

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 09 21 99 - Partitions for Minor Works.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C 553-02, Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S702-1997, Standard for Mineral Fibre Insulation.

1.3 SUBMITTALS

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

1.4 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 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
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- .3 (Cont'd)
packaging material for recycling in accordance with Waste Management Plan.

PART 2 - PRODUCTS

2.1 INSULATION

- .1 Acoustic Insulation: Batt and blanket mineral fibre, EcoLogo certified with minimum 100% recycled content.
 - .1 Thickness as indicated to achieve STC and/or fire rating indicated.
- .2 Accessories:
 - .1 Insulation Clip:
 - .1 Impale type, perforated 50x50mm cold rolled carbon steel 0.8mm thick, adhesive back, spindle of 2.5mm diameter annealed steel, length to suit insulation, 25mm diameter washers of self locking type.
 - .2 Nails:
 - .1 Galvanized steel, length to suit insulation plus 25mm, to CSA B111-1975 (R1998).
 - .3 Staples:
 - .1 12mm minimum leg.
 - .4 Tape:
 - .1 As recommended by manufacturer.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSULATION INSTALLATION

- .1 Install insulation to maintain continuity of acoustical 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 to fit into spaces.

3.3 CLEANING

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

PART 1 GENERAL

1.1 RELATED WORK

- .1 Fire stopping and smoke seals within mechanical assemblies (i.e inside ducts, dampers) and electrical assemblies (i.e. inside cable trays) are specified in Division 23 and 26 respectively.
- .2 Coordinate work of this section with other sections as required to properly execute the work and as necessary maintain satisfactory progress of the work of other sections.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.

1.3 REFERENCES

- .1 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN-S115, Fire Tests of Firestop Systems.

1.4 DEFINITIONS

- .1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.
- .2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.
- .3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.
- .4 Tightly Fitted; (ref: NBC Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of noncombustible construction or have "0" annular space in buildings of combustible construction.

- .1 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.5 SUBMITTALS

- .1 Submit duplicate 300 x 300 mm samples showing actual firestop material proposed for project.
- .2 Submit shop drawings to show proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect actual job conditions.
- .3 Submit manufacturer's engineering judgement identification number and drawing details when no ULC or cUL system is available. Engineering judgement must include both project name and contractor's name who will install firestop system as described in drawing.
- .4 Submit manufacturer's product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site. Include manufacturer's printed instructions for installation. Include manufacturer's specifications, training letter, and technical data for each material including the composition and limitations, documentation of ULC or CUL firestop systems to be used.
- .5 Submit material safety data sheets provided with product delivered to job site.

1.6 MOCK-UP

- .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 Construct mock-up showing service penetrations, fire separation and floor assemblies. Mock-up may be part of finished work.
- .3 Allow 48h for inspection of mock-up by Owner's Representative before proceeding with membrane work.

1.7 MANUFACTURER'S REPRESENTATIVE

A manufacturer's representative is to be on site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures and at commissioning stage to certify acceptance completed installation. Training will be done as per

manufacturer's written recommendations published in their literature and drawing details.

1.8 QUALITY ASSURANCE

.1 Qualifications:

- .1 Installer: person specializing in fire stopping installations with minimum five (5) years documented experience approved by the fire stopping manufacturer.
- .2 Manufacturer: company with minimum five (5) years experience in producing of material used for work required for this project, with sufficient production capacity to produce and deliver required units without causing delay in work.
- .2 All fire stopping materials for this project to be supplied by a single manufacturer.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Use only firestop products that have been ULC or cUL tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements and fire-rating involved for each separate instance.
- .2 Fire stopping and smoke seal systems: in accordance with CAN-S115.
 - .1 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN-S115 and not to exceed opening sizes for which they are intended.
- .3 Service penetration assemblies: certified and tested by ULC or cUL in accordance with CAN-S115.
- .4 Service penetration firestop components: certified and tested by ULC or cUL in accordance with CAN-S115.
- .5 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.
- .6 Non-curing, re-penetrable intumescent sealants, caulking or putty material for use with flexible cables or cable bundles.

- .7 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal. Consult with Owner's Representative and damper manufacturer prior to installation ULC or cUL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
- .8 Intumescent sealants or caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe. No silicone based firestop are allowed to be applied on plastic pipes.
- .9 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
- .10 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .11 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .12 Sealants for vertical joints: non-sagging.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are clean, dry and frost free.
- .2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.
- .4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.2 INSTALLATION

- .1 Install fire stopping and smoke seal material and components in accordance with ULC certification or UL Products Certified for Canada (CUL) and manufacturer's instructions.
- .2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .4 Tool or trowel exposed surfaces to a neat finish.
- .5 Remove excess compound promptly as work progresses and upon completion.

3.3 INSPECTION

- .1 Notify Owner's Representative when ready for inspection and prior to concealing or enclosing firestopping materials and service penetration assemblies.

