FCIA Webinar Series

Engineering Judgements (EJs) & UL Solutions Technical Evaluation Developer Program (TEDP)

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FREE RESOURCES

- ***Info@FCIA.org - REQUEST*** **FREE STUFF**
  - **FREE Life Safety Digest**
  - **FREE MOP, if you Qualify….**
  - **FCIA Passive Fire Protection Barrier Management Symposium https://www.fcia.org/Events/Barrier-Management-Symposium**
- **Firestopping DIIM - FCIA.org/About**

FCIA FIRESTOP MANUAL OF PRACTICE
'THE STANDARD'
FCIA

FCIA – Firestop Contractors International Association

- **UL QFCP, FM 4991 Contractor Programs**
- **ASTM Firestop Inspection Standards**
- **IAS AC 291 Inspection Agency Accreditation Program**
- **Firestop Education Program**
  - **Contractor, Inspection Agency, AHJ, Others**
- **FCIA @ ASTM, ICC, NFPA, UL, ULC STP's, more…**
- **Tools @ FCIA.org …**
  - Specifiers, Facility Directors,
  - AHJ's, Building Owners
  - Firestop Contractors & Inspection Agencies
- **Advocacy….**

FCIA – Firestop Contractors International Association

- India - Mumbai/Ahmadabad – Fire Safe Build India – IIT-G
- UAE - Dubai
- Qatar - Doha
- Canada
- Mexico/LATAM - CONAPCI/AMRACI
- Saudi Arabia
- Australia/New Zealand – FPA, Etc.

FCIA – Firestop Contractors International Association

- FCIA Education & Committee Action Conference
  - 30 April – 3 May 2024
- FCIA Dubai (4-6 June 2024)
- FCIA Doha (9/10 June 2024) Symposium
- **FCIA Canada Symposium – 11-13 Sept.**
- **FCIA Firestop Industry Conference & Trade Show –**
  - **5-8 Nov.**

EJ/EFRRA's & FCIA's DIIM

Learning Objectives

- Learn how to identify when an EJ is needed in design and construction.
  - What does a listing cover and how do I know when applications have deviated?

- Learn how to identify if the condition is a firestop issue or construction issue.
  - Firestop can’t fix bad construction or create a rating when assembly isn’t capable.

- Industry standards & guidelines for EJ’s including the new UL Solutions Technical Evaluation Developer Program (TEDP).
  - Standards such as ASTM E2032, IFC guidelines & UL Solutions requirements.

History

- EJs originated in the fire-resistance-rated construction arena
  - Purpose of EJ was the same in that arena as in firestop arena – to resolve field variations
  - EJ issued by some knowledgeable individual
  - EJ must be approved by the AHJ
  - AHJs have always struggled to judge qualifications of the author and the technical efficacy of the EJ

Traditionally Who is Qualified to Write EJ's?

- Manufacturer's Technical Staff
- Laboratories' Engineering Staff
- Fire Protection Engineers (FPEs)
- Professional Engineers (PEs)
- Other Knowledgeable Firestop Professionals

How does an AHJ judge the qualifications of the author of the EJ? – Ask manufacturer for credentials or ask for a Curriculum Vitae (CV)

Recent ICC Code Activities Relating to EJs

- FS41-24:

- Proposal as submitted:
  - **714.2 System variations.** Where variations between the installed system and the tested *through-* or *membrane-penetration firestop system* exist, sufficient documentation shall be provided to the *building official* to show that the required ratings are not reduced.

- Disapproved for two reasons:
  1. “Installed system” is too limiting
  2. What constitutes “sufficient documentation”?

Recent ICC Code Activities Relating to EJs – Cont.

- Comment issued to resolve these two concerns:
  - **714.2 System variations.** Where field conditions do not permit compliance with all requirements of the *listed through-penetration firestop system* or *membrane-penetration firestop system*, documentation acceptable to the *building official* shall be provided to show compliance with the required ratings.

- Comment to be heard at ICC Committee Action Hearing #2 in Long Beach, CA in October, 2024

UL Solutions Technical Evaluation Developers Program

- The new UL Technical Evaluation Developer Program (TEDP) is an optional program for manufacturers is intended to level the playing field throughout the industry and give AHJs confidence.

- The program provides evidence of compliance and assurance that issued EJs from qualified manufacturers are written by competent individuals, have a basis in science and previously tested systems, follow a quality program audited by UL Solutions for purposes of compliance and randomly selected EJs undergo fire testing.

- This program mandates that manufacturers by confident that issued EJs will perform as indicated due to internal test data and listed systems.

