

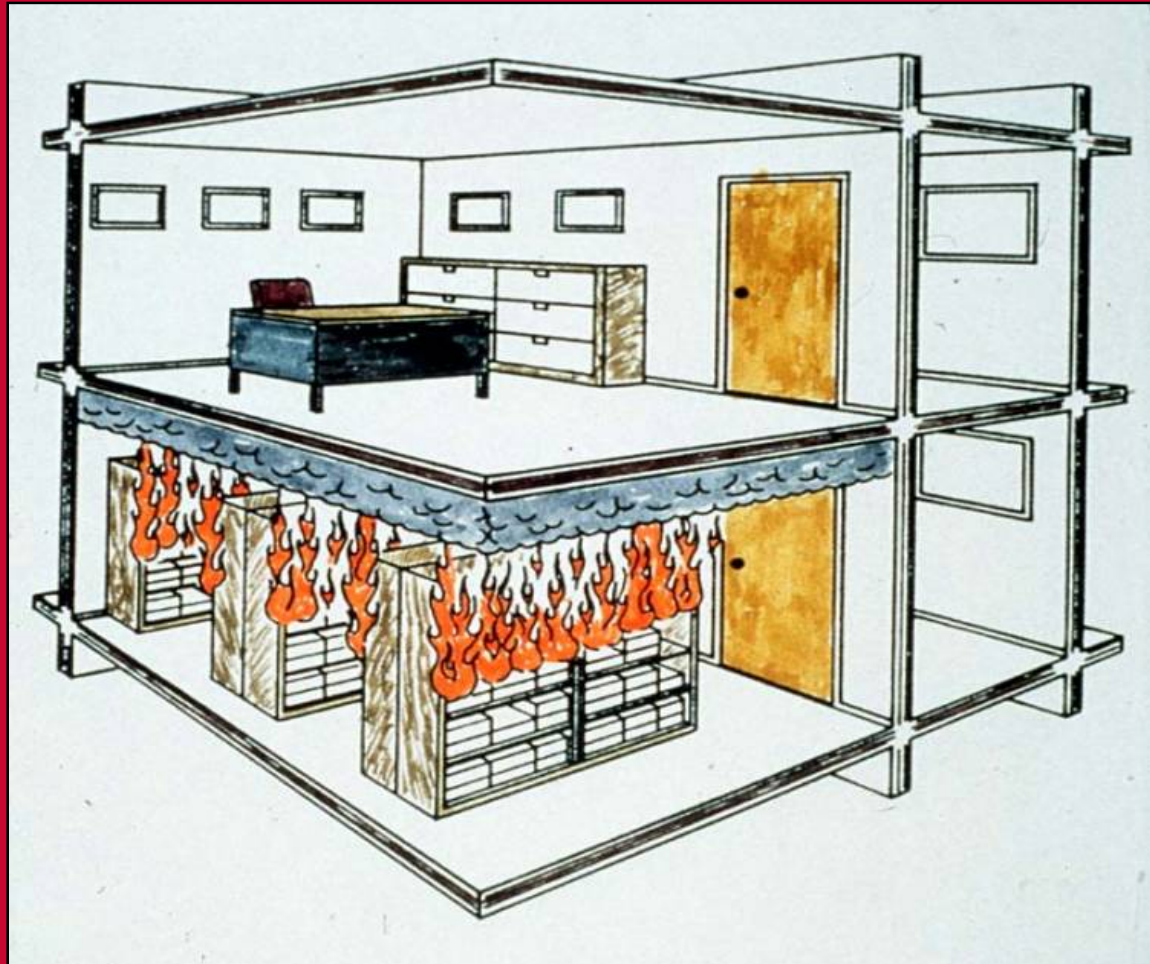
Fire-Resistance Testing



Rich Walke

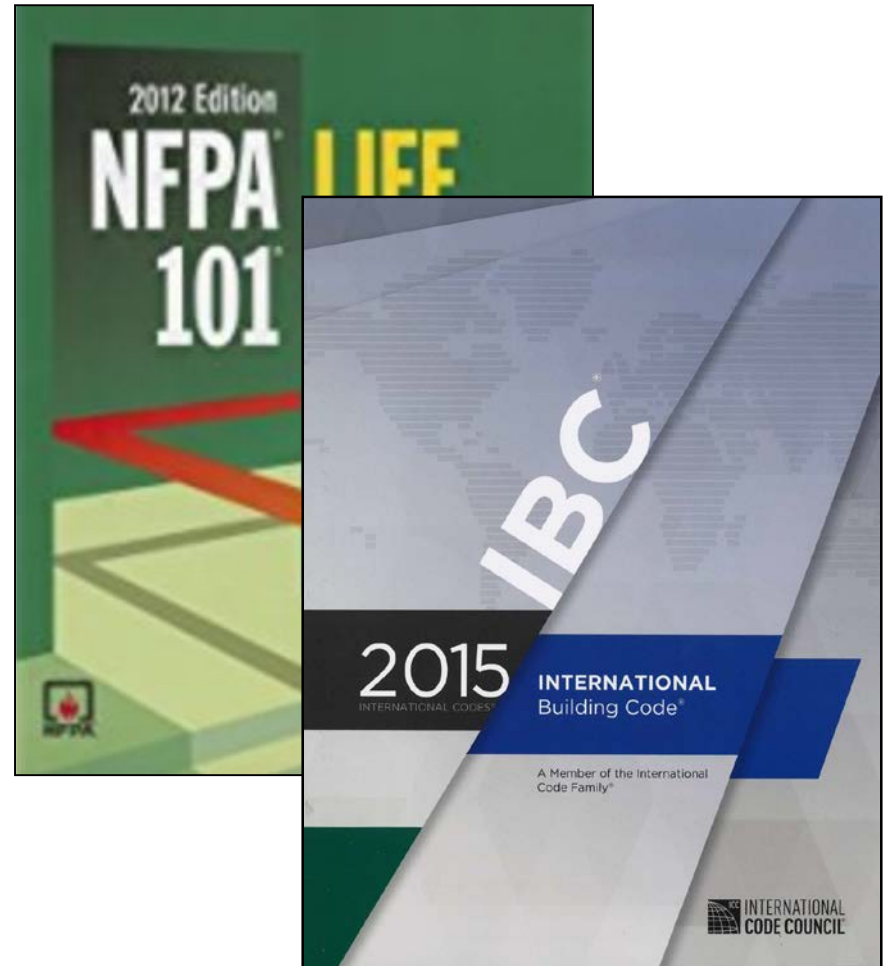
UL Codes and Regulatory Services

Fire-Resistance-Rated Construction



Fire-Resistance-Rated Construction

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 ANSI/UL 263 or ASTM E119



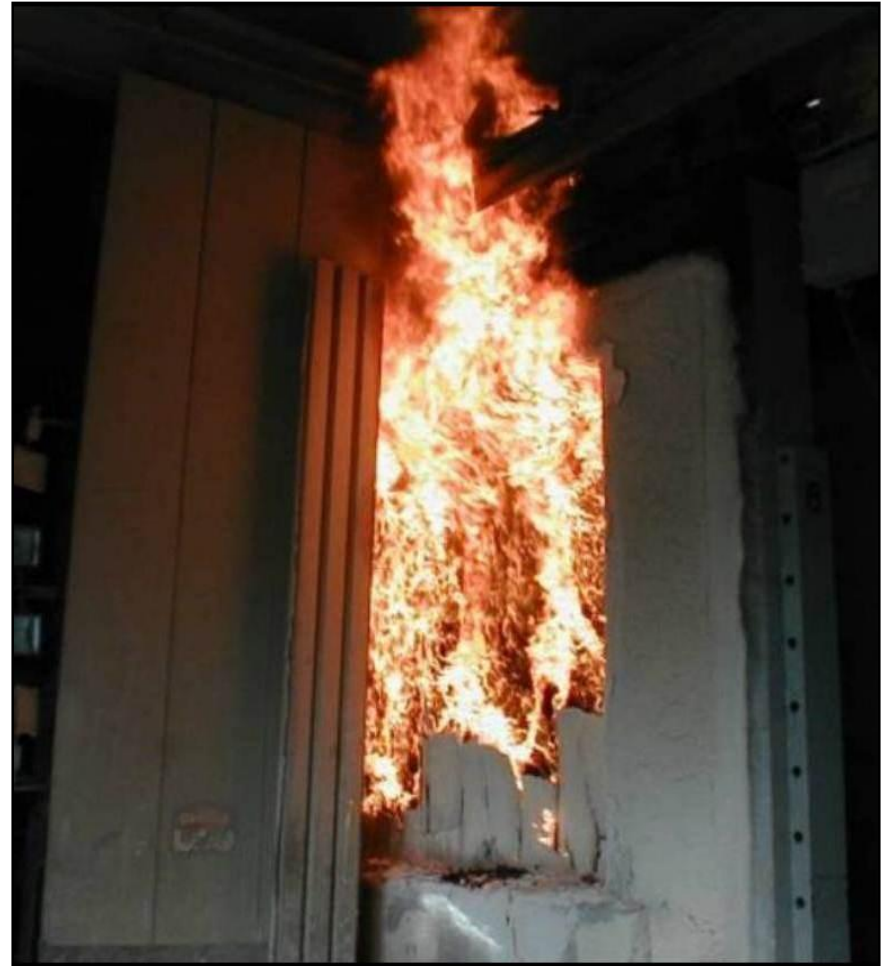
Fire Resistance

