SECTION 07840

FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements for furnishing and installing firestopping for fire-rated construction at the following locations:
    a. Penetrations through fire-rated walls including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
    b. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
    c. Architectural/Construction joint firestops within walls, or the intersection of floors to exterior walls, or the intersection of top of walls to ceilings.
    d. Top of wall firestopping in all fire-rated partitions.
    e. Top of wall and construction joint smoke-stopping in all smoke partitions.

B. Related Sections:

1. Section 03300 - Concrete, Formwork, and Reinforcing.
2. Section 04200 – Unit Masonry.
3. Section 07920 - Joint Sealants: Non-fire-resistive-rated joint sealants.
4. Section 09250 - Gypsum Board Assemblies: Gypsum board fireproofing and for partition identification (stenciling fire-rated walls).
5. Section 09265 – Gypsum Board Shaft Wall
6. DIVISION 15: Sections specifying duct and piping penetrations.
7. DIVISION 16: Sections specifying cable and conduit penetrations.

1.2 REFERENCES

A. Reference Standards: The Reference Standards listed below refer to the latest date of issue or edition, unless otherwise indicated.

1. ASTM E 814: Standard Method of Fire Tests of Through-Penetration Firestops.
2. ASTM E119: Standard Method of Fire Tests of Building Construction and Materials.
3. UL 1479: Fire Test of Through-Penetration Firestops.
4. UL 723: Surface Burning Characteristics of Building Materials.
5. UL 2079: Standard for Tests for the Fire Resistance of Building Joint Systems.
6. Published Through-Penetration and Joint Systems by recognized independent testing agencies:
    a. UL (Underwriters Laboratories Inc.)Fire Resistance Directory (volume 2&3).
    b. Warnock Heresy Certification Listings, current year.
    c. Omega Point Laboratory, current year.
    d. Factory Mutual, current year.

1.3 DEFINITIONS

A. Definitions: As used in this Section, the following definitions apply:

1. Firestop systems: Complete, tested assemblies including wall/floor construction, penetrating items, and field-applied materials designed to prevent the spread of fire through openings.
2. Firestop devices: Factory-built products designed to resist the spread of fire through floor and wall openings, and require only assembly and installation at the project site.
3. Firestopping: Field-applied component materials of firestop systems, which form the seal against spreading fire.
4. Smoke seal systems: Systems designed to stop the spread of smoke through smoke walls. To be a smoke seal system, the system must have at least a one-hour fire-rating.

1.4 SYSTEM PERFORMANCE REQUIREMENTS

A. General: Provide firestop systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases.

B. F-Rated Systems: Provide firestop systems with F ratings indicated, as determined per ASTM E 814 and UL 1479, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.

C. T-Rated Systems: Provide firestop systems with T ratings, in addition to F ratings, as determined per ASTM E 814 and UL 1479, where any of the following conditions exist:

1. Penetrations that incorporate penetrating items that is in contact with combustible materials in acceptable areas.
2. Penetrations that is located outside of wall cavities and fire-resistive shaft enclosures.
3. Penetrations that are located in construction containing doors required to have a temperature rise rating.
4. Penetrations that incorporate penetrating items larger than a 4 inch diameter nominal pipe or 16 sq. in. in overall cross-sectional area.

D. Special Conditions: For firestopping exposed to traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.

1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant firestop systems.
2. For penetrations involving insulated piping, provide firestop systems not requiring removal of insulation.
3. For firestopping exposed to view, provide products with flame-spread values of less than 25 and smoke-developed values of less than 450, as determined per ASTM E 84.

1.5 SUBMITTALS

A. Submit the following:

1. List of proposed firestop systems with system drawings, arranged according to construction type and penetrating items, with design designation of firestop

systems proposed, as listed by UL, Warnock Heresy, Omega Point Laboratory, Factory Mutual or other qualified testing and inspection agency.

2. Testing and inspection agencies complete design designation description and drawings of firestop systems proposed.
3. Manufacturer's product specifications and application recommendations for each product are to be used.
4. Material Safety Data Sheets (MSDS) for each firestop product used.
5. Qualifications: Submit letter from firestop manufacturer approving installer as qualified to install the specified firestop products.

1.6 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Comply with the following requirements in addition to those specified under “System Performance Requirements” in PART 1 of this Section.

