You can optionally also watch a presentation of this material at
https://training.firestop.org/p/ifc-firestop-108-online-firestop-inspection-and-plan-review-noceu

FIRESTOP SYSTEM SEARCH REF ALL5

Listing laboratories provide trustworthy, tested firestop designs

Fire Test ⇨ Test Report ⇨ Listing/Classification

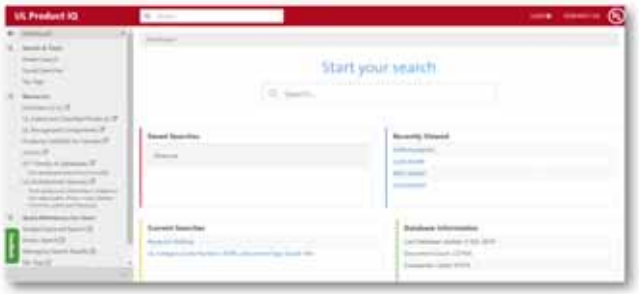
- No need to blindly trust a manufacturer's or installer's firestop performance claims

➔Verify the published system listing for *exact* conformance to installed conditions

- Some firestop vendors or installers might use old system details that have since been modified or withdrawn completely
- Should not approve if no conformance between installation and referenced system
  - Another system might provide the needed compliance documentation (ask for it!)
  - If no matching system, installer would need to investigate possibility of Engineering Judgment

Where Can I Find The Most Current Listings?

UL (free account required)



https://iq.ulprospector.com/info/

INTERTEK

https://bpdirectory.intertek.com/pages/DLP_Search.aspx

"Guide Information" for each UL class of systems

- General installation and specification rules applicable to all systems listed in that Class
- Equipment, materials or systems included in the Category
- Intended use, restrictions or supplemental information that apply
- Standard(s) used to evaluate products under the Category
- Listing or Classification Mark information for the Category

Examples of Guide Information for penetration firestop Systems (UL Listing category XHEZ)

- General Description of a Firestop System
- Standard
- Description of Ratings
- Permitted Substitutions
- Specifications of Penetrating Items
- Support of Penetrating Items
- Angle of Penetration
- Description of Numbering System

➔ Go to firestop.org/reading-list for links to all UL GuideInfo docs

Existing Systems

There are thousands of Tested and Listed Systems:

Each one belongs to a particular manufacturer
And are tested ONLY for a particular product(s)

Different manufacturers' products may never be substituted into a design where it is not specified.

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UL terminology

- UL Approved — No Such Thing!
  (Only AHJ approves products/systems)

- UL Classified, Listed, Certified: all used somewhat interchangeably, depending on the product category

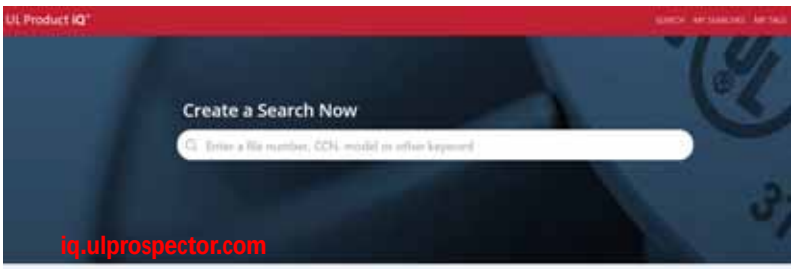
Common usage within firestopping:

- UL Classified — Lab has used the country requirements to evaluate the product for specific hazards or properties c UL us

- UL Listed — Firestop system has passed the standard fire resistance test and is in the lab's directory

Searching the UL online directory

- Got to UL.com/piq
  - Will need a free account
- Enter system number to retrieve system
- Enter listing category (e.g. XHEZ) to see and sort through all listings (7500+!!)



