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An Overview of Code Requirements for Protecting penetrations in fire-rated construction

Ghaith Bakir, CFPS

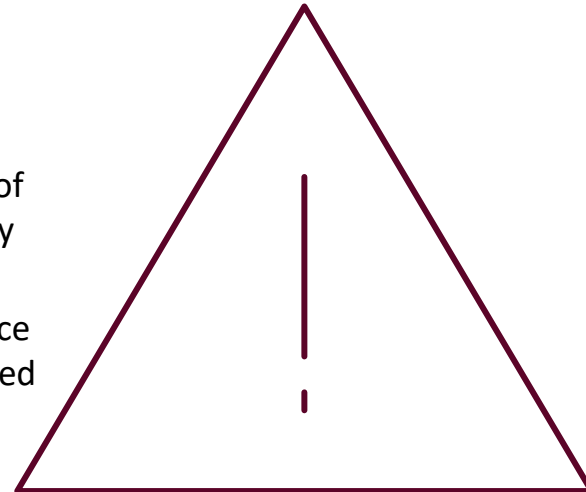
Senior Regulatory Engineer, UL Solutions

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Agenda

- Building & fire code basics
- Through- and membrane penetration firestop systems
- Navigating **UL Product iQ**® for code compliance
- UL's Technical Evaluation Program



Fire Protection

Passive fire protection

Fire area: The aggregate floor area enclosed and bounded by fire walls, fire barriers, exterior walls or horizontal assemblies of a building.

Active fire protection

Fire protection system: Approved devices, equipment and systems or combinations of systems used to detect a fire, activate an alarm, extinguish or control a fire, control or manage smoke and products of a fire or any combination thereof.

Reasonable level of redundancy; inspection, testing and maintenance

Important Definitions

Fire resistance

That property of materials or their assemblies that prevents or retards the passage of excessive heat, hot gases or flames under conditions of use.

Fire resistance rating

The period-of-time a building element, component or assembly maintains the ability to confine a fire, continues to perform a given structural function, or both.

- Passage of flames
- Heat transmission
- Structural integrity

Fire protection rating

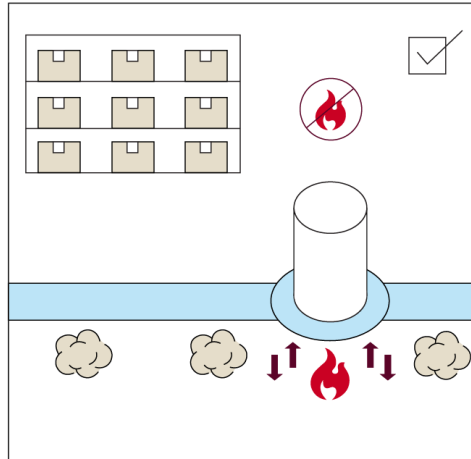
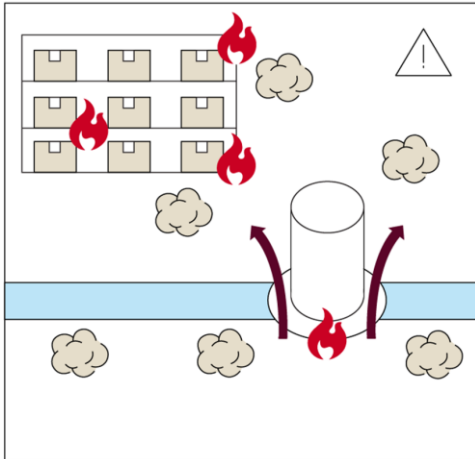
The period-of-time that an opening protective will maintain the ability to confine a fire

- Passage of flames
- Structural integrity

What is firestopping?

Firestopping (v) is the process of restoring the integrity of a fire resistance-rated assembly at a penetration of the assembly through the use of a properly, designed, installed, inspected and maintained firestop system.

Firestopping (n) is a material or device installed to resist the passage of flame and heat through penetrations, i.e., a firestop.



Membrane penetration

A breach in **one side** of a floor-ceiling, roof-ceiling or wall assembly to accommodate an item installed into or passing through the breach.

Through-penetration

A breach in **both sides** of a floor, floor-ceiling or wall assembly to accommodate an item passing through the breaches –

Membrane-penetration firestop

A material, device or construction installed to resist for a prescribed time period the passage of flame and heat through openings in a protective membrane in order to accommodate cables, cable trays, conduit, tubing, pipes or similar items

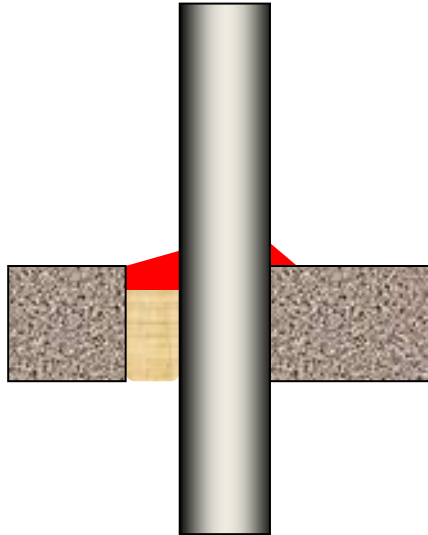
Through-penetration firestop system

An assemblage consisting of a fire resistance-rated floor, floor-ceiling, or wall assembly, one or more penetrating items passing through the breaches on both sides of the assembly and the materials or devices (or both) installed to resist the spread of fire through the assembly for a prescribed period of time

