

**SECTION 07 84 00****FIRESTOPPING: Fire-Resistive Through Penetration and Construction Joints****PART 1 - GENERAL**

## 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section and will be covered during a pre-construction meeting.

## 1.02 DEFINITIONS

- A. **XXXXXXXX** – “Owner”  
General Contractor or Construction Trade – “Contractor”
- B. “Value Engineering” – Industry practice to bring over-budget construction project back within budget. “True Value Engineering” – Well-planned and well-executed process to include design and compliance elements early into a project, while improving efficiency and decreasing back end operating costs. (Reference 1.06 Quality Assurance Requirements)
- C. Authority Having Jurisdiction – “AHJ”  
Federal, state, local, or other regional department, or an individual such as a fire chief, fire marshal, chief of a fire prevention bureau, chief of construction, building official, electrical inspector, or other Individual having statutory authority.
- D. “Appendix A”  
**XXXXXXXX** UL Alphanumeric Chart and UL Nomenclature.
- E. Engineering Judgment – A drawing generated by Hilti Fire Protection Engineers for jobsite applications, where field conditions differ from an original UL, FM or Intertek approved design and existing tested and an approved system does not exist. Engineering judgments “EJ’s” are designed to propose alternative application installation methods, which cannot otherwise be easily redesigned or modified. Firestop system designs are referenced when providing an EJ, if field conditions fall outside of testing parameters, an EJ may not be provided. The Contractor is responsible for submitting the Engineering Judgment.  
**Engineering Judgment request form:**  
[https://www.hilti.com/medias/sys\\_master/h9d/h13/9163477254174.pdf?mime=application%2Fpdf&realname=Hilti+EJ+Form+10-15a.pdf](https://www.hilti.com/medias/sys_master/h9d/h13/9163477254174.pdf?mime=application%2Fpdf&realname=Hilti+EJ+Form+10-15a.pdf)
- F. Firestopping: Material or combination of materials used to retain continuity & integrity of fire-resistance rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations, or construction joints between, fire-resistance rated wall and floor assemblies.
- G. Firestopping of all joints and penetrations in fire-resistance rated and smoke-resistance assemblies, whether indicated on drawings or not, and other openings as indicated.
  1. Through penetrations and membrane penetrations through fire-resistance-rated floor and roof construction including both blank openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
  2. Through penetrations and membrane penetrations through fire-resistance-rated walls and partitions including both blank openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
  3. Through penetrations and membrane penetrations through smoke barriers and construction enclosing compartmentalized areas involving both blank openings and openings containing penetrating items.
  4. Joint applications in fire-resistance-rated construction.
  5. Joint applications in smoke partition assemblies.

- H. Firestop perimeter slab edges and joints in fire-resistance rated and smoke partition assemblies, walls, and floors to maintain continuity and integrity.
1. Floor to floor joints.
  2. Floor to wall joints.
  3. Head of wall joints.
  4. Wall to wall joints.
  5. Bottom of wall joints.
  6. Perimeter edge of slab joints and non-rated exterior curtainwall systems.
- I. **Ratings – Fire-resistance Rated Construction:** (Reference 2.01 Performance Requirements)
1. **F Rating** – The time a firestop system prevents the passage of flame through an opening and successfully passes the hose stream test as determined by ASTM E-814 or UL 1479.
  2. **T Rating** – The time for the temperature of the unexposed surface of the firestop system or any penetrating item to rise 325 degrees above it's initial temperature as determined by ASTM E-814 or UL 1479.
  3. **L Rating** – A measurement of the rate of air of air leakage through test samples resulting from a specified air pressure difference applied across the surface of the test samples.
  4. **W-Rating** – A rating for through floor penetration firestop systems, which determines the effectiveness of a firestop system to restrict the flow of water. Class 1-rated firestop systems have been shown to resist up to a 3-foot water column for 72 hours.