Technical Evaluation – Information Needed

- Technical evaluations/Engineering Judgments (EJ) are required to contain specific information. Requesters can facilitate a faster response by providing needed information.
  - Does the manufacturer have a listed system for the condition.
  - Provide project information (location)
  - Provide a clear description or picture of site conditions requiring EJ.
  - Indicate the ratings needed.
  - Identify the assembly, penetrant/joint, annular space, any sleeves, insulation or pipe coverings, etc.

Limitations of Listings

- Listed Systems are subjected to specific laboratory fire test conditions.
- Substitution of end use conditions may impact the results provided in the listings.
- Where are limitations found?
  - UL Solutions guide cards: BXUV, XHEZ, XHBN, XHDG…
  - ASTM E2032 “Extension of Data From Fire Resistance Tests Conducted in Accordance with ASTM E119”
- Examples: Annular space, pipe coverings, penetration material, penetrant size, penetrant movement, joint size, joint movement, perimeter fire containment, pressure differences, angled penetrations

Limitations of Listings

Hollow core concrete planks

Concrete over metal deck

Penetrants at angles

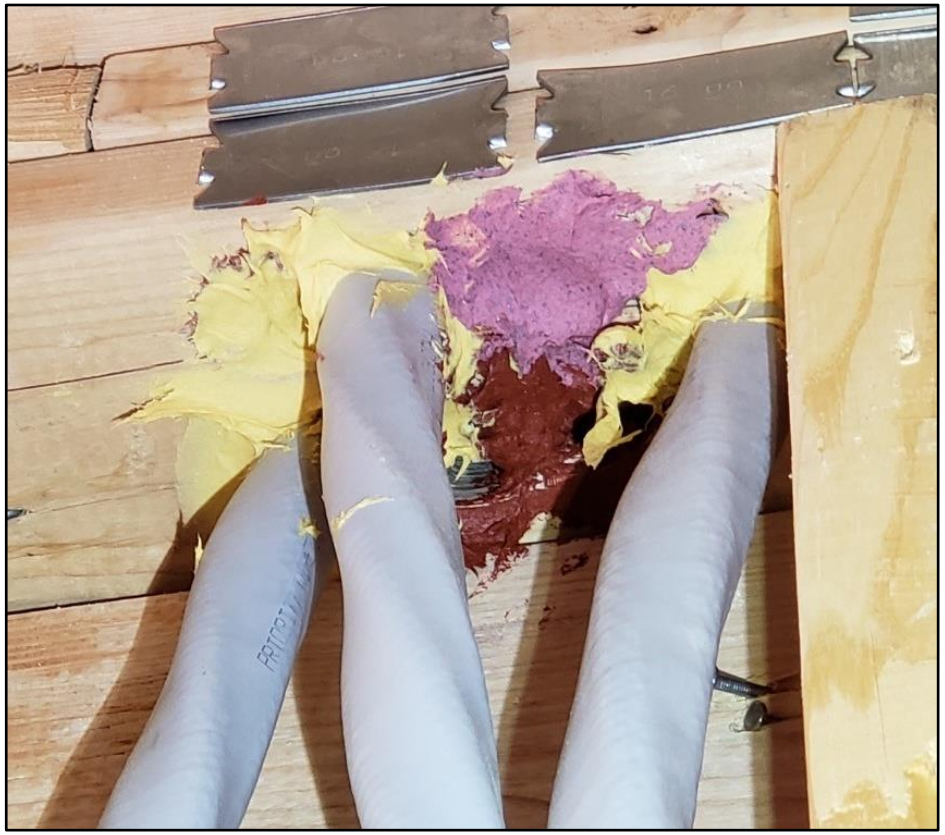
- UL Solutions guide cards can provide clarity into the conditions that a listing covers.

What Conditions Typically Require EJ's?

- Assembly Conditions
  - Designs based on prescriptive or calculated methods allowed in code (not listed assembly)
  - Condition does not align with the test standard
  - Limited listings
- Penetration Conditions
  - Unlisted penetration materials (e.g. aluminum)
  - Membrane penetrations
  - Angled penetrations
- Joint Conditions
  - Penetrations in joint
- Perimeter Fire Containment
  - Highly custom conditions

Consult manufacturer prior installing system.

An EJ is exception, not the rule.



Construction or firestop issue?

Would these installations be candidates for an EJ?

