

REDUCING FIRE RISK AT THE PERIMETER OF THE HIGH RISE STRUCTURES

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Why is Fire Containment Important?



OBJECTIVES



- Review the **basic design features** required at the exterior wall to contain a fire to the level of origination.
- **Guidelines on proper design:** How can the architect influence fire safety at the building's perimeter?
- Proper installation

High Rise Fires: Windsor Tower Madrid Spain, 2005

Curtain Wall

Lessons Learned

- Very tall buildings need sprinkler protection with a reliable water supply
- Curtain walls should be protected to limit fire and smoke spread at joints between floor and exterior walls—E2307
- Spandrel protection needed to prevent fire spread from window to window opening—E2874



High Rise Fires: First Interstate Bank, Los Angeles, 1988

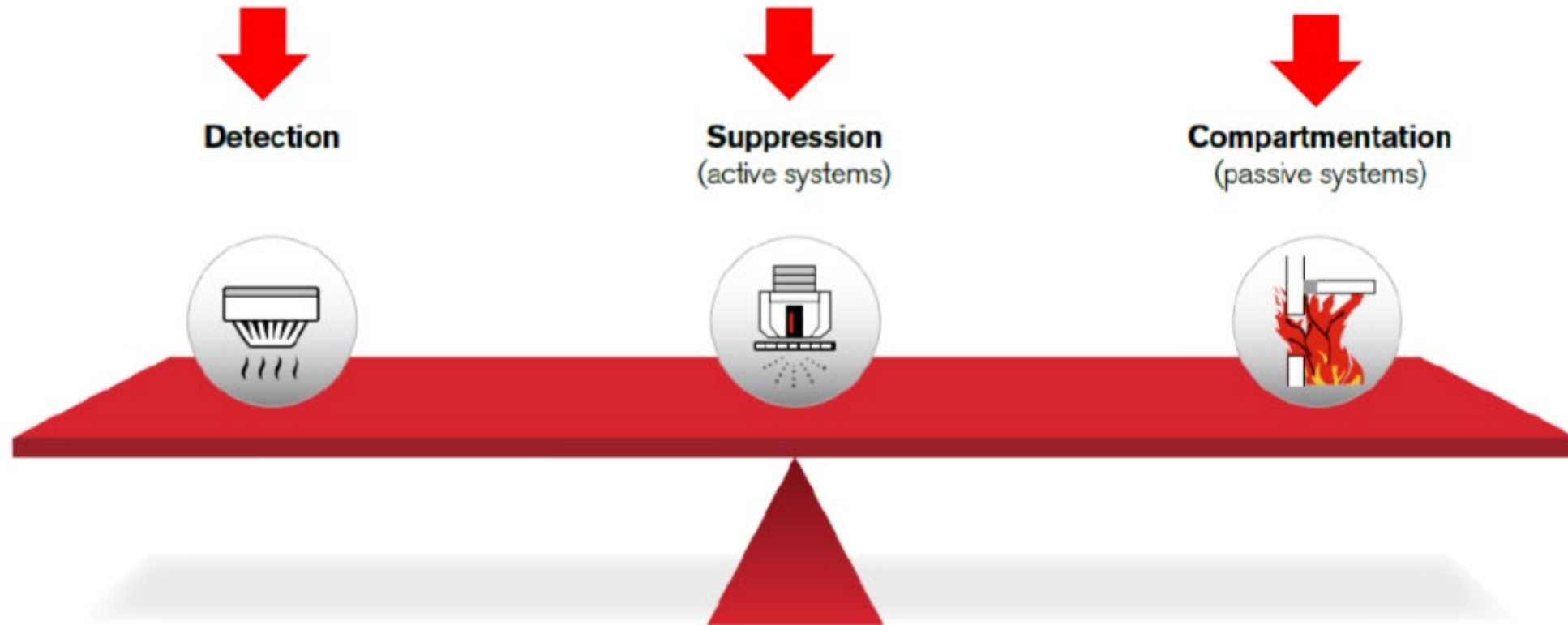
Curtain Wall

Lessons Learned

- Automatic sprinklers need to be installed and activated
- Curtain walls should be designed to limit fire and smoke spread at interior joints—[ASTM E2307](#)
- Automatic elevator recall is needed
- Fire alarm systems need to be connected to a monitoring service or directly to fire department.
- All stairways doors should be fire rated and allow reentry to floors at five floor intervals
- Tall buildings need pre-emergency plan