Firestop system

Membrane or through-penetration firestop system

Three elements of a firestop system



Floor
or wall
assembly

Penetrating
item

Firestopping
products

Code requirements general



Section 714 of the 2018 SBC:

714.3 – Penetrations into or through *fire walls, fire barriers, smoke barrier walls and fire partitions* shall comply with 714.3.1 through 714.3.3. Penetrations in *smoke barrier walls* shall also comply with 714.4.4.

714.5 – Penetrations of horizontal assemblies not required to be protected by shaft enclosures shall be protected per Section 714.4.1 through 714.4.4.

Code requirements wall assemblies



Section 714.3.1 of the 2018 SBC

- **714.3.1** – Through-penetrations shall be protected by one of the following:
 - As tested as part of the entire wall assembly
 - As tested to UL 1479/ASTM E814
- **714.3.1.2** – When tested to UL 1479 or ASTM E814, through-penetrations shall have an **F Rating** of not less than the required rating of the wall penetrated
- **714.4.4** – Penetrations in smoke barriers shall have an L Rating at ambient and 400°F

Ratings



Flame
occurrence



Heat
transmission



Movement
(optional)



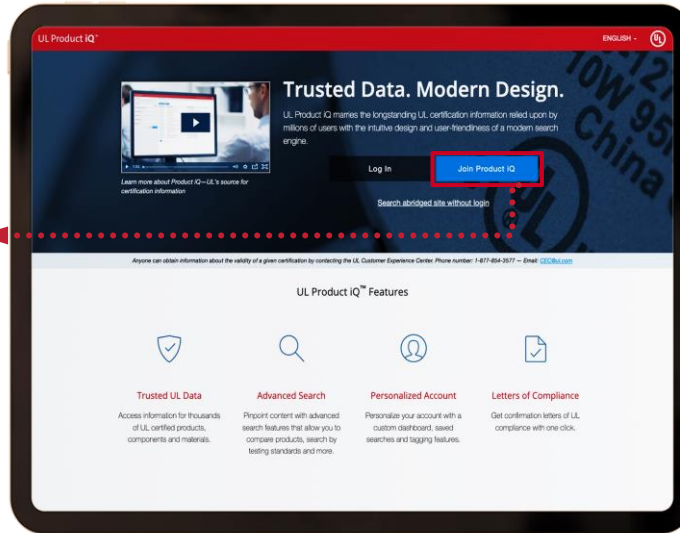
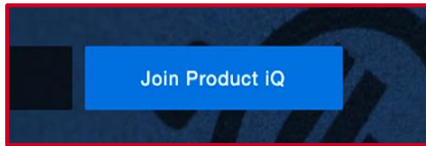
Leakage
(optional)



Water leakage
(optional)

Online search tool from UL Solutions

Works best with Chrome
[ProductIQ.UL.com](https://productiq.ul.com)

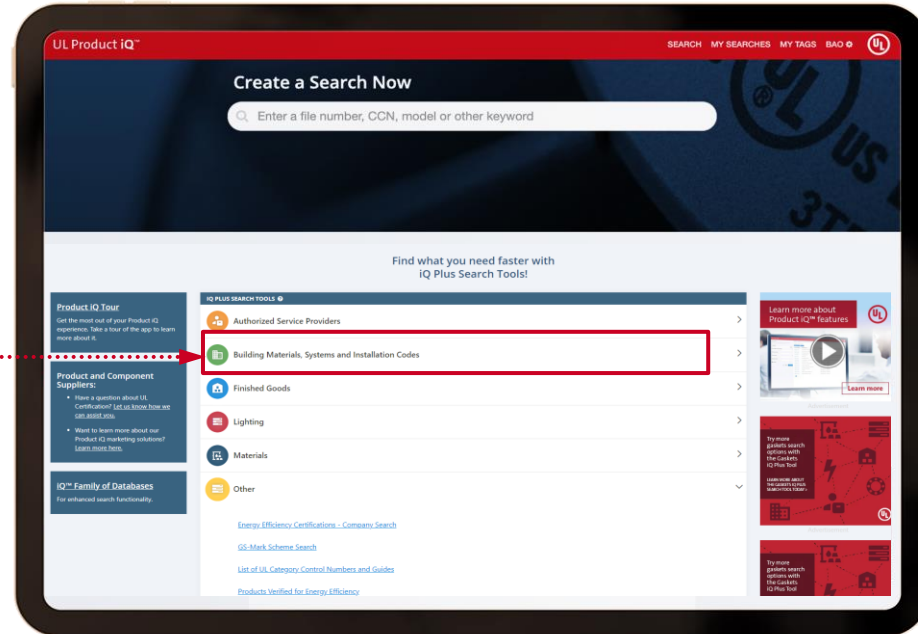


- Helps you verify code compliance
- Continuously updated
- Mobile-friendly
- Requires registration to create a user account
- Basic service – no charge for use
- Paid subscription service provides more features – complimentary upgrade for code authorities. The first month of a premium subscription is for free if someone is interested in trying it out.

