ZERODRAFT Calgary

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Master Specifications

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MASTER SPECIFICATION

ZERODRAFT INSULATING AIR SEAL/FIRESTOPPING

- **Zerodraft Foam Sealant (One-Component Polyurethane Foam)**
- **Zerodraft Insulating Air Sealant (Two-Component Polyurethane Foam)**
- **Zerodraft Door and Window Weatherstripping and Seals**
- **Zerodraft Air Seal/Fire Stop Systems**

SPEC NOTE: This proprietary specification is basic and must be adapted to suit the requirements of individual projects. It is written in accordance with the CSC/CSI (Construction Specifications Canada/Construction Specifications Institute) 3-Part Section Format. Square brackets [] indicate choice, alternatives, data required or need for the specifier to make a decision. Remove brackets and unused options before printing.

1. General

1.1 GENERAL REQUIREMENTS

.1 Conform to Sections of Division 1 as applicable.

1.2 SECTION INCLUDES

.1 Provide labour, materials, products, equipment and services for the following:

.1 Air sealing to supplement and provide continuity of the main or primary air barrier assembly, including the bridging, sealing and/or filling of [perimeter of door and window openings,] [crevices,] [roof-wall connections,] [mechanical and electrical penetrations in walls, floors and roofs,] [window and curtainwall mullions,] [beam and column enclosures,] [voids in walls,] [and] [_____].

.2 Weatherstripping and sealing of exterior [doors] [and] [windows] as per Building Assessment Report [No. _____].

.3 Air seal/firestop and smoke seals at openings in fire rated walls, floors and roofs at mechanical and electrical penetrations, openings at each floor level in shafts or stairwells, and penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.

1.3 RELATED SECTIONS

.1 [Section 01045 – Cutting and patching.]

.2 [Section 02070 – Selective demolition.]

.3 [Section 03010 – Poured concrete slabs and walls.]

.4 [Section 04200 – Masonry partitions including mortaring in of fire dampers.]

.5 [Section 05300 – Steel deck.]

.6 [Section 05999 – Temporary sheet steel covers.]

.7 [Section 07200 – Insulation.]

.8 [Section 07220 – Primary air seal: air barrier.]

.9 [Section 07900 – Sealants and caulking.]

.10 [Section 09250 – Gypsum board partitions.]

.11 [Section 09900 – Painting.]

.12 [Division 15 – Mechanical.]

.13 [Division 16 – Electrical.]

1.4 REFERENCES

.1 Comply with:

.1 CAN/ULC-S710.1 Standard For Thermal Insulation – Bead Applied One-Component Polyurethane Air Sealant Foam, Part 1: Material Specification.

.2 CAN/ULC-S710.2 Standard For Thermal Insulation – Bead Applied One-Component Polyurethane Air Sealant Foam, Part 2: Application.

.3 CAN/ULC-S711.1 Standard for Thermal Insulation – Bead Applied Two-Component Polyurethane Air Sealant Foam, Part 1: Material Specification

.4 CAN/ULC-S711.2 Standard for Thermal Insulation – Bead Applied Two-Component Polyurethane Air Sealant Foam, Part 1: Material Specification, and Part 2: Application.

.5 CAN4-S115-M Standard Method of Fire Tests of Firestop Systems.

.6 ASTM E814-94b Methods for Fire Tests of Through-Penetration Fire Stops.

.7 CAN4-S114-M Standard Method of Test for Determination of Non-Combustibility in Building Materials.

.8 ANSI/UL 1479 Fire Tests of Through-Penetration Stops.

.9 ULC List of Equipment and Materials, Firestop Systems and Components, current edition.

1.5 SUBMITTALS

.1 Shop Drawings: Submit shop drawings indicating the ULC tested firestop system number for each condition, required rating(s), thickness, installation methods and air seal/firestop and smoke seal components, damming materials, reinforcements, anchorages and fastenings, size of opening, adjacent materials and type(s) and number of penetrations.

.2 Listing and Test Reports: Submit copies of current ULC listed Firestop System for each system [and certified copies of test reports] verifying that air seal/firestop and smoke seals meet or exceed specified requirements.