#### 1.03 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

Only US tested, and approved UL firestop systems shall be used for the following applications:

- A. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-resistance rated barriers (walls, floors, partitions) and vertical service shaft walls and partitions.
- B. Safing slot gaps between edge of floor slabs and curtain walls.
- C. Openings between structurally separate sections of wall or floors.
- D. Gaps between the top of walls, bottom of walls and ceilings or roof assemblies.
- E. Fire-resistance rated expansion joints in walls and floors.
- F. Openings and penetrations in fire-resistance rated partitions or walls containing fire doors.
- G. Openings around structural members which penetrate floors or walls. (Assemblies shall require steel stud framing)

#### 1.04 RELATED WORK OF OTHER SECTIONS

- A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
  1. Section 01 81 13 - Sustainable Construction Requirements
  2. Section 03 30 00 - Cast-In-Place Concrete
  3. Section 04 20 00 - Unit Masonry
  4. Section 07 81 00 - Applied Fireproofing
  5. Section 07 91 00 - Preformed Joint seals
  6. Section 07 92 00 - Joint Sealants
  7. Section 07 95 13 - Expansion Joint Cover Assemblies
  8. Section 09 20 00 - Plaster and Gypsum Board
  9. Section 13 48 00 - Sound, Vibration and Seismic Control
  10. Section 21 00 00 - Fire Suppression
  11. Section 22 00 00 - Plumbing
  12. Section 23 00 00 - Heating, Ventilating, and Air Conditioning (HVAC)
  13. Section 23 31 00 - HVAC Ducts and Casings
  14. Section 23 37 00 - Air Outlets and Inlets
  15. Section 26 00 00 - Electrical
  16. Section 27 00 00 - Communications

## 1.05 REFERENCES

- A. ASTM E 814 - Standard Method of Fire Tests of Through Penetration Fire Stops
- B. ASTM E 119 - Test Method for Fire Tests of Building Construction and Materials
- C. UL 1479 - Fire Tests of Through-Penetration Firestops
- D. UL 2079 - Tests for Fire Resistance of Building Joint Systems
- E. Underwriters Laboratories (UL) of Northbrook, IL publishes tested systems in their "FIRE RESISTANCE DIRECTORY" that is updated annually.
  - 1. UL Fire Resistance Directory:
    - a. Firestop Devices (XHJI)
    - b. Fire Resistance Ratings (BXRH)
    - c. Through-Penetration Firestop Systems (XHEZ)
    - d. Fill, Voids, or Cavity Material (XHHW)
    - e. Forming Materials (XHKU)
    - f. Joint Systems (XHBN)
    - g. Perimeter Fire Containment Systems (XHDG)
  - 2. Alternate Systems: "Factory Mutual or Intertek" (updated annually).
- F. ASTM E 1966 - Standard Test Method for Fire Resistive Joint Systems
- G. ASTM E 2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus
- H. ASTM E 2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head of Wall Joint Systems installed between Rated Wall and Non-Rated Horizontal Assemblies.
- I. ASTM E 2174 - Standard Practice for On-site Inspection of Installed Firestops
- J. ASTM E 2393 - Standard Practice for On-site Inspection of Fire Resistive Joint Systems and Perimeter Fire Barriers
- K. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials
- L. ASTM D 6904 - Standard Practice for Resistance to Wind Driven Rain for Exterior Coatings
- M. ASTM C 679 - Standard Test Method for Tack-Free Time of Elastomeric Sealants
- N. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments
- O. Michigan Building Code (MBC 2015)
- P. NFPA 101 - Life Safety Code
- Q. NFPA 70 - National Electric Code
- R. NFPA 221 – Fire Walls and Fire Barriers
- S. NFPA 251 – Fire Tests of Building Construction and Materials
- T. ASTM G21 – Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- U. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- V. FM 4990 – FM Approvals Standard for Firestop
- W. FM 4991 - Approval Standard for Firestop Contractors; Factory Mutual Research Corporation.
- X. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.
- Y. UL Qualified Firestop Contractor – Credible 3<sup>rd</sup> Party Quality Management System Program