Scroll down webpage for advanced search of
- *Firestop systems (penetrations)*
- *Joint systems*
- *Perimeter fire containment systems (curtain wall gap)*
- *Continuity Head-of-Wall Joint Systems*
- *All fire rated roofs, walls, floors, beams and columns*

Searching the UL online directory

Example:

Firestop systems advanced search:

Via Direct link: iq.ulprospector.com/en/_?tt=1027

Searching the Online Intertek Directory

https://bpdirectory.intertek.com/pages/DLP_Search.aspx

UL through-penetration firestop system Nomenclature

Navigating the UL Directory:

Example: W – L – 3132

PENETRATION FIRESTOP SYSTEMS (listing category XHEZ)

First Alpha Character signifies what is being penetrated:

F	=	Floors
W	=	Walls
C	=	Walls & Floors

UL Nomenclature

Navigating the UL Directory:

W – L – 3132

PENETRATION FIRESTOP SYSTEMS (XHEZ)

Second Alpha Character(s) signifies what is being penetrated :

A	=	Concrete floors ≤ 5 inch thick
B	=	Concrete floors > 5 inch thick
C	=	Framed floors
J	=	Concrete or masonry walls ≤ 8 inch thick
K	=	Concrete or masonry walls > 8 inch thick
L	=	Framed walls

UL Nomenclature

Navigating the UL Directory:

W – L – 3132

PENETRATION FIRESTOP SYSTEMS (XHEZ)

First Numeric Character identifies the penetrating item :

0000-0999	=	No Penetrant
1000-1999	=	Metallic pipe, conduit or tubing
2000-2999	=	Plastic pipe, conduit or tubing
3000-3999	=	Electrical cables
4000-4999	=	Cable trays with electrical cables
5000-5999	=	Insulated pipes
6000-6999	=	Bus ducts
7000-7999	=	HVAC ducts
8000-8999	=	Mixed multiple penetrations

UL Nomenclature

Navigating the UL Directory:

W – L – 3132

PENETRATION FIRESTOP SYSTEMS (listing category XHEZ)

Last 3 or 4 Numeric Character identifies –

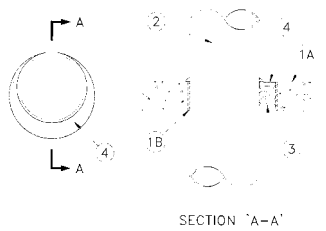
- **individual system number:**
- sequential counter, each time a test is passed the next number is assigned to that system
- every system number is unique to a specific manufacturer

Verify chosen or installed system against field parameters

1. Type of wall or floor assembly, materials
2. Type of penetrating item (if any)
3. Opening size and type
4. Rating requirements (F-rating, T-ratings, etc.)
5. Any special considerations?

SYSTEM No. C-AJ-1379

F Ratings – 3 Hr
T Ratings – 0 Hr



SECTION "A–A"

1A. Floor or Wall Assembly – Min 4-1/2 in. thick reinforced normal weight (150 pcf) concrete. Wall may also be constructed of any UL classified **Concrete Blocks***. Max diam of opening is 26-1/2 in.

See **Concrete Blocks** (CAZT) category in the Fire Resistance Rating Directory for names of manufacturers.

1B. Metallic Sleeve (optional) – Nom 16 in. (or smaller), Schedule 10 (or heavier) steel pipe sleeve, cast or grouted into floor or wall assembly.

2. Through Penetrants – One metallic pipe or tubing to be installed concentrically or eccentrically into opening such that the annular space between the pipe and the periphery of the opening is min 0 in. (point of contact) to max 2-1/2 in. Pipe to be firmly supported on both sides of opening. The following types and sizes of pipes may be used:

(a) Nom. 24 in. diam (or smaller) Schedule 30 (or heavier) steel or iron pipe.
(b) Nom. 4 in. diam (or smaller) electrical metallic tubing.

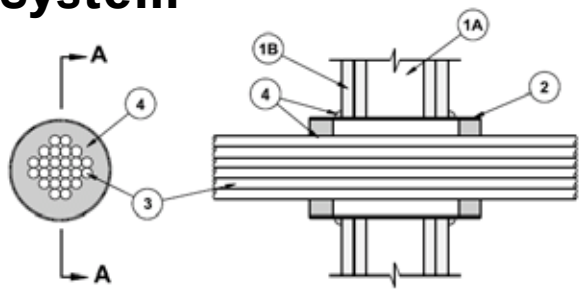
3. Packing Material – Mineral wool insulation of min 4 pcf firmly pressed into opening as a permanent form. Insulation material to be recessed by min depth of 1/2 in. from top surface of floor or both surfaces of wall.

4. Fill, Void, or Cavity Materials* – **Caulk** – Min 1/2 in. thickness of fill material applied within the annulus, flush with top surface of floor or both surfaces of wall. A min 1/4 in. crown of the caulking material shall be applied around the entire circumference of the pipe at the level of the floor surface or both wall surfaces.

Company ABC – SuperDuper Sealant

* Bearing the UL Classification Marking.