- Expressed as an Hourly Time Period
- Ratings range from 1/2 to 4 hours
- Contain Fire to Room or Floor of Origin and Maintain Structural Integrity



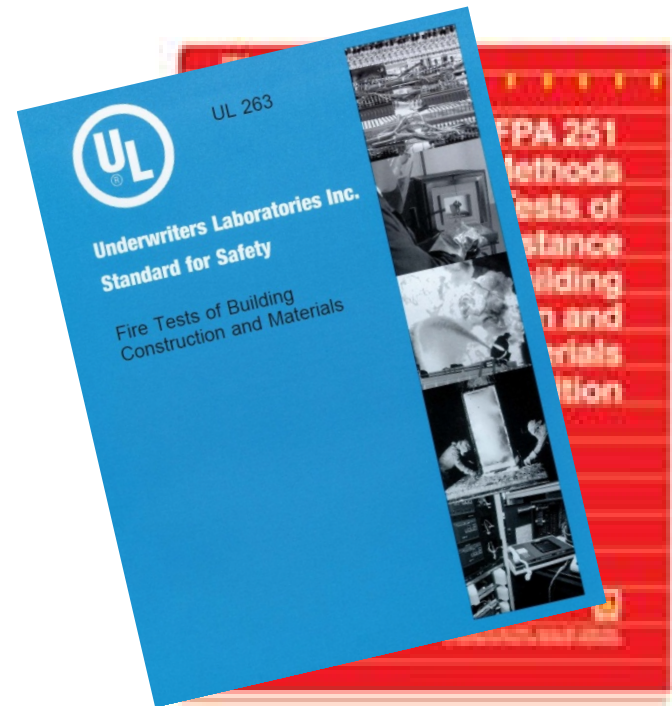
Fire-Resistance-Rated Construction

Establishing
Fire-Resistance
Ratings



Standards

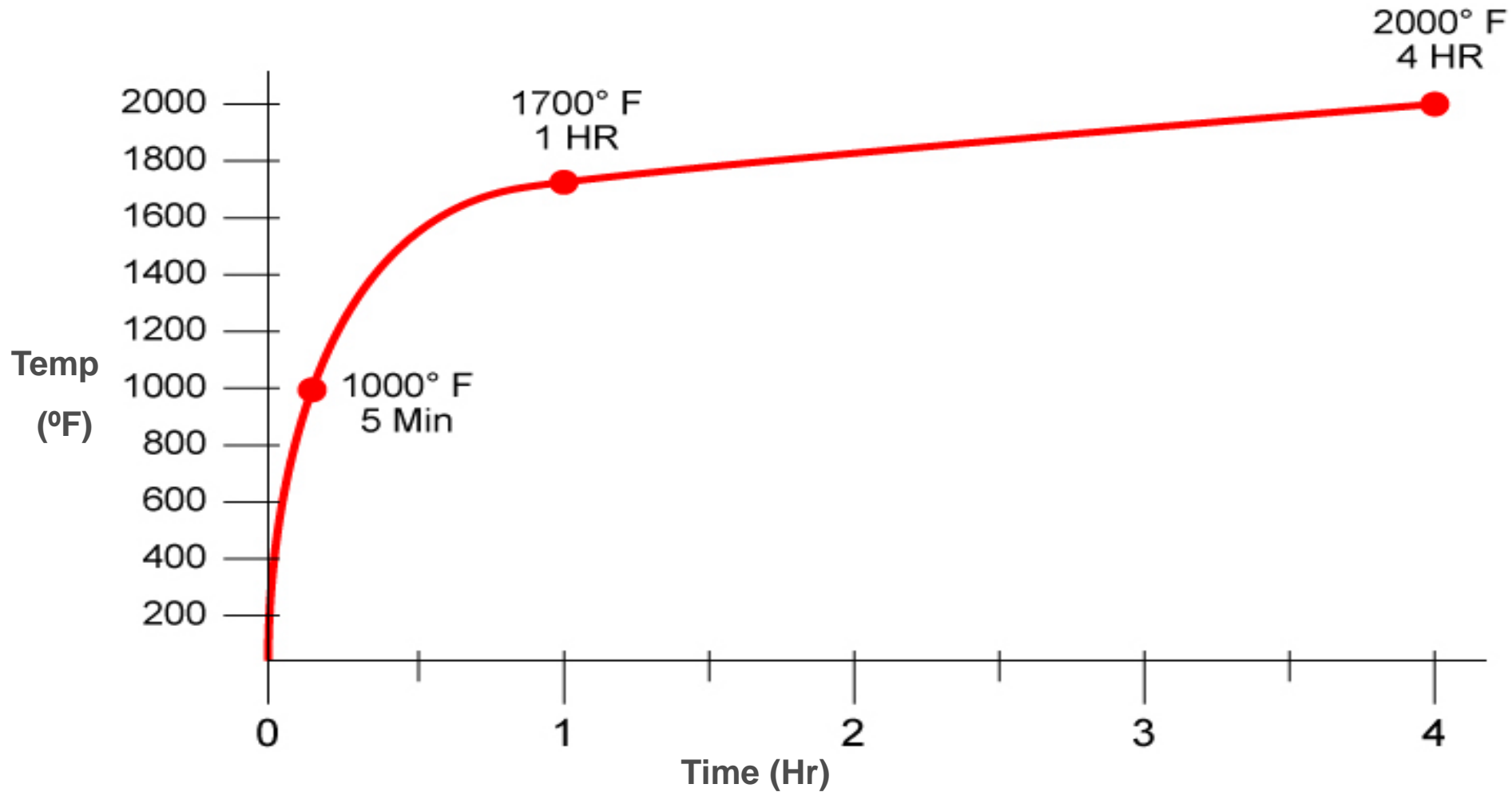
- ANSI/UL 263
- ASTM E119
- NFPA 251 (Withdrawn)



