Firestop 302 - Special Inspection of Firestopping: Understanding and Complying with the 2012 IBC Requirements
Firestop 302: Special inspection of firestopping: Understanding and complying with the 2012 IBC requirements

Presenter: Sarah Fanning

Southern Nevada ICC
May 12, 2016
Objectives

- Understand which buildings are subject to the IBC firestop special inspection requirements
- Explain the specific firestop inspection requirements that these buildings will need to meet
- Understand the requirements of ASTM guides E2174 and E2393, which are the code-mandated inspection procedures
- Understand the qualifications required for the inspectors and the inspection agency who will conduct the special inspections
- Become aware of the training and credentialing available when seeking, selecting, or wanting to become a firestop special inspector
What is a “special inspection”

- Code officials (AHJ) have responsibility for overall code enforcement
- Special inspection for specific elements that are extremely critical or complex
- Special inspection is by 3<sup>rd</sup>-party expert inspection agency
  - Performed according to specified standards

CLARK COUNTY DEPARTMENT OF BUILDING & FIRE PREVENTION BUREAU
4701 W. Russell Road • Las Vegas, NV 89118
(702) 455-3000 • Fax (702) 221-0630
Ronald L. Lynn, Director/Building & Fire Official * Gregory J. Franklin, Assistant Director
Samuel D. Palmer, Assistant Director * Girard Page, Sr., Deputy Fire Chief

SUBJECT: TG-17-2014 - MINIMUM APPROVAL CRITERIA FOR SPECIAL INSPECTORS AND OTHER PERSONNEL

1.0 PURPOSE: 22.02.520 Approved Special Inspector: [IBC 1703.1, 1704.1] The purpose of this guideline is to provide the criteria to comply with 22.02.520 of the Building Administrative Code and the provisions of NRS 278.575.

Some of these personnel designations are modified in the draft Administrative Code. These changes can be reflected in the next update of this TG. The Building Official shall maintain a list of approved special inspection personnel, fabrication shop inspectors, and quality systems auditors. Only approved special inspection personnel may perform special inspections in this jurisdiction.

NRS 278.575 Program to allow independent contractors to review plans and inspect buildings
The governing body of a city or county which, pursuant to NRS 278.570, appoints a building official may establish a program to allow independent contractors who comply with the requirements for certification and continuing education established pursuant to NRS 278.577 to review plans for and inspect buildings on behalf of the building official.
Special inspections mandated by Chapter 17

Select cases & elements of:

- Soils
- Foundations
- Steel construction
- Concrete construction
- Masonry construction
- Wood construction
- Wind resistance
- Seismic resistance (extensive)
- SFRM or intumescent fire-resistant steel coatings
- Smoke control
- Firestopping (as of 2012 IBC)
IBC 2012 statewide adoptions

- Arkansas
- California
- Colorado (State, local)
- Delaware (local)
- DC
- Florida
- Georgia
- Idaho
- Indiana
- Kentucky
- Louisiana
- Maryland (2015)
- Michigan
- Minnesota
- Mississippi (State, local)
- Missouri (State, local)

- Montana
- Nebraska (State, Local)
- Nevada (State, Local)
- New Jersey (2015)
- North Dakota (State, Local)
- Oregon
- Rhode Island
- South Carolina
- South Dakota (2015) (State, local)
- Utah
- USVI
- Vermont
- Virginia (without special inspection)
- Washington
- West Virginia
- Wyoming

New York City

Updates at http://www.iccsafe.org/about-icc/overview/international-code-adoptions/

- Specifying construction for the military services
- UFGS-01 45 35
  - U.S. Army Corps of Engineers (USACE)
  - Naval Facilities Engineering Command (NAVFAC)
  - Air Force Civil Engineer Center (HQ AFCEC)
  - National Aeronautics and Space Administration (NASA)
- IBC 2012
- Special Inspections
  1.5.15 Fire-Resistant Penetrations and Joints
  1.5.15.1 Special Inspector
  a. Passed the UL Firestop Exam with one year of related experience, or
  b. Passed the FM Firestop Exam with one year of related experience, or
  c. Registered Professional Engineer with related experience
3rd Party Inspections Mandatory in 2012 IBC

Chapter 17: Special inspections and tests

1705.16 Fire-resistant penetrations and joints. In high-rise buildings or in buildings assigned to Risk Category III or IV in accordance with Section 1604.5, special inspections for through-penetrations, membrane penetration firestops, fire-resistant joint systems, and perimeter fire barrier systems that are tested and listed in accordance with Sections 714.3.1.2, 714.4.1.2, 715.3 and 715.4 shall be in accordance with Section 1705.16.1 or 1705.16.2.