Reading a UL System



Section A-A

System No. W-L-3132
F Ratings — 1 and 2 Hr (See Item 1)
T Rating — 0 Hr

1. **Wall Assembly** — The 1 or 2 hr fire-rated gypsum wallboard/ stud wall assembly shall be constructed of the materials and in the manner described in the individual U300 or U400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs** — Wall framing shall consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 3-5/8 in. wide and spaced 24 in. OC.
   B. **Gypsum Board**" — 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Designs in the UL Fire Resistance Directory. Max diam of opening is 4-1/2 in.

   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
2. **Steel Sleeve** — Nom 4 in. diam (or smaller) steel electrical metallic tubing (EMT) or Schedule 5 (or heavier) steel pipe friction-fit into wall assembly. Sleeve installed such that the ends project 1-1/2 to 2 in. beyond each side of the wall.
3. **Cables** — Aggregate cross-sectional area of cables in sleeve to be max 48 percent of the cross-sectional area of the sleeve. Tight bundle of cables to be centered within the steel sleeve. The annular space within the firestop system shall be a nom 1/2 in. Cables to be rigidly supported on both sides of the wall. Any combination of the following types and sizes of cables may be used:
   A. Max 200 pair No. AWG (or smaller) copper conductor cable with polyvinyl chloride (PVC) jacketing and insulation.

Reading a UL System

and in the manner described in the individual U300 or U400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs** — Wall framing shall consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 3-5/8 in. wide and spaced 24 in. OC.

B. **Wallboard, Gypsum*** — 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Designs in the UL Fire Resistance Directory. Max diam of opening is 4 in.

The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. **Steel Sleeve** — Nom 4 in. diam (or smaller) steel electrical metallic tubing (EMT) or Schedule 5 (or heavier) steel pipe friction-fit into wall assembly. Sleeve installed such that the ends project 1-1/2 to 2 in. beyond each side of the wall.
3. **Cables** — Aggregate cross-sectional area of cables in sleeve to be max 48 percent of the cross-sectional area of the sleeve. Tight bundle of cables to be centered within the steel sleeve. The annular space within the firestop system shall be a nom 1/2 in. Cables to be rigidly supported on both sides of the wall. Any combination of the following types and sizes of cables may be used:
   - A. Max 200 pair No. 24 AWG (or smaller) copper conductor cable with polyvinyl chloride (PVC) jacketing and insulation.
   - B. Max 3/C No. 2/0 AWC (or smaller) aluminum or copper conductor service entrance cable with PVC insulation and jacket.
   - C. Max 3/C No. 8 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.
   - D. Max 7/C No. 2/0 AWG (or smaller) multiconductor power and control cables with XLPE or PVC insulation and XLPE or PVC jacket.
   - E. Max RG59/U (or smaller) coaxial cable with fluorinated ethylene insulation and jacketing.
   - F. Max 62.5/48 fiber optic cable with PVC insulation and jacketing.
   - G. Max 4 pair No. 24 AWG (or smaller) copper conductor data cable with Mylar insulation and jacket.
4. **Fill, Void or Cavity Material*** — **Putty** — Min 1 in. thickness of fill material applied within annulus, flush with both ends of sleeve. A nom 1/4 in. diam continuous "rope" of putty shall be applied around the circumference of the steel sleeve at its egress from both sides of the wall.

   Specified Technologies Inc. — SpecSeal Putty
5. **Fill, Void or Cavity Material*** — **Sealant** — As an option to the "rope" of putty, a min 1/4 in. diam bead of sealant may applied at the gypsum wallboard/steel sleeve interface on both sides of the wall.

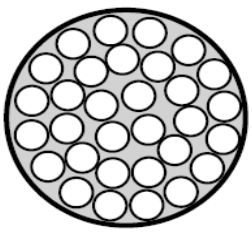
   Specified Technologies Inc. — SpecSeal Series 100 or Series LC Sealant

*Bearing the UL Classification Marking

UL system listings for cables include "maximum % fill"

- *Some listings cite "visual" cable fill instead of actual*

Fig. 2: Cable Loading...
Visually Full... Half Empty By Calculation!



Let's calculate the cable loading of this opening:

Diameter of Opening = 4"

Diameter of Cables = 5/8" (.625")

Number of Cables (N) = 21

Area of Opening (A) = πr^2 or $3.1416 \times 2^2 = 12.57$ sq. in.

Area of Cables (C) = πr^2 or $3.1416 \times .3125^2 = .307$ sq. in.