Building Components

- Columns
- Beams
- Floor/Ceilings or Roof/Ceilings
- Walls

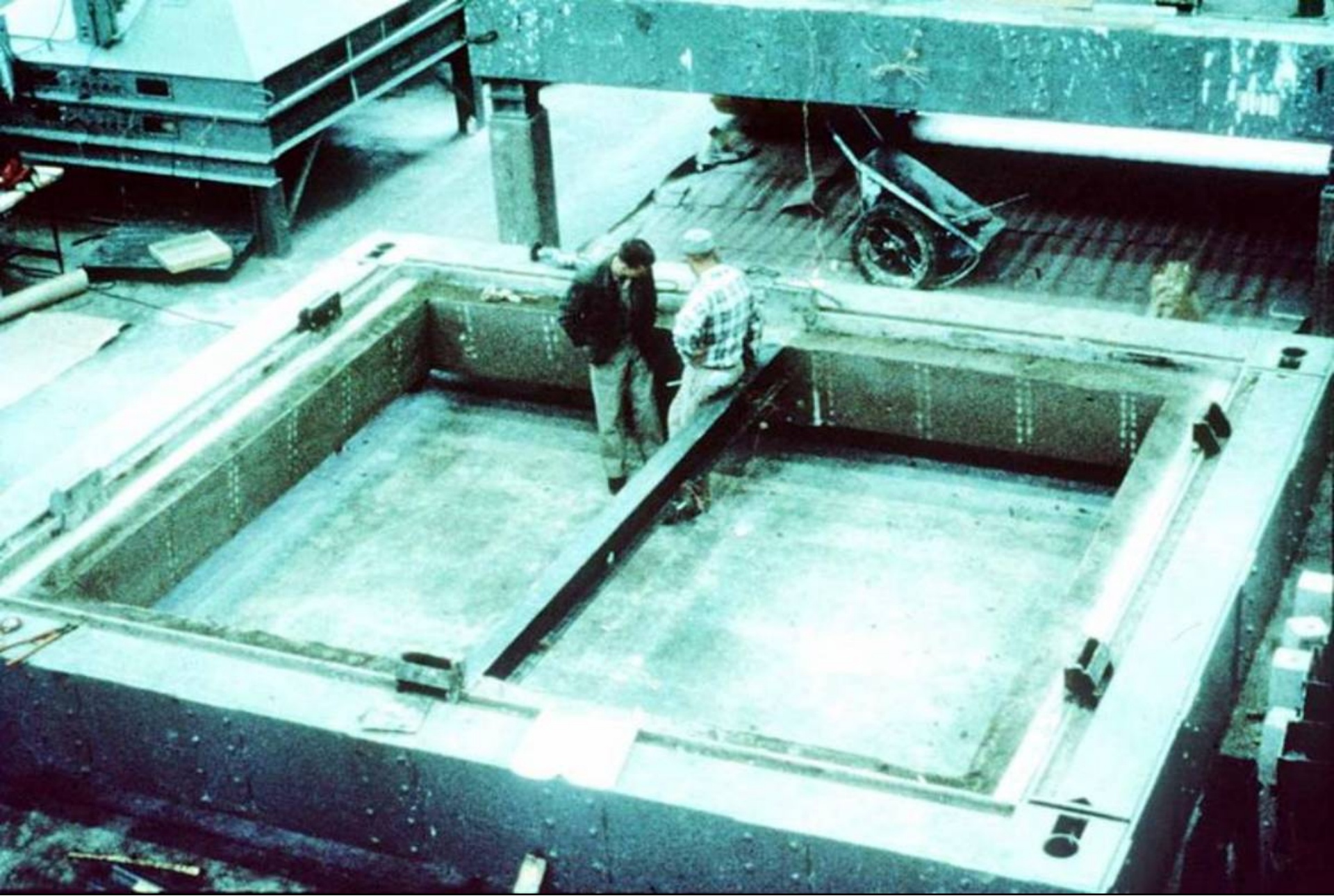
Time - Temperature Curve

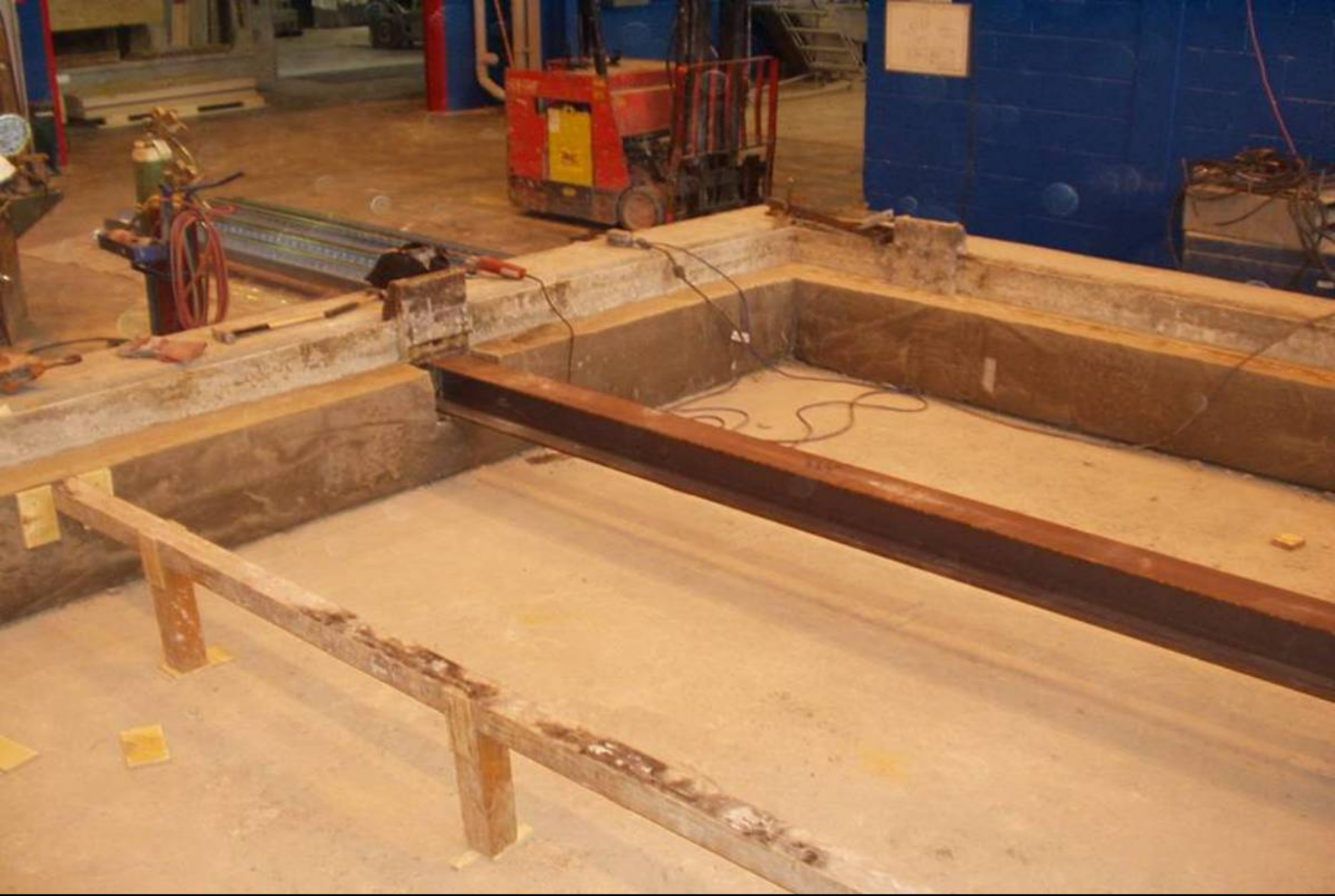


Floor/Ceiling or Roof/Ceilings

