1 General

1.1 REFERENCE STANDARDS

.1 Prefabricated membrane, complies with CAN/CGSB 37.56-M -1985, Membrane Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

.2 CAN/ULC-S704-2001 Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Fixed.

1.2 COMPATIBILITY

.1 All waterproofing materials will be provided by the same manufacturer.

1.3 TECHNICAL DOCUMENTS

.1 Submit electronic copies of the most current technical data sheets. These documents must describe the materials' physical properties and provide explanations about product installation, including installation techniques, restrictions, limitations and other manufacturer recommendations.

1.4 SHOP DRAWINGS

.1 Submit shop drawings in conformance with Section 01 30 00 requirements.

.2 Provide details of flashing and sloped insulation.

.3 Submit drawings locating and identifying sloped insulation blocks.

1.5 QUALITY ASSURANCE AND ENVIRONMENTAL MANAGEMENT

.1 The manufacturer of elastomeric bitumen products will provide proof of ISO 9001 and ISO 14001 Certifications.

1.6 CONTRACTOR QUALIFICATION

.1 Roofing sub-contractors must, when tendering or performing work, possess a roofing contractor operating license.

.2 Only qualified, certified installers employed by a company with the appropriate equipment may execute the roofing work.

.3 Roofing contractors and sub-contractors must also be members of RCAM and provide the consultant with a certificate to this effect before beginning any roofing work.

1.7 INSPECTION

.1 Roofing installation inspection will be done by the consultant and/or a testing agency designated by the Contract Administrator.

1.8 STORAGE AND DELIVERY

.1 All materials will be delivered and stored in conformance with the requirements described in the product manufacturer’s manual; they must remain in their original packaging, displaying the manufacturer's name, product name, weight, and reference standards, as well as all other indications or references considered standard.

.2 At all times, materials will be adequately protected and stored in a dry and properly ventilated area, away from any welding flame or spark and sheltered from the elements or any harmful substance. Only materials destined for same-day use can be removed from this storage area. In cold weather, these materials should be stored in a heated area at a minimum temperature of $+10^0$C and removed prior to application. If rolls cannot be stored

in a heated environment, they may be pre-conditioned before installation. For precise description, please consult SOPREMA'S "Roofers' Guide" on membrane application procedures.

.3 Store adhesives and emulsion-based waterproofing mastics at a minimum +5^{0}C. Store adhesives and solvent-based mastics at sufficient temperatures to ensure ease of application.

.4 Materials delivered in rolls will be carefully stored upright; flashing will be stored to avoid creasing, buckling, scratches or any other possible damage.

.5 Avoid material overloads which may affect the structural integrity of specific roof areas.

1.9 FIRE PROTECTION

.1 Prior to the start of work, conduct a site inspection to establish safe working practices and make sure that all procedures and proposed changes are approved to minimize the risk of fires.

.2 Respect safety measures described in the SOPREMA Specifications Manual as well as local association recommendations.

.3 At the end of each workday, use a heat detector gun to spot any smouldering or concealed fire. Job planning must be organized to ensure workers are still on location at least one hour after torch application.

.4 Never apply the torch directly to old and wood surfaces.

.5 Throughout roofing installation, maintain a clean site and have one approved ABC fire extinguisher within 6 metres of each roofing torch. Respect all safety measures described in technical data sheets. Torches must never be placed near combustible or flammable products. Torches should never be used where the flame is not visible or cannot be easily controlled.

1.10 WARRANTIES

.1 The product manufacturer will issue a written and signed document in the owner's name, certifying that the roofing membranes are free of manufacturing defects for a period of ten (10) years, starting from the date of acceptance. This warranty will cover the removal and replacement of defective roof membrane products, including labour. The warranty must remain a full warranty for the duration of the period specified. No letter amending the manufacturer's standard warranty will be accepted and the warranty certificate must reflect these requirements.

.2 The contractor will provide a written and signed document to the owner certifying that the work executed will remain in place and free of waterproofing defect for a period of 2 years from the date of acceptance.

2 Products

2.1 VAPOUR RETARDER SUPPORT PANELS

.1 Deck board sheathing: Fiber reinforced moisture resistant sheathing: Dens Deck (horizontal surfaces) and DensGlass (vertical surfaces).