.3 Product Data: Submit manufacturer's product data for materials, providing descriptions sufficient for identification at the Project site. Include manufacturer's printed instructions for installation.

.4 Samples: Submit samples of each type of air seal/firestop and smoke seal material, foam sealant and weatherstripping including location(s) where system or material is to be used. Provide approximately 150 mm (6") size samples.

.5 Maintenance Manuals: Provide 2 copies including product literature and sources of repair materials.

.6 Maintenance Training Seminar: Provide a comprehensive seminar to Owner's maintenance staff on the purpose and nature of the air seal/firestop products used. Include a "hands-on" session on re-entry, resealing, and safety aspects of the air seal/firestop.

1.6 QUALITY ASSURANCE

.1 Provide the work of this Section using competent installers, experienced in the application of the materials and systems being used, approved and accredited by the material or system manufacturer.

.2 Firestop and smoke seal materials shall be tested in accordance with CAN4-S115-M and, where applicable, to ASTM E814, ANSI/UL 1479, and other requirements of authorities having jurisdiction.

.3 Provide weatherstripping and seal products of industrial design, strength and quality as that used by professional builders and trade contractors, sourced via leading manufacturers of original products supplying the construction and automotive industries.

1.7 REGULATORY REQUIREMENTS

.1 Conform to applicable local building codes for fire resistance ratings and surface burning characteristics.

.2 Provide certificate of compliance from authority having jurisdiction indicating approval of materials used.

1.8 MOCK-UP

SPEC NOTE: Use this article on larger projects for assessing full sized erected air seal/firestopping assemblies for review of construction sequence, coordination of work of related sections, site testing, or observation of the assembly of materials.

.1 Refer to Section 01400 – Quality Requirements for mock-up requirements.

.2 Locate mock-up where directed.

.3 Mock-up may [not] remain as part of the work.

1.9 PRE-INSTALLATION CONFERENCE

.1 Convene [one] week prior to commencing work of this Section, under provisions of Section 01200.

1.10 ENVIRONMENTAL REQUIREMENTS

.1 Do not apply materials when temperature or weather conditions deviate from manufacturer's recommendations.

.2 Comply with manufacturer's recommended requirements for temperatures, relative humidity, and substrate moisture content during application and curing of materials.

.3 Ensure proper ventilation in areas to receive solvent and moisture cured materials, and in enclosed spaces when installing two-component foam sealant. Alternatively, appropriate breathing apparatus should be worn.

1.11 DELIVERY, STORAGE, AND HANDLING

.1 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels intact. Protect from damage and environmental conditions in accordance with manufacturer's recommendations.

1.12 SEQUENCING AND SCHEDULING

.1 Do not install work of this Section until work of other trades having an affect on this Section of work has been completed.

.2 Schedule work of other trades so that foam sealants can be inspected prior to being covered by subsequent construction.

2 Products

2.1 ACCEPTABLE MANUFACTURERS

.1 This insulating air seal/firestop specification is generally based on systems currently being manufactured by Zerodraft (Division of Canam Building Envelope Specialists Inc.), 125 Traders Blvd. E., Unit # 4, Mississauga, ON, L4Z 2H3 Tel. 1-877-272-2626.

.2 Other systems meeting this specification may be substituted providing that manufacturers show proof that air seal/firestopping materials have both a fire rating and an air barrier rating, and that foam sealants have an equivalent air barrier rating and physical properties.

2.2 MATERIALS

.1 Insulating air sealant: Zerodraft Insulating Air Sealant bead applied gun foam two-component polyurethane sealant to CAN/ULC-S711.1 (Material Specification) as manufactured and distributed by Zerodraft (Division of Canam Building Envelope Specialists Inc.), 125 Traders Blvd. E., Unit # 4, Mississauga, ON, L4Z 2H3 Tel. 1-877-272-2626.

