Part 1 General

1.1 RELATED SECTIONS

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

.2 Section 09 29 00 – Gypsum Board.

.3 Mechanical Divisions.

.4 Electrical Divisions.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM).
- .1 ASTM E595-07, Standard Test Method for Total Mass Loss and Collected Volatile Condensable Materials from Outgassing in a Vacuum Environment.
- .2 ASTM E814-10, Standard Test Method for Fire Tests of Penetration Firestop Systems.
- .3 ASTM E1966-07, Standard Test Method for Fire-Resistive Joint Systems.
- .4 ASTM E2307-10, Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus.

.2 Firestop Contractors International Association (FCIA).
- .1 FCIA Manual of Practice (MOP).

.3 International Firestop Council (IFC).
- .1 IFC 401 Inspection Manual for Firestopped Through Penetrations, Joints and Perimeter Fire Barrier Systems.

.4 National Building Code of Canada, 2005 (NBCC).

.5 National Fire Protection Association (NFPA).
- .1 NFPA 101®: Life Safety Code®, 2009 Edition.

.6 Underwriter's Laboratories (UL).
- .1 UL 1479-03 (R2010), Fire Tests of Through-Penetration Firestops.
- .2 UL 2079-04 (R2008), Tests for Fire Resistance of Building Joint Systems.

.7 Underwriter's Laboratories of Canada (ULC).
- .1 CAN/ULC S115-05, Standard Method of Fire Tests of Fire Stop Systems.

1.3 DEFINITIONS

.1 Firestopping: material or combination of materials used to retain integrity of fire-rated construction by maintaining effective barrier against spread of flame, smoke, and hot gases through penetrations in joints between fire-rated wall and floor assemblies.

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

.3 Membrane penetration: any penetration of fire-rated barrier that breaches one side but does not pass completely through to other side, including recessed electrical devices.

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

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

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

.7 Fireblocking: building materials installed to resist the free passage of flame, smoke and toxic gases to other areas of building through concealed spaces.

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

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

.10 F-Rating: time firestop, penetration item, building, material, firestop material, can withstand direct flame without burn through as tested to CAN/ULC S115 or ASTM E814/UL 1479.

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

.12 W-Rating Water Leakage Test: systems tested and listed in accordance with UL 1479.

1.4 SYSTEM DESCRIPTION

.1 Provide firestopping as indicated and in accordance with NBCC and NFPA 101, consisting of a material or combination of materials that are compatible with each other, and installed to retain the integrity of a new or existing fire resistance rated construction by maintaining an effective barrier against the spread of flame, smoke and/or hot gases through penetrations, fire resistive joints, and perimeter openings in accordance with the requirements of applicable codes and tested by nationally accepted test agencies.

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

.3 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 and as follows:

.1 Penetrations for passage of duct, cable, 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 Openings between structurally separate sections of wall or floors.
.3 Gaps between top of walls and ceilings or roof assemblies.
.4 Expansion joints in walls and floors.
.5 Openings and penetrations in fire-rated partitions or walls containing fire doors.
.6 Openings around structural members which penetrate floors or walls.

1.5 SUBMITTALS

.1 Submit Product Data: manufacturer's specifications and technical data for each material including composition and limitations, documentation of ULC or cUL firestop systems to be used and manufacturer's installation instructions to comply with Section 01 33 00.

.2 Manufacturer's engineering judgment identification number and drawing details when no ULC or cUL system is available for application. Engineered judgment must include both project name and contractor’s name who will install firestop system as described in drawing.

.3 Submit material safety data sheets (MSDS) provided with product delivered to job-site. MSDS to include following:

.1 Technical data on out-gassing, off-gassing, and age testing.
.2 Curing time.
.3 Chemical compatibility to other construction materials.

.4 Provide certification by manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOC's), are non-toxic to building occupants, and comply with following:
- .1 ASTM E595.
- .2 EPA Method 24.
- .3 Volatile Content: below 250 g/l.
- .4 Silicone firestop not permitted.

.5 Provide certification by manufacturer that products supplied are protected against mould growth in both the wet and dry stage.