2.2 VAPOUR RETARDER

.1 Self-adhesive membrane:

.1 Description: self-adhesive membrane composed of SBS modified bitumen and a tri-laminate woven polyethylene facer. Water vapour permeability: <0.9 ng/Pa.s.m^2 (<0.016 Perm)

.2 Specified product: Sopralene FLAM STICK.

2.3 INSULATION

.1 Polyisocyanurate insulation:

.1 Description: closed-cell polyisocyanurate foam core integrally laminated between two heavy coated-glass facers, tan in colour. These facers shall be saturated with a coating that provides a smooth, consistent surface, free of loose fibres.

.2 Specified product: SopraISO PLUS by SOPREMA.

2.4 MEMBRANE SYSTEMS

.1 Description: two plies of reinforced modified bitumen membrane and the base sheet shall be self-adhesive. The top surface of the base sheet is covered with a thermofusible plastic film and the bottom surface is protected by silicone release paper. The cap sheet underface is covered with a thermofusible plastic film and the top face is protected by coloured granules white slate specks.

.2 System properties:Regular	MD	XD
.1 Strain energy (kN/m)	8.4	8.3
.2 Breaking strength (N/5 cm)	18	16
.3 Ultimate elongation (%)	55	56
.4 Tear resistance (N)	120	
.5 Static puncture (N)	380	
.6 Dimensional stability (%)	0.1	0.4
.7 Plastic flow (°C)	105	
.8 Cold bending (at -30°C)-initial	No cracking	
.9 -90 days at 70°C	No cracking	

.3 Prefabricated membrane, complies with CAN/CGSB 37.56-M (9th draft)

.4 Specified products

.1 Base sheet flashing membrane Sopralene FLAM STICK by SOPREMA.

.2 Cap sheet flashing membrane FLAM 180 GRANULAR CAP by SOPREMA, as specified/recommended by SOPREMA.

2.5 PRIMER

.1 Primer for self-adhesive membranes

.1 Description: ELASTOCOL STICK: Composed of SBS synthetic rubber, volatile solvents, adhesive enhancing resins and volatile solvent used to prime porous substrates and non-porous substrates such as wood, concrete or metal to enhance the adhesion of self-adhesive membranes at temperatures above - 10°C.

.2 Specified product: ELASTOCOL STICK by SOPREMA.

.3 Description: Polymeric emulsion finish designed to improve adherence of self-adhesive waterproofing membranes when solvent-based primer is not recommended.

.4 Specified product: SOPREMA ELASTOCOL STICK H²0

2.6 ADHESIVES

.1 Insulation adhesive:

.1 Description: A highly elastomeric, two components, one step, all purpose, foamable adhesive that contains no solvents and sets in minutes.

.2 Specified product : DUOTACK by SOPREMA

2.7 FLAME-STOP MEMBRANE

.1 Description: Self-adhesive membrane composed of a reinforced glass mat and SBS modified bitumen designed to prevent flames from penetrating into empty spaces and openings while installing heat-welded membranes.

.2 Specified products: SOPRAGUARD tape by SOPREMA

2.8 COMPLEMENTARY WATERPROOFING PRODUCTS

.1 Waterproofing mastic:

.1 Description: Mastic made of synthetic rubbers, plasticized with bitumen and solvents. Aluminum pigments are added to SOPRAMASTIC ALU to provide greater resistance to UV.

.2 Specified product: SOPRAMASTIC by SOPREMA.

.2 Pitch pocket filler:

.1 Description: An aluminum coloured solvent-based mastic containing superior grade bitumen modified with SBS synthetic rubber and fibres. Designed for pitch box filling.

.2 Specified product: MAMMOUTH PITCH POCKET FILLER by SOPREMA.

.3 Sealing product

.1 Description: Composed of a bitumen/polyurethane waterproofing mono-component and polyester reinforcements. Designed to finish upstands and details. (no-flame installation).

.2 Specified product: ALSAN FLASHING by SOPREMA

3 EXECUTION

3.1 SURFACE EXAMINATION AND PREPARATION

.1 Surface examination and preparation must be completed in conformance with recommendations in the SOPREMA Specifications Manual, particularly for fire safety precautions.

.2 Do not begin any work before surfaces are smooth, dry, and free of ice and debris. Use of calcium or salt is forbidden for ice or snow removal.

.3 Be sure plumbing, carpentry and all other work has been duly completed.

.4 No materials will be installed during rain or snowfall.

