



Designation: **E2393–10a (Reapproved 2015) E2393 – 20**

Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers¹

This standard is issued under the fixed designation E2393; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers the establishment of procedures to inspect fire resistive joint systems, including methods for field verification and inspection.

1.2 This practice addresses all types of fire resistive joint systems and of perimeter joint protection.

NOTE 1—Fire resistive joint system and joint are defined in Test Method E1966 and UL 2079.

NOTE 2—Perimeter joint protection is defined in Test Method E2307.

NOTE 3—Fire resistive joint systems include joints between two fire resistive assemblies, and perimeter joints between a fire resistive floor assembly and a non-fire-resistive wall assembly. The application of these systems are sometimes extended based on an evaluation to other types of construction.

1.3 This practice provides methods by which qualified inspectors verify that required fire resistive joint systems on a project have been installed and that their installations are in accordance with the inspection documents.

1.4 The values stated in inch-pound units are to be regarded as standard. No other units of measurement are included in this standard.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

E176 Terminology of Fire Standards

E631 Terminology of Building Constructions

E699 Specification for Agencies Involved in Testing, Quality Assurance, and Evaluating of Manufactured Building Components

E1966 Test Method for Fire-Resistive Joint Systems

E2307 Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus

2.2 *UL Standard:*³

UL 2079 Fire Tests of Fire Resistive Joints

2.3 *Other Documents:*

International Building Code⁴

NFPA 5000 Building Code⁵

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from Underwriters Laboratories (UL), 333 Pfingsten Rd., Northbrook, IL 60062-2096, http://www.ul.com.

⁴ Available from International Code Council (ICC), 500 New Jersey Ave., NW, 6th Floor, Washington, DC 20001, http://www.iccsafe.org.

⁵ Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471, http://www.nfpa.org.

3. Terminology

3.1 *Definitions*—Terms defined in Terminology E631, Terminology E176, and Practice Specification E699 will prevail for terms not defined in this document.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *accredited testing laboratory*—a company engaged in conducting testing and possesses a valid evaluation report for testing services and is recognized by the AHJ.

3.2.2 *authority having jurisdiction (AHJ)*—the designated authority, or their duly authorized representative, charged with the administration and enforcement of the local fire code or building code, or both.

3.2.3 *authorizing authority (AA)*—the designated person, or organization, or their duly authorized representative, charged with the administration and enforcement of the provisions of this inspection document.

3.2.3.1 *Discussion*—

Examples of the AA include the responsible Architect, Engineer, Building Owner, or their representatives.

3.2.4 *evaluation report*—an approved document issued by the Model Code Body Evaluation Service or by the AHJ.

3.2.5 *inspection document*—any information provided to the inspector by the AA that is to be used as the basis for the inspection process. This information shall include, but is not limited to, project specifications, contract drawings, Listed Designs, judgments, manufacturer's instructions and designs, building codes and other documentation.

3.2.5.1 *Discussion*—

The approved fire resistive joint system submittal ~~should have sufficient details including the manufacturer's~~ typically includes the manufacturer's product data, a design listing of the tested fire resistive joint system, or the engineering judgment design with illustrated drawings or descriptive text, or both, for the purpose of verifying each installation and conducting the field-inspection procedures.

3.2.6 *inspection form*—the document contained in this practice that is used to record information obtained during the inspection(s).

3.2.7 *inspector*—an individual meeting the qualifications set forth in this document and who performs the inspection.

3.2.8 *judgment*—an evaluation of a field condition which does not conform to an existing tested and listed system.

3.2.8.1 *Discussion*—

<https://standards.iteh.ai/catalog/standards/sist/5663e6cd-9ddd-48ab-8c86-51471a6ec04d/astm-e2393-20>

Judgments are expected to be issued by a manufacturer or an accredited testing laboratory on the basis of an appropriate combination of engineering principles and testing.

3.2.8.2 *Discussion*—

The judgment is commonly referred to as an “Engineering Judgment” in the fire stopping industry. These judgments are not always issued by Engineers.

