



Recommended IFC Guidelines for Evaluating Firestop Systems in Engineering Judgments (EJs)

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 Referenced in Building Codes		
Application	USA	Canada
Service penetrations (e.g. pipes, cables, ducts)	ASTM E814 or UL1479	CAN/ULC-S115
Joint System	ASTM E1966 or UL2079	CAN/ULC-S115
Perimeter Joint Firestops (e.g. exterior wall/floor intersections)	ASTM E2307	CAN/ULC-S115*
Continuity Head-of-Wall Joints (e.g. rated wall to non-rated floor/roof intersections)	ASTM E2837	N.A.**
Grease Ducts	ASTM E2336 or UL2221	CAN/ULC-S144
Ventilation Ducts	ASTM E2816 (AC179) or ISO 6944	ISO 6944
*Some jurisdictions accept ASTM E2307 for perimeter joints		
**Some jurisdictions accept ASTM E2837		

All elements of a tested and rated firestop system, including the assembly into which the system is installed, constitute a specific and inseparable engineered unit that must be utilized as such. Firestop system designs are tested and listed by independent testing agencies such as Underwriters Laboratories, Inc. (UL), Underwriters Laboratories of Canada (ULC), Intertek, and South West Research Institute (SWRI). The specific elements of each design become integral to the listing.

When field conditions differ from original design or unanticipated construction hindrances are encountered and the field conditions cannot be easily or cost effectively redesigned, design recommendations are typically made to propose alternative methods that ensure performance of the firestop system is not compromised. These are sometimes referred to as “Engineering Judgments or EJs”, although other terms may apply dependent upon local practice. Since these recommendations are not based upon identical designs as that which were fire tested, it is important that they be developed using sound engineering principles and good judgment.

Construction industry professionals, building officials, fire officials, firestop contractors and other stakeholders need appropriate guidelines for evaluating and using such judgments. As such, IFC developed *Recommended IFC Guidelines for Evaluating Firestop Systems in Engineering Judgments (EJs)*.

IFC EJ Guidelines

EJs for firestop systems should:

1. Not be used in lieu of tested systems when available;
2. Be issued only by a firestop manufacturer’s qualified technical personnel or in concert with the manufacturer by a knowledgeable registered Professional Engineer, Fire Protection Engineer, or an independent testing agency that provides listing services for firestop systems;
3. Be based upon interpolation of previously tested firestop systems that are either sufficiently similar in nature or clearly bracket the conditions upon which the judgment is to be given. Additional knowledge and technical interpretations based upon accepted engineering principles, fire science and fire testing guidelines (e.g. ASTM E 2032 – Standard Guide for Extension of Data from Fire Endurance Tests, ULC Subject C263E – Criteria for Use in Extension of Data from Fire Endurance Tests, or ASTM E2750 – Standard Guide for Extensions of Data for Penetration Seals) may also be used as further support data;
4. Be based upon full knowledge of the elements of the construction to be protected and the understanding of the probable behavior of that construction and the recommended firestop system protecting that construction if it was subjected to the appropriate Standard Fire Test method for firestops for the rating indicated on the EJ;
5. Be limited only to specific conditions and configurations upon which the EJ was rendered and should be based upon reasonable performance expectations for the recommended firestop system under those conditions;

6. Be accepted only for a single, specific job and project location and should not be transferred to any other job or project location without thorough and appropriate review of all aspects of the next job or location's circumstances.

Basic Presentation Requirements

Proper EJs should:

1. Be presented in appropriately descriptive written form with or without detail drawings where appropriate;
2. Clearly indicate that the recommended firestop system is an EJ;
3. Include clear directions for the installation of the recommended firestop system;
4. Include dates of issue and authorization signature as well as the issuer's name, address and telephone number;
5. Reference tested system(s) upon which design (EJ) is based on;
6. Identify the job name, project location and firm EJ is issued to along with the non-standard conditions and rating supported by the EJ;
7. Have proper justification (i.e. UL, ULC, Intertek, SWRI or other independent laboratory system(s) and or opinions);
8. Provide complete descriptions of critical elements for the firestop configuration.

These should include, but not be limited to the following:

a. Basic, Common

- Type(s) of assembly used or being penetrated;
- Rating supported by the EJ.

b. Through Penetrations

- Penetrating item(s) (type, size, etc.);
- Annular space requirements, (minimum, maximum, actual, nominal, etc.)
- Opening size;
- Firestop product(s) to be used, type and amount (thickness if applicable);
- Accessory items(s) (i.e. anchors, backing material, etc.)

c. Joints

- Joint Width (installed width, nominal)
- Movement Capability;
- Movement Class (thermal, wind sway, seismic);
- Accessory item(s) (i.e. insulation type, thickness and compression, etc.)

d. Duct Enclosure Systems

- Duct System Type (i.e. kitchen exhaust, hazardous material exhaust, ventilation, supply/return, etc);
- Duct Construction – dimensions, material, gauge, reinforcement, connections, orientation (horizontal, vertical or both);
- Enclosure System – brand name designation, description, fire resistance rating;
- Thickness, density, number of layers, fire rating, clearance to combustibles, material joints, mechanical attachment to duct, duct support system, access door construction.

- Firestop System – annular space dimensions, floor/wall construction, design number, components, installed thickness.
- e. Perimeter Fire Barrier Systems
- Type(s) of assembly used (i.e. Glass, Aluminum, Granite, Concrete, etc.)
 - Hourly rating required
 - Closest Listed System upon which the EJ is based.
 - Joint Width
 - Static or Dynamic
 - Safing Insulation Type(s), thickness and compression, etc.
 - Curtain Wall Insulation Type(s), thickness (if required).
 - Five Basic Principles
 1. Mechanical Attachment of the Spandrel Insulation
 2. Protection of the Mullions
 3. Compression fitting and orientation of the Safing Insulation
 4. Installation of a Reinforcement Member(s), stiffener, at the safe-Off area behind the spandrel insulation.
 5. Firestop Coating, type, thickness
- f. Continuity Head-of-Wall Joints
- Joint Width (installed width, nominal)
 - Movement Capability;
 - Movement Class (thermal, wind sway, seismic);
 - Accessory item(s) (i.e. insulation type, thickness and compression, etc.)

IFC recommends that these guidelines be considered when evaluating whether any firestop system EJ meets minimal requirements. Questions concerning the EJ request should be addressed to the initiator of the design recommendation.