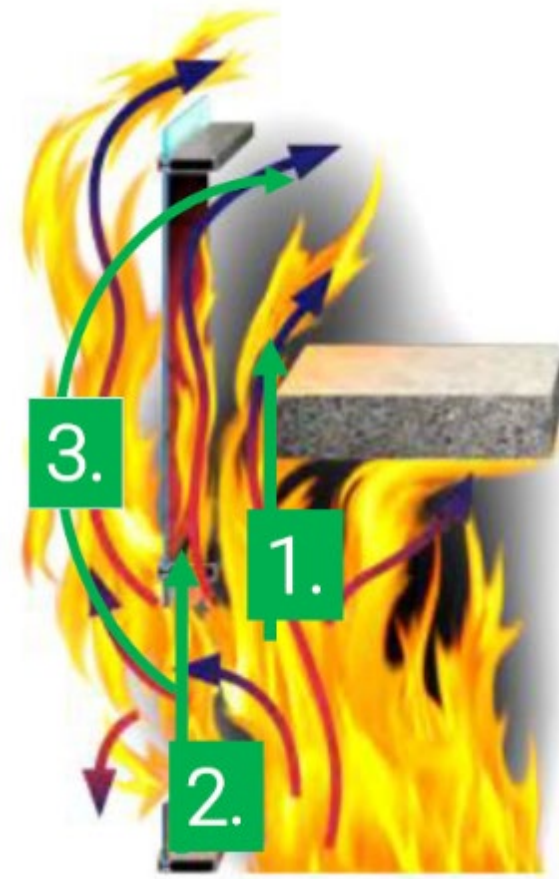
Strategies For Protecting Building Occupants