3.2.8.3 *Discussion*—

Some AHJs allow a judgment by a manufacturer if there is no tested and listed system for the non-typical condition, others do not. Most AHJs will allow judgments by accredited testing laboratories.

3.2.9 *listing label*—identification applied to the product that includes the name of a quality assurance agency indicating that a representative sample of the product or material has been tested and evaluated by the quality assurance agency.

3.2.10 *quality assurance agency*—a company that is engaged in conducting inspections, or certification, or listing and labeling services, or any combination, and possessing a valid evaluation report for quality assurance and is recognized by the AHJ.

4. Summary of Practice

4.1 This practice sets forth the minimum requirements to qualify an inspector to use this practice.

4.2 This practice identifies the types of fire resistive joint systems subject to the inspection procedures outlined in this practice.

4.3 This practice provides the minimum information required to verify compliance of installed fire resistive joints with inspection documents.

4.4 This practice provides a standard inspection form that is to be used when inspecting fire resistive joint systems.

4.5 This practice provides a standard report format that is to be used when reporting the inspection results.

5. Significance and Use

5.1 This practice is intended to provide a standard set of guidelines that are to be followed when conducting and reporting on inspections of installed fire resistive joint systems.

5.2 This practice is intended to provide a means to verify compliance of the installed fire resistive joint systems to the inspection documents.

5.3 This practice is not intended to provide a basis for selecting installers or products, or both.

5.4 This practice is not intended to establish any performance criteria of the inspected fire resistive joint systems.

6. Inspector Qualifications

6.1 Inspectors shall either be contract inspectors or jurisdictional inspectors.

6.2 *Contract Inspectors:*

6.2.1 Contract Inspectors shall be acceptable to the AHJ and shall meet at least one of the following requirements.

6.2.1.1 Meet the criteria contained in Practice Specification E699 for agencies involved in quality assurance, or

6.2.1.2 Have a minimum of two years experience in construction field inspections and have education, credentials, and experience acceptable to the AA, or

6.2.1.3 Be a Quality Assurance Agency accredited by the AHJ.

6.2.2 *Conflicts of Interest:*

6.2.2.1 The contract inspector shall be completely independent of, and divested from, the installer, contractor, manufacturer, or supplier of any material being inspected.

6.2.2.2 The contract inspector shall not be a competitor of the installer, contractor, manufacturer, or supplier of any material being inspected.

6.2.3 The contract inspector shall submit notarized statements to the AA assuring compliance with 6.2.2.

6.2.4 The contract inspector shall provide proof of insurance required by statute, or by the AA, or by the AHJ, or by any combination of these.

6.2.5 The contract inspector shall make a written submission to the AA requesting acceptance. If accepted, the AA shall present the contract inspector with written confirmation of acceptance.

6.3 *Jurisdictional Inspectors:*

6.3.1 A jurisdictional inspector shall have qualifications as required by the AHJ.

7. Inspection Documents

7.1 The inspection documents shall be reviewed by and acceptable to the AA and AHJ.

7.2 The AA shall be responsible for ensuring that the inspection documents do not contain conflicting information.

7.3 The AA shall provide the inspector with a complete set of inspection documents at least ten working days prior to the inspection. The inspector shall review all inspection documents prior to conducting any inspection. When the inspector believes that the inspection documents contain conflicting information or documentation that the inspector believes is insufficient to perform the inspection, the inspector shall submit written notification of the potential conflict and obtain written clarification from the AA before conducting any inspection.

7.4 As part of the inspection documents, Listed Designs shall be provided for every fire resistive joint system, as a reference against which to compare the installation. As an alternative for every case where a Listed Design does not exist for a particular application, a Judgment, issued by a manufacturer or an accredited testing laboratory and acceptable to the AHJ, shall be provided as a reference against which to compare and inspect the installation.