.6 Design system listings to show proposed material, including technical data, reinforcement, anchorage, fastenings and method of installation. Construction details to accurately reflect actual job conditions.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements.
- .1 Firestop System installation must meet requirements of CAN/ULC S115 or UL 2079 tested assemblies that provide fire rating as shown.
- .2 Proposed firestop materials and methods to conform to applicable governing codes having local jurisdiction.
- .3 For those firestop applications that exist for which no ULC or cUL tested system is available through manufacturer, manufacturer's engineering judgment derived from similar ULC or cUL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by IFC 401.

.2 Firestopping material must have a minimum shelf life of 2 years from production and visible expiration or packaging date. All firestopping materials must be installed prior to expiration of shelf life.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Deliver all material to site in manufacturer’s original unopened packaging with labels clearly identifying product name and manufacturer.

.2 Store materials in a dry enclosed area protected from exposure to moisture, construction activity, and direct sunlight in strict accordance with manufacturer's recommendations.

.3 Handle all products with appropriate precautions and care as stated manufacturer's instructions.

.4 Cleaning and Waste Management in accordance with Section 01 74 00.

1.8 SITE CONDITIONS

.1 Do not use materials that contain flammable solvents.

1.9 WARRANTY

.1 Manufacturer's Product Warranty: provide an extended warranty for Work of this Section for a period of 2 years from date of Substantial Performance of the Work. Manufacturer hereby warrants firestopping products to be free of manufacturing defects, and these or other observed defects and deficiencies will be repaired or replaced to the satisfaction of the Contract Administrator and at no additional expense.

.2 Installation Contractor's Warranty: provide an extended warranty for Work of this Section for a period of 2 years from date of Substantial Performance of the Work. Contractor hereby warrants that firestopping will remain as installed, free from any defects and deficiencies, and these or other observed defects and deficiencies will be repaired or replaced to the satisfaction of the Contract Administrator and at no additional expense.

Part 2 Products

2.1 MATERIALS

.1 Sealants or caulking materials for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), following products are acceptable:
- .1 Hilti FS-ONE Intumescent Firestop Sealant.
- .2 Hilti CP 604 Self Leveling Firestop Sealant.
- .3 Hilti CP 620 Fire Foam.
- .4 Hilti CP 606 Flexible Firestop Sealant.
- .5 Hilti CP 601s Elastomeric Firestop Sealant.
- .6 3M Fire Stop Sealant 2000.
- .7 3M Fire Barrier CP25 WB.
- .8 Tremco Tremstop Fyre-Sil Sealant.
- .9 Equivalent products listed in ULC Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory.

.2 Sealants or caulking materials for use with sheet metal ducts, following products are acceptable:
- .1 Hilti CP 601s Elastomeric Firestop Sealant.
- .2 Hilti CP 606 Flexible Firestop Sealant.
- .3 Hilti FS-ONE Intumescent Firestop Sealant.
- .4 Hilti CP 604 Self Leveling Firestop Sealant.
- .5 Equivalent products listed in ULC Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory.

.3 Sealants, caulking or spray materials for use with fire-rated construction joints and other gaps, following products are acceptable:
- .1 Hilti CP 672 Speed Spray.
- .2 Hilti CP 601s Elastomeric Firestop Sealant.
- .3 Hilti CP 606 Flexible Firestop Sealant.
- .4 Hilti CP 604 Self Leveling Firestop Sealant.
- .5 3M Firestop Sealant 2000.
- .6 Tremco Tremstop Fyre-Sil Sealant.
- .7 Equivalent products listed in ULC Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory.

.4 Pre-formed mineral wool designed to fit flutes of metal profile deck; as backer for firestop spray or sealant material.
- .1 Hilti CP 777 Speed Plugs.
- .2 Hilti CP 767 Speed Strips.

.5 Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems) tested to 50 Pa. differential, following products are acceptable:
- .1 Hilti CP 643N Firestop Collar.
- .2 Hilti CP 644 Firestop Collar.
- .3 Hilti CP 645/648 Wrap Strips.
- .4 3M Fire Barrier PPD Plastic Pipe Device.
- .5 Equivalent products listed in ULC Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory.

