

NEW CONSTRUCTION (digital copy available Firestop Solutions Inc.)
FIRESTOPPING SPECIFICATION
SECTION 07840 - FIRESTOPPING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

The BIDDING REQUIREMENTS, CONTRACTING REQUIREMENTS, and applicable parts of DIVISION 1 - GENERAL REQUIREMENTS, as listed in the Table of Contents, shall be included in and made a part of this Section.

1.2 SUMMARY

- A. Provide firestop systems consisting of a material, or combination of materials installed to retain the integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and/or hot gases through penetrations, blank openings, construction joints, or at perimeter fire containment in or adjacent to fire-rated barriers in accordance with the requirements of the Building Code for this project.
- B. Firestop systems shall be used in locations including, but not limited to, the following:
 - 1. Penetrations through fire-resistance-rated floor and roof assemblies requiring protected openings including both empty openings and openings that contain penetrations.
 - 2. Penetrations through fire-resistance-rated wall assemblies including both empty openings and openings that contain penetrations.
 - 3. Membrane penetrations in fire-resistance-rated wall assemblies where items penetrate one side of the barrier.
 - 4. Joints in fire-resistance-rated assemblies to allow independent movement.
 - 5. Perimeter Fire Barrier System between a rated floor/roof and an exterior wall assembly.
 - 6. Joints, through penetrations and membrane penetrations in Smoke Barriers and Smoke Partitions.
- C. Examine Contract Documents for requirements that affect Work of this Section. Other Specification Sections that relate directly to Work of this Section include, but are not limited to:
 - 1. Division 3 – Cast-In-Place Concrete, Concrete Work
 - 2. Division 4 – Unit Masonry
 - 3. Division 5 – Expansion, Control, and Seismic Joints
 - 4. Division 7 – Thermal and Moisture Protection
 - 5. Division 8 – Glass, Glazing and Metal Curtain Wall Systems
 - 6. Division 9 – Gypsum Wallboard
 - 7. Division 15 – Mechanical; Pipe and Duct
 - 8. Division 16 – Electrical; Lighting, Power, Alarms, and Communications

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.
 - 1. Codes of New York State
 - (a) Building Code.
 - (b) Residential Code.
 - (c) Plumbing, Mechanical and Fuel Gas Code.

- (d) Fire and Property Maintenance Codes.
- 2. American Society For Testing and Materials Standards (ASTM):
 - (a) E 84 Test Method for Surface Burning Characteristics of Building Materials
 - (b) E 119 Test Method for Fire Tests of Building Construction and Materials
 - (c) E 136 Test Method for Behavior of Materials in a Vertical Tube Furnace at 750F
 - (d) E 814 Fire Tests of Through-Penetration Fire Stops
 - (e) E 1399 Cyclic Movement and Measuring Minimum and Maximum Joint Widths
 - (f) E 1966 Test Method for Resistance of Building Joint
 - (g) E 2174 Standard Practice for On-Site Inspection of Installed Fire Stops
 - (h) E 2393 Standard Practice for On-Site Inspection of Installed Fire Stop Joint Systems
 - (i) E 2307 Standard Test Method for Determining the Fire Endurance of Perimeter Fire Barrier Systems Using the Intermediate-Scale, Multi Story Test Apparatus (ISMA)
- 3. Factory Mutual Research (FM):
 - (a) FM 4991: FM Approval Standard of Firestop Contractors – Class 4991
- 4. Firestop Contractors International Association (FCIA):
 - (a) M.O.P. Manual of Practice
- 5. Nation Fire Protection Association (NFPA)
 - (a) NFPA 70 - National Electric Code
 - (b) NFPA 101 - Life Safety Code
 - (c) NFPA 221 - Fire Walls and Fire Barriers (preliminary to be released)
 - (d) NFPA 251 - Fire Tests of Building Construction and Materials
- 6. Omega Point Laboratories (OPL)
 - (a) Building Products, Materials & Assemblies – Volume II
- 7. Underwriters Laboratories Inc. (UL):
 - (a) UL Qualified Firestop Contractor Program
 - (b) UL 263 Fire Tests of Building Construction and Materials
 - (c) UL 723 Surface Burning Characteristics of Building Materials
 - (d) UL 1479 Fire-Tests of Through-Penetration Fire Stops
 - (e) UL 2079 Tests for Fire Resistance of Building Joint Systems
- 8. Underwriters Laboratories Inc. (UL) Fire Resistance Directory -Volume 2:
 - (a) Through-Penetration Firestop Devices (XHJI)
 - (b) Fire Resistive Ratings (BXUV)
 - (c) Through-Penetration Firestop Systems (XHEZ)
 - (d) Fill, Void, or Cavity Material (XHHW)