8. Materials

8.1 The inspector shall verify that the materials and systems used for fire resistive joints on the job are in compliance with listed systems that have been tested in accordance with Test Method E1966 or UL 2079, and are Listed and Labeled for the intended use.

NOTE 4—Listed and Labeled refers to materials, devices, or assemblies that have been tested by an accredited testing laboratory after which the test results and description of the materials, devices, or assemblies are published by an accredited quality assurance agency and the materials, devices, or assemblies bear a Listing Label.

8.2 All materials shall bear a Listing Label as defined in 3.2.9. Manufacturer's container labels shall include the manufacturer's name, product name and product description. Other components of the fire resistive joint system shall also be identifiable by labeling or other method approved by the AHJ.

8.3 All materials shall be as identified on the inspection documents.

8.4 All materials used in fire resistive joint systems shall be in conformance with materials for listed systems that have been tested as part of the system in accordance with Test Method E1966 or UL 2079 as required by the building code or fire code, or both.

9. Inspection Schedule

9.1 The inspector and installer(s) shall mutually agree upon a schedule for the notification of the following:

9.1.1 Start of installation of fire resistive joint systems,

9.1.2 Anticipated schedule of inspection(s) of fire resistive joint systems, and

9.1.3 Anticipated completion of inspection(s).

9.2 The inspection schedule shall not interfere with the installation process.

9.3 The installer shall notify the inspector within one working day when any item agreed to on the schedule must be changed due to unforeseen circumstances, such as material delays, project change orders, or other installation conflicts.

10. Inspection

10.1 The inspector shall be permitted to enter the premises to review the applicable inspection documents, to observe the installation in progress, to inspect completed work, and to perform overall functions relative to their duty as inspector.

10.2 The inspector shall use the inspection documents, in 7.3, to identify and locate fire rated assemblies on the project that are subject to the installation of fire resistive joint systems.

10.3 The installer shall notify the inspector of the arrival of the materials (described in 8.1 through 8.4 inclusive).

10.4 Prior to installation, the inspector shall verify that all materials received for the installation of the fire resistive joint systems meet the requirements of 8.1 through 8.4 inclusive and record this information on the inspection form.

10.5 Prior to installation, the inspector shall verify any construction detail on the inspection documents that will not be visible after the fire resistive joint system installation and record this information on the inspection form.

NOTE 5—The following are some examples of construction details that may not be visible after the installation process: amount of free movement area, the rated floor assembly thickness, the width of opening, and the wall construction.

10.6 The inspector shall not supervise or in any manner direct any aspect of the installation process. This includes, but is not limited to, the following:

10.6.1 Handling and storage of materials,

10.6.2 The mixing of materials,

10.6.3 The cutting or fastening of materials, and

10.6.4 The preparation of substrates.

10.7 When work is started and completed in accordance with the schedule in Section 9, the installer shall notify the inspector. Inspection of completed work shall take place within two working days from notification by the installer.

10.8 The inspector shall verify and document that the fire resistive joint systems required in the inspection documents have been installed.

10.9 The inspector shall verify that every fire resistive joint system inspected as required by 10.12 is in accordance with one of the documents specified in 7.4.

10.10 The inspector shall verify that every system inspected as required by 10.12.1 is in accordance with the manufacturer's instructions.

10.11 The inspector shall verify compliance of the fire resistive joint system by observing the installation process and by taking and recording measurements of the substrates and materials being installed or by destructive examination of completed installations.

10.12 Inspection frequency shall depend on the method of inspection and the scope of the project. The method of inspection shall be one of the following:

10.12.1 The inspector shall be on site during installation and randomly witness a minimum of 5 % of total linear feet of each type of fire resistive joint system being installed, or

10.12.2 The inspector shall conduct a post-installation inspection, in accordance with 10.12.2.1(1) through 10.12.2.1(4), except for mechanical systems, which shall be inspected in accordance with 10.12.1.

NOTE 6—It is usually practical and cost-effective to inspect mechanical joint systems by witnessing installation.