3.4 SCHEDULE

- .1 Firestop and smoke seal at:
 - .1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.
 - .2 Edge of floor slabs at curtain wall and precast concrete panels.
 - .3 Top of fire-resistance rated masonry and gypsum board partitions.
 - .4 Intersection of fire-resistance rated masonry and gypsum board partitions.
 - .5 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
 - .6 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
 - .7 Openings and sleeves installed for future use through fire separations.
 - .8 Around mechanical and electrical assemblies penetrating fire separations.
 - .9 Rigid ducts: greater than 129 cm²: 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.

3.5 CLEAN UP

- .1 Remove excess materials and debris and clean adjacent surfaces immediately after application.
- .2 Remove temporary dams after initial set of fire stopping and smoke seal materials.

END OF SECTION

PART 1 - GENERAL

1.1 Description of Work

- .1 Sealants and caulking.
- .2 Backer rod.

1.2 Related Sections

- .1 Section 06 40 00 - Architectural Woodwork.
- .2 Section 06 65 00 - Solid Polymer Fabrications.
- .3 Section 08 11 00 - Steel Doors and Frames.
- .4 Section 08 80 50 - Glazing.

1.3 References

- .1 CGSB 19-GP-5M, Sealing Compound, One Component, Acrylic Base, Solvent Curing.
 - .2 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
 - .3 CGSB 19-GP-14M, Sealing Compound, One Component, Butyl-polyisobutylene Polymer Base, Solvent Curing.
 - .4 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
 - .5 CAN/CGSB-19.18-M87, Sealing Compound, One Component, Silicone Base, Solvent Curing.
 - .6 CAN/CGSB-19.21-M87, Sealing and Bedding Compound Acoustical.
 - .7 CAN/CGSB-19.22-M89, Mildew Resistant, Sealing Compound for Tubs and Tiles.
 - .8 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.
 - .9 LEED-NC, Version 2.1, Environmental Quality Credit 4.1.
 - .10 The VOC content of adhesives and sealants must be less than the current VOC content limits of South Coast Air Quality Management District (SCAQMD) Rule #1168, AND all sealants used as fillers must meet or exceed the
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- .10 (Cont'd)
requirements of the Bay Area Air Quality
Management District Regulation 8, Rule 51.

1.4 Samples

- .1 Submit samples in accordance with Section
01 33 00 - Submittal Procedures.
- .2 Submit duplicate samples of each type of
material and colour.

1.5 Quality Assurance

- .1 Qualifications: Installers shall be trained
and experienced in the necessary skills and
shall be thoroughly familiar with the
requirements of the specification.
- .2 Preconstruction Testing: Letter report from
the sealant manufacturer indicating
satisfactory results of adhesion,
compatibility and stain tests to all
substrates to be sealed.
- .3 Field Samples: Caulk a section of joint as
directed under job conditions at least seven
days prior to start of work for review by
Engineer. When approved, sample shall be used
as a standard of comparison for remainder of
work.

1.6 Delivery, Storage, and Handling

- .1 Deliver, handle, store and protect materials
in accordance with Section 01 61 00 - Common
Product Requirements.
- .2 Deliver and store materials in original
wrappings and containers with manufacturer's
seals and labels, intact. Protect from
freezing, moisture, water and contact with
ground or floor.

1.7 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.
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- .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 Engineer will arrange for ventilation system to be operated on maximum outdoor air and exhaust during installation of caulking and sealants.

1.8 Waste Management and Disposal

- .1 Separate and recycle waste materials in accordance with Section 01 35 73 - Procedures for Deconstruction of Structures.
 - .2 Place materials defined as hazardous or toxic waste in designated containers.
 - .3 Ensure emptied containers are sealed and stored safely for disposal away from children.
 - .4 Dispose of surplus chemical and finishing materials in accordance with federal, provincial and municipal regulations.
 - .5 Separate corrugated cardboard in accordance with the Waste Management Plan and place in designated areas for recycling.
 - .6 Fold up metal banding, flatten, and place in designated area for recycling.
 - .7 Use trigger operated spray nozzles for water hoses.
 - .8 Return solvent and oil soaked rags for contaminant recovery and laundering or for proper disposal.
 - .9 Use the least toxic sealants, adhesives, sealers, and finishes necessary to comply with the requirements of this section.
 - .10 Close and seal tightly all partly used sealant containers and store protected in well ventilated fire-safe area at moderate temperature.
 - .11 Place used hazardous sealant tubes and other containers in areas designated for hazardous materials.
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1.9 Warranty

- .1 Provide two-year workmanship warranty signed by the installer.
- .2 Provide twenty-year limited weatherseal warranty from sealant manufacturer.

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 not contain a total of volatile organic compounds (VOCs) in excess of 5% by weight as calculated from records of the amounts of constituents used to make the product.
 - .4 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.
 - .5 Caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant shall not be used in air handling units.
 - .6 When low toxicity caulks are not possible, confine usage to areas which off gas to the exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.
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- .7 In the selection of the products and materials of this section preference will be given to those with the following characteristics: Water based, water soluble, water clean-up, non-flammable, low Volatile Organic Compound (VOC) content, manufactured without compounds which contribute to ozone depletion in the upper atmosphere, manufactured without compounds which contribute to smog in the lower atmosphere, does not contain methylene chloride, does not contain chlorinated hydrocarbons.
- .8 The manufacturing process must adhere to Lifecycle Assessment Standards as per CSA Z760-94 LCA Standards.
- .9 Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.
- .10 The VOC content of adhesives and sealants must be less than the current VOC content limits of South Coast Air Quality Management District (SCAQMD) Rule #1168, AND all sealants used as fillers must meet or exceed the requirements of the Bay Area Air Quality Management District Regulation 8, Rule 51.