Construction Issues

- Non-rated assemblies
- Penetrant Position and Point of Contact / Annular Space Requirements
- Untested Penetrant
- Multiple ‘odd’ penetrating items
- Angle of Penetrant
- Single or multiple penetrants in Joints
- Incorrect framing / slab thickness

Construction Issues

Penetrants in plane of assembly

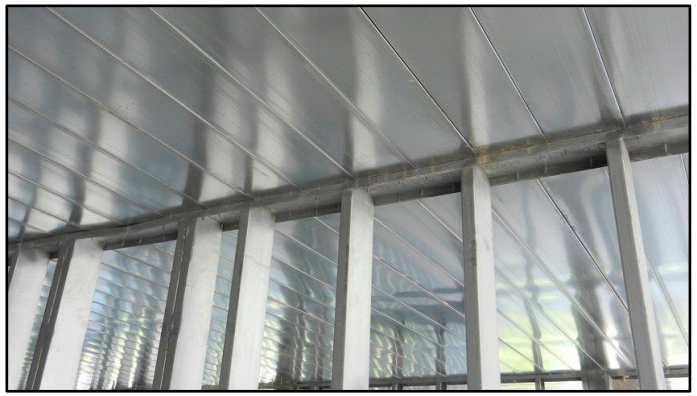
Penetrants in joints

Construction Issues

Multiple “penetrants”