Cable Loading = $\frac{C \times N}{A} = \frac{.307 \times 21}{12.57} = 51\%$

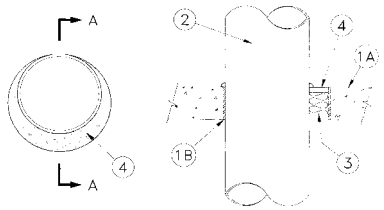
Material Shrinkage

- Understand some sealants may shrink when installed
- Listing always reports wet sealant thickness
- ASTM C1241 shrinkage test
- % shrinkage, if available, is published by UL in manufacturer's listings summary page
  1. Go to UL Product iQ website (free registration)
  2. Type in "XHHW" into search box (listing category)
  3. Select the manufacturer whose product shrinkage data you need
  4. Scroll to very end of the webpage for ASTM C1241 data

Listings always report wet sealant thickness

SYSTEM No. C-AJ-1379

F Ratings – 3 Hr
T Ratings – 0 Hr



SECTION 'A–A'

1A. Floor or Wall Assembly – Min 4-1/2 in. thick reinforced normal weight (150 pcf) concrete. Wall may also be constructed of any UL classified **Concrete Blocks***. Max diam of opening is 26-1/2 in.

See **Concrete Blocks** (CAZT) category in the Fire Resistance Rating Directory for names of manufacturers.

1B. Metallic Sleeve (optional) – Nom 16 in. (or smaller), Schedule 10 (or heavier) steel pipe sleeve, cast or grouted into floor or wall assembly.

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(a) Nom. 24 in. diam (or smaller) Schedule 30 (or heavier) steel or iron pipe.
(b) Nom. 4 in. diam (or smaller) electrical metallic tubing.

3. Packing Material – Mineral wool insulation of min 4 pcf firmly pressed into opening as a permanent form. Insulation material to be recessed by min depth of 1/2 in. from top surface of floor or both surfaces of wall.

4. Fill, Void, or Cavity Materials* – **Caulk** – Min 1/2 in. thickness of fill material applied within the annulus, flush with top surface of floor or both surfaces of wall. A min 1/4 in. crown of the caulking material shall be applied around the entire circumference of the pipe at the level of the floor surface or both wall surfaces.

Company ABC – SuperDuper Sealant

* Bearing the UL Classification Marking.

UL Nomenclature

Navigating the UL Directory: **HW – D – 0060**

JOINT SYSTEMS (XHBN)

First Two Alpha Character identify the type of joint system:

FF = Floor-to-Floor
WW = Wall-to-Wall
FW = Floor-to-Wall
HW = Head-of-Wall

UL Nomenclature

Navigating the UL Directory: **HW – D – 0060**

JOINT SYSTEMS (XHBN)

Third Alpha Character identifies the movement capabilities of the system:

D = Dynamic (movement capabilities)
S = Static (no movement capabilities)

UL Nomenclature

Navigating the UL Directory: **HW – D – 0060**

JOINT SYSTEMS (XHBN)

First Numeric Character identifies the nominal width of the linear opening:

0000 – 0999 =	< 2 in.
1000 – 1999 =	> 2 in. and < 6 in.
2000 – 2999 =	> 6 in. and < 12 in.
3000 – 3999 =	> 12 in. and < 24 in.
4000 – 4999 =	> 24 in.

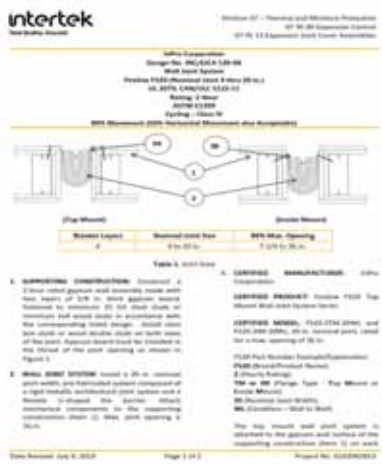
UL Nomenclature

Navigating the UL Directory: **HW – D – 0060**

JOINT SYSTEMS (XHBN)

Second Through Fourth Numeric Characters identify the individual system number

Expansion joint listings


intertek

- *<u>Maximum joint width listed</u> *(products are tested at the joint's widest expansion extents replicating a worst case scenario)*
- Product's distinct <u>movement capabilities</u>
- Requirements of surrounding construction in accordance with listed designs
- <u>Denotes any alternative applications</u> where product can be utilized *(ie- chasewall detailing/ alternate pre-approved cover plate types)*