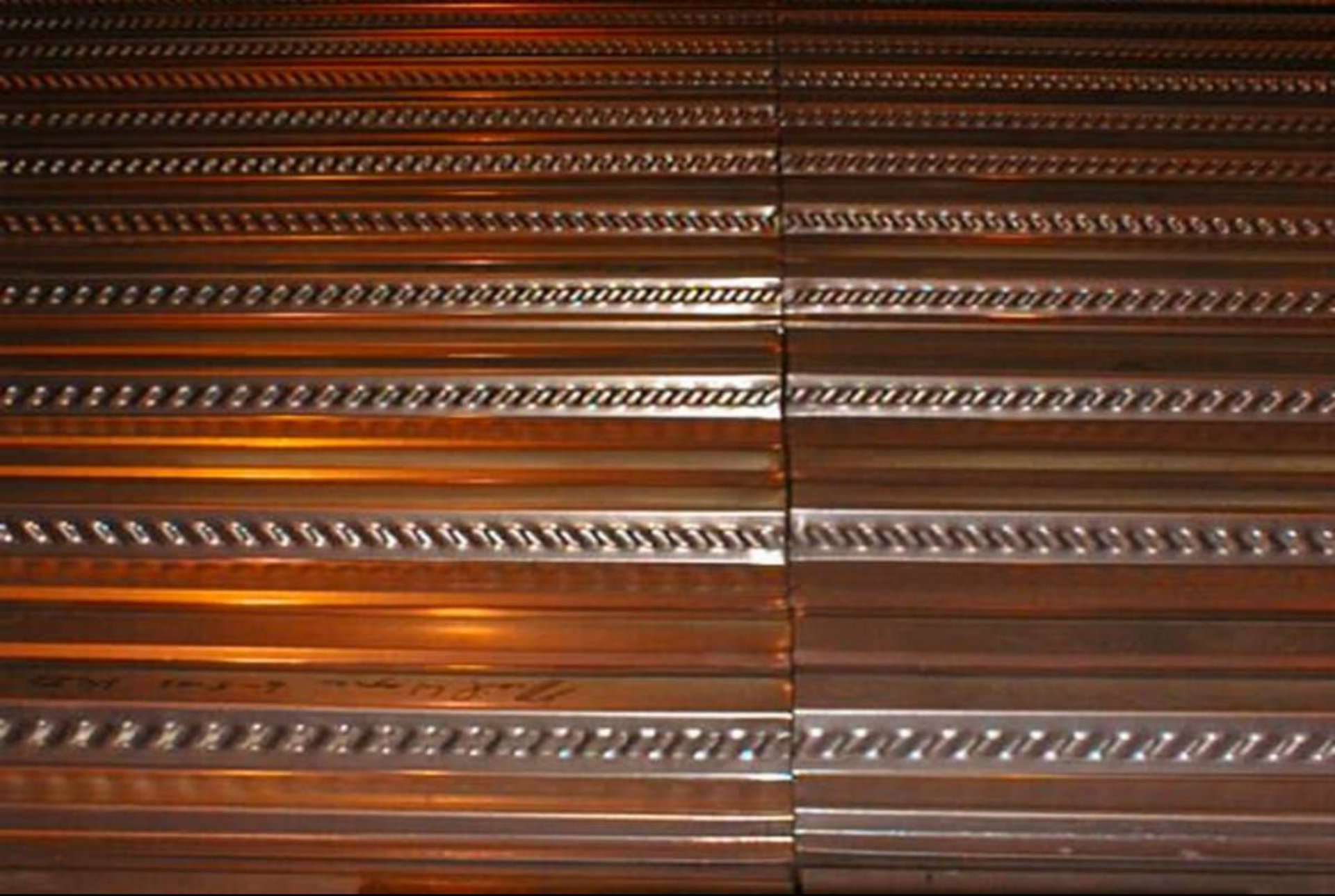
- Sample size – 180 sq ft / 12 ft
- Load applied – Per design

























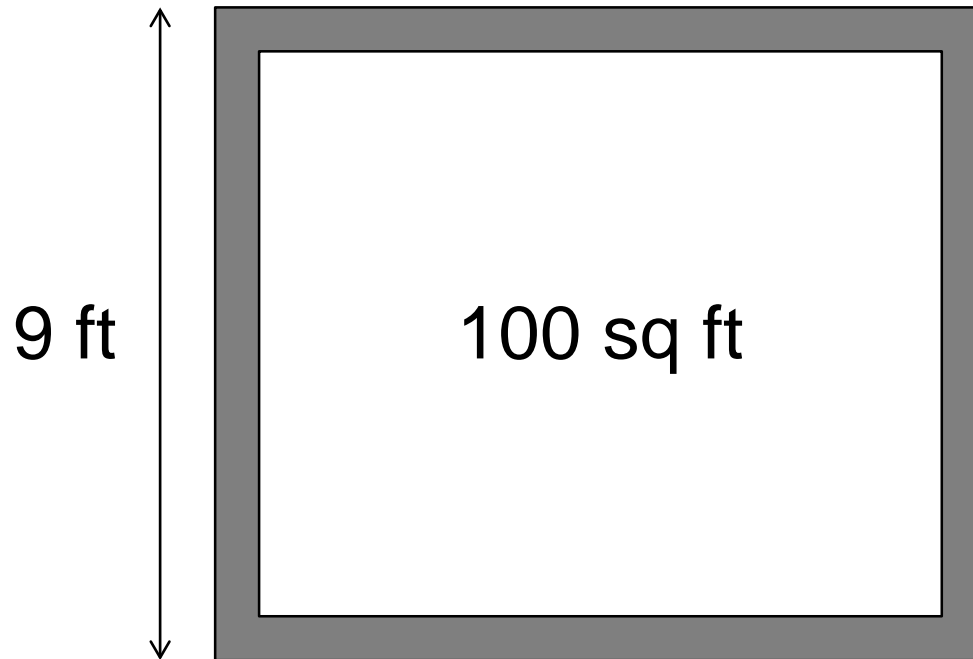
Conditions of Acceptance Floor/Ceilings or Roof/Ceilings