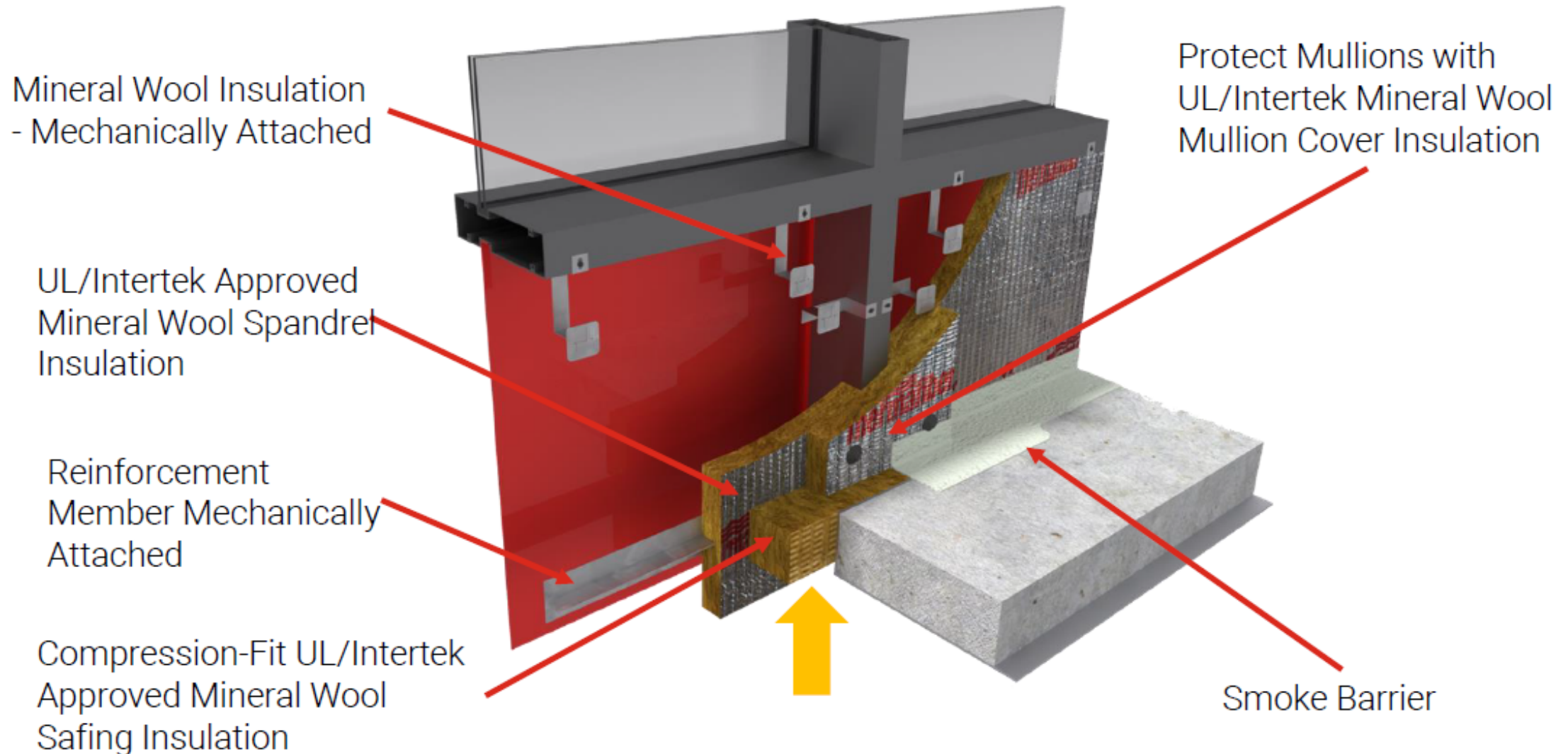
How Fire Spreads at the Perimeter-Interior/Leap Frog

Paths of Fire Propagation

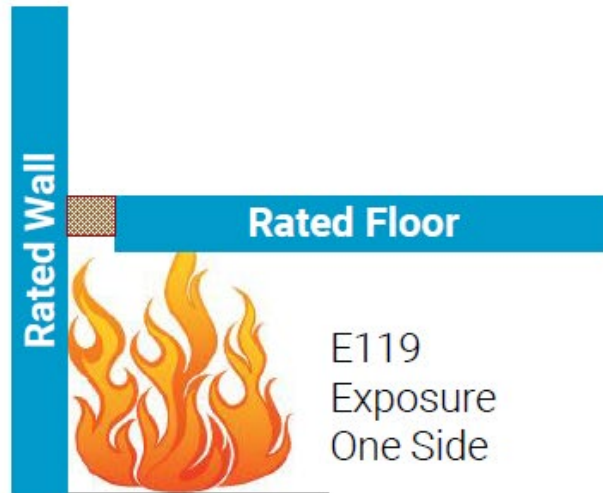
1. Through interior void
 2. Through cavity of spandrel
 3. Via Exterior
- ASTM E2307
 - E2874-Leap Frog