1.4 DEFINITIONS

- A. Firestopping: The use of a material or combination of materials in a fire-rated structure (wall or floor) where it has been breached, so as to restore the integrity of the fire rating on that wall or floor.
- B. System: The use of a specific firestop material or combination of materials in conjunction with a specific wall or floor construction type and a specific penetrant(s).
- C. Barrier: Any bearing or non-bearing wall or floor that has an hourly fire and smoke rating.

- D. Through-penetration: Any penetration of a fire-rated wall or floor that completely breaches the barrier.
- E. Membrane-penetration: Any penetration in a fire-rated wall or floor/roof-ceiling assembly that breaches only one side of the barrier.
- F. Fire Resistive Joint: Any gap, joint, or opening, whether static or dynamic, between two fire rated barriers including where the top of a wall meets a floor; wall edge to wall edge applications; floor edge to floor edge configurations; floor edge to wall.
- G. Perimeter Barrier: Any gap, joint, or opening, whether static or dynamic, between a fire rated floor assembly and an exterior wall assembly.

1.5 PERFORMANCE REQUIREMENTS

- A. Penetrations: Provide through-penetration firestop systems that are produced and installed to resist the spread of fire, passage of smoke and other hot gases according to requirements indicated, to restore the original fire-resistance rating of assembly penetrated.
 - 1. Provide and install complete penetration firestopping systems that have been tested and approved by nationally accepted testing agencies per ASTM E814 or UL 1479 fire tests in a configuration that is representative of field conditions.
 - 2. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E814 or UL 1479, but not less than one (1) hour or the fire resistance rating of the assembly being penetrated.
 - 3. T-Rated Systems: Provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E814 or UL 1479, where required by the Building Code.
 - 4. L- Rated Systems: Provide firestop systems with L ratings less than 5 cfm/sf, in addition to F and T ratings, as determined per UL 1479, where indicated by Code.
 - 5. W-Rated systems: Provide through penetration firestop systems that are resistant to water. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 6. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- B. Fire Resistive Joints: Provide joint systems with fire resistance assembly ratings indicated, as determined by UL 2079 (ASTM E1399 and E1966), but not less than the fire resistance assembly rating of the construction in which the joint occurs. Firestopping assemblies must be capable of withstanding anticipated movements for the installed field conditions.
 - 1. For firestopping assemblies exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction provide appropriate provide appropriate firestop systems for these conditions.
 - 2. For floor penetrations exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means, as specified by the Architect.
 - 3. L- Rated Systems: Provide through penetration firestop systems with L- ratings less than 5cfm/sf.
- C. Perimeter Fire Containment Systems: Provide interior perimeter joint systems with fire-resistance ratings indicated, as determined per ASTM E 2307, but not less than the fire-resistance rating of the floor construction.
- D. Firestopping products shall have flame spread ratings less than 25 and smoke-developed ratings less than 450, as determined per ASTM E 84.
- E. Engineering Judgment (EJ): Where there is no specific third party tested and classified firestop system available for an installed condition, the firestopping contractor shall obtain from the firestopping material manufacturer an Engineering Judgment (EJ) to be submitted to the Approving Authority and Authority

Having Jurisdiction for approval prior to installation. The EJ shall follow International Firestop Council (IFC) guidelines.

1.6 SUBMITTALS

- A. Product Data: For each type of firestopping product selected. Manufactures certification must verify that firestopping materials are asbestos free and contain volatile organic compounds (VOCs) within limits of the local jurisdiction.
- B. Design Listings: Submit system design listings, including illustrations, from a qualified testing and inspecting agency that is applicable to each firestop configuration.
- C. Where there is no specific third party tested and classified firestop system available for a particular configuration, the firestopping contractor shall obtain from the firestopping material manufacturer an Engineering Judgment (EJ) for submittal.
- D. Material Safety Data Sheet (MSDS): Submit for each type of firestopping product selected
- E. Qualification Data: For firms and persons specified in “Quality Assurance” Article to demonstrate their capabilities and experience. Submit documents of accreditation from FM or UL according to 1.7.B.1 and manufacturer according to 1.7.B.2.ii.
- F. A quality control manual approved by FM and/or UL.
- G. Firestop Application Log: A separate binder shall be prepared and kept on site for use by the Inspection Agency or the Authority Having Jurisdiction. The binder shall contain the following:
 - 1. The binder shall be a three (3) ring binder.
 - 2. All firestopping assemblies including engineering judgments shall be provided and organized by trade.
 - 3. A matrix or table of contents listing each assembly shall be provided.
 - 4. The binder shall be updated as new firestop assemblies or EJ's are added.
 - 5. The binder shall be kept in the project office.