1. Provide systems that have been tested by UL, Warnock Hersey, Omega Point or by another qualified testing and inspecting agency acceptable to authorities having jurisdiction, and that correspond to design designation listings published by the testing agency.
2. Provide systems tested per ASTM E 814 under conditions where positive furnace pressure differential of at least 0.01 inch of water is maintained at a distance of 0.78 inch below the fill materials surrounding the penetrating items in the test assembly.
3. Provide firestopping products that bear the classification marking of qualified testing and inspecting agency.

B. Installer Qualifications: Engage an experienced Installer who has completed firestopping that is similar in material, design, and extent to that indicated for Project and that has performed successfully.

C. Single Source Responsibility: Obtain firestopping for each type of penetration and construction condition from a single manufacturer.

D. Firestopping Contractor Qualifications: Due to life safety considerations, all firestopping applications shall be performed by a single specialty contractor that is trained and licensed specifically in this discipline. Said contractor will be used to install firestopping in all disciplines. To ensure consistency, quality and proper installations, application of firestopping products by any other contractor or subcontractor will not be acceptable. Firestopping contractor’s personnel shall have received specific training and certification or approval from the proposed firestop material manufacturer and shall have a minimum of two (2) years experience installing firestop systems of the type specified in this Section.

E. Selection: Contractor shall select firestop systems, based on information in the Contract Drawings and on conditions that are expected to exist during installation, from the acceptable types specified in this Section, to satisfy all of the following criteria:

1. Systems shall meet or exceed the required fire-resistance-rating of the construction involved at each penetration.
2. Systems shall be rated for installation in the type of construction involved at each penetration.
3. Systems shall be rated for use in conjunction with penetrating items of the type, size, and number involved at each penetration.

F. Asbestos: Provide firestopping products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, "Polarized Light Microscopy."

G. Coordinating Work: Coordinate construction of openings and penetrating items to ensure that designated through-penetration firestop systems are installed per specified requirements.

H. Preinstallation Conference: Conduct conference at Project site to comply with requirements of "Section 01314 - Project Meetings".

I. Engineering Judgments: For those firestop applications that exist for which no approved tested system is available through a manufacturer, an engineering judgment derived from similar system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment drawings must follow requirements set forth by the International Firestop Council (September 7, 1994, as may be amended from time to time) and be provided via approved manufacturer.

1.7 MOCK-UPS

A. Job Mock-Ups: Prepare job mock-up of the material proposed for use in the project as directed by Architect. Approved mock-ups may be left in place as part of the finished project and shall constitute the standard for remaining work, including aesthetics.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi-component materials.

B. Storage and Handling: Store and handle firestopping materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.9 PROJECT CONDITIONS

A. Environmental Conditions: Do not install firestopping when ambient or substrate temperatures are outside limits permitted by firestopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilation: Ventilate application areas per firestopping manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.

C. Sequencing and Scheduling: Commence firestopping in each location after penetrating items are complete and tested but prior to concealing the openings.

1. Firestopping shall precede gypsum board finishing.

D. Agency Inspections: Do not conceal firestopping installations behind other construction until authorities having jurisdiction, if required, have examined each installation.

E. Existing Construction: Include firestopping at newly formed penetrations and at existing unprotected penetrations, which are disclosed during performance of the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Approved Firestopping Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include but are not limited to the following:

1. 3M Company.
2. Spec Seal (Specified Technologies Inc. - STI)
3. The Rectorseal Corporation (Bio Fireshield & Metacaulk).
4. Hilti, Inc. 1-800-879-8000
5. Tremco Inc. 1-800-321-7906

B. Approved Firestopping Contractors: Subject to compliance with requirements, firestopping applications shall be performed by the following contractors (other contractors will require pre-bid approval):

1. Firestop International, L.L.C. 504-832-3190
2. Acadian Firestopping of Lafayette, Inc. Phone: 1-337-981-0621, Fax: 1-337-981-0644
3. J-Kaulk Firestopping, Carriere,MS., Phone: (601) 798 – 0828

2.2 FIRESTOPPING, GENERAL

A. Compatibility: Provide components that are compatible with each other, the substrates forming openings, and the penetrating items, if any, under conditions of service and application, as demonstrated by firestopping manufacturer's testing and field experience.

B. Accessories: Provide accessory components for each firestopping system specified by the firestopping manufacturer and approved for the designated fire-resistance-rated systems. Accessories include but are not limited to the following items:

1. Permanent forming/damming/backing materials including the following:
   a. Semi-refractory fiber (mineral wool) insulation.
   b. Ceramic fiber.
   c. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
   d. Fire-rated formboard.
   e. Joint fillers for joint sealants.
2. Temporary forming materials.
3. Substrate primers.
4. Metal collars and sleeves.