## 1.06 QUALITY ASSURANCE

- A. Owner does not recognize **“Value Engineering”** as an acceptable construction standard as it relates to firestopping and construction of fire-resistance rated wall and floor barriers. **“Non-compliance is not acceptable”**, *NOT adhering to scope, constitutes grounds for Owner to chargeback Contractor.*
- If renovation project, Existing Conditions shall be addressed per 2015 MBC Code requirements.
- B. Construction of fire-resistance rated, and smoke partition gypsum, concrete or masonry barriers shall be constructed to establish continuity and integrity. Installation of “Lap Patches or Hot Patches” are not permitted. Repairs are to be made with “like materials” to reinstate continuity and integrity, as per an original UL Design or GA-225-15 gypsum repair guideline.
- C. Head of Wall applications:
- New Construction – Head of Wall firestop applications in fire-resistance rated gypsum barriers and smoke partition barriers shall be complete and finished **prior** to other Contractors making through penetration firestop applications. *Assemblies may be topped out.*
  - Renovation – Head of Wall firestop applications in fire-resistance rated barriers and smoke partition barriers shall be addressed and repaired per 2015 MBC.
- D. Bottom of Wall applications:
- Bottom of Wall applications in fire-resistance rated gypsum barriers, and smoke partition barriers shall be complete and finished prior to installation of flooring materials. *Gypsum Bottom of Wall assemblies shall be installed with a min 1/4” - max 3/4” Joint.*
    - Reference: 2015 MBC Continuity: Fire Barriers - 707.5 / Smoke Barriers - 709.4 / Smoke Partitions - 710.4
- E. Fire-Test-Response Characteristics: Provide through-penetration firestop systems and fire-resistive joint systems that comply with specified requirements of tested and approved systems. Penetrations of horizontal assemblies, *whether concealed or unconcealed*, shall comply with section 714 Penetrations.
- F. Access holes or openings made in fire-resistance rated barriers, smoke partition barriers, concrete or block walls or concrete floors shall be made with appropriate power equipment and in accordance to the annular space requirements of a UL tested and passed System.
- G. Proposed fire stop materials and methods shall conform to applicable governing codes and authorities having jurisdiction.
- H. Firestop Systems do not reestablish structural integrity of load bearing partitions / assemblies or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.
- I. For firestop applications that exist for which no approved Hilti / UL tested system is available, an engineering judgment derived from similar qualified tested system designs or other tests shall be requested from Hilti and will be submitted to local authorities having jurisdiction for their review and approval prior to installation.
- Engineering judgment documents must follow requirements set forth by the International Firestop Council. The engineering judgment shall be obtained and in the possession of the Contractor, Authority Having Jurisdiction and Owner prior to initiating work.
- J. Owner shall review project takeoff’s, submittals and inspect renovation and new construction areas per ASTM E2174 / E2393 prior to covering of walls or placement of ceiling assemblies.
- K. **Owner to coordinate Firestop Training with Hilti Technical Representative, Contractor and AHJ with a firestop exam following the training. A minimum passing score of 80% is required to receive a Firestop Training Card.**
- Owner responsible for application mockup, which shall be utilized during firestop training to ensure UL System installation and compliance, while representing application minimum standards.**
- Installers not passing the exam will be provided an opportunity to retake the test within one week. Installers not passing the exam, shall not be permitted to make firestop applications while onsite. Installers working on Owner properties, shall renew their firestop training on an annual basis.**

- L. Low Voltage applications must be made with prior communication to Contractor onsite and any access holes made in fire-resistance rated barriers, smoke partition barriers, concrete or block walls or concrete floors and door / frame assemblies, shall be made with appropriate power equipment and in accordance to the annular space requirements of a UL tested and passed system.

Cable Tray applications shall terminate prior to wall barrier and through-penetrate fire-resistance rated barriers with Hilti Gangplate and Hilti Speed Sleeves as applicable.

