
FIRESTOPPING AND SMOKE SEALS

1. GENERAL

1.1 Quality Assurance

- .1 Firestopping and smoke sealing shall be by competent installers having minimum five (5) years experience in application of materials and systems being used, approved and trained by material or system manufacturer.
- .2 Asbestos free firestopping and smoke seal materials and/or systems to provide closures to fire and smoke at openings around penetrations, and at openings and joints within fire separations and assemblies having a fire-resistance rating, including openings and spaces at perimeter edge conditions. System shall provide draft tight barriers to retard passage of flame and smoke, and firefighter's hose stream and passage of liquids. System shall provide and maintain fire resistance rating of adjacent floor, wall or other fire separation assembly acceptable to authorities having jurisdiction. Firestopping and smoke seals within mechanical (i.e. inside ducts, dampers) and electrical assemblies (i.e. inside bus ducts) will be provided as part of the work of Division 15 and 16 respectively firestopping and smoke seal around outside of such mechanical and electrical assemblies where they penetrate rated fire separations are part of the work of this section.
- .3 Firestopping and smoke seal materials shall conform to both the temperature and flame ratings of ULC-S115 and, where applicable, to ASTM E814, and other requirements of authorities having jurisdiction.

1.2 Submittals

- .1 Submit Shop Drawings indicating ULC assembly number for each condition, required temperature rise and flame rating, hose stream rating, thickness, installation methods and materials of firestopping and smoke seals, damming materials, reinforcements, anchorages and fastenings, size of opening, adjacent materials and number of penetrations. Submit copies of current ULC listings for each system and certified copies of test reports verifying that firestopping and smoke seals meet or exceed specified requirements.

1.3 Environmental Requirements

- .1 Comply with requirements of WHMIS regarding use, handling, storage, and disposal of hazardous materials; and material safety data sheets acceptable to Ministry of Labour.

2. PRODUCTS

2.1 Materials

- .1 Certified and listed by ULC or WH in accordance with CAN4-S115 and bearing ULC or WH label, products shall be heat resistant, flexible, durable and compatible with adjacent materials and finishes. System shall be self supporting at penetration capable to adhere and yet maintain its integrity while providing effective barrier against passage of flame, smoke and gases. Product shall provide flame and temperature rating in accordance with requirements of National Building Code for openings in respective fire resistance rated floor, wall, or other assembly.

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- .2 Firestop Systems: Certified by ULC, WH and listed in ULC Guide No. 40 U19.
- .3 Firestop System Components: Certified by ULC, WH and listed in ULC Guide No. 40 U19.13 under the Label Service of ULC.
- .4 Cementitious Matrices: Minimum 2758 kPa (400 psi) compressive strength when cured, to retard cable tray warping within the firestop seal.
- .5 Firestopping and Smoke Seals at Openings Where Reinstallation Occurs: An elastomeric or re-useable cementitious matrix or putty seal; do not use a permanent cementitious seal at such locations.
 - .1 Firestopping and smoke seals at openings around penetrations for electrical bus ducts, pipes, ductwork and other electrical and mechanical items requiring sound and vibration control or allowance for expansion, contraction and other movement: An elastomeric seal; do not use a cementitious or rigid seal at such locations.
 - .2 Firestopping and smoke seals at joints and spaces designed and required to allow movement such as building movement joints, deflection spaces, control joints, expansion joints, and similar locations shall be flexible, elastomeric seal suitable to withstand the required movement and capable of returning to original configuration without damage to seal and without adhesive or cohesive failure; do not use a cementitious or rigid seal at such locations.
 - .3 Primers: To Manufacturer's recommendation for specific material, substrate, and end use.
 - .4 Water (if applicable): Potable, clean and free from injurious amounts of deleterious substances.
 - .5 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.
 - .6 Pipe and Duct Insulation and Wrappings: Compatible with firestopping systems.
 - .7 Intumescent Pads: Permanently pliable type.
 - .8 Intumescent Composite Sheet: Composite sheet, strip or precut shapes.
 - .9 Sealants and Putty For Vertical And Overhead Joints: Non-sagging.
 - .10 Sealants and fluid seals at floors: Self-levelling.
 - .11 Materials and products shall not cause stress, chemical or physical reaction, or other damage to penetrating items or adjacent materials.