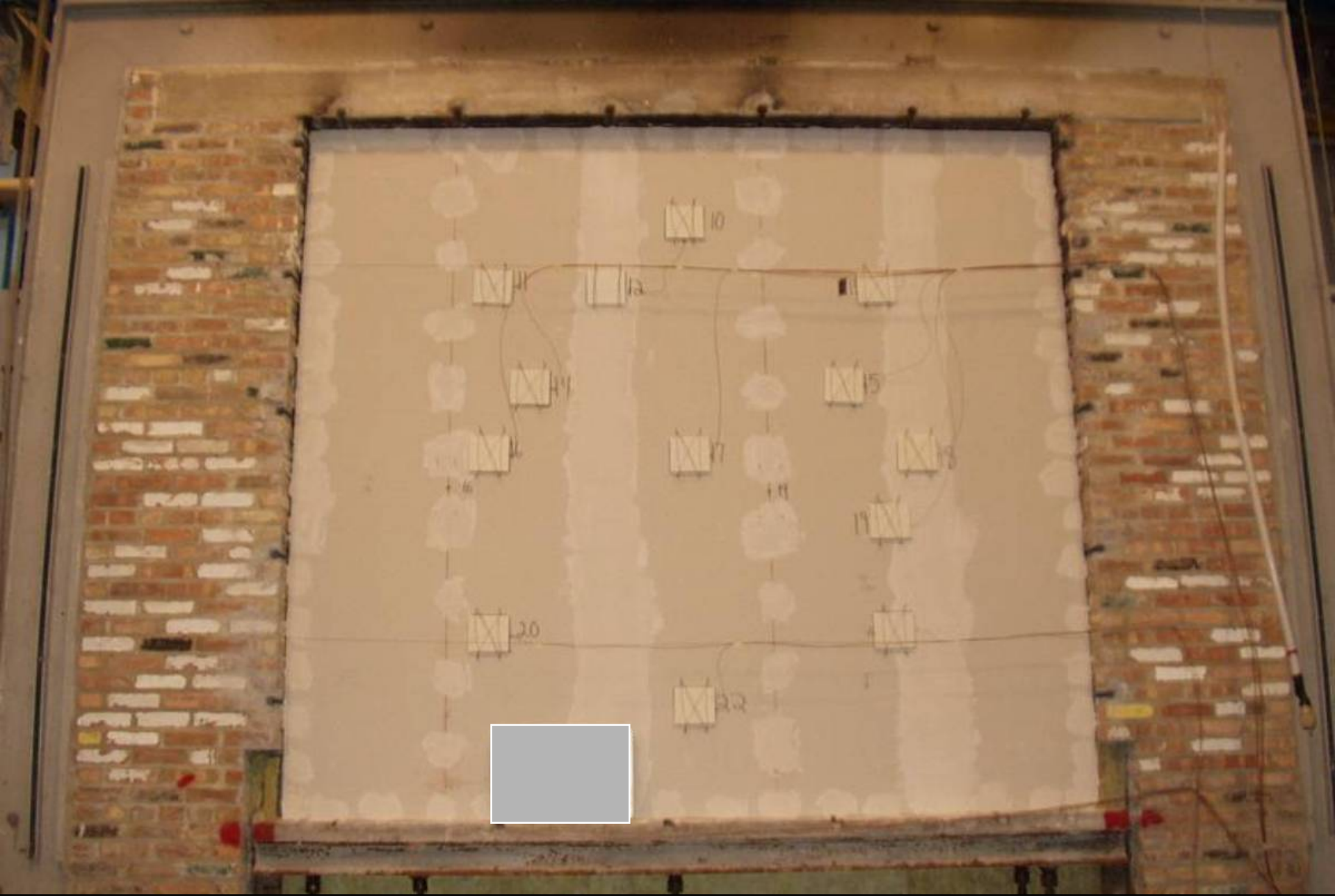
- Support load
- Flame passage
- 250°F / 325°F
- Support temperatures



Walls

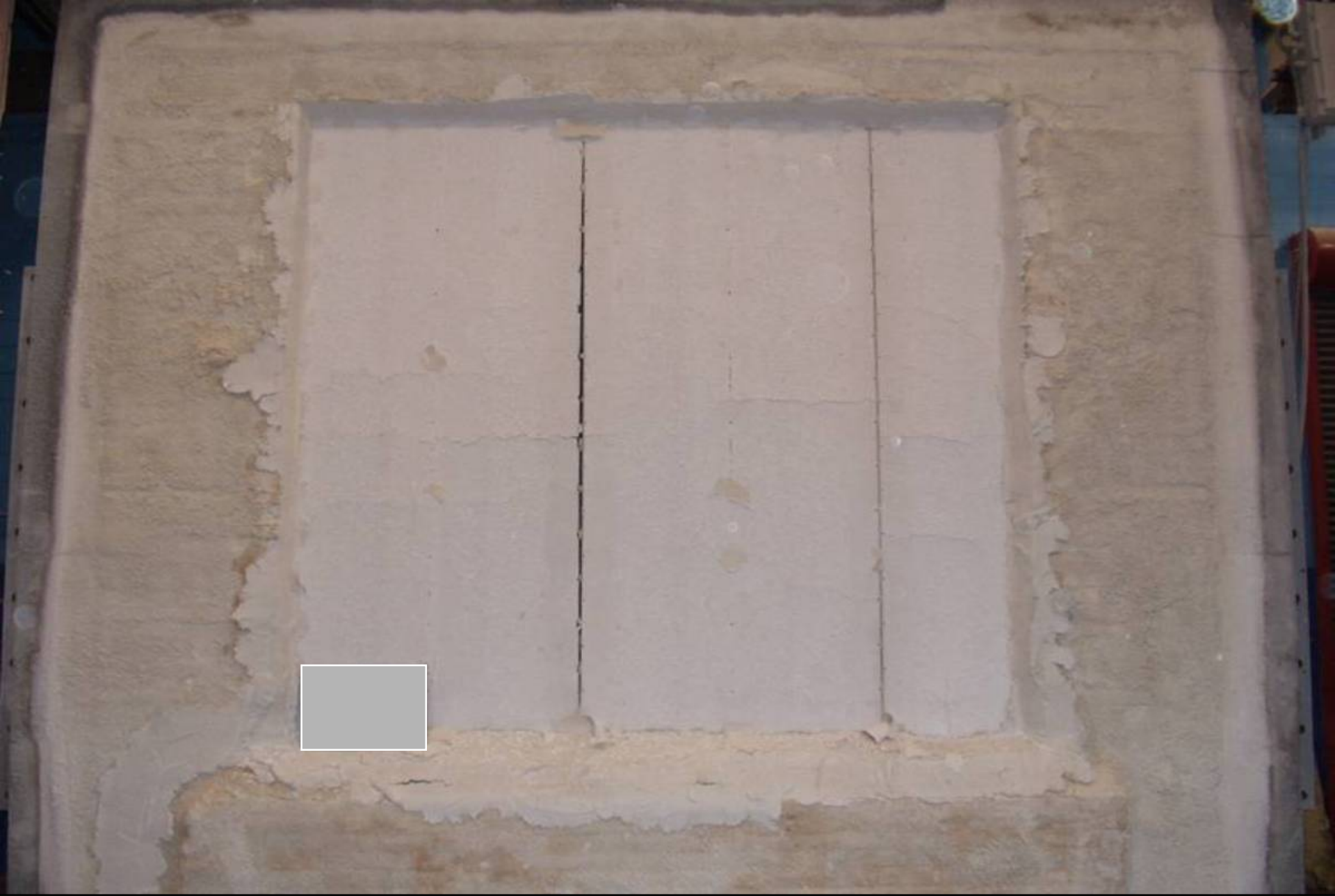
- Sample size - 100 sq ft / 9 ft
- Load applied - Per design