It is the responsibility of the Low Voltage Contractor to follow established cable pathways, while utilizing proper cable hangers to keep all cables free of sprinkler lines. Ensure cable entry / exit distance through Hilti Speed Sleeves allow proper closure from either side, while following allowable percent fill for all applications per a UL System. Hilti Speed Sleeves shall be used for Low Voltage applications, with Hilti Gangplates where large or multiple cable runs exist. Low Voltage cables shall not touch or wrap around sprinkler lines.

***The Following Low Voltage firestop applications are not acceptable and shall reference an applicable UL System***

1. Hilti Putty Pads sections placed over the end of a sleeve or conduit
  2. Hilti Firestop Block or Hilti Plug "torn-pieces" placed on end of sleeve or conduit
  3. Hilti Cable Disc – Shall not be installed within any **XXXXXX** property
- M. The Contractor shall follow Owner's "Contractor orientation training" and Interim Life Safety Measures
- N. Any NEW or RENOVATION work, involving cutting, replacement or removal of pipes, insulated pipes, HVAC insulation or assemblies, data lines, phone or communication lines or cables shall be entirely removed from the area or project. None of the above materials shall be left in the ceiling or on the premise.

1.07 SUBMITTALS

- A. Submit Product Data: Manufacturer's specifications and technical data for each firestop application including the composition and limitations, documentation of qualified tested and approved UL firestop systems. Submitted applications shall meet each construction type and materials used on the project.
- B. Where project conditions warrant modification to a UL System, an engineering judgment shall be obtained prior to starting work and must include both project name and Contractor's name who will install firestop system as described in document. Engineering judgment request shall be submitted to the Hilti Fire Protection Engineering team, with application illustration and requested modification to an existing UL System.
- C. Submittals shall include:
1. Cover Page
  2. Table of Contents
  3. Hilti / UL Systems – Reference **XXXXXXX** / Hilti Alphanumeric Chart (Appendix A)
  4. Hilti Product Sheets
  5. Certificate of Compliance
  6. MSDS
  7. Installer Qualifications
- D. Firestopping shall not begin until the above submittal scope has been submitted and approved.
- E. Bluebeam PDF software documenting installed penetration and joint systems, with locations noted on the project compliance plans.
1. Close Out Document: Contractor shall provide an as-built fire stopping plan indicating all penetration and joint systems utilized on the project. Contractor shall utilize an electronic markup tool/ software (Preferably Bluebeam Revu) of a portable document file (PDF) to perform this submission. This document may be a conglomeration of all Contractors or Contractor specific.
    - Reference "2.03 n Materials" and "3.05 Identification & Documentation" for relevant labeling criteria.
    - Where existing conditions are modified or brought to current code compliance, these applications are to be labeled as well.

## 1.08 INSTALLER QUALIFICATIONS

- A. Engage an experienced Installer who is certified, accredited, licensed and qualified by UL, FM or the firestopping manufacturer (Hilti). A supplier's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer the buyer has met installation qualifications.
- B. Installer Responsibility: Each Contractor to assign installation of through-penetration firestop systems and fire-resistive joint systems on project to a single (same) Key Responsible Contact (KRC - DRI).
- C. The work is to be installed by a Contractor with at least one of the following qualifications:
  - 1. FM 4991 Approved Contractor (Factory Mutual)
  - 2. UL Qualified Contractor (Underwriter's Laboratory)
  - 3. HAFSC (Hilti Accredited Firestop Specialty Contractor)

## 1.09 PRE-INSTALLATION MEETING

- A. Schedule a pre-installation conference a minimum of two weeks prior to starting firestopping applications, with each phase to have its own coordination.
  - 1. **Meet at the Project Site with the following parties in attendance.**
    - a. ~~XXXXXX~~ – "Owner".
    - b. Architect.
    - c. Construction Manager.
    - d. Firestopping Contractor.
    - e. Firestop Hilti Technical Representative.
    - f. Installers of associated work, including architectural, mechanical, electrical, and communications.
    - g. Other parties concerned with performance of firestopping, including AHJ
  - 2. Review submittals for each specific condition.
  - 3. Review each application for specific firestopping material and installation method per UL assemblies.
  - 4. Tour representative areas where firestopping is to be installed.
    - a. Inspect and discuss each type of condition and each type of substrate.
    - b. Discuss preparation work required to be performed by other Contractors and schedule.
- B. Contractor shall record discussion, including agreement or disagreement on significant matters. Furnish copies of report to all parties present within 5 days after meeting.
  - 1. If substantial disagreements exist, Owner's Representative and Contractor will determine how disagreements will be resolved and set date and time to reconvene.

