

Recommended IFC Guidelines For Evaluating Engineering Judgments on Fire Resistant Duct Enclosure Systems for Ventilation Ducts

The International Firestop Council (IFC) is a not for profit association of manufacturers and users of fire protective materials and systems. IFC's mission is to promote the technology of fire containment in modern building construction through research, education programs, and the development of safety standards and code provisions. These recommended guidelines are presented as part of IFC's educational information program. They are for informational and educational purposes.

The Premise of Fire Resistant Duct Enclosure Systems

Fire Resistant Duct Enclosure Systems protect ventilation ducts against the passage of fire, hot gases and smoke enabling them to perform their intended function during fire conditions. The assemblies being enclosed are ducts providing a life safety function in a building. These systems can be utilized as a shaft alternative to provide a fire resistance rated enclosure when accepted by the local jurisdiction per the alternate methods and materials section of the building code. The most accepted method for evaluating fire rated duct enclosure systems is ISO 6944, "Method for Determination of the Fire Resistance of Ventilation Ducts".

The elements of a tested and rated duct enclosure system constitute a specific and inseparable engineered unit that must be utilized as such. Fire Resistant Duct Enclosure Systems are tested and listed by independent testing agencies and the specific elements of each design become part of the listing.

Beyond the listed fire resistant duct enclosure systems, there is a need for a means to properly address unanticipated construction configurations that fall outside of the envelope of tested systems. Because such conditions often cannot be redesigned and must not be ignored, the fire resistant duct enclosure industry addresses these types of occurrences through the issuance of Engineering Judgments (EJ's). In that these recommendations are not based upon identical fire testing of the specific design in question, it is important that engineering judgments be developed in accordance with sound engineering practice to ensure that life safety is not compromised.

Construction industry professionals, building officials, fire officials, firestop contractors and others need appropriate guidelines for evaluating and using such judgments. Toward that end, the IFC has developed a set of Recommended IFC Guidelines for Evaluating Fire Resistant Duct Enclosure Systems utilizing Engineering Judgments.

IFC EJ Guidelines

Fire Resistant Duct Enclosure Systems Engineering Judgments should:

1. Not be used in lieu of tested systems when available;
2. Be issued only by Fire Resistant Duct Enclosure Manufacturer's qualified technical personnel or, in concert with the manufacturer, by a knowledgeable registered Professional Engineer, or Fire Protection Engineer, or an independent testing agency that provides listing services for fire resistant duct enclosure systems;
3. Be based upon interpolation of previously tested fire resistant duct enclosure 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) may also be used as further justification;
4. Be based upon full knowledge of the elements of the construction, and their behavior, within close proximity of the fire resistant duct enclosure system;
5. Be limited only to the specific conditions and configurations upon which the engineering judgment was rendered and should be based upon reasonable performance expectations for the recommended fire resistant duct enclosure systems 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;

Minimum Suggested Content

Proper Fire Resistant Duct Enclosure Systems Engineering Judgments should:

1. Be presented in appropriately descriptive written form with or without detail drawings as may be deemed necessary;
2. Clearly indicate that the recommended fire resistant duct enclosure system is an engineering judgment;
3. Include clear directions for the installation of the recommended fire resistant duct enclosure 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) which design (EJ) is based on;
6. Identify the job name, project location and firm EJ is issued for along with the non-standard conditions and rating supported by the EJ;
7. Have relevant documentation (i.e., UL, ULC, OPL, Intertek, SwRI or other independent laboratory system(s), test report(s), and or opinions);

8. Provide complete descriptions of critical elements for the fire resistant duct enclosure system configuration. These should include, but are not limited to the following:
 - a. Duct System Type - e.g., stair pressurization, smoke exhaust, etc;
 - b. Duct Construction – dimensions, material, gauge, reinforcement, connections, orientation (horizontal, vertical or both), pressure rating on duct system;
 - c. Enclosure System – brand name designation, description, fire resistance rating;
 - Thickness, density, number of layers, fire rating
 - Installation details such as mechanical attachments, material joints/overlaps, duct support system
 - Firestop System – annular space dimensions, floor/wall construction, design number, components, installed thickness. Please refer to IFC Guideline for Evaluating Firestop Systems Engineering Judgments for additional details.

IFC recommends that these guidelines be considered in evaluating whether any fire resistant duct enclosure system engineering judgment meets minimal requirements. Questions concerning the EJ request should be addressed to the initiator of the judgment. IFC recommends that the AHJ be consulted regarding the EJ prior to the installation of the fire resistant duct enclosure system.

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