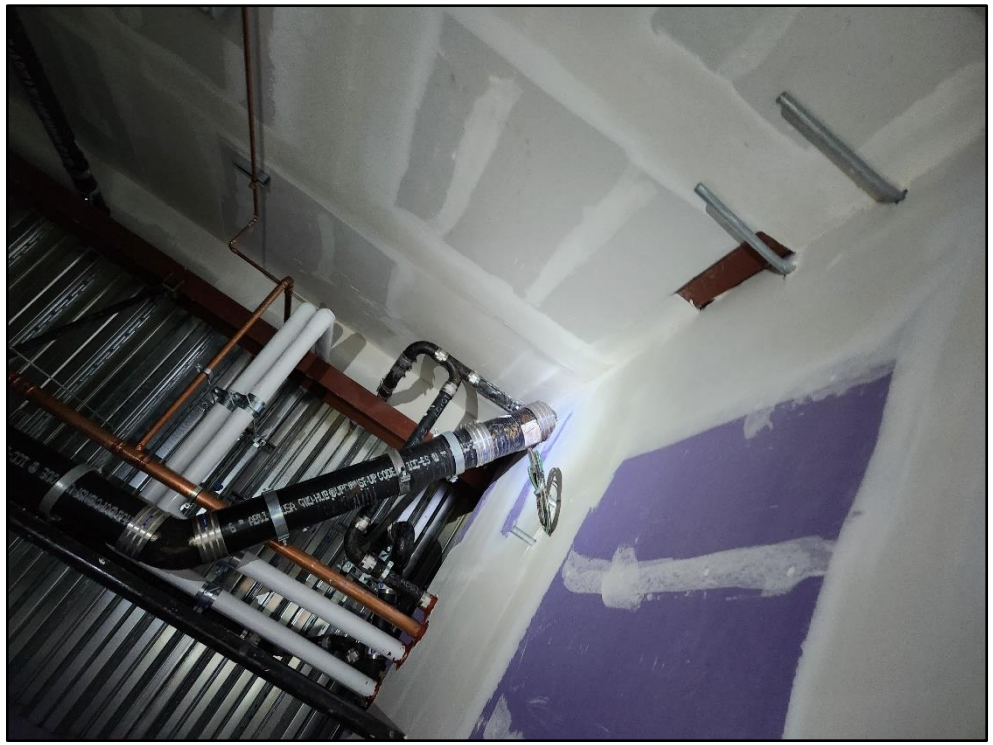
Accessibility – one sided install

Metal deck profiles

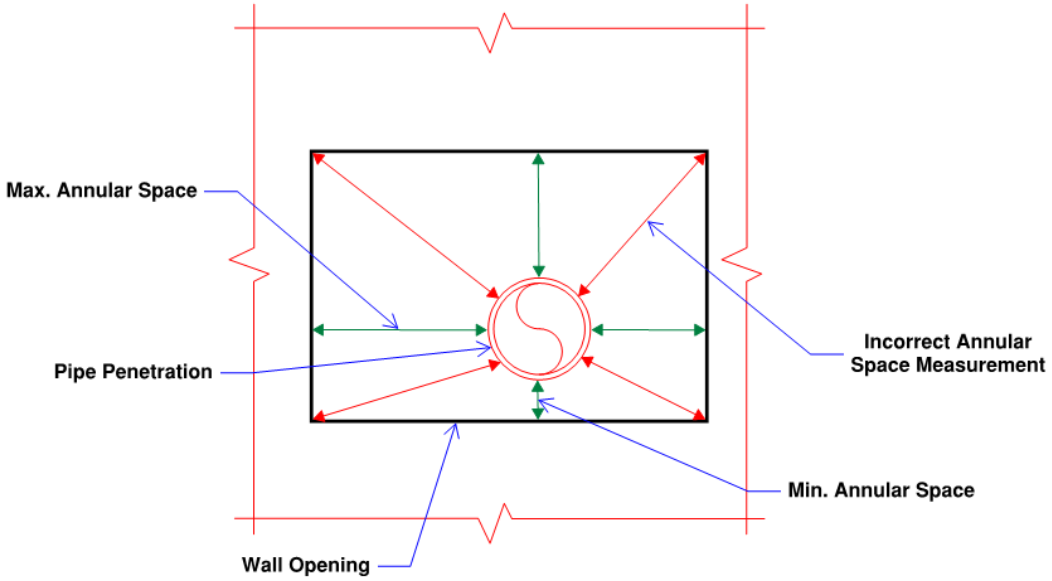


Construction Issues

Penetrants at angles



Annular space

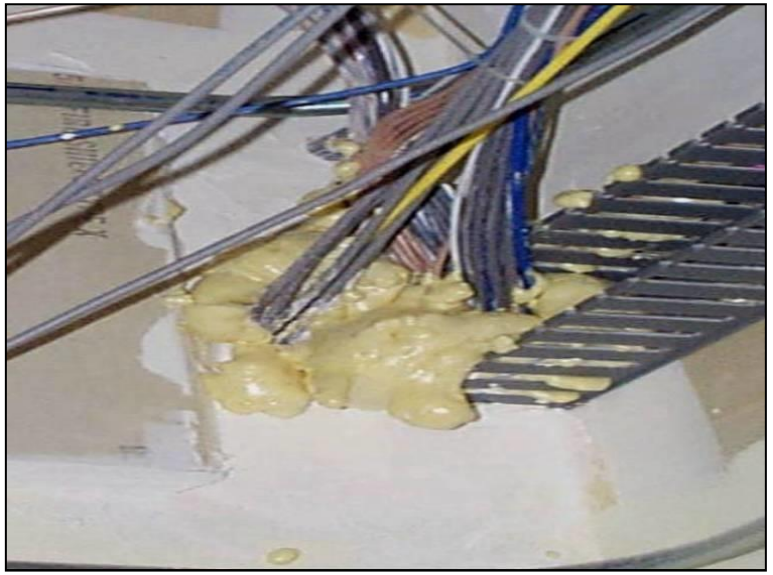


Firestop Issues

- Mixing of firestop systems

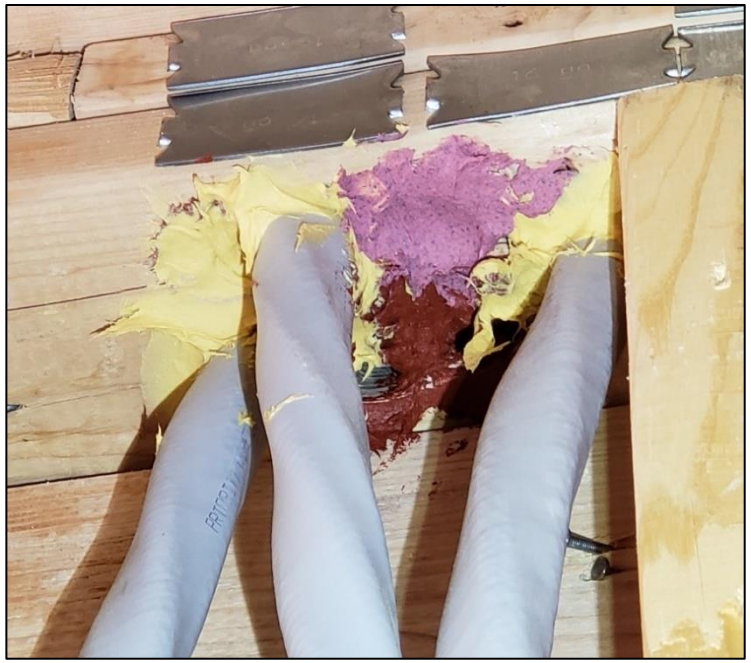
Firestop Issues

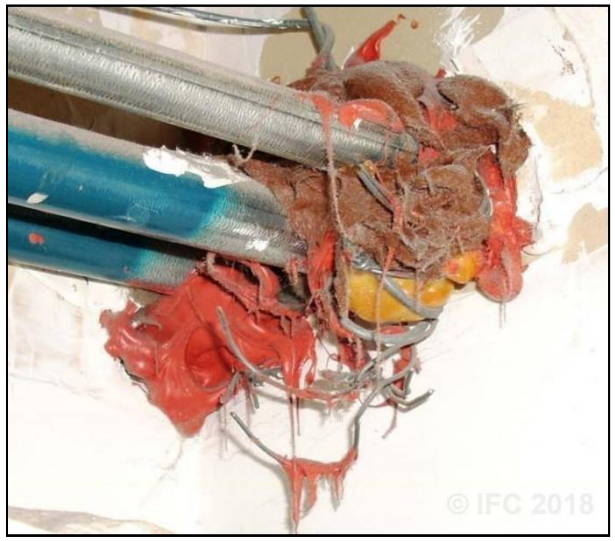
- Use of Wrong Product



Firestop Issues

- Mixing of firestop products