2.3 FIRESTOPPING MATERIALS

A. Firestop Mortars:

1. Hilti, Inc." FS 635 mortar"
2. 3M "Fire Barrier Mortar".
3. Spec Seal "Fire Rated Mortar"
4. Metacaulk or Bio Shield "Fire Rated Mortar"
5. Tremco Inc. "Tremstop M"

B. Firestop Sealants and Caulks:

1. Hilti, Inc. "Intumescent and Non-Intumescent sealants", consisting of FS-one, CP-606, and CP-601S
2. 3M "Intumescent and Non-Intumescent Caulks".
3. Spec Seal "Intumescent and Non-Intumescent Caulks".
4. Rectorseal "Intumescent and Non-Intumescent Caulks"
5. Spec Seal "Electrometric Sealant."
6. 3M "Electrometric Sealant."
7. Tremco Inc. "Intumescent and Non-Intumescent Sealants"

C. Firestop Putty:

1. Hilti, Inc. "Fire Rated Putty and Putty Pads", consisting of CP-618 putty stick and CP-617 putty pads.
2. 3M "Fire Rated Putty and Putty Pads".
3. Spec Seal "Fire Rated Putty and Putty Pads".
4. Rectorseal "Fire Rated Putty and Putty Pads".
5. Tremco, Tremstop MP

D. Fire Barrier Sheet Material:

1. CS "195 + composite sheet" or approved equal

E. Firestop Plastic Pipe Devices:

1. Hilti, Inc. "Intumescent Collars"
2. 3M "Plastic Pipe Devices".
3. Spec Seal "Intumescent Collars".
4. Rectorseal "Intumescent Collars".
5. Tremco, Inc. "Fyre-Can/Sleeve"

F. Intumescent Wrap Strips:

1. Hilti, Inc. "Intumescent Wrap Strips"
2. 3M "Intumescent Wrap Strips".
3. Spec Seal "Intumescent Wrap Strips".
4. Rectorseal "Intumescent Wrap Strips".
5. Tremco, Inc. "Tremstop WS"

G. Firestop Mastic and Wrap Materials:

1. Hilti, Inc. "Speed Spray", mastic.
2. 3M "Mastic Sprays".

3. Spec Seal “Mastic Sprays”.
4. Rectorseal “Mastic Sprays”
5. Spec Seal "Electrometric Spray"
6. 3M "Electrometric Spray"
7. 3M “Duct Wrap and Plenum Wraps”.
8. Spec Seal “Duct Wrap and Plenum Wraps”.
9. Rectorseal “Duct Wrap and Plenum Wraps”.
10. Tremco, Inc. Tremstop “Acrylic-SP”

H. Firestop Pillows:

1. Hilti, Inc. “Fire Block”, FS-657
2. Spec Seal “Firestop Pillows”.
3. Rectorseal “Firestop Pillows”.
4. Tremco, Inc. “Tremstop PS”

I. Sealants, caulking or spray materials for use with fire-rated construction joints, For openings between structurally separate sections of wall and floors, And other gaps, the following products are acceptable:

1. Hilti, Inc. “Speed Spray”-CP-672
2. Hilti, Inc. CP_601S, Electrometric Firestop Sealant
3. Hilti, Inc. CP-606, Flexible Firestop Sealant
4. Tremco “Fyre-Sil”
5. Equivalent products listed in the U.L. Fire Resistance Directory-Volume 2

J. Cast – In Place Firestop Device for use with non-combustible and combustible Plastic pipe (closed and open piping systems) penetrating concrete floors, the following products are acceptable:

1. Hilti, Inc. “CP-680 cast – in place
2. Tremco, Inc. “Tremstop Fyre-Can”
3. Equivalent products listed in the U.L. Fire Resistance Directory- Volume 2

2.4 ACCESSORIES

A. Forming/Damming Materials: Mineral fiberboard, or other type, is recommended by firestopping manufacturer.

B. Primer, Sealant and Solvent Cleaner: Types as recommended by firestopping manufacturer.

2.5 MIXING

A. General: For those products requiring mixing prior to application, comply with firestopping manufacturer's directions to produce firestopping products of uniform quality for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Examination: Examine substrates and conditions for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected, and penetrating items are complete and tested.