2.2 Sealant Materials

- .1 Type ES#1
 - .1 One part low modulus, neutral cure, SILYL-terminated non-sag elastomeric sealant conforming to ASTM C920.
 - .2 Type: S
 - .3 Grade: NS
 - .4 Class: 25
 - .5 Use NT, M, A, G and O.
 - .6 Additional movement capability of +100 to -50.
- .2 Type ES#2
 - .1 Two component, self leveling and slope grade elastomeric polyurethane for horizontal joints (vehicular and pedestrian traffic bearing) conforming to ASTM C920.
 - .2 Type: M
 - .3 Grade: D
 - .4 Class: 25
 - .5 Use T and M.
 - .6 Movement capability of +/-25%

- .3 Type ES#3
 - .1 One part, medium modulus, neutral cure silicone sealant conforming to ASTM C920
 - .2 Type: S
 - .3 Grade: NS
 - .4 Class: 25
 - .5 Use NT, M, G, A, and O.
 - .6 Movement capability of +/-25%
- .4 Type ES#4
 - .1 Two-part, neutral cure, medium modulus silicone sealant conforming to ASTM C920. Non-staining to porous surfaces per ASTM C1248
 - .2 Type: M
 - .3 Grade: NS
 - .4 Class: 25
 - .5 Use NT, M, G, A and O.
 - .6 Additional Movement capability of +/-50%
- .5 Type ES#5
 - .1 One-part mildew-resistant silicone sealant conforming to ASTM C920. Meeting requirements of FDA Regulation No. 21 CFR 177.2600
 - .2 Type: S
 - .3 Grade: NS
 - .4 Class: 25
 - .5 Use G, A and O.
 - .6 Additional Movement capability of +/-50%
- .6 Type ES#6
 - .1 One-part acrylic-based acoustical sealant conforming to ASTM C920.
 - .2 Class: 25
- .7 Type ES#7
 - .1 One-part paintable silicone sealant (water based).
- .8 Type ES#8
 - .1 One-part clear silicone sealant

2.3 Accessories

- .1 Primer: Type recommended by the sealant manufacturer and compatible with joint forming materials.
- .2 Joint Cleaner: Non-corrosive and non-staining type recommended by sealant manufacturer and compatible with joint forming material.
- .3 Polyethylene: Extruded closed cell foam backer rod.

- .3 Polyethylene:(Cont'd)
 - .1 (Cont'd)
 - .1 Size: oversize 30 to 50 %, as required for joint design.
 - .2 Comply with ASTM C 1330
- .4 Bond Breaker Tape.
 - .1 Polyethylene bond breaker tape which will not bond to sealant.

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 Clean and prime surfaces in accordance with manufacturer's directions. Remove loose materials and other foreign matter which may impair adhesion of sealant.
- .6 Verify that joint shaping materials and release tapes are compatible with sealant.
- .7 Install joint filler with roller or blunt instrument to achieve required joint depth. Do not puncture or twist.

3.3 Sealant Color

- .1 Sealant color to be selected by Consultant from manufacturers full range.

3.4 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.

3.5 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.

3.6 Mixing

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

3.7 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.
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- .3 (Cont'd)
 - .2 Remove excess and droppings, using recommended cleaners as work progresses.
 - .3 Remove masking tape after initial set of sealant.
 - .4 Protect joint sealants during and after cure, from contact with contaminating substances, damage from construction operations or other gauges. Sealants are to be without damage or deterioration at time of substantial performance of the work.
 - .5 During the course of the Work and upon completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition in accordance with Section 01 52 00 - Construction Facilities.

3.8 Sealant Schedule

- .1 1 Type ES#1
 - .1 Use: Vertical expansion and control joints.
 - .2 Substrate: Masonry, concrete and pre-cast.
- .2 Type ES#2
 - .1 Use: Perimeter joints and non-structural weatherseals.
 - .2 Substrate: Aluminum, Plastics, Masonry, Concrete
- .3 Type ES#3
 - .1 Use: Structural curtain wall adhesive sealant
 - .2 Substrate: Glass, Aluminium, Spandrel materials.
- .4 Type ES#4
 - .1 Use: Weatherseals.
 - .2 Substrate: Metal Panels, Natural Stone Panels
- .5 Type ES#5
 - .1 Use: Plumbing fixtures.
 - .2 Substrate: ceramic tile, sinks.
- .6 Type ES#6
 - .1 Use: Acoustical sealant around partitions.
 - .2 Substrate: Gypsum board, Steel, Aluminum.

- .7 Type ES#7
 - .1 Use: Interior Joints to be painted.
 - .2 Substrate: Metal, Gypsum Board.

- .8 Type ES#8
 - .1 Use: Interior Joints.
 - .2 Substrate: Wood, Solid Surfacing, Gypsum Board.