.2 Air sealant foam: Zerodraft Foam Sealant bead applied gun foam one-component polyurethane sealant to CAN/ULC-S710.1 (Material Specification) as manufactured and distributed by Zerodraft (Division of Canam Building Envelope Specialists Inc.), 125 Traders Blvd. E., Unit # 4, Mississauga, ON, L4Z 2H3. Tel. 1-877-272-2626.

.3 Primer: As recommended by foam sealant manufacturer.

.4 Substrate Cleaner: Non-corrosive type recommended by foam sealant manufacturer.

.5 Firestop system components: Certified by ULC and listed in ULC Guide No. 40 U19.13 under the Label Service of ULC in accordance with CAN4-S115-M and bearing ULC label, asbestos free materials and systems to provide an effective barrier against the passage of flame, smoke and gasses, and to provide a fire protection rating in accordance with the requirements of the applicable building code for openings in the respective fire resistance rated floor, wall or other assembly.

.1 Firestopping mortar: A/D FIREBARRIER Mortar, fibre reinforced, foamed cement mortar, charcoal colour, tested in accordance with CAN4-S115-M, ASTM E814-83, ANSI/UL 1479 and CAN4-S114-M and as listed and certified by ULC, ULI, Warnock Hersey and Factory Mutual.
.2 Water: Potable, clean and free from injurious amounts of deleterious substances.
.3 Damming materials: To manufacturer's recommendations, and in accordance with the tested assembly being installed as acceptable to authorities having jurisdiction.
.4 Backing material: Zerodraft Insulating Air Sealant two-component polyurethane foam to CAN/ULC-S711.1 (Material Specification) and CAN/ULC-711.2 (Application), and having a maximum allowable air leakage rate of 0.02 $l/s \cdot m^2$ measured at an air pressure difference of 75 Pa.

3 Execution

3.1 EXAMINATION

.1 Examine sizes and conditions of voids to be air sealed/firestopped to establish correct ULC Firestop System and thicknesses and installation of materials.

.2 Verify that surfaces are ready to accept the work of this Section and penetrating elements are securely fixed, properly located and with the required space allowance between penetrants and openings.

.3 Do not proceed with work of this Section until unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Clean substrate surfaces to remove dirt, dust, grease, oil, loose material, or other matter which may affect bond of foam sealant or air seal/firestopping material. Ensure surfaces are dry before proceeding with installation.

.2 Remove incompatible materials which may affect bond.

.3 Install backing and damming materials for air seal/firestopping if required to arrest liquid material leakage and for support.

.4 Mask, using masking tape, where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces. Remove tape as soon as possible without disturbing air seal/firestopping or air seal with substrates.

3.3 INSTALLATION

.1 Air seal (air barrier systems)

.1 Install materials in accordance with manufacturer's instructions and acceptable to authorities having jurisdiction and the Consultant to provide required air seal.

.2 Apply sealants within recommended application temperature ranges. Consult manufacturer when sealants cannot be applied within specified ranges.

.3 In low humidity, mist area with water to aid cure of one-component sealant.

.4 Paint or cover foam exposed to ultra-violet radiation.

.5 Avoid overfilling restricted spaces.

.6 Use one-component foam for cracks or openings 6 mm (1/4") to 50 mm (2") wide. Use two- component foam sealant for gaps over 50 mm (2") wide, and for voids in hidden cavities.

.7 Install foam sealants in accordance with authorities having jurisdiction and all other applicable regulations pertaining to sealing materials.

SPEC NOTE: Modify the following "Project Type" paragraphs as appropriate to drawing details. Ensure drawings use the same terminology employed in this specification.

SPEC NOTE: Include the following clauses for High-Rise Residential projects.

.8 To provide continuity with the air/vapour barrier, seal the following areas:

.1 Gypsum board at roof slab, floor and around perimeter of sliding patio door.
.2 Wall/roof junctions at drain scuppers, and at other mechanical equipment including vent stacks located on the roof.
.3 All basement, corridor and parking garage penetrations made vertically through floor or horizontally through walls.
.4 Plumbing and duct penetrations in corridors and behind fire hose cabinets.
.5 Junctions between block walls.
.6 In cavity wall construction at parapet, around perimeters of windows, and at exhaust vents and soffits.
.7 Where mechanical and electrical services penetrate the roof.