10.12.2.1 The method shall be approved by the AA and the AHJ, which shall require one of the following methods:

(1) Destructive type verification of the fire resistive joint system and repair of the joint system;

(2) Disassembly and verification of the components and reinstallation of the joint system;

(3) Visual inspection and verification of the component or entire joint system, where a visual inspection establishes conformance to the document enumerated in Section 7; or

(4) Other appropriate methods showing compliance with the approval process or manufacturers' instructions or specifications, or both.

10.12.2.2 Inspection shall consist of a minimum of one sampling per type of joint system per 500 lineal feet.

NOTE 7—The AA may determine the types of fire resistive joint systems and subsequently the number of each type that is to be inspected in addition to the minimum required by this practice. The determination of a "type" will typically be a function of a unique combination of parameters, including joint type (head of wall, wall to wall, floor to wall, floor to floor, floor to exterior wall) firestopping material or system (for example, intumescent, caulk, mortar, sealant, mechanical, factory preassembled), and substrates (for example, gypsum wall, concrete floor, composite floor deck).

10.13 Any type of fire resistive joint system noted in 10.12 that does not comply with the inspection documents will require repair or replacement and re-inspection of that fire resistive joint system plus one full additional inspection, of the percentage specified in 10.12.1 or of the number specified in 10.12.2, as applicable, of that type fire resistive joint system. If non-compliance occurs on 10 % or more of the quantity of like fire resistive joint systems within 10.12.1 or 10.12.2, then inspection of those particular type fire resistive joint systems shall cease. The installer shall inspect their own work, repair or replace those like fire resistive joint systems within the area prior to re-commencement of inspections by the inspector.

10.14 All observed deficiencies shall be documented and marked on the inspection forms. In addition, the inspector shall physically identify the location where a required fire resistive joint system has been omitted or where the inspection results indicate that the installed fire resistive joint system does not comply with the inspection documents.

10.15 The inspector shall advise the contractor of any deficiencies noted within one working day.

10.16 Repair of fire resistive joint systems damaged during inspection shall be conducted according to the manufacturers recommended procedures and methods. The repaired fire resistive joint system that was damaged shall comply with the inspection documents.

10.17 When repairs have been made to fire resistive joint systems with documented deficiencies, the installer shall notify the inspector. Follow up inspections of fire resistive joint systems with repaired deficiencies should take place within two working days from notification by the installer. The repaired fire resistive joint system that contained deficiencies shall comply with the inspection documents.

10.18 Inspection forms, as defined in 3.2.6, shall be submitted to the AA and installer within one working day after an area is inspected.

NOTE 8—The delivery of inspection reports in a timely manner helps to ensure that project construction schedules are not delayed and that the installer has an adequate opportunity to repair all deficiencies prior to the work of other trades (for example, installation of gypsum wallboard, ceilings, ductwork, etc.) impairing or obstructing proper installation.

11. Inspection Forms

11.1 An inspection form shall be written and clearly describe the results of the inspection and any deficiencies.

11.2 See Fig. 1 for an example of an inspection form.

11.3 Inspection forms shall be sequentially numbered, starting with "1," and only contain information about one type of fire resistive joint system. Use a new inspection form for each type of joint system. Use as many inspection forms as needed. Attach drawings and additional pages if needed.

11.4 When deficiencies or repairs are made to a fire resistive joint system, the inspection form number shall be cited on the inspection form (see Fig. 1) for cross reference.

12. Report

12.1 At the end of the installation and inspection process, the inspector shall submit a final report.

12.2 The final report shall contain a cover page with the following:

12.2.1 The project name, location, and reference number;

12.2.2 The name and address of the inspector;

12.2.3 The name and address of the installer, as well as the prime contractor if different;

12.2.4 The name and address of the AA; and

12.2.5 The name and address of the AHJ.

12.3 The final report shall also contain a summary page with the following:

12.3.1 Types and quantity of each fire resistive joint system on the project according to the inspection documents.

12.3.2 Which verification method from 10.9 was used to ascertain compliance with the inspection documents.

12.3.3 The quantity of each system inspected on the project and a notarized written statement by the contract inspector that the number of fire resistive joint systems inspected comply with 10.12.