B. Environmental Conditions: Verify that environmental conditions are safe and suitable for installation of firestop products.

3.2 CONDITIONS REQUIRING FIRESTOPPING

A. General: Provide firestopping for conditions specified whether or not firestopping is indicated, and if indicated, whether such material is designed as insulation, safing, or otherwise.

B. Through-Penetrations: Firestopping shall be installed in all open penetrations and in the annular space in all penetrations in any bearing or non-bearing fire-rated barrier.

C. Membrane-Penetrations: Where required by code, all membrane-penetrations in rated walls shall be protected with firestopping products that meet the requirements of third party time/temperature testing.

D. Construction Joints/Gaps: Firestopping shall be provided at the following locations:

1. Between the edges of floor slabs and exterior walls
2. In the control joint in masonry walls and floors
3. In expansion joints

E. Smoke-Stopping: Smoke-Stops shall be provided for Through-Penetrations, Membrane-Penetrations, and Construction Gaps with a material approved and tested for such application as required by other Sections as listed in 1.1. B "Related Sections".

3.3 INSTALLATION

A. General: Installation of firestops shall be performed by an applicator/installer qualified and trained by the manufacturer. Installation shall be performed in strict accordance with manufacturer's detailed installation procedures.

1. Apply firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, and manufacturer's recommendations.
2. Coordinate with plumbing, mechanical, electrical and other trades, to assure that all pipe, conduit, cable, and other items, which penetrate fire-rated construction have been permanently installed prior to installation of firestops. Schedule and sequence the work to assure that partitions and other construction, which would conceal penetrations are not erected prior to the installation of firestops.
3. Unless specified and approved, all insulation used in conjunction with through-penetrants shall remain intact and undamaged and may not be removed.
4. Seal holes and penetrations to ensure an effective smoke seal.
5. In areas of high traffic, protect firestopping materials from damage. If the opening is large, install firestopping materials capable of supporting the weight of a human.

6. Insulation types specified in other Sections shall not be installed in lieu of firestopping material specified herein.
7. All combustible penetrants (e.g. non-metallic pipes or insulated metallic pipes) shall be firestopped using products and systems tested in a configuration representative of the field condition.

B. Dam Construction: When required to properly contain firestopping materials within openings, damming or packing materials may be utilized. Combustible damming material must be removed after appropriate curing. Noncombustible damming materials may be left as a permanent component of the firestop system.

3.4 FIELD QUALITY CONTROL

A. Maintain onsite copy of submittal package including system drawings.

B. Prepare and install firestopping systems in accordance with manufacturer's printed instructions and recommendations.

C. Follow safety procedures recommended in the Material Safety Data Sheets.

D. Finish surfaces of firestopping, which are to remain exposed in the completed work to a uniform and level condition.

E. Accessibility: All areas of work must be accessible until inspection by the applicable Code Authorities.

F. Correct unacceptable firestops and provide additional inspection to verify compliance with this specification at no additional cost.

3.5 CLEANING

A. Cleaning: Remove excess firestopping materials as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.

3.6 PROTECTION

A. Protection: Protect firestopping during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so that firestop systems are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping immediately and install new materials to produce firestop systems complying with specified requirements.