- High-rise: A building with an occupied floor located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.

- 1705.16.1 Penetration firestops. …. shall be conducted by an approved inspection agency in accordance with ASTM E 2174.

- 1705.16.2 Fire-resistant joint systems. …. shall be conducted by an approved inspection agency in accordance with ASTM E 2393.
Risk Category III Buildings IBC 1604.5

- Buildings and other structures that represent a **substantial hazard to human life** in the event of failure, including but not limited to:

  - public assembly > 300 occupants.
  - elementary school, secondary school or day care > 250 occupants
  - adult education > 500 occupants
  - Group I-2 > 50 occupants, no surgery or emergency
  - Group I-3 (prisons, jails)
  - > 5,000 occupants
  - Power-generating stations, water treatment facilities for potable water, waste water treatment facilities and other public utility facilities not included in Risk Category IV.
  - Buildings/structures not included in Risk Category IV containing quantities of toxic or explosive materials that exceed certain thresholds and hazardous to public if released

**OCCUPANT LOAD.** The number of persons for which the means of egress of a building or portion thereof is designed.
Risk category IV buildings IBC 1604.5

- Buildings and other structures designated as essential facilities, including but not limited to:
  - Group I-2 occupancies having surgery or emergency treatment
  - Fire, rescue, ambulance and police stations and emergency vehicle garages.
  - Designated earthquake, hurricane or other emergency shelters.
  - Designated emergency preparedness, communications and operations centers and other facilities required for emergency response.
  - Power-generating stations and other public utility facilities required as emergency backup facilities for Risk Category IV structures.
  - Aviation control towers, air traffic control centers and emergency aircraft hangars.
  - Buildings and other structures having critical national defense functions.
  - Water storage facilities and pump structures required to maintain water pressure for fire suppression.
  - Buildings and other structures containing quantities of highly toxic materials that exceed certain thresholds and pose a threat to public if released.
General Inspection Requirements

1703.1.1 Independence. An approved agency shall be objective, competent and independent from the contractor responsible for the work being inspected. The agency shall also disclose possible conflicts of interest so that objectivity can be confirmed.

1703.1.3 Personnel. An approved agency shall employ experienced personnel educated in conducting, supervising and evaluating tests and/or inspections.

- Aries Consultants Inc.
- Centurion Consultants Inc.
- CONSTRUCTION TESTING SERVICES LLC
- GeoTek Inc.
- JBA Consulting Engineers Inc.
- Kleinfelder Inc.
- NOVA Geotechnical and Inspection Services
- Terracon Consultants, Inc.
- TERPconsulting
- Western Firestop Inspection Agency
General inspection requirements: Who pays?

1704.2 Special inspections. Where application is made for construction as described in this section, the owner or the registered design professional in responsible charge acting as the owner’s agent shall employ one or more approved agencies to perform inspections during construction on the types of work listed under Section 1705. These inspections are in addition to the inspections identified in Section 110.
General Inspection Requirements: Inspector Qualifications

1704.2.1 Special inspector qualifications.
The special inspector shall provide written documentation to the building official demonstrating his or her competence and relevant experience or training. Experience or training shall be considered relevant when the documented experience or training is related in complexity to the same type of special inspection activities for projects of similar complexity and material qualities. These qualifications are in addition to qualifications specified in other sections of this code.

The registered design professional in responsible charge and engineers of record involved in the design of the project are permitted to act as the approved agency and their personnel are permitted to act as the special inspector for the work designed by them, provided they qualify as special inspectors.
ASTM E2174/E2393: Inspector Requirements

- Acceptable to AHJ
- Qualifications:
  - Meet the criteria in ASTM E699 (Construction Quality assurance agencies), OR
  - Min. 2 years construction inspection experience and credentials acceptable to Authorizing Authority, OR
  - Quality assurance agency accredited by AHJ (e.g. IAS AC291 – Special Inspection Agencies)
- No conflicts of interest
  - Completely independent of installer, contractor, manufacturer, or supplier of any material
  - Inspector to submit notarized statement indicating compliance
- Must not interfere or direct
- ASTM standard being developed for inspector qualifications
How is the Inspection Conducted?

1705.16.1 Penetration firestops. Inspections of penetration firestop systems that are tested and listed in accordance with Sections 714.3.1.2 and 714.4.1.2 shall be conducted by an approved inspection agency in accordance with ASTM E 2174.