## 1.10 PROJECT COORDINATION:

- A. Coordinate construction of openings and penetrating items to ensure designated through Penetration and membrane firestop systems are installed per UL System specified requirements.
- B. Coordinate construction of fire-resistive joint system installations to ensure that designated Joint firestop systems are installed per UL System specified requirements.
- C. Schedule installation inspection of firestopping with Owner and AHJ after completion of penetrating item installation, but prior to covering or concealing of openings.
- D. Verify existing conditions, substrates and product adhesion before starting work. Correct unsatisfactory conditions before proceeding.
- E. Weather conditions: Do not install firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

- F. During installation, provide masking and drop cloths to prevent firestop materials from contaminating any adjacent surfaces.
- G. Coordinate special application installations and / or cast-in or drop-in device applications.  
Note: some devices require additional measures to satisfy F, T, L and W-Ratings.

#### 1.11 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials undamaged in manufacturers clearly labeled, unopened containers, identified with brand, type, date of expiration and UL label where applicable. Do not use damaged or expired material.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum jobsite storage.
- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions. Do not place firestop directly on the floor or ground.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

### PART 2 – PRODUCTS

#### 2.01 PERFORMANCE REQUIREMENTS

- A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance rated systems.
- C. Where structural members have field spray applied fireproofing, the fireproofing shall be installed and cured, prior to installation of firestop applications. Any damaged or removed fireproofing is to be repaired / replaced by the Contractor installing hangers or clamps. Contact **XXXXX** Owner's Representative for questions. Structural members through penetrating fire-resistance rated gypsum barriers shall be installed per UL Systems and requiring framing.
- D. Provide Hilti Speed Sleeve cable management devices whenever cables penetrate identified fire rated walls and where frequent cable changes and additions may occur. The Hilti Speed Sleeve cable management device shall maintain the hourly rating of the barrier being penetrated. Install device per the manufacturer's published installation instructions and is the responsibility of the low voltage Contractor to close the device. Reference 1.06-K Quality Assurance
- E. Penetrations through Fire Resistance Rated Walls: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814 and Michigan Building Code, while maintaining continuity and integrity.
  - 1. F-Rating: Not less than the fire-resistance rating of the wall construction being penetrated.
- F. Penetrations through Fire-Resistance Rated Vertical Assemblies: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.
  - 1. F-Rating: Minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
  - 2. T-Rating: when penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated. (Select systems, or submit for an engineering judgment, with T-rating assembly installed from the bottom of the concrete floor down and supported with riser clamps).
  - 3. W-Rating: Class 1 rating in accordance with water leakage test per UL 1479. UL Systems shall reflect products and installations to meet requirement.

- G. Penetrations in Smoke Barriers: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814. L-Rating of the system measured at 0.30 inch of water in both the ambient and elevated temperature tests shall not exceed:
1. 5.0 cfm/sq. ft. of penetration opening for each at both ambient and elevated temperatures. Or
  2. A total cumulative leakage of 50 cfm for any 100 square feet of wall area, or floor area.
- H. Mold Resistance: Provide penetration firestopping with mold and mildew resistance rating of one (1) or less as tested per ASTM G21. *Gypsum Bottom of Wall assemblies shall be installed with a min 1/4" - max 3/4" Joint.*
- I. Rain and water resistance: provide perimeter joint sealant tested in accordance with ASTM D 6904 with less than 1-hour tack free time as tested in accordance with ASTM C 679.
- J. Firestopping Materials are either "cast-in-place" (integral with concrete placement) or "post installed." Provide cast-in-place firestop devices prior to concrete placement or drop-in device for post concrete placement.
- K. Should firestop applications become damaged during construction, the assembly shall be removed and reinstalled with new materials.