3.7 SYSTEMS AND APPLICATIONS SCHEDULES (FOLLOWING PAGES)

Schedule of UL through Penetration Firestop Systems

CONCRETE FLOORS		UL-CLASSIFIED SYSTEMS				CONCRETE OR BLOCK WALLS		UL-CLASSIFIED SYSTEMS			
TYPE PENETRANT	F-RATING (HR)	STI	HILTI	3M	TREMCO	TYPE PENETRANT	F-RATING	STI	HILTI	3M	TREMCO
CIRCULAR BLANK OPENINGS	1	CAJ 0014	FA 0006, CAJ 0070	CAJ 0009	CAJ 0011	CIRCULAR BLANK OPENINGS	1	CAJ 0014	CAJ 0055, CAJ 0070	CAJ 0009	CAJ 0011
	2	CAJ0014	FA 0006, CAJ 0070	CAJ 0009	CAJ 0011		2	CAJ 0014	CAJ 0055, CAJ 0070	CAJ 0009	CAJ 0011
	3	CAJ0014	CAJ 0055	CAJ 0009	N/A*		3	CAJ 0014	CAJ 0055	CAJ 0009	N/A*
SINGLE METAL PIPES OR CONDUIT	1	CAJ1079	CAJ 1226,CAJ 1382	CAJ 1058	CAJ 1064, CAJ 1302	SINGLE METAL PIPES OR CONDUIT	1	CAJ 1079	CAJ 1226, WJ 1021	CAJ 1058	CAJ 1064, CAJ 1302
	2	CAJ1079	CAJ 1226, CAJ 1382	CAJ 1058	CAJ 1064, CAJ 1302		2	CAJ 1079	CAJ 1226, WJ 1021	CAJ 1058	CAJ 1064, CAJ 1302
	3	CAJ1079	FA 1017,CAJ 1226,CAJ 1382	CAJ 1058	CAJ 1064		3	CAJ 1079	CAJ 1226, WJ 1041, WJ 1042	CAJ 1058	CAJ 1064
	4	CAJ1079	CBJ 1037, CBJ 1034	CAJ 1044	CAJ 1064		4	WJ 1070 CAJ 1079	CBJ 1034, CBJ 1037, WJ 1041, WJ 1042	CAJ 1044	CAJ 1064
SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, ENT)	1	CAJ 2125	FA 2053, CAJ 2109, CAJ 2098, CAJ 2141, CAJ 2167, CBJ 2021	CAJ 2189, CAJ 2117, CAJ 2027	CAJ 2075, CAJ 2116, CAJ 2229	SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, ENT)	1	CAJ 2125	CAJ 2109, CAJ 2098	CAJ 2189, CAJ 2117, CAJ 2027	CAJ 2075, CAJ 2116, CAJ 2229
	2	CAJ 2125	FA 2053, CAJ 2109, CAJ 2098, CAJ 2141, CAJ 2167, CBJ-2021	CAJ 2189, CAJ 2117	CAJ 2075, CAJ 2116, CAJ 2229, FA 2024		2	CAJ 2125	CAJ 2109, CAJ 2098	CAJ 2189, CAJ 2117, CAJ 2027	CAJ 2075, CAJ 2116, CAJ 2229
	3	CAJ 2125	FA 2054,CAJ 2109,CAJ 2098	CAJ 2005, CAJ 2117	CAJ 2075		3	CAJ 2125	CAJ 2109, CAJ 2098	CAJ 2005, CAJ 2117, CAJ 2027	CAJ 2075
	4	N/A*	N/A*	N/A*	N/A*		4	WJ 2061	WJ 2057	N/A*	N/A*
SINGLE OR BUNDLED CABLES	1	CAJ 3154	FA 3007,CAJ 3095,CAJ 3096	CAJ 3021	CAJ 3141	SINGLE OR BUNDLED CABLES	1	CAJ 3154 WJ 3043	WJ 3036, CAJ 3095, CAJ 3096	CAJ 3021	CAJ 3141
	2	CAJ 3154	FA 3007,CAJ 3095,CAJ 3096	CAJ 3021	CAJ 3141		2	CAJ 3154 WJ 3043	WJ 3036, CAJ 3095, CAJ 3096	CAJ 3021	CAJ 3141
	3	CAJ 3154	CAJ 3095, FA 3007	CAJ 3030	CAJ 3141		3	CAJ 3154	CAJ 3095, CAJ 3096	CAJ 3030	CAJ 3141
	4	N/A*	N/A*	N/A*	N/A*		4	WJ 3091	WJ 3050	N/A*	N/A*
CABLE TRAY	1	CAJ 4029	CAJ 4034, CAJ 4054	CAJ 4003	N/A*	CABLE TRAY	1	WJ 4021 WJ 4022	WJ 4016, CAJ 4034, CAJ 4054	CAJ 4003	WJ 4012
	2	CAJ 4029	CAJ 4034, CAJ 4054	CAJ 4003	N/A*		2	WJ 4021 WJ 4022	WJ 4016, CAJ 4034, CAJ 4054	CAJ 4003	WJ 4012
	3	CAJ 4029	CAJ 4034, CAJ 4035	CAJ 4003	N/A*		3	CAJ 4029	CAJ 4034, CAJ 4035	CAJ 4003	N/A*
	4	N/A*	N/A*	N/A*	N/A*		4	CAJ 4029	WJ 8007	N/A*	N/A*