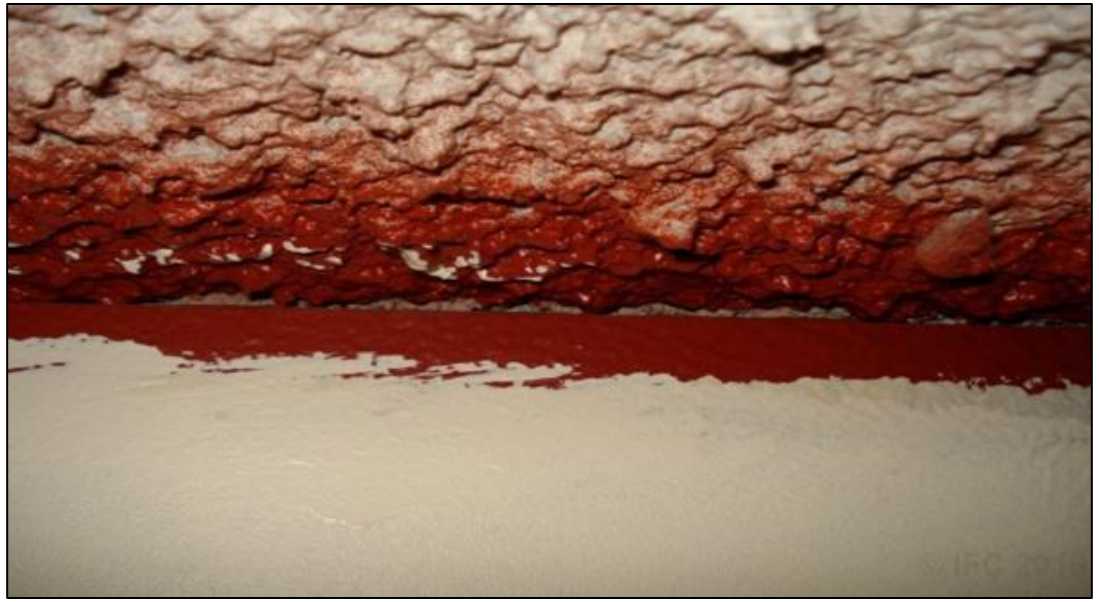


Firestop Issues

- Mineral wool insulation type and density
  - Mineral wool should be UL listed or listed by the agency that issued the firestop system.
  - Listed for the appropriate category.
  - Of the minimum density required within the System.
  - For Joints and Perimeter Fire Containment Systems:
    - As specified in the UL System.
    - Same manufacturer as listed.
    - Same type as listed.
  - With the correct fiber orientation.