.8 At expansion joints.
.9 In cavity wall construction at intermediate slab and low roof junctions.

SPEC NOTE: Include the following clauses for Commercial projects.

.8 To provide continuity with the air/vapour barrier, seal the following areas:

.1 Various roof locations including penetrations of all kinds and roof to fascia junctions.
.2 Window head, jamb and sill areas at cavity wall.
.3 Roof/wall junctions.
.4 Window frame at columns.
.5 Curtain wall systems at window and metal panels.
.6 At intervals in the cavity wall to achieve compartmentalization.
.7 Window frames, and parapets, in stucco wall construction.
.8 Exterior soffit overhangs in cavity wall construction.
.9 Wall/roof junctions at drain scuppers and other areas where mechanical equipment is located on the roof.
.10 All basement, corridor and parking garage penetrations made vertically through floors or horizontally through walls.

SPEC NOTE: Include the following clauses for Industrial projects.

.8 To provide continuity with the air/vapour barrier, seal the following areas:

.1 Various metal roof locations, particularly roof to wall and fascia junctions.
.2 Wall/roof junctions at drain scuppers and at other mechanical equipment including vent stacks located on the roof.
.3 All roof/wall junctions e.g. to join parapet upstand and metal wall liner at top of insulated metal wall system.
.4 Roof drain collars at single ply or built-up roof drain areas.
.5 At junctions between block walls, steel columns and metal walls.
.6 At girt angles and pre-formed metal flashing where the insulated wall meets the floor slab.
.7 At door jambs and heads in steel insulated wall systems.

SPEC NOTE: Include the following clauses for Institutional projects.

.8 To provide continuity with the air/vapour barrier, seal the following areas:

.1 Various roof areas including sloped roof/wall junctions, penetrations of all kinds and roof/wall junctions.
.2 Window heads, jambs and sills in [cavity] walls.
.3 Junction of roof air/vapour barrier and wall air/vapour barrier.
.4 Window frames at columns.
.5 At intervals in the cavity wall to achieve compartmentalization.
.6 Window frames, and parapets, in stucco wall construction.
.7 Sliding door head, jambs and threshold.
.8 Where gypsum board meets the roof slab and floor slab.
.9 In cavity wall construction at roof/wall junctions, window perimeters, exhaust vents and soffits.
.10 Junctions at roof scuppers and other mechanical equipment located on the roof.
.11 In masonry, stone or curtain wall systems at window perimeters and at metal panel interface locations.
.12 All basement, corridor and parking garage penetrations made vertically through floors or horizontally through walls.

SPEC NOTE: Include items .9 and .10 for Residential Retrofit projects.

.9 Provide reduced air leakage into and out of building (s) by sealing gaps, leaks and holes in interior and exterior construction.

.10 Seal areas listed, as applicable, in the retrofit literature published by Zerodraft "Locations For Sealing With Polyurethane Foam Sealants In Homes".

SPEC NOTE: Include item .9 for Window Retrofit (Replacement Windows) projects.

SPEC NOTE: The following clauses are applicable to all window types e.g. vinyl, wood, metal, for all building types (residential, commercial, industrial, institutional, etc.).

.9 Ensure continuity of air and vapour seal between wall and window frame in accordance with the requirements of CSA A440.4 Windows standard.

SPEC NOTE: Include item .9 to .13 for Roof/Wall Joints.

SPEC NOTE: The following clauses are applicable to existing or new low-rise commercial, industrial and institutional buildings with flat metal deck roofs to prevent uncontrolled air leakage.

.9 Inspect roof perimeter for air leakage paths such as the fluted deck itself, truss and structural beam penetrations above and below the top of the wall, open mortar joints, and conduit and pipe penetrations. Use smoke tester kits to identify and locate leakage.

.10 Use both one-component and two-component foam sealants in combination to create a continuous foamed-in-place seal between the wall and the roof air/vapour barrier.

.11 Where deck flutes run perpendicular to the wall, foam the open flutes completely out to the fascia.