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3. EXECUTION

3.1 Installation

- .1 Ensure materials and products are compatible with abutting materials, coatings and finishes. Remove applied coatings and finishes as required to permit proper installation and adhesion.
- .2 Ensure that pipe and duct insulation and wrappings occurring within openings to receive firestopping and smoke seal are installed prior to work of this Section and that insulation and wrapping within fire seals is a ULC listed component of the system to be installed, unless ULC certified assembly permits such other insulation and wrapping to remain within the assembly. Otherwise, precede installation of mechanical insulations or remove insulation from area of insulated pipe or duct where such pipes or ducts penetrate a fire separation. Coordinate work of this Section with the work of Division 15, Mechanical. Ensure the continuity and integrity of thermal and vapour barriers where such are removed, altered, or replaced, acceptable to Division 15 and the City.
- .3 Apply firestopping and smoke seals in accordance with Manufacturer's instructions and tested designs acceptable to authorities having jurisdiction to provide required temperature and flame rated seal, and to prevent passage of smoke and liquids.
- .4 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing. Completely fill and seal voids with firestopping and smoke seal materials. Do not cover up materials until full curing has taken place. Notify when completed installations are ready for inspection and prior to concealing or enclosing firestopping and smoke seals.

3.2 Cleaning

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

END OF SECTION

JOINT SEALANTS

1. GENERAL

1.1 General Requirements

- .1 This Section specifies sealing Work not specified in other Sections. Refer to other Sections for the respective sealant Work.

1.2 Submittals

- .1 Samples for Initial Selection: Provide 150 mm (6") long cured, colour samples of Manufacturer's standard range of colours in each type of sealant for selection by Contract Administrator. Submit samples of primer, bond breaker tape, and joint backing material, if requested.
- .2 Product Data: Submit product information from sealant Manufacturers prior to commencement of Work of this Section verifying:
 - .1 Selected sealant materials are from those specified;
 - .2 Composition and physical characteristics;
 - .3 Surface preparation requirements;
 - .4 Priming and application procedures;
 - .5 Suitability of sealants for purposes intended and joint design;
 - .6 Test report on adhesion, compatibility and staining effect on samples of materials used on Project;
 - .7 Sealants compatibility with other materials and products with which they come in contact including but not limited to sealants provided under other Sections, insulation adhesives, bitumens, brick, stone, concrete, masonry, metals and metal finishes, ceramic tile, plastic laminates, paints;
 - .8 Suitability of sealants for temperature and humidity conditions at time of application.

1.3 Quality Control

- .1 Installer: Trained and approved by the manufacturer and having a minimum three (3) years experience in the installation of the Work described in this Section and can show evidence of satisfactory completion of projects of similar size, scope and type. If requested, provide letter of certification from Manufacturer stating that installer is certified applicator of its products, and is familiar with proper procedures and installation requirements required by the Manufacturer.
- .2 Maintenance Seminars: Provide, to the City, training seminars, and recommendations on product maintenance procedures.
- .3 Field Adhesion Testing Every 30 m.

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- .1 The field adhesion test shall be performed as follows:
 - .1 Make a knife cut horizontally along the full width of the joint.
 - .2 Make two (2) vertical cuts (from the horizontal cut) approximately 75 mm long, along both sides of the joint.
 - .3 Place a 25 mm mark on the sealant tab.
 - .4 Grasp the 75 mm sealant tab firmly 25 mm from its bonded edge and pull at a 90° angle.
 - .5 If dissimilar substrates are being sealed, check the adhesion of sealant to each substrate separately. This is accomplished by extending the vertical cut along one side of the joint, checking adhesion to the opposite side and then repeating for the other surface.
 - .6 Field adhesion test criteria: The sealant should tear cohesively within itself without bond loss.
 - .7 At this time the joint will be inspected for complete fill. The joint should not have voids, and joint dimensions should match those shown on the drawings.
- .4 Manufacturer's Site Inspection: Have the manufacturer's technical representative inspect the Work at suitable intervals during application and at conclusion of the Work of this Section, to ensure the Work is correctly installed. When requested, submit Manufacturer's inspection reports and verification that the Work of this Section is correctly installed.
- .5 Pre-Installation Meeting: Two weeks prior to commencing Work of this Section, arrange for Manufacturer's technical representative to visit the Site and review preparatory and installation procedures to be followed, conditions under which the Work will be done, and inspect the surfaces to receive the Work of this Section. Advise the Contract Administrator of the date and time of the meeting.
 - .1 Weather conditions under which Work will be done
 - .2 Anticipated frequency and extent of joint movement
 - .3 Joint design
 - .4 Suitability of durometer hardness and other properties of material to be used
 - .5 Recommendations of manufacturer for mixing of multi-component sealants
 - .6 Number of beads to be used in sealing operation and priming operation if required

1.4 Delivery, Storage And Handling

- .1 Deliver materials in original, unopened containers with manufacturers labels identifying Manufacturer's name, brand name of product, grade and type, application directions and shelf life or expiry date of product.

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- .2 Handle and store materials in accordance with Manufacturer's printed directions. Store flammable materials in safe, approved containers to eliminate fire hazards.
- .3 Do not use sealing materials that has been stored beyond the maximum recommended shelf life.