3.2 METHOD OF INSTALLATION

.1 Prepare surfaces and complete waterproofing work in conformance with SOPREMA'S requirements, and the "Roofers' Guide".

.2 Install roofing elements on clean and dry surfaces, in conformance with manufacturer's instructions and recommendations.

.3 Roofing work must be completed in a continuous fashion as surfaces are readied and weather conditions permit.

.4 It is preferable to seal all seams that are not covered by a cap sheet membrane in the same day. The cap sheet cannot be installed if any moisture is present at/in the base sheet seams.

.5 Whenever membranes are torch-applied, a continuous and even bead of molten bitumen must be visible as the membrane is unrolled and torched.

.6 Ensure waterproofing conditions for roofs at all times, including protection during installation work by other trades and progressive protection as work is completed (e.g. vents, drains, etc.).

.7 Complete all work (temporary supports for equipment and bases, disconnection and connection of equipment as needed, moving and lifting of bases, etc.) required for waterproofing beneath equipment and bases as shown on drawings; use qualified trade persons as required. Temporary supports for waterproofing beneath air-conditioning units must be designed to hold supported loads and distribute these loads to avoid structural damage. Avoid interruption of functioning equipment during roofing. Unavoidable interruptions must be planned with the owner and may be scheduled outside normal working hours.

3.3 SITE PROTECTION

.1 Protect finished work to avoid damage during roof installation and material transportation. Install protective boardwalks over installed roofing materials to enable passage of people and products. Assume full responsibility for any damage.

.2 Ensure site protection below deck is provided at all times. Any contamination from construction processes and/or precipitation must not be permitted to penetrate the areas below the roof deck. Complete environmental separation must be maintained at all times.

3.4 CLEANING

.1 The work site must be routinely cleared of rubbish and other materials which may hinder roof installation, performance, or present a fire hazard.

3.5 EQUIPMENT FOR WORK EXECUTION

.1 Maintain all roofing equipment and tools in good working order.

.2 Use torches recommended by SOPREMA

3.6 VAPOUR BARRIER SUPPORT PANELS INSTALLATION ON STEEL DECK

.1 These boards must be screwed carefully onto the steel deck's upper rib surfaces in conformance with Factory Mutual I-90 requirements, bulletin 1-28 for installation of boards to roof perimeters and corners, 1-90. Use a minimum of 12 hot-dipped galvanized screws and washers for each 1220 mm x 2440 mm board. Cut boards so edges rest on centre of upper ribs. Cut straight lines with adequate tools.

3.7 APPLICATION PRIMER

.1 Roofing substrates of wood, metal, concrete, masonry or gypsum board surfaces will receive a coat of asphalt primer at a rate specified by manufacturer. All surfaces to be primed must be free of rust, dust or any residue that may hinder adherence. Cover primed surfaces with roofing membrane as soon as possible (same day coverage for self-adhesive membranes). Application temperature limit of +5°C for ELASTOCOL 350.

3.8 INSTALLATION OF AIR BARRIER AND VAPOUR RETARDER

.1 The vapour retarder will be self-adhered to the substrate in conformance with SOPREMA's written recommendations. Unroll vapour retarder membrane dry onto substrate for alignment purposes. Overlap side laps by 75 mm. and end laps by 150 mm. Laps shall be staggered a minimum of 300 mm. Begin work at bottom of slopes.

.2 The primer must be dry when the vapour retarder is installed.

.3 The roof vapour retarder must meet and overlap the air/vapour barrier on adjoining walls to ensure total continuity.

.4 Air/vapour barrier membrane continuity shall be continuous at all penetrations, including but not limited to drains, mechanical and electrical penetrations, upstands, etc.

.5 Dip all fasteners in liquid membrane prior to insertion to affect air seal at penetration.

3.9 INSULATION INSTALLATION

.1 Apply insulation to vapour retarder or to adjoining board with specified adhesive applied in 2 cm. wide bands every 33 cm. OR in 10 cm. diameter spots 9 spots per square metre at a rate of 2 to 3 kg. per square metre.

.2 Ensure air/vapour barrier membrane surface is dry and in accordance with manufacturer's requirements prior to application of insulation.

.3 Use largest insulation sheets as possible when cutting.

.4 All vertical joints between level boards and sloped modules for the two rows of insulation board will be staggered.