1.7 QUALITY ASSURANCE * THE BID PACKAGE SHALL CONSIST OF ONE FIRESTOP CONTRACT

- A. Fire-Test-Response Characteristics: Provide firestopping System Design Listing by a testing and inspection agency in accordance with the appropriate ASTM Standard(s) per article 1.5. A qualified testing and inspection agency may be UL, FM Research, Intertek Testing Services, Omega Point Laboratories (OPL) or another agency performing testing and follow-up inspection services for firestop materials that is acceptable to the authority having jurisdiction.
- B. Single Source Contractor Qualifications: An acceptable Firestop Contractor shall be:
 - 1. FM Research approved in good standing and in accordance with FM Standard 4991 – Approval of Firestop Contractors, and/or Underwriters Laboratories Inc. approved in good standing and in accordance with UL Qualified Firestop Contractor, and
 - 2. Meet all of the following requirements
 - i. Licensed by State or Local Authority where applicable,
 - ii. Trained and accredited by the firestop manufacturer. Accredited Firestopping Contractor Installer Qualifications: A firm that has undergone hands on and classroom training at the manufacturers training facility. The firm shall be experienced in installing through-penetration firestop systems and fire resistive joint systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified tested and listed system requirements. Manufacturer's willingness to sell its through-penetration firestop system products to Firestop Contractor does not in itself confer qualification on buyer.

(a) "Accredited Training Programs" are currently available from but not limited to the following manufacturers

(i) Hilti Firestop Products, P.O. Box 21148, Tulsa OK 74121, (800) 879-8000

(ii) Specified Technologies Inc.

(iii) 3M; Fire Protection Products Division.

iii. Shown to have successfully completed not less than 5 comparable scale projects and provide references.

C. Contractors Meeting the Above Qualifications

Firestop Solutions – Is both FM 4991 Approved and UL Qualified and has met the above criteria.
1655 Sycamore Ave.
Bohemia, NY 11716
(800) 431-1591
www.FirestopSolutions.com
OR EQUIVELANT

D. Installation Responsibility: Assign installation of through-penetration firestop systems and fire-resistive joint systems in project to a single qualified installer per section B above.

E. Single Source Manufacturer Limitations: Obtain firestop systems, for each kind of penetration and construction condition indicated from a single manufacturer, where possible.

1. Materials of different manufacture than allowed by the tested and listed system shall not be intermixed in the same firestop system or opening.

2. Tested and listed firestop systems are to be used before an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRA) is installed.

F. Materials from different firestop manufacturers shall not be installed in the same firestop system or opening.

G. Firestopping material shall be asbestos and lead free and shall not incorporate nor require the use of hazardous solvents.

H. Firestopping sealants must be flexible, allowing for normal pipe movement.

I. Firestopping materials shall not shrink upon drying as evidenced by cracking or pulling back from contact surfaces such that a void is created.

J. Firestopping materials shall be moisture resistant, and may not dissolve in water after curing.

K. Materials used shall be in accordance with the manufacturer's written installation instructions.

L. Label each firestopping system installation with the following information:

1. Firestopping product name

2. System listing number

3. Date of installation

4. Installer firm

5. Statement on label reading, "Warning: Firestop System – Do Not Disturb. Notify Building Management of any Damage."

M. Field Constructed Mockup: Prior to installing firestopping, erect mockups for each different firestop system indicated to verify selections made and to demonstrate qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final installations.

1. Locate mockups on site in locations indicated or, if not indicated, as directed by Architect. Include mockup for each type of system.

2. Notify Architect in advance of the dates and times when mockups will be installed.

3. Obtain Architect's acceptance of mockups before start of Work.

4. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging completed unit of Work. Accepted mockups in an undisturbed condition at time of Substantial Completion may become part of completed unit of Work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturer's labels identifying product and manufacturer, date of manufacture, lot number, UL or OPL classification marking, and mixing instructions for multi-component materials.
- B. Store and handle materials per manufacturer's instructions to prevent deterioration or damage due to moisture, temperature changes, contaminants, or other causes.
- C. All firestop materials shall be installed prior to expiration of shelf life.