## 2.02 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with through penetration firestop systems (XHEZ), joint systems (XHBN), and perimeter firestop systems (XHDG) listed in Volume 2 of the UL Fire Resistance Directory; provide products of the following manufacturers as identified below:
1. **Hilti, Inc., Plano, Texas**  
**800-879-8000 / www.us.hilti.com**
  2. **Provide products from the above acceptable manufacturer; no substitutions will be accepted.**

## 2.03 MATERIALS

**XXXXXXX** / Hilti pricing may be utilized by Construction trades for **XXXXXX** projects only.

- A. Use only firestop products that have been UL 1479, ASTM E 814 or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each individual application.  
For the below applications, reference the attached **XXXXXX** specific / Hilti UL Alphanumeric Chart. (Reference Appendix A)
- B. **Pre-installed firestop devices:**  
For use with noncombustible and combustible pipes (closed and open systems), conduit, and/or cable bundles penetrating gypsum / masonry walls or concrete floors. The following products are acceptable:  
The installer shall follow all UL installation parameters, hole diameter, support / bracing, Hilti anchors and required assembly accessories to meet applicable F, T, L and W Ratings.
1. Hilti Cast-In Place Firestop Device (CP 680-P) for use with combustible penetrants
  2. Hilti Cast-In Place Firestop Device (CP 680-M) for use with noncombustible penetrants
  3. Hilti Firestop Speed Sleeve (CP 653) for use with cable penetrations
  4. Hilti Gangplate (CFS-SL GP) for use with multiple cable management devices
  5. Hilti Gangplate Cap (CFS-SL GP CAP) for use at blank openings within Gangplate
  6. Hilti Firestop Drop-In Device (CFS-DID) for use with noncombustible and combustible penetrants
  7. Hilti Firestop Cast-In Device (CFS-CID M/P) for use with noncombustible and combustible penetrants.
  8. Hilti Firestop Block (CFS-BL)
  9. Hilti Cable Collar (CFS-CC 4")



- C. **0000-0999 No Penetrating Item / Blank opening:**  
Opening made in fire-resistance rated wall or floor assemblies, where future applications of pipes, conduits, or cables is expected. The following products are acceptable:
1. Hilti Firestop Block (CFS-BL)
  2. Hilti Firestop Plug (CFS-PL)
  3. Hilti Firestop Board (CP 675T)
  4. Hilti Composite Sheet (CFS-COS)
  5. Hilti Firestop Speed Sleeve (CP 653)
  6. Hilti Gangplate (CFS-SL GP)
  7. Hilti Gangplate Cap (CFS-SL GP CAP)
- D. **1000-1999 Metallic Pipe, Conduit or Tubing Sealants:**  
Intumescent caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT) penetrating gypsum / masonry walls or concrete floor. The following products are acceptable:
1. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
  2. Hilti Fire Foam (CP 620)
  3. Hilti Flexible Firestop Sealant (CP 606)
  4. Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
  5. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
  6. Hilti Firestop Board (CP 675T)
  7. Hilti Composite Sheet (CFS-COS)
- E. **2000-2999 Non-Metallic Pipe, Conduit or Tubing:**  
Intumescent caulking materials (diameter specific), firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems) penetrating gypsum / masonry walls or concrete floors. The following products are acceptable:
1. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
  2. Hilti Firestop Collar (CP 643N)
  3. Hilti Firestop Collar (CP 644)
  4. Hilti Wrap Strips (CP 648E/648S)
- F. **3000-3999 Electrical Cables:** (Note Maximum % Fill Ratios)  
Re-penetrable, round cable management devices for use with new or existing cable bundles penetrating gypsum / masonry walls or concrete floors. The following products are acceptable:
1. Hilti Firestop Speed Sleeve (CP 653) with integrated smoke seal fabric membrane.
  2. Hilti Retrofit Sleeve (CFS-SL RK) for use only with Gangplate and existing cable bundles.
  3. Hilti Gangplate (CFS-SL GP) for use with multiple cable management devices.
  4. Hilti Gangplate Cap (CFS-SL GP CAP) for use at blank openings within Gangplate
  5. Hilti Cable Collar (CFS-CC 4")
- Optional sleeve or metal pipe sleeve for use with new or existing cable bundles penetrating gypsum / masonry walls or concrete floors. The following products are acceptable:
1. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
  2. Hilti Firestop Plug (CFS-PL)
- G. **4000-4999 Cable Trays with Electrical Cables:**  
Non-curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays and bundles penetrating gypsum / masonry walls or concrete floors. The following products are acceptable:
1. Hilti Firestop Block (CFS-BL)
  2. Hilti Firestop Board (CP 675T)
  3. Hilti Composite Sheet (CFS-COS)