Product iQ



Search: Building Materials,
Systems and Installation Codes



Product iQ — Search results

The screenshot shows the UL Product iQ search results for "Firestop Systems". The left sidebar contains filters for Keyword, System Number, Through-Penetration Firestop System, Assembly Type, Penetrating Item, F Rating, and T Rating. The main content area displays a table of results with columns for Document Name, Company Name, UL CCN Description, and My Tags. A red box highlights the search results summary at the top, which states "634 Results" and "Base Template: Firestop Systems : Assembly Type: Concrete or masonry walls with a minimum thickness less than or equal to 203.2 mm (8 in.)".

Document Name	Company Name	UL CCN Description	My Tags
XHEZ.C-AJ-0008	JM COMPANY	Through-penetration Firestop Systems	
XHEZ.C-AJ-0011	TREMCO INC.	Through-penetration Firestop Systems	
XHEZ.C-AJ-0012	RECTORSEAL	Through-penetration Firestop Systems	
XHEZ.C-AJ-0013	PRC-DESOTO INTERNATIONAL INC.	Through-penetration Firestop Systems	
XHEZ.C-AJ-0015	SPECIFIED TECHNOLOGIES INC.	Through-penetration Firestop Systems	
XHEZ.C-AJ-0040	UNITED STATES MINERAL PRODUCTS CO. DBA ISOLATEK INTERNATIONAL	Through-penetration Firestop Systems	
XHEZ.C-AJ-0041	RECTORSEAL	Through-penetration Firestop Systems	
XHEZ.C-AJ-0047	SPECIFIED TECHNOLOGIES INC.	Through-penetration Firestop Systems	
XHEZ.C-AJ-0064	PASSIVE FIRE PROTECTION PARTNERS	Through-penetration Firestop Systems	
XHEZ.C-AJ-0070	HLTI CONSTRUCTION CHEMICALS, DIV OF HLTI INC.	Through-penetration Firestop Systems	

The screenshot shows the detailed view of the product "XHEZ.C-AJ-0008 - Through-penetration Firestop Systems". The page includes a "Design/System/Construction/Assembly Usage Disclaimer" section, a "Notes" section, and a "See General Information for Through-penetration Firestop Systems" link. The main content area displays a technical diagram of the firestop system, showing a cross-section of a wall with a firestop assembly. The diagram is labeled "XHEZ - Through-penetration Firestop Systems" and "System No. C-AJ-0008". The diagram shows a wall with a firestop assembly, including a firestop seal and a firestop sealant. The diagram is labeled "XHEZ - Through-penetration Firestop Systems" and "System No. C-AJ-0008".

UL's Technical Evaluation Program



Engineering judgment is a **letter or report** issued by some knowledgeable party which evaluates the construction of some site-specific application that **deviates from a tested design, system or assembly** and concludes with a judgment of the applicable rating of that assembly.

The Problem	The Request	The Goal
<ul style="list-style-type: none">• As-built construction details often vary from an ideal tested/certified solution• Lack of guidance in codes & standards• AHJ's may not accept "EJs" / Want Certified solutions	<ul style="list-style-type: none">• Multiple manufacturers & Industry approached UL separately for guidance• Concerns echoed by UL stakeholders globally• Find way to improve on current state	<ul style="list-style-type: none">• Provide structured framework & defined qualifications for current practice to assure acceptance• Reduce the number of low quality TE's in the market, increase testing and certification

Program Scope



Penetrations and Joints

Perimeter Fire Containment

Ducts

- *For UL, ASTM, EN/ETA and Canadian standards associated with these products*

Program Requirements



- Quality management system similar to the UL Qualified Firestop Contractor Program
- Participating companies must have a contractual relationship with UL for Certification, Assessment or Notified Body Services
- Knowledge testing of all judgment writers with Continuing education requirements for judgement writers
- Minimum requirements for decisions
- Documentation & record keeping
- On site audits of program requirements
- Annual testing and certification requirements
- Manufacturer's Authorized Representative Concept for program management

Exams, Audit and Certification testing



- Engineering exams based to assure knowledge of standards, principals and products.
- Audits focus on participant's quality scheme, adherence to quality scheme and the quality scheme's following of the UL program.
- It is not a technical audit of evaluations, it is an audit of processes, Non-compliances require follow-up and may require additional auditing.
- Testing is a mandatory element of this Program; Number of tests will vary with Number of Evaluations Provided.
- Minimum of 1, Maximum of 15 tests per calendar year, Also require participants to review decisions and content regularly to follow-up commonly issued decisions with formal approvals through UL.
- Goal to reduce evaluations where possible by encouraging certifications and approvals for most commonly written evaluations.

Questions or comments?



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THANK YOU

For more information:

Ghaith Bakir

Ghaith.Bakir@ul.com

00971553259980