12.3.4 The summary page shall also contain percentages of deficiencies for each type of fire resistive joint system referenced in the inspection documents.

INSPECTION FORM		Reference No. _____
Inspection Date: _____	Inspector: _____	
Installer: _____	AA: _____	
AHJ: _____	Project: _____	
Fire Resistive Joint System Type per Inspection Documents: _____		
Quantity of Fire Resistive Joint System Type on Project: _____	Quantity Inspected Today: _____	
Total Quantity Inspected to Date: _____		
Inspected Fire resistive joint systems		
Location & Inspection Document Reference	Deficiency	
Repaired Fire resistive joint systems		
Location & Inspection Form Reference	Compliant "Yes" If "No" State Deficiency	

FIG. 1 Example of Inspection Form

12.3.5 A total number of deficiencies shall be expressed as a percentage of the total number of feet of fire resistive joint system inspected.

12.4 The final report shall also contain copies of all information submitted by the contract inspector to the AA.

12.5 The final report shall also contain copies of all inspection forms submitted during the inspection process. They shall be arranged chronologically.

13. Keywords

13.1 fire resistive joint system; firestopping; inspection; inspector; joint; joint system

APPENDIX

(Nonmandatory Information)

X1. DISCUSSION OF ITEMS IN THIS PRACTICE

X1.1 Inspector

X1.1.1 The inspector is responsible for the verification and inspection of all the fire resistive joint systems on the inspection documents.

X1.1.2 Therefore, it is possible that in addition to meeting the requirements set forth in this practice, the inspector is also one of the following:

X1.1.2.1 A code official,

X1.1.2.2 An architect,

X1.1.2.3 An engineer,

X1.1.2.4 A representative of a quality assurance agency or an accredited testing laboratory, or

X1.1.2.5 A licensed professional in the construction industry.

X1.2 The procedures discussed in this practice should be established at a mandatory pre-construction meeting attended by representatives of the owner, general contractor, the subcontractors responsible for openings or joints, the fire resistive joint system installer, and the inspector.

X1.3 In order to facilitate co-operation between all parties during the installation and inspection of the fire resistive joint systems, the following documents may be made available from the AA: project specifications, drawings, penetration schedule, designed joint movement schedule, and the approved fire resistive joint systems submittals. Project drawings should include, but not be limited to, architectural, structural, mechanical, plumbing, electrical, and fire protection. These drawings, the penetration schedule, and designed joint movement schedule are normally sufficient for identifying and locating all fire resistance rated assemblies on the project as well as the joints and openings.

X1.4 Normally, a current design listing of a fire resistive joint system generated by an approved quality assurance agency should be deemed to be adequate information for reference in contracts, specifications, drawings, submittals and reports. Published fire resistive joint system design listings are used if available. Judgments are from manufacturers or accredited testing laboratories and are then submitted for acceptance to the AHJ.

NOTE X1.1—Examples of listing and testing agencies that produce design listings are Factory Mutual, Omega Point Laboratories, Underwriters Laboratories, Underwriters Laboratories of Canada, and Warnock Hersey/Intertek Testing Services.

X1.5 Prior to the establishment of the inspection documents, the fire resistive joint system installer(s) should make a submittal through the proper construction document established communication channels, which is submitted, possibly by others, to the AA. The name of the fire resistive joint system product manufacturer, a description of the products and systems that will be installed, and the manufacturer's installation instructions should be presented for approval by the AA.

X1.6 The inspector can use the following as a guide during inspections.

X1.6.1 The inspector should bring any tools needed to examine the fire resistive joint system for compliance. These tools may include, but are not limited to, the following:

X1.6.1.1 A razor knife to cut into the fire resistive joint system,