.5 Use a weighted roller to ensure continuous contact between insulation and air/vapour barrier membrane.

.6 At gaps in the insulation, cut and adhere segments of rigid insulation as required to ensure full continuity in thermal barrier.

.7 If localized mechanical anchors are required to secure insulation due to surface irregularities, they shall be included in the fixed price of the roof installation and the fasteners shall be hot-dipped galvanized No. 14 screws. Dip screws in liquid membrane prior to insertion to provide air seal.

.8 Top layer of insulation to be polyiso 'A' facing up to accept self-adhesive base sheet.

.9 Install only as much insulation as can be covered in the same day.

3.10 BASE SHEET FLASHING INSTALLATION (SELF ADHERED)

.1 Apply base sheet flashing only after primer coat is dry.

.2 Before applying membranes, always remove the plastic film on the section to be covered if there is an overlap (inside and outside corners and field surface). For sanded base sheet membranes, apply ELASTOCOL STICK to the area to be covered at the foot of the parapets.

.3 Position the pre-cut membrane piece. Peel back 100 to 150 mm. (4 to 6 in.) of the silicone release paper to hold the membrane in place at the top of the parapet.

.4 Then, gradually peel back the remaining silicone release paper, pressing down on the membrane with an aluminum applicator to ensure good adhesion. Use the aluminum applicator to ensure a perfect transition between the upstand and the field surface. Smooth the entire membrane surface with a roller for full adhesion.

.5 Cut off corners at end laps to be covered by the next roll.

.6 Install a reinforcing gusset in all inside and outside corners.

.7 Always seal overlaps at the end of the workday.

3.11 INSTALLATION OF REINFORCEMENTS

.1 Install reinforcements specified for various roof surfaces according to the following instructions and illustrations found in SOPREMA's technical data.

3.12 INSTALLATION OF CAP SHEETS ON UPSTANDS AND PARAPETS (HEAT-WELDED)

.1 This cap sheet must be installed in one-metre-wide strips. The side joints must overlap by 100 mm. and must be staggered by at least 100 mm. with respect to the joints of the cap sheet on the field surface, to avoid areas of excessive membrane thickness. The overlaps on the field surface must be 50 mm. wider than those of the base sheet membrane on the upstands and parapets. At end laps, angle-cut the corners that will be covered by the following roll.

.2 Use a chalk line to draw a straight line on the field surface 150 mm. from the upstands and parapets.

.3 Use a propane torch and round-nose trowel to embed the surface granules in the layer of hot bitumen starting from the chalk line on the field surface to the bottom edge of the upstand or parapet as well as on the granulated vertical surfaces that are to be overlapped.

.4 This cap sheet will be heat-welded directly to the base sheet membrane, proceeding from bottom to top. This technique softens both membranes in order to obtain even, continuous weld.

.5 During installation, be careful not to overheat the membrane or to create excessive bitumen bleeding at the joints.

3.13 WATERPROOFING FOR VARIOUS DETAILS

.1 Install waterproofing membranes in conformance with various roofing details illustrated in the SOPREMA Manual.

- END OF SECTION -

Part 1 General

1.1 RELATED SECTIONS

.1	Joint Sealing	Section 07 92 00
.2	Gypsum Board Assemblies	Section 09 21 16
.3	Painting For Minor Works	Section 09 91 99

1.2 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

.1 Only tested firestop systems shall be used in specific locations as follows and also as indicated in the schedule of firestop locations, Item 3.4:

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

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

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

.4 Gaps between the bottom of walls.

.5 Gaps between the top of walls and ceilings or roof assemblies, slip joint detail.

.6 Mechanical and electrical recessed boxes in walls and partitions.

.7 Expansion joints in walls and floors.

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

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

.2 All specific locations shall be identified with assembly identification penetration plate.

1.3 REFERENCES

.1 Standard Method of Fire Tests of Through Penetration Fire Stops, ULC-S115-M.95/ CAN4- S115-M.95 or ASTM E814 Test Requirements.

.2 Underwriters Laboratories of Canada (ULC) CAN4-S115-M.95 under their designation of ULC-S115-M.95 and publishes the results in FIRE RESISTANCE RATINGS

DIRECTORY.