1705.16.2 Fire-resistant joint systems. Inspection of fire-resistant joint systems that are tested and listed in accordance with Sections 715.3 and 715.4 shall be conducted by an approved inspection agency in accordance with ASTM E 2393.
The Inspection Process

- Statistical sampling
- Verify materials prior to installation
- Verify against listed systems and/or EJs
- Verify that ALL firestops installed

**ASTM E2174**: *Standard Practice for On-Site Inspection of Installed Fire Stops*

**ASTM E2393**, Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers
10.12.1 The inspector shall be on site during installation and randomly witness a minimum of 10% of each type of firestop system being installed, or

10.12.2 The inspector shall conduct a post installation inspection, which shall require destructive type verification of the firestop system and repair of the firestop system. A minimum of 2%, but not less than one, of each *type of firestop system shall be inspected per floor or for each area of a floor when a floor is larger than 10,000 ft² (946.7 m²). An area consists of 10,000 ft² or less.

*Type = 1) penetrant, 2) substrate and 3) firestop product
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 10**—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**.
CCBD – TRG-Y – Fire Resistant Penetration and Joint Confirmation & Daily Reporting Requirements

ASTM E2174 Penetrations

<table>
<thead>
<tr>
<th>INSPECTION FORM</th>
<th>Reference No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspection Date:</td>
<td>Inspector:</td>
</tr>
<tr>
<td>Installer:</td>
<td>AA:</td>
</tr>
<tr>
<td>AHJ:</td>
<td>Project:</td>
</tr>
<tr>
<td>Firestop Type per Inspection Documents:</td>
<td></td>
</tr>
<tr>
<td>Quantity of Firestop Type on Project:</td>
<td>Quantity Inspected Today:</td>
</tr>
<tr>
<td>Total Quantity Inspected to Date:</td>
<td></td>
</tr>
</tbody>
</table>

**Inspected Firestops**

<table>
<thead>
<tr>
<th>Location &amp; Inspection Document Reference</th>
<th>Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Repaired Firestops**

<table>
<thead>
<tr>
<th>Location &amp; Inspection Form Reference</th>
<th>Compliant “Yes” If “No” State Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ASTM E2393 Joints**

<table>
<thead>
<tr>
<th>INSPECTION FORM</th>
<th>Reference No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspection Date:</td>
<td>Inspector:</td>
</tr>
<tr>
<td>Installer:</td>
<td>AA:</td>
</tr>
<tr>
<td>AHJ:</td>
<td>Project:</td>
</tr>
<tr>
<td>Fire Resistant Joint System Type per Inspection Documents:</td>
<td></td>
</tr>
<tr>
<td>Quantity of Fire Resistant Joint System Type on Project:</td>
<td>Quantity Inspected Today:</td>
</tr>
<tr>
<td>Total Quantity Inspected to Date:</td>
<td></td>
</tr>
</tbody>
</table>

**Inspected Fire resistant joint systems**

<table>
<thead>
<tr>
<th>Location &amp; Inspection Document Reference</th>
<th>Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Repaired Fire resistant joint systems**

<table>
<thead>
<tr>
<th>Location &amp; Inspection Form Reference</th>
<th>Compliant “Yes” If “No” State Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Firestop Performance can Change Completely with a Small Change in any Parameter (System Dependent)

- Size and type of penetrating item(s)
- Size and shape of opening
- Desired fire (F) rating (hrs)
- Stud width for gypsum walls
- Floor or wall construction type and thickness
- Annular space *
- Percent fill (cables) *
- Temperature (T) rating?
- Leakage (L) rating?
- Water (W) rating?
- STC requirement?
Engineering Judgments are project-specific and are used when a tested system is not available.

**Tested System**

- Included on plans
- Typical conditions

**Engineering Judgment**

- Based on previously tested systems
- Project specific

Secure engineering judgments early in the design process
If Non-Compliance is Identified:

- One non-compliance:
  one full additional inspection of that type
- 10% non-compliance of one type:
  inspection halted, installer re-inspects own work
- Non-compliant firestop must be repaired/replaced
- E2174/E2393: no guidance on what is an acceptable non-compliance percentage
Firestop inspection training can be found at www.firestop.org/inspection
IFC Education Program Overview

- Why is it needed?
- Comprehensive study material from multiple authoritative sources
- Only firestop inspector exam developed and written by
  - 3rd Party Firestop Inspectors
  - Manufacturers that develop the technology and test the firestop systems
  - Scientists and engineers experienced in firestop technology
- All reading curriculum relevant to firestop inspectors
- Online curriculum at no cost*
IFC Education Program Overview (cont.)