1.5 Project Conditions

- .1 Environmental Requirements: Do not apply any sealant under adverse weather conditions, when joints to be sealed are damp, wet or frozen or when at ambient temperatures below 5°C (40°F). Maintain minimum temperature of application during application and for 8 hours after application. Consult manufacturer for specific instructions before proceeding and obtain Contract Administrator's approval.

2. PRODUCTS

2.1 Materials

- .1 General: Non-bleeding, non-migrating, capable of supporting their own weight.
 - .1 Horizontal Joints: Self leveling
 - .2 Vertical and Overhead Joints: Non-sag
- .2 Sealant Type A: ASTM C920, Type S, Grade NS, Class 25, Use NT-M-A, one component, chemical curing, urethane base, Sikaflex 1a by Sika, or Dymonic by Tremco.
- .3 Sealant Type B: [CAN/CGSB-19.24-M, Type 2, Class B] [ASTM C920, Type M, Grade NS, Class 50, Use NT-M-A], multi-component, chemical curing, modified polyurethane, Sikaflex 2cNS EZ Mix by Sika, or Dymeric 240 by Tremco.
- .4 Sealant Type C: [CAN/CGSB-19.24-M] [ASTM C920, Type M, Grade P, Class 25, Use T], multi-component, chemical curing, modified polyurethane, self-levelling, Sikaflex 2c SL by Sika, THC900 by Tremco, or Vulkem 245 by Tremco.
- .5 Sealant Type D: ASTM C920, Type S, Grade NS, Class 25, Use NT, one component, chemical curing, mildew resistant silicone, DC786 by Dow Corning, Sanitary 1700 by GE Silicones, or Proglaze by Tremco.
- .6 Joint Backing: Preformed, compressible, resilient, non-waxing, non-extruding, non-staining closed cell polyethylene or urethane foam, shape to suit intended use, oversize 25% and compatible with sealant, primer, and substrate.
- .7 Bond Breaker Tape: As recommended by sealant manufacturer.
- .8 Joint Primer: Non-staining, suitable for substrate surfaces, compatible with joint sealants and as recommended by sealant manufacturer.

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- .9 Cleaning Material: Non-corrosive, non-staining, xylol, methyl-ethyl-ketone, toluol, isopropyl alcohol or as recommended by sealant manufacturer and acceptable to material or finish manufacturers for surfaces adjacent to sealed areas.
- .10 Sealants, Cleaning Materials and Primers: Compatible with each other.

3. EXECUTION

3.1 Examination

- .1 Ensure joints are suitable to accept and receive sealants. Commencement of Work implies acceptance of surfaces and conditions.
- .2 Do not apply sealant to masonry until mortar has cured.
- .3 Before any sealing Work is commenced, test materials for indications of staining or poor adhesion.

3.2 Preparation

- .1 Clean joints and spaces which are to be sealed and ensure they are dry and free of dust, loose mortar, oil, grease, oxidation, coatings, form release agents, sealers and other foreign material.
- .2 Clean porous surfaces such as concrete, masonry or stone by wire brushing, grinding or sandblasting as required to obtain clean and sound surfaces.
 - .1 Remove laitance by grinding or mechanical abrading.
 - .2 Remove oils by abrasive blast cleaning.
 - .3 Remove loose particles present or resulting from grinding, abrading, or sandblast cleaning by thorough brushing.
- .3 Clean ferrous metals of rust, mill scale, and foreign materials by wire brushing, grinding, or sanding.
- .4 Wipe non-porous surfaces such as metal and glass to be sealed, except pre-coated metals, with cellulose sponges or clean rags soaked with ethyl alcohol, ketone solvent, xylol, or toluol and wipe dry with clean cloth.
 - .1 Where joints are to be sealed with silicone based sealants clean joint with methyl-ethyl-ketone or xylol. Do not allow solvent to air-dry without wiping.
 - .2 Clean pre-coated metals with solutions or compounds which will not injure finish and which are compatible with joint primer and sealant.
- .5 Install joint backing material to achieve correct and uniform joint profile.