.3 Underwriters Laboratories (UL) ASTM E-814 under their designation of UL 1479, Fire-Tests of Through Penetration Firestops and publishes the results in FIRE RESISTANCE DIRECTORY. UL tests that meet the requirements of ULC-S115-M.95 are given a cUL listing and are published by UL in Products Certified for Canada (cUL) Directory.

.4 Tests for Fire Resistance of Building Joint Systems, UL 2079, Test Requirements.

.5 Standard Test for Resistive Joint Systems, ASTM EI966 under designation UL 2079.

.6 Cyclic movement and measuring the minimum and maximum joint widths of Architectural Joint Systems, ASTM E1399.

.7 Standard Test Method for Surface Burning Characteristics of Building Materials, CAN/ULC-S102-M or ASTM E84.

.8 Method for Fire tests of Building Construction and Materials CAN/ULC-S101 or ASTM E119.

.9 International Firestop Council Guidelines (IFC) for Evaluating Firestop Systems Engineering Judgements.

.10 International/Firestop Council (IFC) Inspection Guideline and ASTM E2174, Standard Practice for on Site Inspection of Installed Firestop Systems.

.11 M.O.P. Manual of Practice, (MOP) Guideline as set out by the Firestop Contractors International Association (FCIA).

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

.13 NFPA 101-Life Safety Code

.14 Canadian Electrical Code

1.4 QUALITY ASSURANCE

.1 Work is to be undertaken by experienced workers in their trade of material or system being used with a minimum of five (5) working years of experience.

.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 Manufacturer shall ensure that their Fire Protection Engineers will oversee the project, and have a minimum five (5) years experience on the manufacturers design systems.

.4 A manufacturer's National and Local representative (not distributor or agent) to be on-site during initial mock-up installation of firestop systems to ensure the mock-ups have been

installed, based on the approved design system listings and to train appropriate sub-contractor personnel in proper selection and installation procedures.

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

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

1.5 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 resistant wall and floor 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 smoke and flame.

1.6 SAMPLES

.1 Submit material samples of each type of proposed product in un-opened containers including all anchors/fasteners and daming material.

.2 Submit a sample of the proposed assembly identification penetration plate.

1.7 DESIGN SYSTEM LISTINGS SHOP DRAWINGS

.1 Submit Design System Listings, 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.

.3 Design System Listings shall show proposed material, including technical data, reinforcement, anchorage, fastenings and method of installation. Construction details shall accurately reflect actual job conditions.

.4 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.

.5 Provide ULC, cUL or WH Design System Listings complete with product literature and MSDS sheets on each system for each application, for each area as indicated.

.6 Where there is no specific tested Design System Listings available for particular firestop configuration, the Firestopping Sub-Trade shall obtain from the Manufacturer an Engineer Judgement (EJ) for submittal.

.7 Submit shop drawings as follows:

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

.2 Provide copies of all fire and smoke stop system ULC, cUL or WH Design No. listings for each penetration type for all areas located.

.3 Provide product data, MSDS and all other technical data information required as indicated in Item No. 1.5.1 System Description.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Deliver materials undamaged in manufacturer’s clearly labelled, unopened containers, identified with brand, type, and ULC, cUL or WH label, complete with batch number, manufacturing date and 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 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 this minimum temperature before, during and for three (3) days after installation of materials.

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

.4 During installation, provide masking and drop sheets to prevent fire stopping materials from contaminating any adjacent surfaces.

.5 Do not use materials that contain flammable solvents.

1.10 PRECONSTRUCTION MEETING

.1 After Design System Listings Shop Drawings are reviewed by the Contract Administrator and one week prior to the mock-up installation, the Contractor shall request a pre construction meeting be held.

.2 All Sub-Trades that are affected, such as the window, gypsum board/steel stud, mechanical (including their Sub-Trades) and electrical (including their Sub-Trades) shall be in attendance, along with Firestopping Sub-Trade, Contractor, and Contract Administrator(s).

.3 Each Sub-Trade shall receive one copy of the Design System Listings Shop Drawings.

.4 Standard installation, scheduling, precautions, annular opening sizes, wall/floor preparations shall be reviewed to ensure that all Sub-Trades understand the full complexity of the firestop installation, based on the approved Design System Listings Shop Drawings.

1.11 MOCK-UPS

.1 After Design System Listings Shop Drawings are reviewed by the Contract Administrator and one-week prior to actual commencement of construction, provide field sample mock-up of each proposed ULC, CUL or WH system for this project for Contract Administrator review. This mock-up shall also include if required, work by other trades, to provide the required finish work.