1.9 PROJECT CONDITIONS

- A. Environmental Limitations: Install firestopping when ambient or substrate temperatures are within limits permitted by the manufacturer's written instructions. Do not install firestopping when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate per the manufacturers written instructions on the product's Material Safety Data Sheet.
- C. Verify the condition of the substrates before starting work.
- D. Care should be taken to ensure that firestopping materials are installed so as not to contaminate adjacent surfaces.

1.10 COORDINATION * MUST BE PUT INTO SPECIFICATIONS OF ALL TRADES

- A. Coordinate areas prior to firestopping installation with the Construction Manager and/or General Contractor and the Firestopping Contractor.
- B. Coordinate construction of openings and penetrating items to ensure that firestopping assemblies are installed according to specified requirements. Firestopping contractor shall not be responsible for: penetration patch and or fill of existing openings, curtain walls, seams, expansion and perimeter joints that exceed maximum restrictions allowable for annular spacing per Underwriters Laboratory or acceptable Engineering Judgments.
- C. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- D. Do not conceal firestopping installations until the Owner's inspection agency or Authorities Having Jurisdiction have examined each installation.
- E. Schedule firestopping after installation of penetrants and joints but prior to concealing or obstructing access to areas requiring firestopping.
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section and/or "Project Management and Coordination."
- G. Destructive testing shall be performed at mock up and at pre determined intervals according to ASTM E 2174 and ASTM E 2393-04 by the inspector and with the installing firm present. Inspector to test for in place installation conformance to tested and listed system or engineering judgment details. Non conformances will result in additional destructive testing, at the cost of the installer.

- H. Owner/Developer, Construction Manager, or General Contractor to hire 3rd party independent inspection firm to verify that the quality process results in tested and listed systems or engineering judgments installed comply with details submitted. Inspection process to follow ASTM E 2174 and ASTM E 2393-04.

PART 2 - PRODUCTS

2.1 FIRESTOPPING, GENERAL

- A. Firestopping products specified in system design listings by UL or OPL may be used providing they conform to the construction type, penetrant type, annular space requirements and fire rating involved in each separate assembly.
- B. Manufacturer of firestopping products shall have been successfully producing and supplying these products for a period of not less than three years and be able to show evidence of at least ten projects where similar products have been installed and accepted.
- C. Accessories: Provide components for each firestop system that is needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by the firestopping manufacturer and approved by UL or OPL for the firestop systems indicated. Accessories include, but are not limited to the following items:
 - 1. Permanent forming/damming/backing materials, including the following:
 - i. Slag wool fiber insulation.
 - ii. Foams or sealants used to prevent leakage of fill materials in liquid state.
 - iii. Fire-rated form board.
 - iv. Polyethylene/polyurethane backer rod.
 - v. Rigid polystyrene board.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Steel sleeves
- D. All firestopping products and systems shall be designed and installed so that the basic sealing system will allow the full restoration of the thermal and fire resistance properties of the barrier being penetrated with minimal repair if penetrants are subsequently removed.

2.2 MIXING

- A. For those products requiring mixing before application, comply with firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

2.3 MANUFACTURERS

- A. Subject to compliance with the requirements, provide products by one of the following or equivalent manufacturers:
 - 1. Grace Construction Products, 62 Whittemore Ave, Cambridge MA 02140, (866) 333-3726.
 - 2. Nelson Firestop Products, P.O. Box 726, Tulsa OK 74101, (918) 627-5530.
 - 3. Hilti Firestop Products, P.O. Box 21148, Tulsa OK 74121, (800) 879-8000
 - 4. A/D Fire Protection Systems Inc.
 - 5. RectorSeal Corporation (The).

6. Specified Technologies Inc.
7. 3M; Fire Protection Products Division.
8. Tremco; Sealant/Weatherproofing Division.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Verify that all pipes, conduits, cables, and/or other items which penetrate fire-rated construction have been permanently installed prior to installation of firestops.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing firestop systems to comply with written recommendations of firestopping manufacturer and the following requirements:
 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of firestop systems.
 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestop systems. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
 4. Priming: Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond. Do not allow spillage and migration onto exposed surfaces.
 5. Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of Work. Remove tape as soon as it is possible to do so without disturbing the firestopping seal with substrates.
 6. Verify that system components are clean, dry, and ready for installation.
 7. Verify that field dimensions are as shown on the Drawings and as recommended by the manufacturer.