Perimeter Fire Containment: The 6 Basic Design Principles



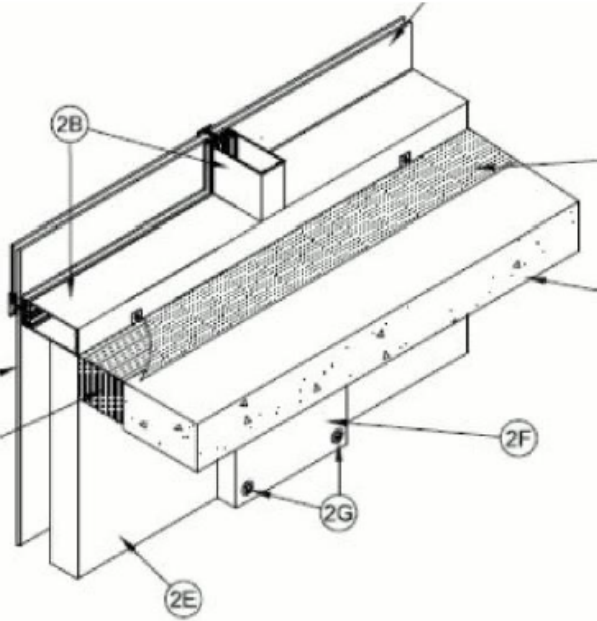
ASTM E119



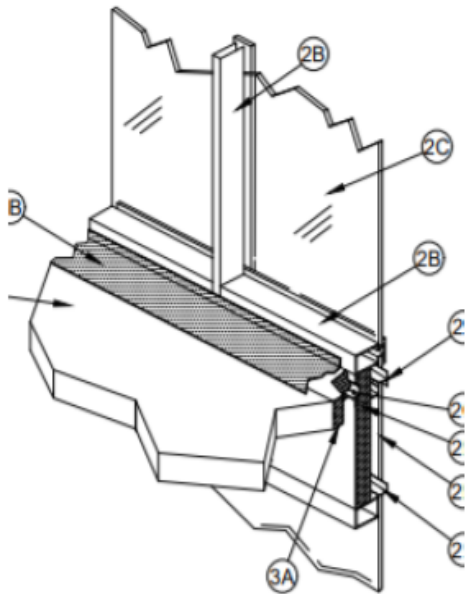
ASTM E2307



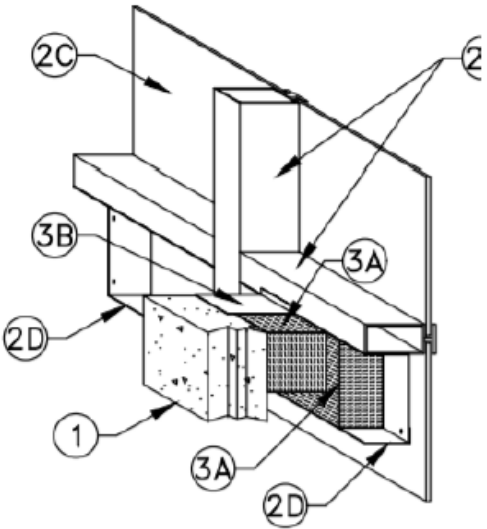
ASTM E119 Cannot Be Used in Lieu of E2307



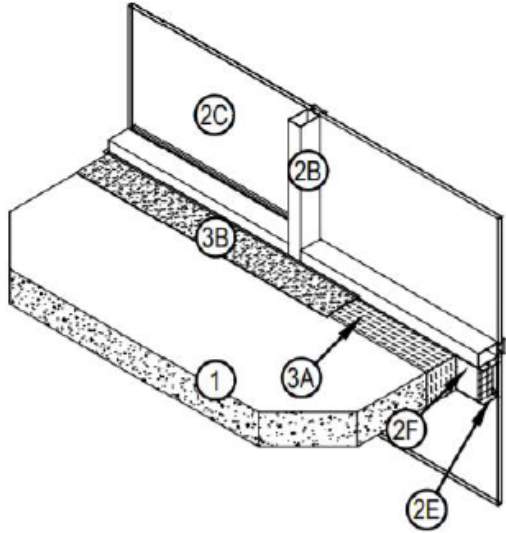
Spandrel Height of 24"



Spandrel Height of 10"

