Testing of Fire Resistance and Smoke Resistant Assemblies

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Fire-Resistance-Rated Construction
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Code Requirements for Fire-Resistance-Rated Construction
Code Requirements

• IBC Section 703.2 – Fire-resistance ratings shall be determined in accordance with ANSI/UL 263 or ASTM E119
• LSC 8.2.3.1 – The fire resistance of structural elements and building assemblies shall be determined in accordance with test procedures set forth in NFPA 251 (i.e. ANSI/UL 263 or ASTM E119)
Fire Resistance

- Expressed as an Hourly Time Period
- Ratings range from 1/2 to 4 hours
- Containment of Fire to Room or Floor of Origin
Fire-Resistance-Rated Construction

Establishing Fire-Resistance Ratings
Standards

- ANSI/UL 263
- ASTM E119
- NFPA 251 (Withdrawn)
Building Components

• Columns
• Beams
• Floor/Ceilings or Roof/Ceilings
• Walls
Time - Temperature Curve

- 1000°F, 5 Min
- 1700°F, 1 HR
- 2000°F, 4 HR

Temperature (°F)

Time (Hr)
Floor/Ceiling or Roof/Ceilings

- Sample size – 180 sq ft / 12 ft
- Load applied – Per design

12 ft

180 sq ft
Conditions of Acceptance
Floor/Ceilings or Roof/Ceilings

- Support load
- Flame passage
- 250°F / 325°F
- Support temperatures
Walls

- Sample size - 100 sq ft / 9 ft
- Load applied - Per design

![Diagram of a 9 ft by 100 sq ft sample size]
Conditions of Acceptance – Walls

- Flame passage
- 250°F / 325°F
- Support load
- Hose stream
Where are the Listings Found?

Hard Copy

Online

UL PRODUCT SPEC™

1. HOW DO YOU WANT TO SEARCH?
   > Installation Code
   > Product Type
   > Products, Systems or Assemblies
   > UL Product Category Code
   > Master Format Number

2. RESULTS
Breaches in Fire-Resistance-Rated Construction

- Penetrations
- Joint Systems
- Opening Protectives
- Ducts and Air Transfer Openings
Breaches in Fire-Resistance-Rated Construction Cont.

Do breaches really impact the performance of a fire-resistance-rated assembly?

Absolutely!!!
MGM Grand
Las Vegas, NV – 1980

- Fire confined to 1st floor
- 679 injured, 85 fatalities
- Most fatalities on upper floors due to smoke inhalation
Hilton Hotel
Las Vegas, NV – 1981

• Fire spread from 8th to 23rd floor in 25 minutes at exterior of building
• 8 fatalities
First Interstate Bank
Los Angeles, CA – 1988

• Fire spread from 12\textsuperscript{th} to 16\textsuperscript{th} floor through improperly protected penetrations and through unprotected perimeter joint
• Lunch bags were used to protect penetrations
• One fatality
One Meridian Plaza
Philadelphia, PA – 1991

• Fire spread from 22nd to 30th floor through improperly protected penetrations and through perimeter joint
• Three fire fighter fatalities, 24 FF injuries
Code Requirements

• IBC – Breaches shall be protected
  • Section 712 – Penetrations
  • Section 713 – Fire-Resistant Joint Systems
  • Section 715 – Opening Protectives
  • Section 716 – Ducts and Air Transfer Openings

• Each type of breach has a unique fire test standard associated with it which compliments ANSI/UL 263 and ASTM E119
• LSC – Breaches shall be protected
  • Penetrations
  • Joint Systems
  • Opening Protectives
  • Ducts and Air Transfer Openings
• Each type of breach has a unique fire test standard associated with it which compliments NFPA 251
Questions / Comments
Fire Resistive Construction

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UL’s Online Search Tools

- Online Certifications Directory
- Product Spec
- Code Link
Online Certifications Directory

- Helps you achieve code compliance
- Is continuously updated
- Needs no password
- Is free – no charge for use
- www.ul.com/database
Product Spec

- Helps identify designs meeting project parameters
- Needs no password
- Is free – no charge for use
- Covers everything discussed at this symposium
- www.ul.com/productspec
Code Link

- Correlates model code sections to UL product categories
- Covers many model codes and editions (IBC, IFC, NEC, etc.)
- Flexible search capabilities
- Powerful tool to locate appropriate Listings
- www.ul.com/codelink
Questions / Comments
Thank You for Attending!!!

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