Firestop Issues

- Insufficient thickness of materials or improper installation



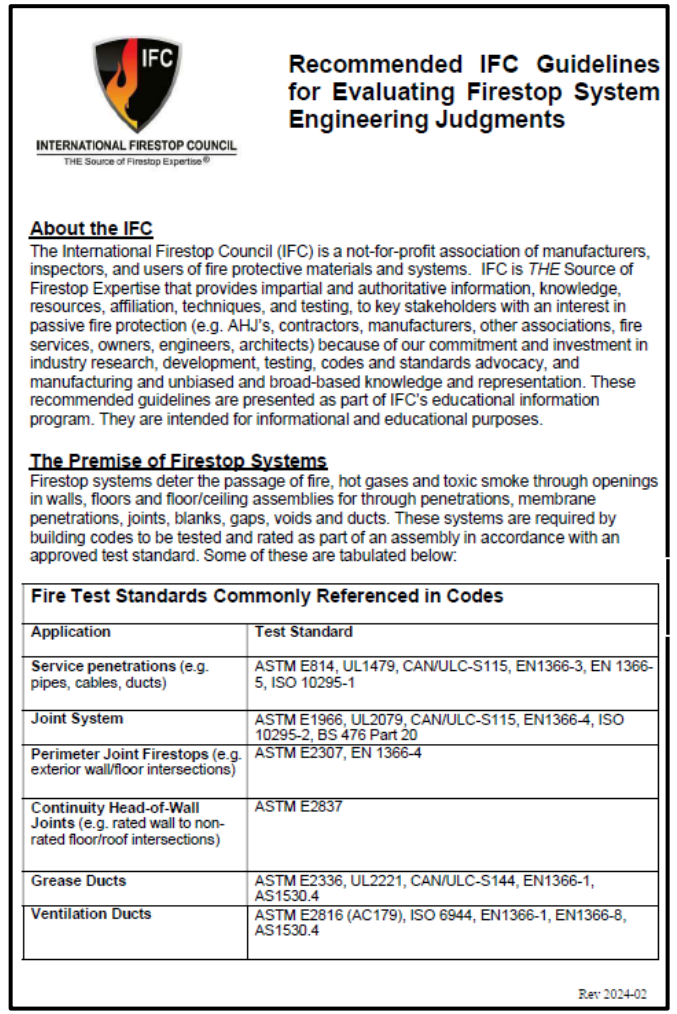
Firestop Issues

- Exotic penetrating item and or covering materials

Industry Guidelines / Standards

- North America
  - UL 1479, ASTM E814
  - CAN/ULC-S115
  - UL 2079
  - ASTM E2307
  - ASTM E2336, UL 2221
  - UL 263, ASTM E119, CAN/ULC-S101
  - ASTM E84 / UL 723
- Europe / United Kingdom
  - BS 476, Parts 21 and 22
  - EN1366-3 (service penetrations)
  - EN1366-4 (linear seals)
  - EN 1364 Series (fire resistance)
  - And more….

EJ shall always conclude with the rating anticipated based on the appropriate Standards.



INTERNATIONAL FIRESTOP COUNCIL
THE Source of Firestop Expertise®

Recommended IFC Guidelines for Evaluating Firestop System Engineering Judgments

About the IFC

The International Firestop Council (IFC) is a not-for-profit association of manufacturers, inspectors, and users of fire protective materials and systems. IFC is *THE* Source of Firestop Expertise that provides impartial and authoritative information, knowledge, resources, affiliation, techniques, and testing, to key stakeholders with an interest in passive fire protection (e.g. AHJ's, contractors, manufacturers, other associations, fire services, owners, engineers, architects) because of our commitment and investment in industry research, development, testing, codes and standards advocacy, and manufacturing and unbiased and broad-based knowledge and representation. These recommended guidelines are presented as part of IFC's educational information program. They are intended for informational and educational purposes.

The Premise of Firestop Systems

Firestop systems deter the passage of fire, hot gases and toxic smoke through openings in walls, floors and floor/ceiling assemblies for through penetrations, membrane penetrations, joints, blanks, gaps, voids and ducts. These systems are required by building codes to be tested and rated as part of an assembly in accordance with an approved test standard. Some of these are tabulated below:

Fire Test Standards Commonly Referenced in Codes

Application	Test Standard
Service penetrations (e.g. pipes, cables, ducts)	ASTM E814, UL1479, CAN/ULC-S115, EN1366-3, EN 1366-5, ISO 10295-1
Joint System	ASTM E1966, UL2079, CAN/ULC-S115, EN1366-4, ISO 10295-2, BS 476 Part 20
Perimeter Joint Firestops (e.g. exterior wall/floor intersections)	ASTM E2307, EN 1366-4
Continuity Head-of-Wall Joints (e.g. rated wall to non-rated floor/roof intersections)	ASTM E2837
Grease Ducts	ASTM E2336, UL2221, CAN/ULC-S144, EN1366-1, AS1530.4
Ventilation Ducts	ASTM E2816 (AC179), ISO 6944, EN1366-1, EN1366-8, AS1530.4

Rev 2024-02

Engineering Judgment / EJ
Equivalent Fire Resistance Rated Assembly / EFRRA

- **FCIA Position –** No System at Jobsite; Contact Office, if none…

  - **First Action in Process**
    - **Find another system** – Same Manufacturer
    - **Find another system** – Different Manufacturer
    - **If no system exists in either case**….

  - **Second Action**
    - ***Engineering Judgment – "EJ"***
    - ***Equivalent Fire Resistance Rated Assembly – "EFRRA"***

  - ***Based on Engineering, IFC Protocol***

C. Zussman – Pepper Image

EJ/EFRRA – FCIA Position….

- ***System Performance*** **-** Where there is no specific third party tested and listed, classified firestop system available for a particular firestop configuration, the firestopping contractor shall obtain from the firestop manufacturer, an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRRA) for submittal.

- ***All EJ/EFRRA's shall state that the manufacturer attests the EJ will meet specific rating criteria, when subjected...***

FCIA MOP Guidelines / References

- Referred to as either an Engineering Judgement (EJ) or an Equivalent Fire Resistance Rated Assembly (EFRRA)
- Developed by mfr, a mfr in conjunction with a FPE or testing lab, or a testing lab
- Based on data, in conjunction with IFC document
- Shall be requested early enough to obtain approval prior to installation
- Shall:

FCIA MOP Guidelines / References Cont.

