



April 3, 2008

TO: PARTIES INTERESTED IN EVALUATION REPORTS ON METALLIC HVAC DUCT ENCLOSURE ASSEMBLIES

SUBJECT: Proposed Revisions to the Acceptance Criteria for Metallic HVAC Duct Enclosure Assemblies, Subject AC179-0408 (KR/RB).

Dear Madam or Sir:

The revisions proposed to the subject acceptance criteria, as presented in the enclosed criteria draft, are being posted on the ICC-ES web site to allow for public comment. The revisions include:

1. Revise editions of standards noted in Section 1.3 to show the current standards referenced in the 2006 *International Building Code (IBC)* and the 2006 *International Mechanical Code (IMC)*, or the most current editions available.
2. Revise Section 3.2 to include language from 2006 IMC Section 604.3 that references ASTM E 2231 for specimen preparation and mounting procedures, and to include ASTM E 2231 in Section 1.3.
3. Revise Section 1.4.3 to reflect changes in IBC Section 707.

You are cordially invited to submit written comments, within 30 days of the date of this letter. An explanation of the alternate criteria process can be found on our web site at http://www.icc-es.org/Criteria_Development/alternative_criteria_process.shtml.

All comments received in the 30-day comment period will be considered. During this same 30-day period, however, the draft criteria will be balloted to the Evaluation Committee. If the public comments raise major issues, generate controversy, or require the criteria to be substantially rewritten, then ICC-ES staff may decide to reballot the criteria; or place a revised draft on the web site for further public comment; or put the criteria on the agenda for a future Evaluation Committee meeting.

Correspondence received and a memo outlining staff's resolution of the comments in the correspondence will be posted on the web site shortly after the close of the comment period.

Your cooperation is requested in forwarding to the Los Angeles business/regional office all material directed to the Evaluation Committee. Parties interested in the deliberations of the committee should refrain from communicating, whether in writing or verbally, with committee members. The committee reserves the right to refuse communications that do not comply with this request.

Newly approved acceptance criteria may involve test methods or test protocols that are not currently included in the scope of testing services offered by accredited testing laboratories. As noted in the ICC-ES Rules of Procedure for Evaluation Reports, the scope of the laboratory's accreditation must include the type of testing that is to be reported to ICC-ES. We encourage accredited laboratories to expand their scopes of accreditation to include testing under newly approved acceptance criteria. Please note that testing laboratories must be accredited by the International Accreditation Service (IAS) or by another accreditation body that is a signatory to the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement. For further information, please contact IAS at (562) 699-0541, extension 3309, or send an e-mail to pmccullen@iasonline.org.

If you have any questions, please contact the undersigned at (800) 423-6587, extension 5694, or Richard Beck P.E., Principal Mechanical Engineer, at extension 5690. You may also reach us by e-mail at es@icc-es.org.

Yours very truly,



Ken Roberts
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KGR/raf

Enclosure

cc: Evaluation Committee



PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOR METALLIC HVAC DUCT ENCLOSURE ASSEMBLIES

AC179

Proposed June 2008

Effective November 1, 2005

Previously approved February 2005, October 2005

PREFACE

Evaluation reports issued by ICC Evaluation Service, Inc. (ICC-ES), are based upon performance features of the International family of codes and other widely adopted code families, including the Uniform Codes, the BOCA National Codes, and the SBCCI Standard Codes. Section 104.11 of the *International Building Code*[®] reads as follows:

The provisions of this code are not intended to prevent the installation of any materials or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety.

Similar provisions are contained in the Uniform Codes, the National Codes, and the Standard Codes.

ICC-ES may consider alternate criteria, provided the report applicant submits valid data demonstrating that the alternate criteria are at least equivalent to the criteria proposed in this document, and otherwise meet the applicable performance requirements of the codes. Notwithstanding that a product, material, or type or method of construction meets the requirements of the criteria proposed in this document, or that it can be demonstrated that valid alternate criteria are equivalent to the criteria in this document and otherwise meet the applicable performance requirements of the codes, ICC-ES retains the right to refuse to issue or renew an evaluation report, if the product, material, or type or method of construction is such that either unusual care with its installation or use must be exercised for satisfactory performance, or malfunctioning is apt to cause unreasonable property damage or personal injury or sickness relative to the benefits to be achieved by the use of the product, material, or type or method of construction.

PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOR METALLIC HVAC DUCT ENCLOSURE ASSEMBLIES

1.0 INTRODUCTION

1.1 Purpose: The purpose of this acceptance criteria is to establish requirements for fire protection enclosure systems, applied to metallic HVAC ducts which provide an alternate to required fire-resistance-rated shafts or an alternate to required fire dampers in specific locations, to be recognized in an ICC Evaluation Service, Inc. (ICC-ES), evaluation report under the 20036 *International Building Code*® (IBC) and the 20036 *International Mechanical Code*® (IMC). Bases of recognition are IBC Sections 104.11, 707.2, 712, 716 and ~~4019.4.3~~ 1020.1.3, and IMC Sections 105.2 and 607.