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- .6 Where joint design or depth of joint prevents use of joint backing material, apply bond breaker tape to prevent three-sided adhesion.
- .7 Do not stretch, twist, puncture, or tear joint backing. Butt joint backing at intersections. Install bond breaker tape at back of joint where joint backing is not required or cannot be installed.
- .8 On horizontal traffic surfaces, support joint filler against vertical movement which might result from traffic loads, including foot traffic.
- .9 Where surfaces adjacent to joints are likely to become coated with sealant during application, mask them prior to priming and sealing.
- .10 Do not exceed shelf life and pot life of materials, and installation times, as stated by manufacturers.
- .11 Be familiar with work life of sealant to be used. Do not mix multiple component materials until required for use.
- .12 Use materials as received from manufacturer, without additions, deletions, and adulterations of materials.
- .13 Mix multiple component sealants and bulk sealants using mechanical mixer capable of mixing without mixing air into material, strictly in accordance with Manufacturer's directions and recommendations. Continue mixing until material is homogeneously blended, uniform in colour, and free from streaks of unmixed material. Install compound prior to start of hardening or curing cycle.
- .14 Seal joints in surfaces to be painted before surfaces are painted. Where surfaces to be sealed are prime painted in shop before sealing check to make sure prime paint is compatible with primer and sealant. If they are incompatible, inform Contract Administrator and change primer and sealant to compatible types approved by Contract Administrator.
- .15 Where irregular surface or sensitive joint border exists, apply masking tape at edge of joint to ensure joint neatness and protection.
- .16 Prime joints is mandatory applied as instructed by sealant manufacturer. Prime sides of joints for type of surface being sealed prior to application of joint backing, bond breaker, or sealant.

3.3 Application

- .1 Apply sealant using hand operated guns or pressure equipment fitted with suitable nozzle size and equipment approved by sealant manufacturer. Apply in accordance with manufacturer's directions and recommendations.
- .2 Force sealant into joint and against sides of joints to obtain uniform adhesion. Use sufficient pressure to completely fill all voids in joint regardless of variation in joint widths and to proper joint depth as prepared. Ensure full firm contact with interfaces of joint. Superficial pointing with skin bead shall not be acceptable.

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- .3 Finish face of compound to form smooth, uniform beads. At recesses in angular surfaces, finish compound with flat face, flush with face of materials at each side. At recesses in flush surfaces, finish compound with concave face flush with face of materials at each side.
- .4 Compound may be tooled, provided that such tooling does not damage seal or tear compound. Avoid pulling of sealant from sides.
- .5 Tool surfaces as soon as possible after sealant application or before any skin formation has occurred, particularly when using silicone sealants.
- .6 Joint surfaces shall be straight, neatly finished, free from ridges, wrinkles, sags, dirt, stains, air pockets and embedded foreign matter or other defacement and be uniform in colour, free from marbling and/or colour streaking due to improper mixing or use of out of shelf life products.

3.4 Sealant Schedule

- .1 Use one of sealants specified for each type in following locations. Ensure sealant chosen for each location is recommended by manufacturer for use for conditions encountered.
- .2 Refer to Drawings for sealing Work not specifically listed in this Section.
- .3 Seal following joints with Sealant Type A:
 - .1 Interior non-rated masonry and gypsum board control joints.
 - .2 Interior top of non-rated masonry walls to structure above.
 - .3 Interior hollow metal door, window and screen frames, both sides.
- .4 Seal following joints with Sealant Type D:
 - .1 Underside of rims of sinks between sink rims and counters/vanities.
 - .2 Around pipes and conduits passing through walls and ceilings in washrooms. Conceal sealant with escutcheons.
 - .3 Joints in ceramic tile walls where joints occur over control joints in masonry back-up and where joints occur over control joints between cast-in-place concrete and masonry back-up.
 - .4 Joints between counters/vanities and walls in washrooms.
 - .5 Joints between urinals and walls in washrooms.
 - .6 Joints between water closets and walls in washrooms.
 - .7 Joints between wall mounted lavatories and walls in washrooms.
 - .8 Joints between access panels and walls.

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- .9 Joints between splash backs and walls.

3.5 Repair

- .1 Remove any compounds not complying with requirements specified herein. Exercise care in removal operations not to mar or damage finishes adjacent to joints. Repeat preparation, priming, and installation of new material as specified to provide finished Work complying with specified requirements, and acceptable to Contract Administrator. Do such repair work at no extra cost to City.

3.6 Cleaning

- .1 Immediately clean adjacent surfaces which have been soiled and leave Work in neat, clean condition. Remove excess materials, compounds smears or other soiling resulting from application of sealants. Use recommended cleaners and solvents.

3.7 Protection of Completed Work

- .1 Provide approved, non-staining means of protection for completed joint sealant installations where required to protect Work from mechanical, thermal, chemical and other damage by construction operations and traffic.
- .2 Maintain protection securely in place until completion of Work. Remove protection when so directed by Contract Administrator.

3.8 Warranty

- .1 Warrant Work of this Section against defects and deficiencies including cracking, crumbling, melting, shrinkage, sag, failure in adhesion, cohesion or reversion, air and moisture leakage, marbling or streaking due to improper mixing, discolouration due to dirt pick-up during curing and staining of adjacent materials.

END OF SECTION