.2 Reviewed mock-ups shall become the standards of workmanship and material against which installed work will be checked. Reviewed and approved mock-ups may be used in final construction.

.3 Install identification penetration plate no. adjacent to each penetration.

.4 Local and National representation from the manufacturer shall be present during the Contract Administrator mock-up review.

.5 Upon completion of the review, the National and Local representative shall provide in writing to the Contract Administrator that their review finds the mock-ups acceptable by the manufacturer and meets or exceeds the ULC, cUL or WH design system listing requirements for each mock-up application.

.6 Retain and maintain mock-ups during construction in an undisturbed condition as a standard for judging completed unit of work. Accepted mock-ups in an undisturbed condition at time of Substantial Performance may become part of completed unit of work.

1.12 DEFINITIONS

.1 Firestops: specially tested materials used to establish or re-establish the integrity of a fire rated wall, floor or other partition after the structure has been breached for the through-penetration of building utility items or to close off openings left due to construction methods.

.2 Through-penetration: pipes, conduits, ducts, cable trays, cable, wire or any other element passing completely through an opening in a fire rated barrier/assembly.

.3 Membrane penetration: any penetration of a fire rated barrier that breaches one side but does not pass completely through to the other side.

.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 or other partition with a fire-smoke rating of 1, 2, 3 or up to 4-hours.

.6 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-M95/ULC-S115-M95 or ASTM E814/UL 1479.

.7 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-M95/ULC-S115-M95 or ASTM E814/UL 1479.

1.13 WARRANTY

.1 Manufacturer shall warrant work of this Section against defects and deficiencies in the product material for a period of five (5) years from date of Substantial Performance, in accordance with General and Supplementary Conditions of Contract.

.2 Fire and smoke stop system Contractor hereby warrants workmanship on material installation for period of five (5) years from date of Substantial Performance, in accordance with General and Supplementary Conditions of Contract. Promptly correct any defects or deficiencies, which become apparent within warranty period at no

expense to The City.

1.14 MAINTENANCE DATA AND MATERIAL

.1 Provide operation and maintenance data and material for Fire and Smoke-Stop Systems to incorporate into a Manual.

Part 2 Products

2.1 MATERIALS

.1 Fire-stopping and smoke-seal systems: in accordance with CAN4-S115-M95 or ASTM E814.

.1 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke, water and toxic gases in compliance with requirements of CAN4-S115-M95 or ASTM E814., and not to exceed opening sizes for which they are intended, in accordance with ULC, cUL or WH Design Numbers or other Design System Listings acceptable to local authority having jurisdiction.

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

.2 Fire-stop Methods:

.1 Method 1: non-combustible, semi-rigid, felt; minimum density 65 kg per cu. m.; 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, fluid, gas and fire resistant elastomeric sealant, ULC, WH (Warnock Hersey), 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-M95 or ASTM E814.

.3 Mechanical or Electrical service: penetration assemblies; certified in accordance with

CAN4-S115-M95.

.4 Service - penetration fire-stop components: Certified in accordance with CAN4-S115-M95 or ASTM E814.

.5 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.

.6 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.

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

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

.9 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.

.10 Sealants for vertical joints: non-sagging.

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.

.2 Acceptable 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 3M Fire Protection Products as distributed by:

Brock White Canada Inc.

1325 Ellice Avenue, Winnipeg, Manitoba R3G 0G1

Phone: (204) 786-6426

.4 Tremco, Tremstop, Firestop Systems as distributed by:

Wearing Williams Limited

1140 St. James Street, Winnipeg, Manitoba R3H 0K7

Phone: (204) 786-8831

2.3 ACCEPTABLE FIRE STOP APPLICATORS

.1 National Firestop Ltd.

405 Gunn Road, Winnipeg, Manitoba R2C 2Z2

Phone: (204) 222-0920

.2 Total Fire Stop Systems Limited

Stony Mountain, Manitoba R0C 3A0

Phone: (204) 344-5696

.3 Western Industrial Services Ltd.

1475 Dugald Road, Winnipeg, Manitoba R2J 0H3

Phone: (204) 956-9475

.4 Groundstar Systems (1987) Ltd.

1556 Erin Street

Winnipeg, MB R3E 2T1

Phone: (204) 694-4899

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 design system listings for each condition.