SINGLE INSULATED PIPES	1	CAJ 5087	FA 5015, FA 5016, CAJ 5090, CAJ 5091, CAJ 5098	CAJ 5080, CAJ 5024, CAJ 5017	CAJ 5111, CAJ 5121	SINGLE INSULATED PIPES	1	WJ 5046	CAJ 5090, CAJ 5091, CAJ 5061	CAJ 5080, CAJ 5024, CAJ 5017	CAJ 5111, CAJ 5121
	2	CAJ 5087	FA 5015, FA 5016, CAJ 5090, CAJ 5091, CAJ 5098	CAJ 5080, CAJ 5024, CAJ 5017	CAJ 5111, CAJ 5121		2	WJ 5046	CAJ 5090, CAJ 5091, CAJ 5061	CAJ 5080, CAJ 5024, CAJ 5017	CAJ 5111, CAJ 5121
	3	CAJ 5021	FA5016, CAJ 5090	CAJ 5024, CAJ 5017	N/A*		3	WJ 5046	CAJ 5090, CAJ 5061	CAJ 5024, CAJ 5017	N/A*
	4	N/A*	CBJ 5006	N/A*	N/A*		4	WJ 5072	WJ 5028, CBJ 5006	N/A*	N/A*
ELECTRICAL BUSWAY	1	CAJ 6018	CAJ 6006, CAJ 6017	CAJ 6001, CAJ 6002	CAJ 6007	ELECTRICAL BUSWAY	1	CAJ 6018	CAJ 6006, CAJ 6017	CAJ 6001, CAJ 6002	CAJ 6007
	2	CAJ 6018	CAJ 6006, CAJ 6017	CAJ 6001, CAJ 6002	CAJ 6007		2	CAJ 6018	CAJ 6006, CAJ 6017	CAJ 6001, CAJ 6002	CAJ 6007
	3	CAJ 6018	CAJ 6006, CAJ 6017	CAJ 6001, CAJ 6002	CAJ 6007		3	CAJ 6018	CAJ 6006, CAJ 6017	CAJ 6001, CAJ 6002	CAJ 6007
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	CAJ 7027	CAJ 7046 CAJ 7051	CAJ 7003, CAJ 7021	CAJ 7005, CAJ 7044	NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1		CAJ 7046, CAJ 7051, WJ 7021, WJ 7022	CAJ 7003, CAJ 7021	CAJ 7005, CAJ 7044
	2	CAJ 7027	CAJ 7046 CAJ 7051	CAJ 7003, CAJ 7021	CAJ 7005, CAJ 7044		2		CAJ 7046, CAJ 7051, WJ 7021, WJ 7022	CAJ 7003, CAJ 7021	CAJ 7005, CAJ 7044
	3		CAJ 7046 CAJ 7051	CAJ 7003, CAJ 7021	CAJ 7005		3		CAJ 7046, CAJ 7051	CAJ 7003, CAJ 7021	CAJ 7005
MIXED PENETRANTS	1	CAJ 8113	CAJ 8041, CAJ 8056,CAJ 8096	CAJ 8001, CAJ 8013	CAJ 8057	MIXED PENETRANTS	1	CAJ 8113	CAJ 8041, CAJ 8096,WJ 8007	CAJ 8001, CAJ 8013	CAJ 8057
	2	CAJ 8113	CAJ 8041,CAJ 8056,CAJ 8096	CAJ 8001, CAJ 8013	CAJ 8057		2	CAJ 8113	CAJ 8041, CAJ 8096,WJ 8007	CAJ 8001, CAJ 8013	CAJ 8057
	3	CAJ 8093	CAJ 8041, CAJ 8056	CAJ 8001, CAJ 8013	N/A*		3	CAJ 8093	CAJ 8041, CAJ 8056, WJ 8007	CAJ 8001, CAJ 8013	N/A*
	4	CAJ 8093	CBJ 8010	N/A*	N/A*		4	CAJ 8093	CBJ 8010, WJ 8007	N/A*	N/A*