.12 Where closed flutes occur, punch flutes and inject foam through holes. Locate holes as close to wall as possible so that the plane of injected and cured foam within the closed flute is level with the plane of the exposed foam in the open flutes.

.13 Where the steel deck is parallel to the wall, fill the void with either one-component or two-component material, depending on gap size.

.2 Door weatherstripping/sealing

SPEC NOTE: The following specification clauses are for the weatherstripping and sealing of exterior doors and windows, or for any door drawing air from the outside, i.e. mechanical room door, fire door, elevator room door, vestibule door or similar type doors.

.1 Install work of this Section at [door] [and] [window] locations indicated in Building Assessment Report [No. _____].

.2 Provide door and window weatherstripping and seals as per manufacturer's Installation Guidelines as outlined under [Lo-Rise] [Hi-Rise] Points to Seal/Task Index.

.3 Ensure use of proper type of weatherstripping to provide appropriate levels of durability, expandability, and appearance without impeding use of doors and windows.

.4 Install weatherstripping/seals plumb, square and level, wherever possible.

.5 Adjust weatherstripping for correct function and to form weathertight seal.

.3 Firestopping

.1 Provide air seal/firestop system(s) of sufficient thickness, dimensions and density to maintain integrity of fire separation assembly in accordance with applicable building codes and to the requirements of and acceptable to the authorities having jurisdiction and the Consultant.

.2 Provide seals to form draft tight barriers to retard the passage of flame and smoke, and, except where specified otherwise, firefighter's hose stream and the passage of liquids.

.3 Ensure compatibility of materials used in the system including materials used in or on penetrations as well as all adjoining building materials.

.4 Firestop and smoke seals within mechanical or electrical assemblies i.e. inside ducts, dampers, bus ducts and similar items to be provided as part of the works of Divisions 15 and 16 respectively.

.5 Provide compatible accessory components as required for the designated rated air seal/firestop system. Accessories to include but are not limited to permanent forming/damming/backing materials, temporary forming materials, substrate primers, collars, and steel sleeves.

.6 Provide temporary forming or damming as required.

.7 Use combustible type damming boards for temporary dams only. Remove after air seal/firestopping material has been cured.

.8 Use non-combustible damming boards for temporary or permanent dams. Provide wherever damming cannot be removed after applying air seal/firestopping.

.9 Install mortar by pumping, trowelling or hand packing into openings to thicknesses required by ULC firestop system.

.10 Install insulating air sealant backing material in accordance with CAN/ULC S711.2 (Application Standard).

.11 Completely fill and seal voids with air seal/firestop and smoke seal materials. Remove excess air seal/firestop material promptly as the work progresses and upon completion.

.12 Tool or trowel exposed surfaces.

.13 Allow materials to cure. Do not cover up materials until full curing has taken place.

.14 Provide air seal/firestop systems at following locations, without being limited to:

.1 At all openings, voids and penetrations through all floor slabs except openings within shafts constructed with a fire resistance rating and slabs on granular fill.
.2 At all openings, voids and penetrations through fire rated masonry, concrete and gypsum board walls, partitions and shaft walls.
.3 At all openings, voids, penetrations installed for future use through fire rated masonry, concrete, gypsum board walls, partitions and shaft walls.
.4 Around mechanical and electrical assemblies penetrating fire assemblies.

3.4 FIELD QUALITY CONTROL

.1 Notify Consultant when completed installations are ready for inspection prior to concealing or enclosing an area containing firestop materials.

.2 Arrange for inspections by the Owner's independent inspection and testing company, appointed and paid for by Owner.

.3 Following field inspections, provide all repair as required to ensure compliance with the Contract Documents.

.4 Remove temporary forming and dams only after materials have gained sufficient strength and after initial cure of firestop materials.

3.5 CLEANING AND PROTECTION

.1 Upon completion of this work, remove all materials, equipment and debris from the site.

.2 Leave work area and adjacent surfaces in a condition acceptable to the Consultant.

.3 Remove excess sealant with recommended solvent

.4 Leave installed work with sufficient protection to enable it to remain untouched until project turnover.

End of Section