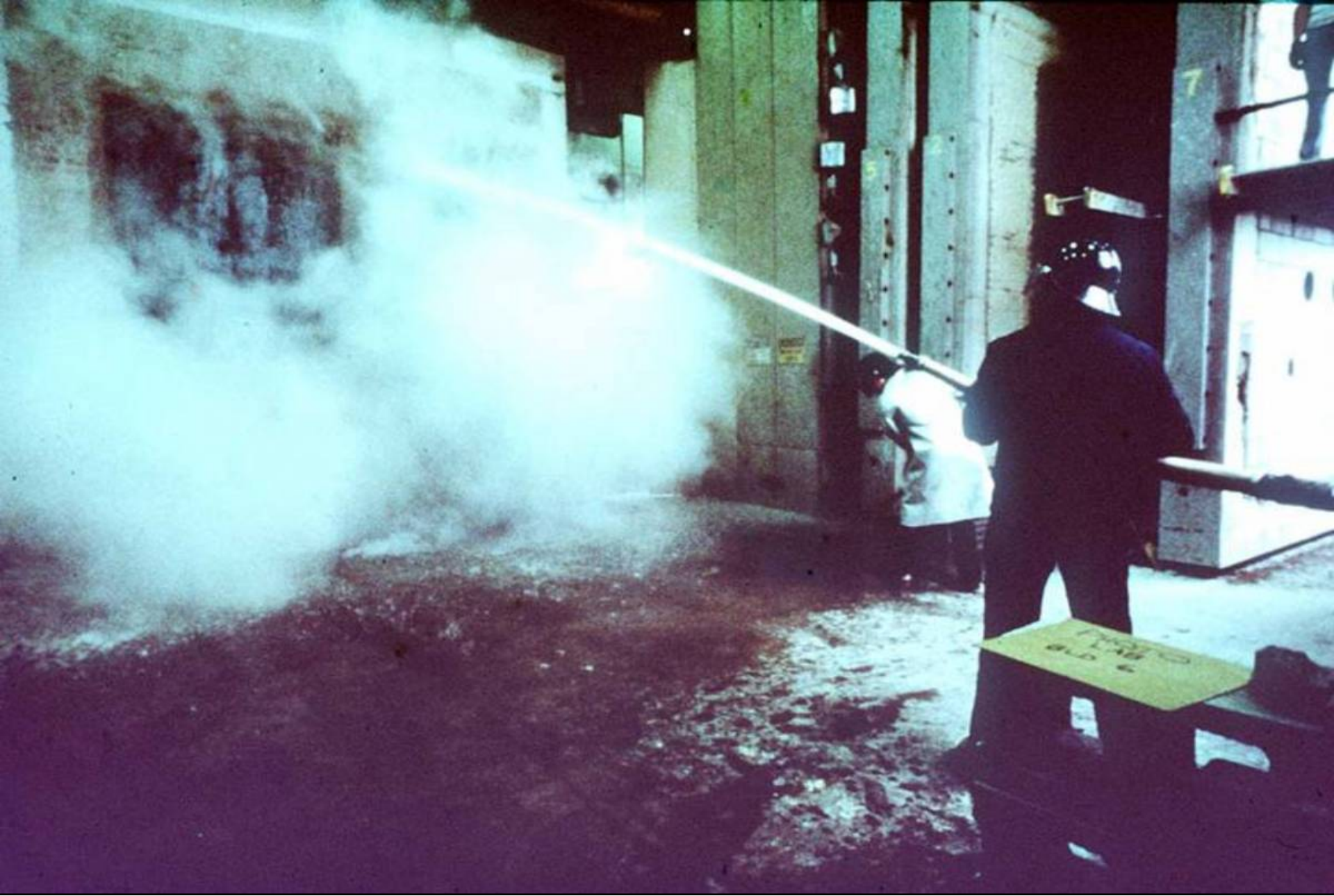














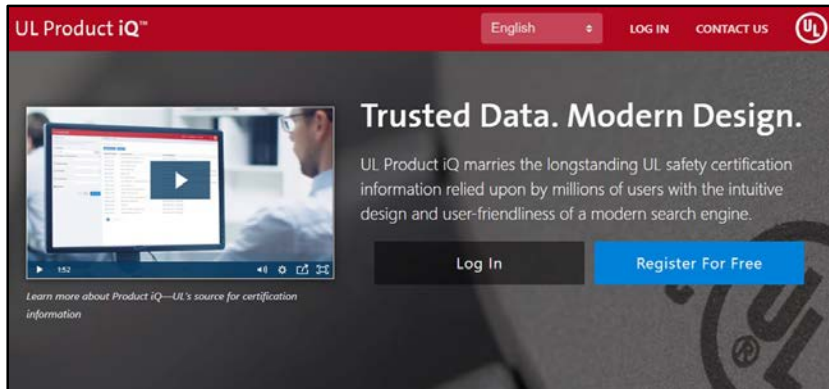
Conditions of Acceptance – Walls

- Flame passage
- 250°F / 325°F
- Support load
- Hose stream



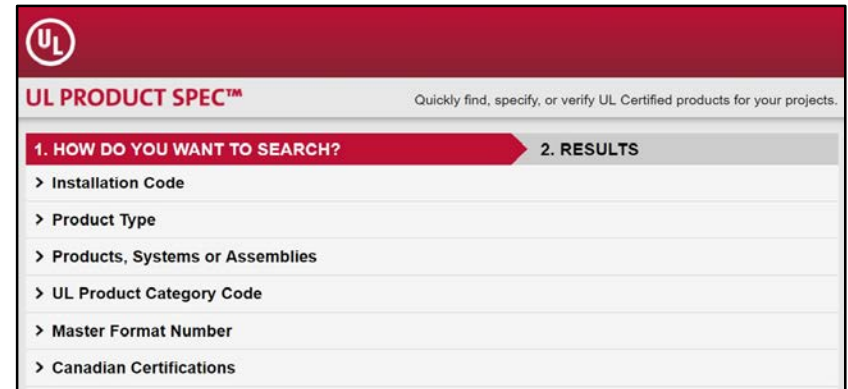
Where are the Listings Found?

Product iQ



The screenshot shows the UL Product iQ website homepage. At the top, there is a red navigation bar with the text "UL Product iQ™", a language dropdown set to "English", and links for "LOG IN" and "CONTACT US". The main content area features a video player on the left showing a person at a computer. To the right of the video, the headline reads "Trusted Data. Modern Design." followed by a paragraph: "UL Product iQ marries the longstanding UL safety certification information relied upon by millions of users with the intuitive design and user-friendliness of a modern search engine." Below this text are two buttons: "Log In" and "Register For Free". At the bottom left, there is a small text link: "Learn more about Product iQ—UL's source for certification information".

Product Spec



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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!!!



Breaches in Fire-Resistance-Rated Construction Cont.