WOOD FLOORS			UL-CLASSIFIED SYSTEMS			GYPSUM WALLBOARD ASSEMBLIES			UL-CLASSIFIED SYSTEMS		
TYPE OF PENETRANT	F-RATING	STI	HILTI	3M	TREMCO	TYPE OF PENETRANT	F-RATING	STI	HILTI	3M	TREMCO
METAL PIPES OR CONDUIT	1	FC 1074	FC 1009, FC 1059	FC 1002	FC 1050, FC 1054	METAL PIPES OR CONDUIT	1	WL 1079 WL 1049	WL 1054, WL 1058, WL 1164	WL 1146	WL 1158
							2	WL 1079 WL 1049	WL 1054, WL 1058, WL 1164	WL 1010, WL 1146	WL 1019, WL 1020, WL 1158
	2	FC 1074	FC 1009, FC 1059	FC 1002	N/A*		4	WL 1172	WL 1110, WL 1111	WL 1001	N/A*
NON-METALLIC PIPE OR CONDUIT	1	FC 2158	FC 2025, FC 2030	FC 2024	FC 2049, FC 2135	NON-METALLIC PIPE OR CONDUIT	1	WL 2074	WL 2078, WL 2075, WL 2128	WL 2088, WL 2002	WL 2083, WL 2129
							2	WL 2074	WL 2078, WL 2075, WL 2128	WL 2088, WL 2002	WL 2063, WL 2129, WL 2159
	2	FC 2158	FC 2025, FC 2029	FC 2024	FC 2049, FC 2083		4	WL 2198	WL 2184	N/A*	N/A*
SINGLE OR BUNDLED CABLES	1	FC 3057	FC 3012, FC 3044	FC 3017	FC 3037	SINGLE OR BUNDLED CABLES	1	WL 3210	WL 3065, WL 3111, WL 3112	WL 3032, WL 3030	WL 3131
							2	WL 3210	WL 3065, WL 3111, WL 3112	WL 3032, WL 3030	WL 3017, WL 3131
							4	WL 3211	WL 3139	N/A*	N/A*
	2	FC 3057	FC 3012	FC 3017	N/A*	CABLE TRAY	1	WL 4029	WL 4011,WL 4019,WL4054	WL 4004	N/A*
							2	WL 4029	WL 4011,WL 4019,WL4054	WL 4004	WL4012
							4	N/A*	WL 8014	N/A*	N/A*
INSULATED PIPES	1	FC 5043	FC 5004, FC 5036, FC 5037	FC 5014	FC 5055	INSULATED PIPES	1	WL 5014	WL 5028, WL 5029, WL 5047	WL 5040, WL 5001, WL 5032	WL 5070, WL 5081
							2	WL 5014	WL 5028, WL 5029, WL 5047	WL 5040, WL 5001, WL 5032	WL 5070, WL 5081
	2	FC 5043	FC 5004, FC 5036, FC 5037	N/A*	N/A*		4	WL 5158	WL 5073	N/A*	N/A*
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	FC 7014	FC 7013	FC 7001	N/A*	NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	WL 7025 WL 7033 WL 7026	WL 7017, WL 7040, WL 7042	WL 7008	WL 7039
							2	WL 7025 WL 7033 WL 7026	WL 7040, WL 7042	WL 7008, WL 7013, WL 7016	WL 7039
							4				
MIXED PENETRANTS	1	FC 8029	FC 8009, FC 8014	FC 8013	N/A*	MIXED PENETRANTS	1	WL 8003 WL 8045	WL 1095, WL 8013	WL 8010	N/A*
							2	WL 8003 WL 8045	WL 1095, WL 8013	WL 8010, WL 8002	N/A*
	2	N/A*	N/A*	N/A*	N/A*		4 4	N/A*	WL 8014 WL 8014	N/A*	N/A*

* No UL-Classified systems for this manufacturer. Engineer Judgement Drawing Required

NOTES:

1. Jobsite conditions of each through-penetration firestop system must meet ALL details of the UL-Classified System selected.
2. If jobsite conditions do not match any UL-classified systems in the schedules above, contact firestop manufacturer for alternative systems or Engineer Judgement Drawings.
3. Where more than one applicable UL-Classified System is listed in the schedules, choose the UL System which is most economical for each through-penetration firestop system.
4. Coordinate work with other trades to assure that penetration opening sizes are appropriate for penetrant locations, and vice versa.
5. For 3-hour rated gypsum walls, contact the firestop manufacturer for a UL-classified system or engineer judgement drawing.