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IFC

INTERTEK DIRECTORY OF LISTED PRODUCTS (DLP) CSI CATEGORIES AND ABBREVIATIONS

05 50 00 Metal Fabrications	
05 58 00 Formed Metal Fabrications	
System Abbreviations Include:	
FMF	Formed Metal Fabrications

07 00 00 Thermal and Moisture Protection	
07 20 00 Thermal Protection	
07 21 00 Thermal Insulation	
System Abbreviations Include:	
BI	Blanket Insulation
FBI	Foam Board Insulation
FBI	Fibrous Board Insulation
MBI	Mineral Board Insulation
MFF	Mineral-Fiber Fireproofing

07 80 00 Fire and Smoke Protection	
07 81 00 Applied Fireproofing	
System Abbreviations Include:	
AF	Applied Fireproofing
CF	Cementitious Fireproofing
IF	Intumescent Fireproofing

07 84 00 Firestopping	
System Abbreviations Include:	
PF	Penetration Firestopping
PFM	Penetration Firestopping Mortars
PFD	Penetration Firestopping Devices
JF	Joint Firestopping
BPF	Building Perimeter Firestopping
Legacy Abbreviations Include:	
PH	Penetrant Horizontal
PHV	Penetrant Horizontal & Vertical
PV	Penetrant Vertical
JS	Joint Sealants
PFB	Perimeter Fire Barrier
BP	Building Perimeter
FS xxx F	Firestopping, Floor
FS xxx W	Firestopping, Wall
CEJ xxx P	Construction/Expansion Joint, Perimeter

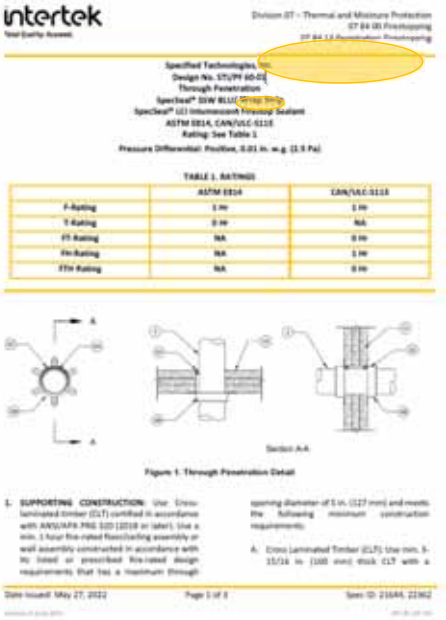
07 95 00 Expansion Control	
System Abbreviations Include:	
EC	Expansion Control
EJCA	Expansion Joint Cover Assemblies
Legacy Abbreviations Include:	
EJH	Expansion Joint, Horizontal
EJV	Expansion Joint, Vertical

08 31 00 Access Doors and Panels	
23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	
23 35 00 Special Exhaust Systems	
23 35 33 Listed Kitchen Ventilation Exhaust System	
System Abbreviations Include:	
DI	Duct Insulation
Legacy Abbreviations Include:	
FRD	Grease Duct Protection
CFD xxx F	Chemical Fume Duct
GD xxx F	Grease Duct Protection
PP xxx P	Plenum Protection System
VAD xxx F	Ventilation Duct Protection

INTERTEK DIRECTORY OF LISTED PRODUCTS (DLP)
EXAMPLES OF APPLICATIONS

intertek

Figure 1. Perimeter Fire Barrier



intertek

Figure 1. Through Penetration Detail

UL Nomenclature

Navigating the UL Directory:

CW – D – 2005

PERIMETER FIRE CONTAINMENT SYSTEMS (XHDG)

First Two Alpha Character identify the type of joint system:

CW = Curtain Wall

UL Nomenclature

Navigating the UL Directory: **CW – D – 2005**

PERIMETER FIRE CONTAINMENT SYSTEMS (XHDG)

Third Alpha Character identifies the movement capabilities of the system:

D = Dynamic (movement capabilities)
S = Static (no movement capabilities)

UL Nomenclature

Navigating the UL Directory: **CW – D – 2005**

PERIMETER FIRE CONTAINMENT SYSTEMS (XHDG)

Third Alpha Character identifies the movement capabilities of the system:

D = Dynamic (movement capabilities)
S = Static (no movement capabilities)

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