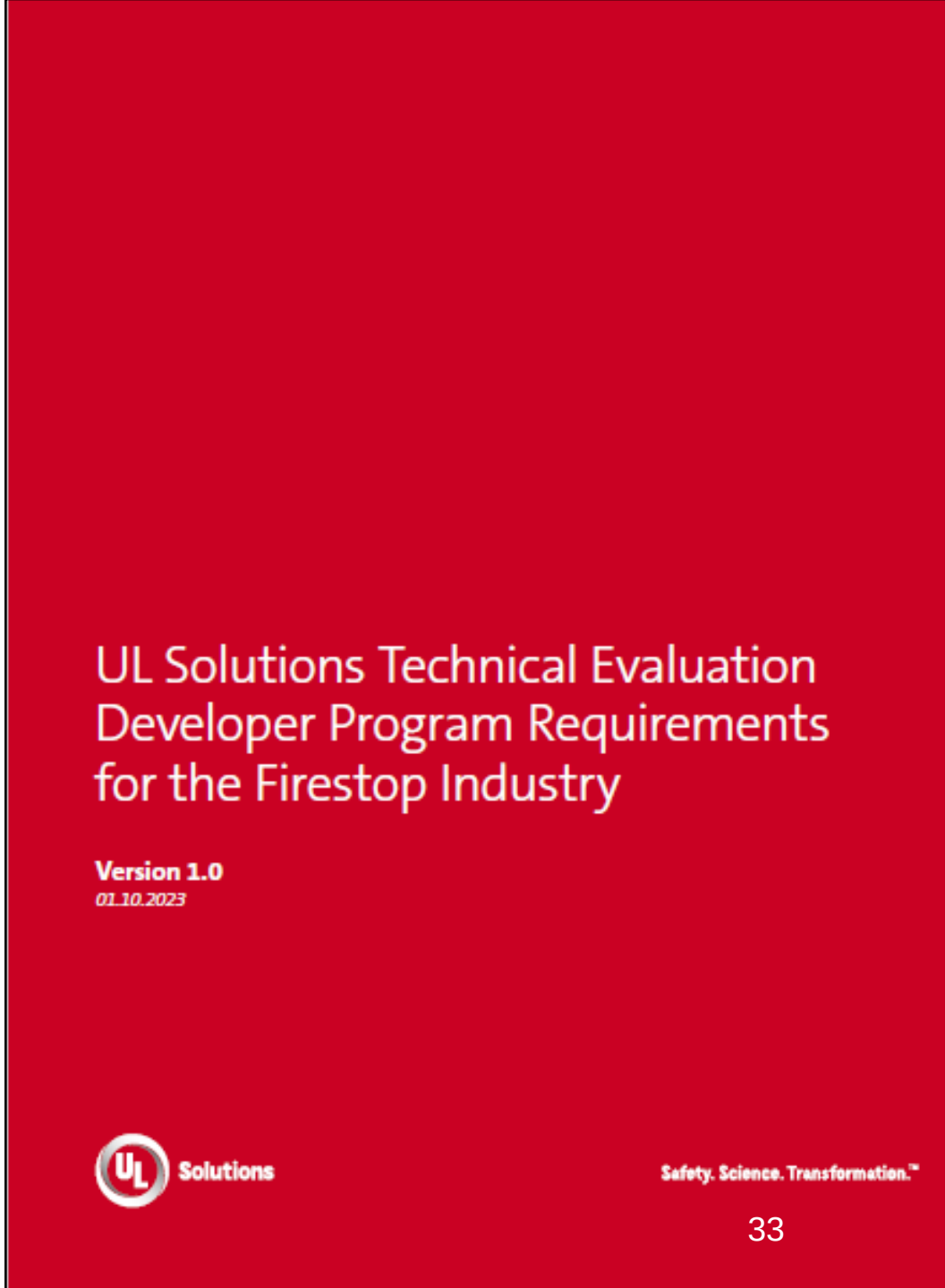
- Include a drawing
- Have a unique reference number to track EJ / EFRRA
- Clearly indicate it is not a tested system
- Reference supporting data
- Conclude with F, T, L, W, M or Assembly Rating
- Describe wall, floor or ceiling penetrated, size and shape of opening, penetrating item, firestopping materials, design limitations (AS, penetrant size, etc.)
- Name of project

Technical Evaluation Developer Program

- UL Solutions is offering firestop manufacturers a **management system qualification program** focused on the creation of technical evaluations. Qualification is at the manufacturer level.

- Participating manufacturers must have all writers pass UL Solutions exams, develop a quality management system, pass annual audits and fire test randomly selected EJs issued.

- **Technical Evaluation Developer Program (TEDP)** strives to improve the technical content and quality of engineering decisions for firestopping products and systems by testing.



Frequently Asked Questions

- How Can I Confirm Participation?
  - Manufacturers enrolled in program will have company listed in UL Solutions Product iQ tool.