1.2 Scope: This criteria includes requirements for applied, rigid or flexible fire protection enclosure systems (including stability, integrity, and insulation) that are installed on metallic HVAC ducts, yielding an alternate to required fire-resistance-rated shafts which are required to be protected from both internal and external fire exposure, or required fire dampers. This criteria provides an alternate to shaft enclosures for vertical ducts, and an alternate to fire dampers in horizontal ducts (penetrating fire barriers, fire partitions, and or smoke barriers) and vertical ducts connecting not more than two stories. This criteria is not applicable to conventional shaft walls nor to commercial kitchen hood ventilation systems (grease ducts, which are addressed in AC101).

1.3 Codes and Reference Standards: Reference Documents:

1.3.1 20036 *International Building Code*® (IBC), International Code Council.

1.3.2 20036 *International Mechanical Code*® (IMC), International Code Council.

1.3.3 International Standard ISO 6944-1985, Fire resistance tests—Ventilation ducts, International Organization for Standardization.

1.3.4 ASTM C 411-~~92~~97, Test Method for Hot-surface Performance of High-temperature Thermal Insulation, ASTM International.

1.3.5 ASTM C 518-~~85~~04, Standard Test Method for Steady State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus, ASTM International.

1.3.6 ASTM E 84-~~98~~04, Standard Test Method for Surface Burning Characteristics of Building Materials, ASTM International.

1.3.7 ASTM E 119-~~98~~00, Standard Test Methods for Fire Tests of Building Construction and Materials, ASTM International.

1.3.8 ASTM E 814-~~97~~02, Standard Test Method for Fire Tests of Through-penetration Fire Stops, ASTM International.

1.3.9 ASTM E 2231-04, Standard Practice for Specimen Preparation and Mounting of Pipe and Duct Insulation Materials to Assess Surface Burning Characteristics.

1.4 Definitions:

1.4.1 HVAC Duct: For the purposes of this criteria, a metallic heating, ventilating, or air-conditioning (HVAC) duct fabricated in accordance with Chapter 6 the IMC. Often referred to as an air duct.

1.4.2 Shaft: An enclosed space extending though one or more stories of a building, connecting vertical openings in successive floors, or floors and roof.

1.4.3 Shaft Enclosure: The walls or construction forming the boundaries of a shaft. For HVAC ducts penetrating more than two floors, IBC Section 716.6 requires shaft enclosure walls to be fire-resistance-rated in accordance with Section 707.4. Section 707.4 requires the rating to be one or two hours, depending on the number of floors penetrated by the shaft. Section 706~~7~~ requires the shaft enclosure walls to satisfy the requirements of a fire barrier in accordance with Section 706 or horizontal assemblies in accordance with Section 711, or both. Section 703.2.1 requires all fire-resistance-rated walls to be assigned a rating based on fire exposure from the side with the least resistance. Fire-resistance-rated shaft enclosures are required for vertical HVAC duct penetrations of fire-resistance-rated floors or floor/ceiling assemblies, with the following exceptions: (1) a fire damper placed at the floor line is allowed when connecting not more than two stories; ~~and or~~ (2) a maximum 4-inch-diameter HVAC duct is allowed to connect up to three stories without damper or shaft protection, provided all the exceptions to Section 716.6.1 are satisfied.

2.0 BASIC INFORMATION

2.1 General: The following information shall be submitted:

2.1.1 Product Description: Information on the manufacturing process of the fire protection enclosure system; method of packaging and product identification; specifications and/or mill order certificates for steel duct material, including gage, thickness and galvanization details.

2.1.2 Installation Instructions: Description of fasteners, including manufacturer's type and method of application; details of duct supports; description of any covering or linings for the insulation material.

2.1.3 Packaging and Identification: A description of the method of packaging and field identification of the fire protection enclosure system. Identification provisions shall include the evaluation report number, the name or logo of the inspection agency, and a description of safety labeling.

2.2 Testing Laboratories: Testing laboratories shall comply with Section 2.0 of the ICC-ES Acceptance Criteria for Test Reports (AC85) and Section 4.2 of the ICC-ES Rules of Procedure for Evaluation Reports.

2.3 Test Reports: Test reports shall comply with AC85. Test reports shall include test specimen description, details of the test method, manner of testing, test results, calculated results, and photographs. The test reports shall also include information required by the applicable standard.

2.4 Product Sampling: Sampling of the duct insulation material for tests under this criteria shall comply with Section 3.1 of AC85.

3.0 TEST METHODS AND PERFORMANCE REQUIREMENTS

3.1 General: Fire protection enclosure systems tested under this criteria shall satisfy the requirements of Sections 3.2, 3.3, 3.4, and 3.5 and/or 3.6.

3.2 Surface-burning Characteristics: Fire protection covering systems, including adhesives, when used, shall have a flame-spread index of not more than 25 and a smoke-developed index of not more than 50, when tested in accordance with ASTM E 84 using the specimen preparation and mounting procedures of ASTM E 2231. Duct coverings shall not flame, flow, smolder or smoke when tested in accordance with ASTM C 411 at the temperature to which they will be exposed in service. The test temperature shall not fall below 250°F (121°C).