.6 For penetrations through Fire Separation wall provide firestop system with "F" Rating as determined by ULC or cUL as indicated below:

Fire Resistance Rating of Separation	Required ULC or cUL “F” Rating of Firestopping Assembly
30 minutes	20 minutes
45 minutes	45 minutes
1 hour	45 minutes
1.5 hours	1 hour
2 hours	1.5 hours
3 hours	2 hours
4 hours	3 hours

Note - For combustible pipe penetrations through Fire Separation provide firestop system with “F” Rating as determined by ULC or cUL which is equal to fire resistance rating of construction being penetrated.

.7 For penetrations through Fire Wall or horizontal Fire Separation provide firestop system with “FT” Rating as determined by ULC or cUL which is equal to fire resistance rating of construction being penetrated.

.8 For joints provide firestop system with Assembly Rating as determined by CAN/ULC S115 or UL 2079 which is equal to fire resistance rating of construction being penetrated.

Part 3 Execution

3.1 PREPARATION

.1 Verification of Conditions: examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
- .1 Verify penetrations are properly sized and in suitable condition for application of materials.
- .2 Surfaces to which firestop materials will be applied to be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may effect proper adhesion.
- .3 Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
- .4 Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
- .5 Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

.1 Manufacturer's Instructions: comply with manufacturer's written installation instructions and published drawings for installation of through-penetration and construction joint materials.
- .1 Seal all holes or voids made by penetrations to ensure air and water resistant seal.
- .2 Consult with mechanical Contract Administrator and damper manufacturer prior to installation of ULC or cUL firestop systems that might hamper performance of fire dampers as it pertains to duct work.
- .3 Protect materials from damage on surfaces subjected to traffic.

.2 Firestopping of New Fire Separations.
- .1 Install firestopping to maintain the integrity of all new fire separations in new fire rated floors and walls whenever affected by new construction including:
  - .1 Penetrations through and top of fire-resistance rated masonry, and gypsum board walls.
  - .2 Penetrations through fire-resistance rated floor assemblies.
  - .3 Intersections of fire-resistance rated masonry and gypsum board walls.
  - .4 Control joints in fire-resistance rated floor assemblies, and masonry and gypsum board walls.
  - .5 Openings and sleeves installed for future use through fire separations.
  - .6 Around mechanical and electrical assemblies penetrating fire separations.
  - .7 Rigid ducts greater than 129 cm^2 (20 in^2): firestopping to consist of bead of firestopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

.3 Firestopping of Existing Fire Separations.
.1 Install firestopping and/or restore integrity of existing fire separations in existing fire rated floor assemblies and walls whenever affected by the demolition and new construction.
.2 Patch and restore integrity of existing fire separations at openings in existing fire rated walls resulting from the demolition of doors, windows, ceilings, abutting walls, etc.
.3 Install firestopping and/or restore openings (i.e. abandoned and not required for future services, or replaced with services of a smaller size) in existing fire rated floor assemblies and walls remaining after the demolition and removal of mechanical pipes and or ducts and electrical services.
.4 Install firestopping at all new penetrations in existing fire separations.

3.3 FIELD QUALITY CONTROL

.1 Do not conceal firestopping installations until Contract Administrator or Authorities Having Jurisdiction have examined each installation.

.2 Perform under this Section, patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

.3 Install warning card that is clearly visible adjacent to all large and medium openings that may be re-penetrated. This card should contain following information:
.1 Warning that opening has being fire stop protected.
.2 Indicate fire stop system used (ULC or cUL).
.3 F rating or FT rating.
.4 Fire stop product(s) used.
.5 Person to contact and phone number in case of modification or new penetration of fire stop system.

.4 Cut and remove systems for visual review by Contract Administrator and manufacturer's representative. Once review is completed and accepted, replace firestop system with new. For such exploratory reviews per approved design system listings, allow:
.1 Minimum of 2% of each design listing for each area of 900 m^2;
.2 Cut test perimeter joints every 15 meters;
.3 Cut test bottom- and top-of-wall joints, wall-to-wall joints and building expansion joints every 15 meters minimum.

3.4 ADJUSTING AND CLEANING

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

END OF SECTION