- Unsealed or improperly sealed breaches cost lives and property!
 - MGM Grand, Las Vegas, NV – Fire confined to 1st floor. Eighty-four fatalities, most on upper floors.
 - Hilton Hotel, Las Vegas, NV – Fire spread from 8th to 23rd floor in 25 minutes at exterior of building. Eight fatalities.
 - First Interstate Bank, Los Angeles, CA – Fire spread from 12th to 16th floor through improperly protected penetrations and through unprotected perimeter joint. One fatality.
 - One Meridian Plaza, Philadelphia, PA – Fire spread from 22nd to 30th floor through improperly protected penetrations and through perimeter joint. Three fatalities.

IBC Requirements

- IBC – Breaches shall be protected
 - Section 714 – Penetrations
 - Section 715 – Fire-Resistant Joint Systems
 - Section 716 – Opening Protectives
 - Section 717 – Ducts and Air Transfer Openings

LSC Requirements

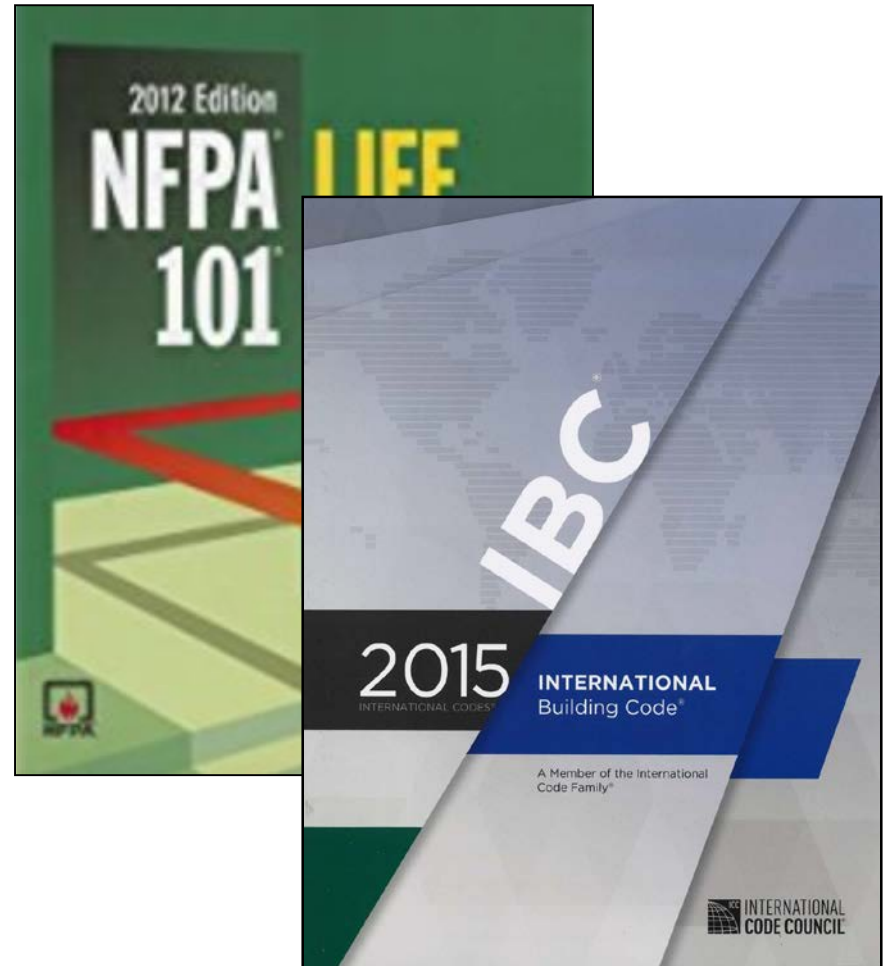
- LSC – Breaches shall be protected
 - Penetrations
 - Joint Systems
 - Opening Protectives
 - Ducts and Air Transfer Openings

Code Requirements

- Each type of breach has a unique fire test standard associated with it which compliments ANSI/UL 263 and ASTM E119
- Where breach occurs in, through or between assemblies intended to restrict the movement of smoke, the code also sets limits on the leakage through the breach

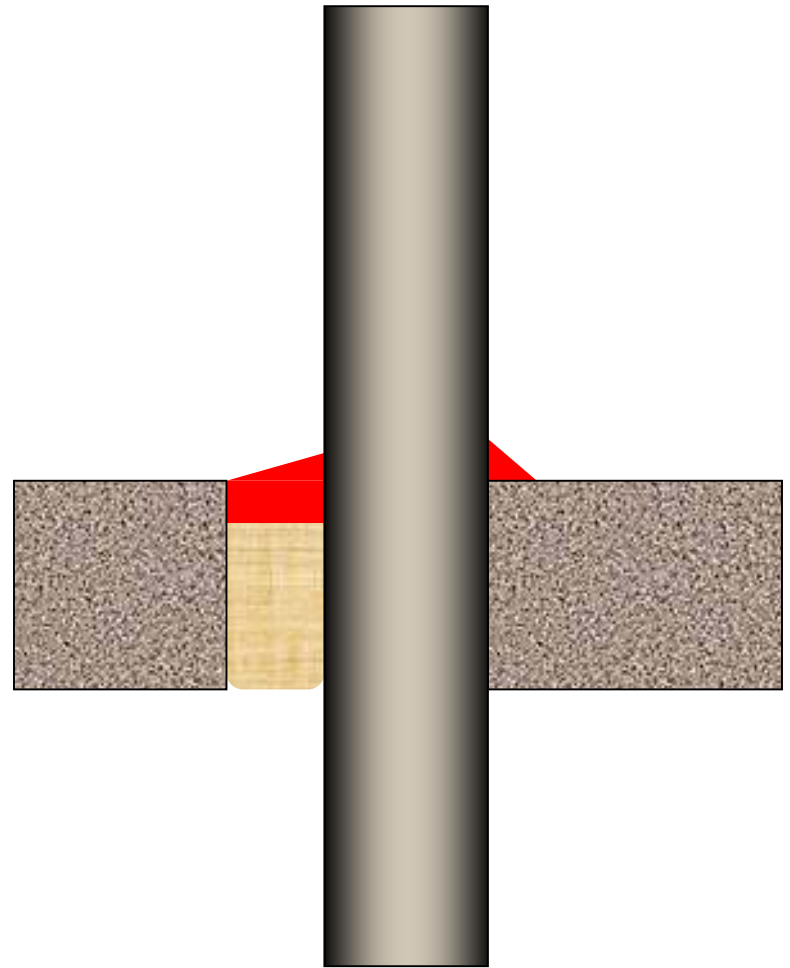
Firestop Systems

Code
Requirements
for Penetrations
of Smoke
Resistant
Construction



Firestop Systems

- Three elements
 - Floor or Wall Assembly
 - Penetrating Item
 - Firestopping Products
- Tested in accordance with ANSI/UL 1479



Ratings

- F - Flame Occurrence
- T - Heat Transmission
- L - Leakage (Optional)
- W - Water Leakage (Optional)

Code Requirements

- IBC 714.4.4 – Penetrations in smoke barriers shall have an L Rating at ambient and 400°F
 - Max 5.0 CFM / sq ft of opening for each system, or
 - Cumulative 50 CFM for all systems in any 100 sq ft of barrier
- LSC 8.5.6.2 – Penetrations shall be protected by a system or material capable of restricting the transfer of smoke

Firestop Systems

Establishing Leakage Ratings



L (Air Leakage) Ratings

- L Rating methodology added to ANSI/UL 1479 in 1993
- Leakage determined at 0.3 in. WC
- Tested at Ambient and 400°F
- Results published in either CFM or CFM per sq ft