- Reading list of linked documents and videos
- Optional online exam (test.com)
  - Free practice test
- Passing the exam = certificate of achievement
  - Space to record hands-on product training from 4 IFC-member firestop manufacturers
- AHJs:
  Ask inspectors for their IFC program certificate!
Verifying whether someone has passed the IFC inspector exam

- [www.firestop.org/certificate-holders](www.firestop.org/certificate-holders)
  - Premier certificate holders: additional hands-on product training
Special Inspection Agency accreditation - IAS AC291

- International Accreditation Service, Inc.  
  “ACCREDITATION CRITERIA FOR SPECIAL INSPECTION AGENCIES”
- Accreditation of company, not of individual inspectors
- Requires one employee to have passed UL or FM exam for firestop contractors
- Potential conflict with ASTM E2174/E2393 conflict of interest mandates

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.

- As of Nov. 2015, agencies accredited for firestop inspection:
  - 2 in New York (without UL/FM exams)
  - 1 in Auburn, WA
  - 2 in Dubai
Summary

- 2012 IBC makes firestop special inspection mandatory for high-rises and Risk Category III and IV buildings
- Approved agency shall be objective, competent and independent
- Special inspector shall provide written documentation to the building official demonstrating his or her competence and relevant experience or training
- Property owner pays for the inspection
- Inspection per ASTM E2173, E2393
- IFC program provides both education and needed written documentation
Hilti’s Best in Class Firestop Solutions

- CP 653 Speed Sleeve
- CP 680 Cast-in Device
- Fire Blocks
- Spray Systems

www.us.hilti.com/firestop
www.hilti.ca/firestop

Saving Lives Through Innovation and Education
Hilti Firestop Solutions - what’s new?
https://www.us.hilti.com/top-track-seal

TOP TRACK SEAL CFS TTS

Firestop Cable Disc
CFS-D 1”

Installation
- Fast installation: less working steps (once & done)
- Simple: ideal shape designed to saddle over top track without additional folding, taping or gluing
- No mess, zero waste: no caulk or tooling required
- Easy to inspect for compliance with project specifications
- Versatile solution for any track size under real jobsite conditions

UL Systems
- BW-S-0039
- BW-S-0040
- HW-D-0757
- HW-D-0758
- WW-S-0074
- WW-S-0075
- Firestop Submittal Generator
- Guideline Specifications
- Interior Wall CAD Details
Hilti Design Support Services:

- 100+ Hilti Field Engineers in U.S.
- On-line Firestop Design Center
- Firestop System Selector Guide
- Sample Specifications
- CAD Drawings for Typical Details
- Engineering Judgment Support
- Continuing Education Seminars
- Firestop technical support (by phone)

Firestop Design Center available at www.us.hilti.com/firestop
Hilti Field Support Services:

- 40+ Fire Protection Specialists
- 1100+ Account Managers
- Firestop Installation Training
- Product Selection / Field Consultation
- Jobsite Observation Walk-Thru
- Engineering Judgment support
- Coordination / Pre-Install Meetings
- HAFSCs Relationship
- CFS-DM Firestop Documentation Management Software
Product selection: Tools available online from manufacturers

UL Firestop System Selector

Steps to generate a submittal
Step 1: Find an appropriate UL Firestop System by directly searching with the system number or by inputting the application characteristics into the filters. The systems that best match will populate automatically.

Step 2: Select a system that matches the application by adding a check in the system box. Click on “more info” to learn more about the UL system’s attributes. Download the document as a PDF or DWG file, or to add the system to a submittal, click “Go to Submittal Generator”.

Step 3: Generating a submittal is fast and easy. Review the selected systems, related products, and additional information. If the content is complete, select “Generate Submittal.” The submittal can be saved, after which you can share it via email or print it out.

Need help? Click here for a quick tutorial.

Understand what the logos mean

Please turn off your browser’s pop-up blocker before downloading the submittal.

812 matching downloads found

C-AJ-0055
Barrier type: Concrete Floor, Concrete/Masonry Wall
F-Rating: Max. 4” steel pipe sleeve

Download document

Display: 1 ➔ Show All

Size: 148.8 kB
Related products: CFS-BL
All related products
Hilti Online Services

www.us.hilti.com/firestop
www.hilti.ca/firestop

- Design resources
- UL Systems Online Selector
- Product submittals
- Engineering Judgment
- Firestop Documentation
- Management Software
- ...and much more!
Questions?

Hilti North America
☎ (800) 879-8000
✉ HNAtechnicalservices@hilti.com
🌐 www.us.hilti.com/engineering

Presenter:
Sarah Fanning
Sarah.Fanning@Hilti.com
702.241.9805