3.3 Through-penetration Fire-stops: Through-penetration fire-stops that are part of any test assembly evaluated under this criteria shall be tested in accordance with ASTM E 814. The test period shall be 1, 2, 3 or 4 hours. There shall be no structural collapse, failure or opening of the duct cavity or through-penetration fire-stop during the fire-exposure test or the hose-stream test.

3.4 Durability Tests:

3.4.1 The purpose of aging durability tests is to simulate the effects of long-term exposure to typical in-service conditions on the thermal transmission properties of the duct covering materials.

3.4.2 A minimum of eight samples of the duct enclosure material is needed, in the thickness intended for use. The length and width of the test specimen shall comply with ASTM C 518, and all specimens shall be conditioned for a minimum of 24 hours at 75°F ± 5°F (23.8°C ± 2.7°C) with a relative humidity of 50 ± 5 percent.

3.4.3 Four samples are exposed to the effects of temperature aging. An additional four samples are reserved as control samples for comparison.

The temperature-aging samples are placed on a rack in a vertical position, with a clearance, between samples, of between ³/₈ and ³/₄ inch (9.5 to 19.1 mm). The rack is placed into an oven that has been preheated to a temperature of 300°F (149°C). After 12 hours of exposure, the oven is shut off and the specimens are allowed to cool for 12 hours. This cycle is repeated 10 times.

On completion of the final cycle, the specimens are removed from the oven and allowed to cool for a period of two hours at standard atmospheric conditions.

3.4.4 Thermal conductivity properties of temperature-aged samples and control samples are determined in accordance with ASTM C 518. The average thermal conductivity of the temperature-aged samples shall be reported as a percentage of the average thermal conductivity of control samples.

3.4.5 Conditions of Acceptance: When compared to results for control specimens, thermal conductivity shall not increase by more than 10 percent as a result of temperature aging.

3.5 Ducts with Fire Protection Enclosure Systems in lieu of Fire-resistance-rated Shaft Walls: To establish equivalence with fire-resistance-rated vertical shaft

enclosures and fire dampers, the proprietary enclosure material and duct assembly shall be tested in accordance with ASTM E 119. The test specimen shall be fabricated in the form of a wall, and there shall be fire exposure to both sides, with the assigned fire-resistance rating being that of the lower of the two sides. The test specimen configuration shall consist of metallic duct material of the thinnest gage, of the maximum cross-sectional area (width to height ratio), with the minimum thickness cover, for which recognition is sought. Fire protection enclosure systems successfully tested to AC179 also qualify as an alternate to required fire dampers in horizontal or vertical applications.

3.6 Fire Protection for Horizontal and Vertical HVAC Ducts with Dedicated Fire Protection Systems in Lieu of Required Fire Dampers:

The intent of this section is to establish equivalence of duct fire protection systems to the level of protection provided by required fire dampers, for specific applications as noted herein. The fire protection system, consisting of the proprietary protection materials or assemblies, including supports, shall be tested in accordance with and shall meet the conditions of acceptance of ISO 6944 Duct A and/or Duct B. Requirements for Duct A and/or Duct B testing shall be in accordance with Annex A, Table titled "Fire Resistance Tests on Ventilation Ducts - Necessary Measurements," of ISO 6944. Recognition under Section 3.6 is limited to horizontal ducts penetrating fire-resistance-rated fire barriers, fire partitions and/or smoke barriers and to vertical ducts that connect not more than two stories, each with a maximum fire-resistance rating of two hours. The test shall be performed for horizontal and/or vertical applications, with metallic duct material of the thinnest gage, of the maximum cross-sectional area (width to height ratio), with the minimum thickness cover, for which recognition is sought.

4.0 QUALITY CONTROL

4.1 The products shall be manufactured under an approved quality control program with inspections by an inspection agency accredited by the International Accreditation Service (IAS) or otherwise acceptable to ICC-ES.

4.2 A Quality control manual documentation complying with the ICC-ES Acceptance Criteria for Quality Control ~~Manuals~~ Documentation (AC 10) shall be submitted.

5.0 EVALUATION REPORT RECOGNITION

The evaluation report shall include the following conditions of use:

5.1 The system shall bear the words "Fire-Resistance-Rated Protective Duct Assembly - DO NOT REMOVE." The wording shall be visible after the fire protection system is installed.

5.2 Substitution of fire protection systems for required fire dampers under Section 3.6 is limited to horizontal ducts penetrating fire-resistance-rated fire barriers, fire partitions and/or smoke barriers and to vertical ducts that connect not more than two stories, each with a maximum fire-resistance rating of two hours.

5.3 For fire protection systems qualified under Section 3.6, openings are not permitted for a minimum distance of 6 feet (1828.8 mm) from each side of the fire-resistance-rated assembly. ■