L (Air Leakage) Ratings



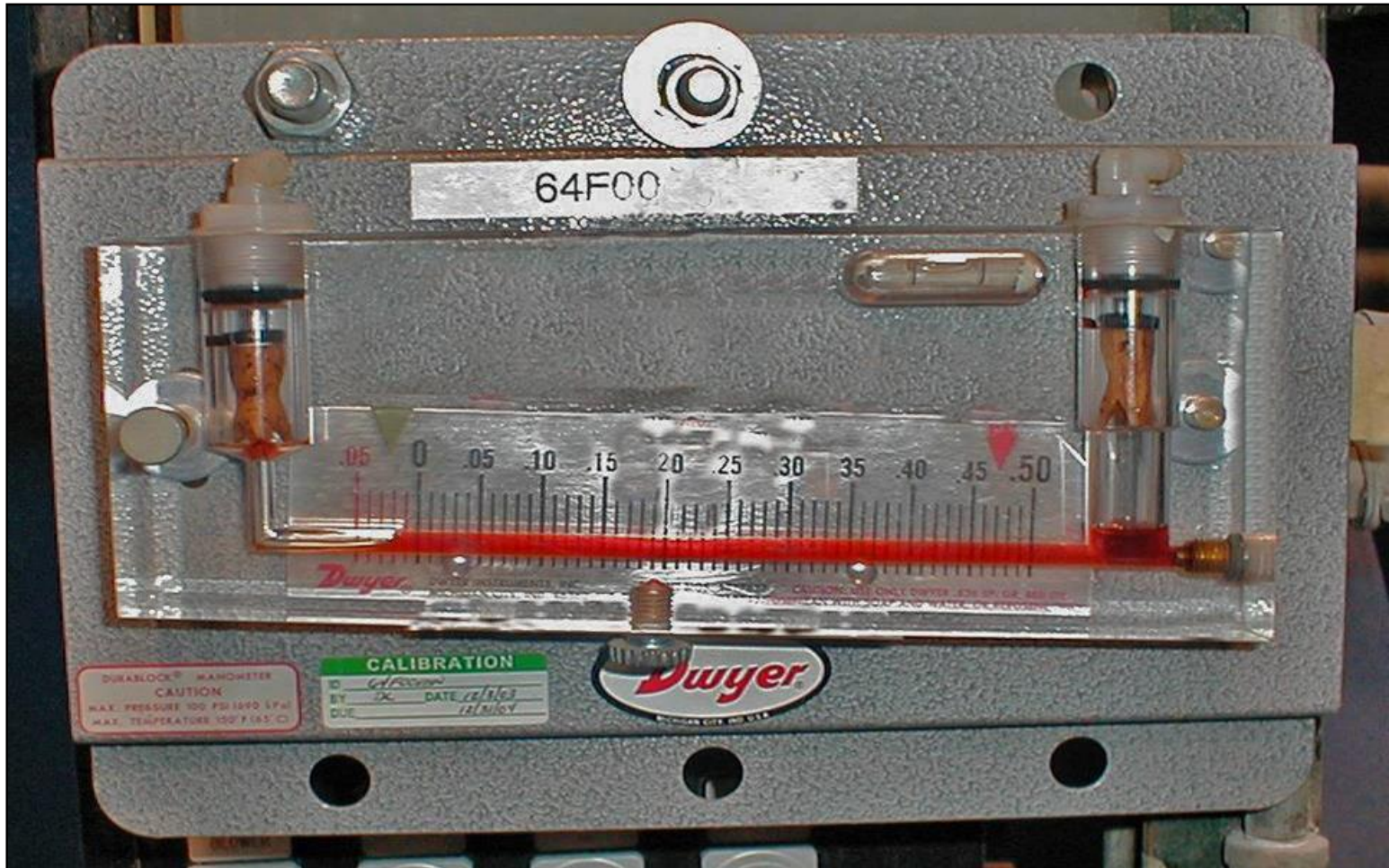
L (Air Leakage) Ratings



L (Air Leakage) Ratings



L (Air Leakage) Ratings



Test Procedure

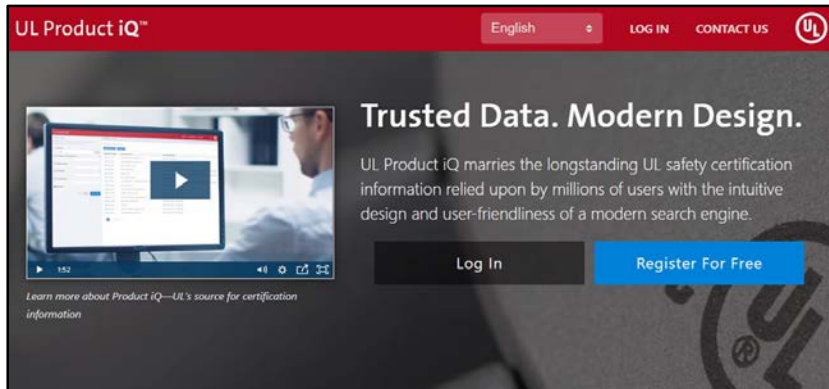
- Incidental chamber leakage determined using blank slab
- Air leakage of test sample determined at ambient temperature
- Air leakage of test sample determine at 400°F
- Incidental chamber leakage rechecked after cooling

Test Procedure Cont.

- Firestop system assigned L Rating at ambient and 400°F, by subtracting incidental chamber leakage from test sample leakage

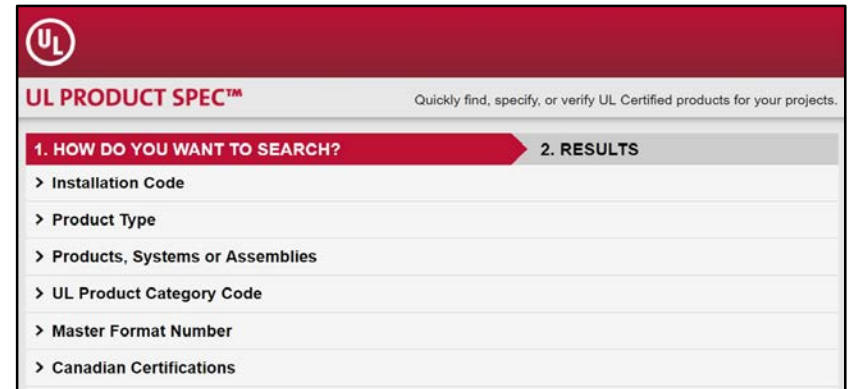
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Fire Resistive Construction

UL's Online Search Tools

- Product iQ
- Product Spec



Product iQ – UL's New Online Directory

- Replaces the old Online Certifications Directory which was developed in 1999
- Same listing information as the old platform
- Is continuously updated
- Helps you achieve code compliance
- Requires one-time registration to create user account



Product iQ – UL's New Online Directory

- Basic Service – no charge for use
- Paid Subscription Service provides more features
 - Save Searches
 - Tags and Groups
 - Confirmation Letters
- www.ul.com/database

Product Spec

- Helps identify fire-resistance designs and firestop systems meeting project parameters
- Is continuously updated
- Needs no password
- No charge for use
- www.ul.com/productspec



Questions / Comments



Thank You for Attending!!!

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