.2 Verify that all joints, service penetrating elements and supporting devices have been properly installed. All temporary lines and markings have been removed to meet the approved Design System Listings for each condition has been identified.

.3 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.

.4 Report in writing to the Contract Administrator any defective surfaces or conditions affecting the firestop system installation.

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

.6 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.

.7 Beginning of installation means acceptance of site conditions.

3.2 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 Prime substrates where recommended by firestopping Manufacturer using manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

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

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

.7 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, cUL or WH Design System Listing.

.8 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.

.9 Ensure that multi-penetration openings have been framed and boarded out, all around the annular opening as indicated in the firestopping Detail Drawings (FS) prior to prepping the opening.

.10 Mask where necessary to avoid spillage and over-coating onto adjoining surfaces. Remove stain on adjacent surfaces immediately.

.11 Confirm that the temperature and humidity conditions during and after installation are being maintained as per manufacturers recommendations.

3.3 INSTALLATION

.1 Install fire-stopping and smoke-seal material and components in accordance with manufacturer's instructions and rated system as tested to ULC/CAN4-S115-M95, and ULC, cUL and WH Design System Listings.

.2 Coordinate with other Sub-Trades to assure that all pipes, conduit, cable, and other items, which penetrate fire-rated assemblies have been permenantly installed prior to installation of firestop assemblies.

.3 Schedule the work to assure that fire-rated assemblies and all other construction that conceals penetrations are not erected prior to the installation of firestop and smoke seals.

.4 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.

.5 Provide temporary forming as required. Remove forming material only after Firestop System have gained sufficient strength and after initial curing as per manufacturer's instructions.

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

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

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

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

3.4 SCHEDULE OF FIRESTOP LOCATIONS

.1 Fire stop and smoke-seal, but not limited to the following locations:

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

.2 Penetrations through fire-resistance-rated new or existing masonry, concrete, and gypsum board partitions/walls, floors and roof assemblies.

.3 Intersection of fire-resistance-rated new or existing masonry, concrete and gypsum board partitions.

.4 Joints at top and bottom of fire resistance rated new or existing concrete masonry and gypsum board partitions. Joints to allow for independent movement.

.5 Control and sway joints in fire-resistance-rated new or existing masonry and gypsum board partitions and walls.

.6 Penetrations through fire-resistance-rated floor slabs/systems, ceilings and roof.

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

.8 Around mechanical and electrical assemblies/devices penetrating fire separations.

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

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

.11 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.

.12 Mechanical and electrical recessed boxes in walls and partitions.

.13 Where indicated on working drawings and specification detail drawings.

3.5 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.

.3 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.

3.6 INSTALLATION OF ASSEMBLY IDENTIFICATION PENETRATION PLATE

.1 Install adjacent to all through wall/floor service penetration firestop 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 plate shall be completely filled out and installed prior to requesting substantial performance.

.3 Clean substrate prior to applying penetration plate.

.4 Securely apply penetration plate to substrate, by mechanically fastening.

3.7 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 specified installation requirements herein. Use only materials approved by manufacturer as suitable for repair of original seal. Do not mix different manufacturer’s products.

3.8 CONTRACT ADMINISTRATOR REVIEW

.1 Upon completion of construction and prior to requesting Substantial Performance Review, Firestopping Sub-Trade shall inspect all firestopping work, prepare a deficiency list, submit this list to the Contract Administrator and then the Firestop Sub-Trade shall repair any deficiencies and re-inspect work to ensure that all deficiencies have been completed.

.2 Firestop Sub-Trade shall request Substantial Performance review of work once all work is completed, inspected and identified with assembly identification penetration plates.

.3 During Substantial Performance Review, the sub-contractor shall be present with the Contract Administrator

.4 The Firestopping Sub-Trade shall do all cutting and removal of the systems for visual review by the Contract Administrator. Once the review is completed and accepted, the Firestopping Sub-Trade shall replace the firestop system with new.

3.9 CLEAN-UP

.1 Remove equipment, excess materials and debris and clean adjacent surfaces immediately after application. Use methods and cleaning materials approved by Manufacturer.

.2 Protect firestopping during and after curing period from contact with contaminating substances. If damage caused by others, the Contractor shall instruct the Firestop Sub-Trade to make appropriate repairs and charge to appropriate trades.