- H. **5000-5999 Insulated Pipes:**  
 Intumescent sealants, caulking materials for use with insulated combustible pipes (penetrant includes insulation consumed by high heat and flame). The following products are acceptable:  
 Insulated pipe assemblies with greater than nominal 2" thick glass-fiber pipe insulation, require Owens Corning mineral fiber pipe insulation with banding to extend 6" out from each side of the wall (WL-5047)
1. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
  2. Hilti Wrap Strips (CP 648E) / Hilti Retaining Collar
- I. **6000-6999 Miscellaneous Electrical Penetrants – Electrical Buss**  
 Intumescent sealant, re-penetrable items used for use with electrical busways penetrating gypsum, masonry walls and concrete floors. The following products are acceptable:
1. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
  2. Hilti Firestop Block (CFS-BL)
- J. **7000-7999 Miscellaneous Mechanical Penetrants / Metal Duct\* / Insulated Metal Duct\*:**  
 Sealants or caulking materials for use with sheet metal ducts penetrating gypsum, masonry walls or concrete floors. The following products are acceptable: (\*Non-Dampened Ducts)
1. Hilti Silicone Sealant Gun Grade (CFS-S SIL GG)
  2. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
  3. Hilti Flexible Firestop Sealant (CP 606)
  4. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
- K. **8000-8999 Groupings of Penetrations – “Multiple Penetrations”**  
 Re-penetrable openings used for large size/complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways penetrating gypsum / masonry walls or concrete floors. The following products are acceptable:
1. Hilti Firestop Block (CFS-BL)
  2. Hilti Firestop Board (CP 675T)
  3. Hilti Composite Sheet (CFS-COS)
  4. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
  5. Hilti Fire Foam (CP 620)
- L. **CLIV – Electrical Boxes**  
 Wall opening protective materials for use with U.L. listed metallic and specified non-metallic outlet Boxes. The following products are acceptable:
1. Hilti Firestop Putty Pad (CFS-P PA)
  2. Hilti Firestop Putty Pad (CP 617)
  3. Hilti Firestop Box Insert
- M. **Floor-to-Floor, Wall-to-Wall, Floor-to-Wall, Head-to-Wall, Bottom-to-Wall and Curtain Wall Joints**  
 The following products are acceptable:  
 Sealants, sprays, or pre-formed materials for use with fire-rated construction joints and other gaps, the following products are acceptable:
1. Hilti Firestop Top Track Seal (CFS-TTS)
  2. Hilti Firestop Joint Spray (CFS-SP WB)
  3. Hilti Firestop Silicone Joint Spray (CFS-SP SIL)
  4. Hilti Flexible Firestop Sealant (CP 606)
  5. Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
  6. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
  7. Hilti Bottom of Wall Sealant CP 605
- N. **Pre-formed mineral wool:** designed to fit flutes of metal profile deck and gap between top of wall and metal profile deck; as a backer for spray material.
1. Hilti Speed Plugs (CP 777)
  2. Hilti Speed Strips (CP 767)

## PART 3 - EXECUTION

### 3.01 PREPARATION

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, meeting annular space and in suitable condition for application of materials and adhesion / tooling.
2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect 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.
6. Insulated pipe assemblies with greater than 2" insulation, shall require mineral fiber insulation and banding to extend 6" on either side of the wall and through the wall cavity.