3.3 PENETRATION FIRESTOP SYSTEMS

- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" article in Part 1 and firestopping manufacturer's written installation instructions and published drawings for products and applications indicated.
 1. Coordinate with other trades to assure that all pipes, conduit, cable, and other items, which penetrate fire rated construction, have been permanently installed prior to installation of firestop assemblies.
 2. Schedule the work to assure that partitions and all other construction that conceals penetrations are not erected prior to the installation of firestop and smoke seals.
- B. Installation of firestopping shall be performed by an applicator/installer qualified as described in article 1.7.
- C. Apply firestopping in accordance with UL, OPL or Warnock Hersey listed system designs or manufacturer's EJ per the manufacturer's installation instructions.
- D. Install forming/damming/backing materials and other accessories required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire resistance ratings required.

- E. Install fill materials for firestop systems by proven techniques to produce the following results:
 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 2. Apply materials so they fully contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
- F. Tool non-sag firestop materials immediately after their application and prior to the time skinning or begins. Form smooth, uniform beads of configuration indicated or required to:
 1. produce fire-resistance rating
 2. to eliminate air pockets
 3. to ensure contact and adhesion with sides of penetration and substrate

3.4 JOINT FIRESTOP SYSTEMS

- A. General: Install fire resistive joint firestop systems to comply with “Performance Requirements” article in Part 1 and firestopping manufacturer’s written installation instructions and published drawings for products and applications indicated.
- B. Installation of firestopping shall be performed by an applicator/installer qualified as described in article 1.7.
- C. Apply firestopping in accordance with UL or OPL listed system designs or manufacturer’s EJ per the manufacturer’s installation instructions.
- D. Install joint forming/damming materials and other accessories required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths of installed firestopping material relative to joint widths that allow optimum movement capability and achieve fire resistance ratings required.
- E. Install fill materials for firestop systems by proven techniques to produce the following results:
 1. Fill joint as required to achieve fire-resistance ratings indicated.
 2. Apply materials so they fully contact and adhere to substrates forming the openings.
 3. Completely fill recesses provided for each joint configuration.
 4. Tool non-sag firestop materials after their application and prior to the time skinning begins. Use tooling agents approved by the firestopping manufacturer.

3.5 PERIMETER BARRIER FIRESTOP SYSTEMS

- A. General: Install perimeter barrier firestop systems to comply with “Performance Requirements” article in Part 1 and firestopping manufacturer’s written installation instructions and published drawings for products and applications indicated.
- B. Installation of firestopping shall be performed by an applicator/installer qualified as described in article 1.7.
- C. Apply firestopping in accordance with UL or OPL listed system designs or manufacturer’s EJ per the manufacturer’s installation instructions.
- D. Install metal framing, curtain wall insulation, mechanical attachments, safing materials and firestop materials as applicable within the system design.

3.6 FIELD QUALITY CONTROL

- A. Inspection – Independent inspection agency employed and paid by owner, will examine penetration firestopping in accordance with ASTM E – 2174, “Standard Practice for On-Site Inspection of Installed Fire Stops and ASTM E-2393, “Standard Practice for On-Site Inspection of Installed Fire Stop Joint Systems. Inspection agency to examine

firestopping and will determine, in general, that firestopping has been installed in compliance with requirements of tested and listed firestop system, and installation process conforms to FM 4991 – Standard for Approval of Firestop Contractors or UL Qualified Firestop Contractor Program.

- B. The inspector shall advise the contractor of any deficiencies noted within one (1) working day.
- C. Do not proceed to enclose firestopping with other construction until inspection agency has verified that the firestop installation complies with the requirements.
- D. Where deficiencies are found, repair or replace the firestopping so that it complies with requirements of tested and listed system design.

3.7 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings, as Work progresses by methods and with cleaning materials that are approved in writing by firestopping manufacturer(s) and that do not damage materials in which openings occur. Leave finished work in neat, clean condition with no evidence of spillovers or damage to adjacent surfaces.
- B. Provide final protection and maintain conditions during and after installation that ensure firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestop systems immediately and install new materials to produce firestop systems complying with specified requirements.