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

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

1	Fire Stopping	Section 07 84 00
2	Standard Hollow Metal Frames	Section 08 12 13
3	Gypsum Board Assemblies	Section 09 21 16
4	Painting For Minor Works	Section 09 91 99

1.2 INSTALLER QUALIFICATIONS

.1 Sealant installer shall be a specialized applicator, having skilled mechanics, trained and competent in all phases of caulking work, with a minimum of five years experience.

1.3 ENVIRONMENTAL CONDITIONS

.1 Sealant and substrata materials to be minimum 5°C.

.2 Should it become necessary to apply sealants below 5°C, consult sealant manufacturer and follow their recommendations.

1.4 EXTENDED WARRANTY

.1 Contractor hereby warrants that caulking work will not leak, in accordance with the General and Supplementary Conditions of the Contract, but for five years.

.2 Manufacturer hereby warrants that caulking will not crack, crumble, melt, shrink, run, lose adhesion or stain adjacent surface in accordance with the General and Supplementary Conditions of the Contract, but for five years.

Part 2 Products

2.1 MATERIALS

.1 **Primers:** type recommended by sealant manufacturer.

.2 **Joint fillers:**

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

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

.3 **Bond breaker:** pressure sensitive plastic tape, which will not bond to sealants.

.4 **Material Designations:**

.1 Polysulfide Two part

.1 Non-Sag to CAN/CGSB-19-24, Type 2, Class B, colour white

.2 Silicones One Part

.1 To CAN/CGSB-19.13

.2 To CAN/CGSB-19.22 (Mildew resistant).

.3 Acrylics One Part

.1 To CGSB 19-GP-5M

.4 Acrylic Latex One part

.1 To CAN/CGSB-19.17.

.5 Acoustical Sealant

.1 To CAN/CGSB-19.21

.5 **Acceptable Distributors:**

.1 PRC as distributed by:

.1 Brock White Canada Inc.

1325 Ellice Avenue, Winnipeg, Manitoba R3G 0G1

Phone: (204) 786-6426

.2 Mameco, Vulkem as distributed by:

.1 G.D. Johnson Ltd.

542 Plinquet Street, Winnipeg, Manitoba R2J 2W6

Phone: (204) 233-4107

.3 Sonnoborne as distributed by:

.1 G.D. Johnson Ltd.

542 Plinquet Street, Winnipeg, Manitoba R2J 2W6

Phone: (204) 233-4107

.2 Chemrex Inc.

59 Keats Way, Winnipeg, Manitoba R3K 0S2

(204) 895-7552

.4 Dow Corning as distributed by:

.1 G.D. Johnson Ltd.

542 Plinquet Street, Winnipeg, Manitoba R2J 2W6

Phone: (204) 233-4107

.5 Sikaflex, GE as distributed by:

.1 Brock White Canada Inc.

1325 Ellice Avenue, Winnipeg, Manitoba R3G 0G1

Phone: (204) 786-6426

.6 Tremco as distributed by:

.1 Wearing Williams Ltd.

1140 St. James Street, Winnipeg, Manitoba R3G 0G1

Phone: (204) 786-8881

.7 Morton Thiokol and

.8 Bostik as distributed by:

.1 Specialty Construction Products Ltd.

77 Paquin Road, Winnipeg, Manitoba R3V 3V9

Phone: (204) 661-6732

.5 **Colour of sealants:** selected by Contract Administrator based on a custom colour range.

.6 **Joint cleaner:** xylol, methylethylketone or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.

Part 3 Execution

3.1 PREPARATION

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

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

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

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

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

.6 Install joint filler to achieve correct joint depth.

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

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

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

3.2 APPLICATION

.1 Apply sealants, primers, joint fillers, bond breakers to manufacturer's instructions. Apply sealant, using gun with proper size nozzle. Use sufficient pressure to fill voids and joints solid. Superficial pointing with skin bead is not acceptable.

.2 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities. Neatly tool surface to a slight concave joint.

.3 Apply sealant to joints between window or door frames to adjacent building components around perimeter of every external window or door opening, to control joints in masonry walls, concrete slabs, and where indicated.

.4 Clean adjacent surfaces immediately and leave work neat and clean. Remove excess sealant and droppings using recommended cleaners as work progresses. Remove masking after tooling of joints.

END OF SECTION