### 3.02 COORDINATION

- A. Coordinate construction of openings, penetrations and construction joints to ensure that the firestop systems are installed according to specified requirements.
- B. Coordinate cast-in / drop-in devices, sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire-resistance rated construction joint systems are installed according to specified requirements.
- C. Coordinate fire stopping with other Contractors so that obstructions are not placed in the way prior to the installation of the fire stop systems. Contractors to coordinate application side and outside diameter of assemblies with Firestop Specialty Contractor, prior to holes being made.
- D. Do not cover up through-penetration fire stop and joint system installations that will become concealed behind other construction until each installation has been examined by the Owner's Representative / Authority Having Jurisdiction.

### 3.03 INSTALLATION

- A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory, Factory Mutual or Intertek Directory.
- B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.
  1. Seal all through penetration openings in fire-resistance rated concrete floors, while ensuring F, T and W-rating parameters are met per designated UL Systems.
  2. Seal all through penetration openings in fire-resistance rated gypsum, concrete and block walls in accordance to F and L-ratings, per a UL Systems.
  3. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers.
  4. Protect materials from damage on surfaces subjected to traffic.
- C. Firestop installations to meet requirements of ASTM E 814, UL 1479 or UL 2079 tested assemblies that provide a fire-resistance rating equal to that of construction being penetrated. All applications to be tooled for adhesion purposes and shall be free of foreign debris or dust so firestop applications do not delaminate.
- D. Should firestop applications become damaged, the assembly shall be immediately removed and reinstalled with new firestop materials.

## 3.04 FIELD QUALITY CONTROL

- A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
- B. Keep areas of work accessible until inspection by Owner's Representative and Authority Having Jurisdiction.
- C. Inspection Requirements of through-penetration firestopping shall be performed in accordance with ASTM E 2174, "Standard Practice for On-Site Inspection of Installed Fire Stops"
- D. Inspection Requirements: ASTM E 2393, "Standard Practice for On-site Inspection of Fire Resistive Joint Systems and Perimeter Fire Barriers"
- E. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other Contractors. Reference 1.06 Quality Assurance
- F. Manufacturer's Field Services: During Installation, provide periodic destructive testing inspections to assure proper installation/application. After installation is complete, submit findings in writing indicating whether the installation of the tested system identified was installed correctly.

## 3.05 IDENTIFICATION &amp; DOCUMENTATION

- A. Identify and stencil fire-resistance rated barriers and non-rated smoke partitions with stenciling, max 15 feet per 2015 Michigan Building Code, as amended.
- B. Identify through-penetration firestop systems with Hilti Firestop System Plastic Label. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems.  
Include the following information on labels:
  - 1. "Fire Rated Assembly"
  - 2. Product name and application location
  - 3. UL System #
  - 4. Installer: Contractor's Name and phone number.
  - 5. Date of Installation.
  - 6. Firestop system repenetrated by: Contractor and date.
  - 7. Installer's Training ID number
- C. Bluebeam software shall be used to document, track, maintain and generate reports of passive firestop systems throughout the construction and maintenance phase of the facility.
  - 1. Contractor shall document, track and maintain passive firestop systems throughout the construction and turn over an as-built document for use in the maintenance phase of the facility. (Reference 1.07E Submittals)

## 3.06 ADJUSTING AND CLEANING

- A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- B. Clean all surfaces adjacent to sealed openings and joints to be free of excess firestop materials and soiling as work progresses.

## 3.07 LABOR USE TO INSTALL FIRESTOP SYSTEMS

- A. If firestopping is not assigned to a single-source Firestop Specialty Contractor, the installation of each scope of work is to be performed jurisdictionally correct per existing Contractor agreements.

## 3.08 SCHEDULE OF COMMON FIRESTOP SYSTEMS

\* Reference **XXXXXXX** Hilti Alphanumeric Chart Schedule. (Appendix A)

**END OF SECTION**