- What are the selection criteria for lab testing?
  - UL Solutions randomly selects issued technical evaluations for lab testing across different product types and firestop solutions.

- What happens if a selected system fails the lab test?
  - The manufacturer can review the test and resubmit for a retest provided a construction change occurs.

UL Solutions Resources

- UL Solutions Guide Cards on Product iQ: www.UL.com/PiQ
- UL Solutions Code Authority website: https://code-authorities.ul.com
- Technical Inquiries: ArchServices@ul.com

FAQs

1. Q: My AHJ said that engineers only with a fire protection degree are allowed to write EJs. Is this true? If not, who is qualified to write an EJ?

   A: International Firestop Council Guidelines state that EJs should only be issued by a firestop manufacturer's qualified technical personnel OR in concert with the manufacturer by a knowledgeable registered professional engineer. It is up to each manufacturer to determine who is qualified. I can speak from Hilti's perspective that every FPE that is hired goes through a structured training process. If you're looking for something in addition to IFC guidelines, every manufacturer that is qualified per UL TEDP has a part of their manual dedicated to staff competency. This includes minimum education requirements, minimum time spent producing EJs that are reviewed by a more senior FPE and continuing education for each FPE to maintain certification. This certification is achieved when someone passes UL's exam on firestopping knowledge and test standards.

FAQs Cont.

2. Q: I understand the UL guide info for metallic through penetrations stating they can be installed at an angle. However, the AHJ is insisting on an EJ. How should I proceed?

   A: This still comes up from time to time for manufacturers. If you reach out to for this type of EJ, typically our first response with be a reference to the UL guide info. If you confirm you already communicated this to the AHJ, manufacturers still have an ability to produce that EJ. Another option is to involve UL via one of the resources shown earlier in the slides.

FAQs Cont.

3. Q: Through-penetrations with T-ratings require much more material than penetrations without T-ratings. Can you clarify when a T-rating is and is not required?

   A: If anyone is unfamiliar with a T-rating, it is a temperature rating. It is defined as the time it takes for the non-fire side to reach approximately 400 degrees. It is ultimately up to the AHJ to determine when a T-rating is required or not. However, I can speak to the international building code. According to the 2018 IBC, through penetrations through fire-resistance rated walls are not required to have a T-rating. Through penetrations through fire-resistance rated floor are generally required to have a T-rating, but there are three exceptions when it comes to floor penetrations that you are firestopping. These are floor penetrations contained and located within the cavity of the wall above or below the floor, floor penetrations by floor drains, tub drains or shower drains contained and located within the concealed space of a horizontal assembly and floor penetrations of maximum 4-inch metal conduit or tubing penetrating directly into metal-enclosed electrical power switchgear. These exceptions can be found in section 714.5.1.2 of the 2018 IBC.

FAQs Cont.

4. Q: How will we know when a manufacturer is qualified as a UL TEDP Program participant?

   A: Participating manufacturers in good standing will be listed in the Product IQ Plus Search Tools / Authorized Service Providers section under Qualified Firestop Technical Evaluators (WYGB), or under the same category search in UL Product IQ.

5. Q: What if I discover an Engineering judgment by a participant that seems to be technically deficient or questionable?

   A: There is a process within the program whereby a questionable EJ can be presented to UL for review. This will become part of the participant’s regular audit program.

FAQs Cont.

6. Q: What kind of assurance does the program provide that Engineering judgment quality will be better by participants in the program over those who don’t participate?

   A: First, a participant must create and operate in accordance with a quality system that is reviewed by UL and determined to be compliant with the program requirements. Second, all participants must show continued conformance and continuous improvement in accordance with their quality system through regularly scheduled audits. Third, any person writing EJs for the participating company is required to prove their proficiency of knowledge by scoring 80% or higher on a written exam and must retake the exam every three years or maintain a qualifying continuing education regimen. Fourth, all Engineering judgments written are subjected to random selection that must be tested successfully in accordance with the test standard the EJ is based on.

FAQs Cont.

7. Q: What happens if a participant does not comply with the program?

   A: If a participant is found to be non-compliant with the program through audit findings or non-complying tests, they may be subjected to increased audit requirements and/or punitive action, up to and including removal from the program.

8. Q: Some jurisdictions require that EJs be signed off by a Professional Engineer. Will participation in this program remove the requirement?

   A: While some jurisdictions may recognize the value of participation in the program and what it brings from an Engineering judgment quality standpoint, the program is not designed to replace third-party professional engineer requirements. But it is expected that the program will drive more testing, which will provide more systems that no longer require PE signature.

Thanks for Attending!!!

Matt Schumann / Julio Lopez / Rich Walke / Angela Nepa / Mark St. Onge

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