, Glazing Compound, Nonhardening, Modified Oil Type or latest.

.3 CGSB 19-GP-5M-76, Sealing Compound, One Component, Acrylic Base, Solvent Curing or latest.

.4 CAN/CGSB-19.6-M87, Caulking Compound, Oil Base or latest.

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

.6 CGSB 19-GP-14M-76, Sealing Compound, One Component, Butyl-polyisobutylene Polymer Base, Solvent Curing or latest.

.7 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound or latest.

.8 CAN/CGSB-19.18-M87, Sealing Compound, One Component, Silicone Base, Solvent Curing or latest.

.9 CAN/CGSB-19.21-M87, Sealing and Bedding Compound Acoustical or latest.

.10 CAN/CGSB-19.22-M89, Mildew Resistant, Sealing Compound for Tubs and Tiles or latest.

.11 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound or latest.

.12 LEED Canada NC-1.0, credit "Indoor Air Quality – Credit 4.4 – Low Emitting Materials" or latest

.13 California South Cost Air Quality Management District Rule #1168 – Adhesive and Sealant Applications (October 2, 2003) – LEED REQUIREMENT

1.3 SAMPLES

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

1.4 SUBMITTALS

.1 Submit to the City a binder with complete list of joint sealer assemblies with coordinated Site applied stickers.

.2 Provide at each rated assembly a sticker adjacent to the construction detail Site.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect Materials in accordance with Section 01 60 00 - Basic 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 ENVIRONMENTAL AND SAFETY 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 acceptable to Labour Canada.

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

.3 Ventilate area of Work as directed by Contract Administrator by use of approved portable supply and exhaust fans.

.4 Place used hazardous sealant tubes and other containers in areas designated for Hazardous Materials.

.5 Apply sealants only to completely dry surfaces.

Part 2 Products

2.1 SEALANT MATERIALS

.1 Sealants and caulking compounds must:

.1 meet or exceed all applicable governmental and industrial safety and performance standards; and

.2 be manufactured and transported in such a manner that all steps of the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the fisheries Act and the Canadian Environmental Protection Act (CEPA).

.2 Sealant and caulking compounds must not be formulated or manufactured with: aromatic solvents, fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, barium or their compounds, except barium sulfate.

.3 Sealant and caulking compounds must be accompanied by detailed instructions for proper application so as to minimize health concerns and maximize performance, and information describing proper disposal methods.

.4 Caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant shall not be used in air handling units.

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

.6 In the selection of the products and Materials of this section preference will be given to those with the following characteristics: non-flammable, low Volatile Organic Compound (VOC) content, manufactured without compounds which contribute to ozone depletion in the upper atmosphere, does not contain methylene chloride, does not contain chlorinated hydrocarbons.

.7 Sealants acceptable for use on this project except CAN/CGSB-19.1 and CAN/CGSB-19.18 must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

	Type	**Ref.**	**Description**	**Application**	**Accepted Material**
1	Neoprene or Butyl Rubber.		Round solid rod, Shore A hardness 70		
2	High Density Foam		Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m3 density, or neoprene foam backer, size as recommended by manufacturer.		
3	Bond Breaker Tape		Polyethylene bond breaker tape which will not bond to sealant.		
4	Polyurethane Sealant.	CAN 19.13-M87	single component, high performance, non-sagging, low modulus, non-staining	to be used at all exterior and interior control / expansion joints and on the exterior side of all window / door frame perimeters. Color as selected by the Contract Administrator.	Tremco Dymonic or Sonolastic NP1
5	Latex Sealant.	CGSB 19-GP-17M	single component, non-sagging, non-staining.	To be used on the interior side of all exterior window / door frame perimeters and at all interior window / door frame perimeters. Color as selected by the Contract Administrator	Tremco Spectrem 2
6	Silicone Sealant.	CGSB 19-GP-9M	single component, fungus resistant, non-sagging, non-staining, non-bleeding, moisture curing.	To be used in all sloped glazing, skylights, and at all joints between vanities, countertops, backsplashes and adjacent wall Materials and at the joint between bathtubs and finish flooring in washrooms. Color as selected by Contract Administrator.	Tremco Proglaze or GE Sanitary SCS 1700
7	Siliconized acrylic latex sealant		single component, pure acrylic latex, fast-setting with minimal shrinkage, white colour	To be used at exposed joints between hollowcore slabs to 1/4" maximum width.	Tremco Tremflex 834

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 PREPARATION OF JOINT SURFACES

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

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

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

.4 Ensure joint surfaces are dry and frost free.

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

3.3 PRIMING

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

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

3.4 BACKUP MATERIAL

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

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

3.5 MIXING

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

3.6 APPLICATION

.1 Sealant.

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

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

.3 Apply sealant in continuous beads.

.4 Apply sealant using gun with proper size nozzle.

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

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

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

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

.2 Curing.

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

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

.3 Cleanup.

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

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

.3 Remove masking tape after initial set of sealant.

END OF SECTION