SCHEDULES OF UL-2079 (DYNAMIC) JOINT FIRESTOP SYSTEMS

			UL-CLASSIFIED SYSTEM						
			JOINT WIDTH LESS THAN OR EQUAL TO 2"			JOINT WIDTH GREATER THAN 2", LESS THAN OR EQUAL TO 6"			
JOINT TYPE	F-RATING	STI	HILTI	3M	TREMCO	HILTI	3M	STI	TREMCO
CONCRETE FLOOR-TO-FLOOR	1	FFD 1025 FFD 0015	-	FF-D-0002	FF-D-0009	FF-D-1012, FF-D-1013	FF-D-1002, FF-D-1003, FF-D-1004	FFD 1025	
	2	FFD 1025 FFD 0015	-	FF-D-0002	FF-D-0009	FF-D-1012, FF-D-1013	FF-D-1002, FF-D-1003, FF-D-1004	FFD 1025	
	3	FFD 1025 FFD 0015	-	N/A**	FF-D-0010	FF-D-1011, FF-D-1026	N/A**	FFD 1025	
EDGE OF CONCRETE FLOOR SLAB-TO-WALL (USE ONLY CWS OR CWD SYSTEMS PER UL)	1	CWS 1003 CWS 2050 CWS 2051 CWS 2052	N/A***	N/A***	N/A***	N/A***	N/A***	CWS 1003 CWS 2050 CWS 2051 CWS 2052	N/A***
	2	CWS 1003 CWS 2050 CWS 2051 CWS 2052	N/A***	N/A***	N/A***	N/A***	N/A***	CWS 1003 CWS 2050 CWS 2051 CWS 2052	N/A***
	3	CWS 2050 CWS 2051 CWS 2052	N/A***	N/A***	N/A***	N/A***	N/A***	CWS 2050 CWS 2051 CWS 2052	N/A***
CONCRETE OR BLOCK WALL TO FLAT CONCRETE SLAB FLOOR (TOP-OF-WALL)	1	HWD 1034	HW-D-0097	HW-D-0023, HW-D-0029	HW-D-0017	HW-D-1008, HW-D-1009	HW-D-1003	HWD 1034	HWD 1011
	2	HWD 1034	HW-D-0097	HW-D-0023, HW-D-0029	HW-D-0017	HW-D-1008, HW-D-1009	HW-D-1003	HWD 1034	HWD 1011
	3	HWD 1034	-	-	N/A**	HW-D-1008	HW-D-1002, HW-D-1007	HWD 1034	HWD 1011
CONCRETE OR BLOCK WALL TO CONCRETE OVER FLUTED METAL DECK (TOP-OF-WALL)	1	HWD 0086 HWD 0139	HW-D-0080, HW-D-0081, HW-D-0098, HW-D 0181	HW-D-0022, HW-D-0030, HW-D-0040HW-D-0013	HW-D-0092	N/A**			
	2	HWD 0086 HWD 0139	HW-D-0080, HW-D-0081, HW-D-0098, HW-D 0181	HW-D-0022, HW-D-0030, HW-D-0040HW-D-0013	HW-D-0092				
	3	HWD 0086 HWD 0139	N/A**	N/A**	N/A**				
CONCRETE WALL-TO-WALL	1	WWD 0018	WW-D-0017	-	WW-D-0009	WW-D-1011, WW-D-1012	WW-D-1003, WW-D-1004, WW-D-1010	WWD 1007	N/A**
	2	WWD 0018	WW-D-0017	-	WW-D-0009	WW-D-1011, WW-D-1012	WW-D-1003, WW-D-1004, WW-D-1010	WWD 1007	N/A**
	3	WWD 0018	-	-	WW-D-0010	WW-D-1011	WW-D-1003, WW-D-1010	WWD 1007	N/A**

** CONTACT MANUFACTURER FOR CURRENT UL-CLASSIFIED SYSTEM OR ENGINEER JUDGEMENT DRAWING

*** UL REQUIRES CWS OR CWD SYSTEMS FOR PERIMETER FIRE CONTAINMENT SYSTEMS. USE SYSTEMS LISTED IN THE XHDG SECTION OF THE UL FIRE RESISTANCE DIRECTORY VOLUME II ONLY.

Notes:

1. CLASSIFIED SYSTEMS FOR 2"-6" WIDE JOINTS MAY BE USED FOR JOINTS 2" WIDE AND LESS.
2. CONFIRM THAT MOVEMENT CAPABILITIES OF THE SELECTED UL SYSTEM MEETS OR EXCEEDS THE SPECIFIED MOVEMETN RANGE OF THE PARTICULAR JOINT.
3. SYSTEMS MARKED WITH ASTERIK (*) ARE SUIT ABLE FOR TOP OF WALL JOINTS WHERE THE FLUTED METAL DECK HAS SPRAY ON MONOKOTE MK-6/HY FIREPROOFING.

END OF SECTION 07840