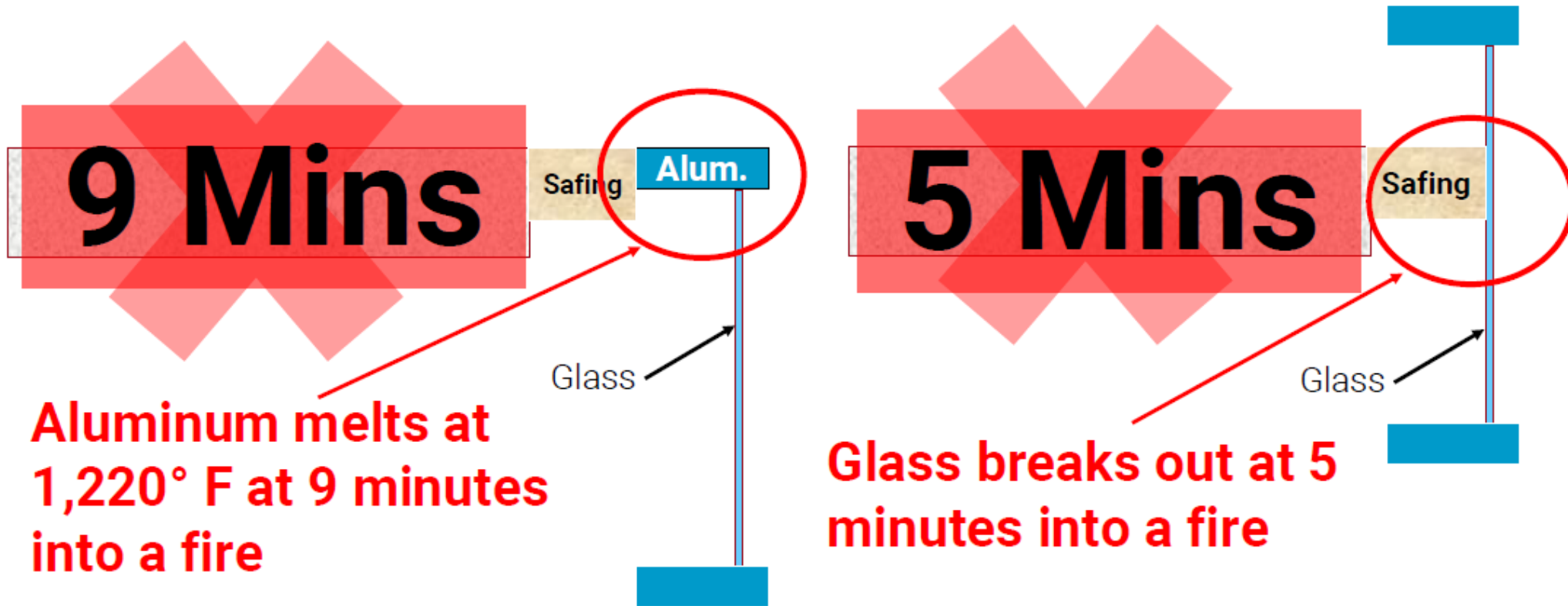


Zero Spandrel



Zero Spandrel

Common Misconception: ASTM E119 exception can be used in lieu of E2307 tested system



Third Party Certification of Products and Systems



Intertek



Third Party Certification of Products and Systems

ONLINE CERTIFICATIONS DIRECTORY

System No. CW-D-1037
XHDG.CW-D-1037
Perimeter-fire-containment Systems

Design/System/Construction/Assembly Usage Disclaimer

XHDG - Perimeter-fire-containment Systems

System No. CW-D-1037
 January 22, 2017
 F Rating - 2 hr
 T Rating - 112 min
 Integrity Rating - 2 hr
 Insulation Rating - 112 min
 Linear Opening Width - 4 In. Max
 Class II Movement Capable - 6% Vertical Shear

CLASSIFIED

Product Name
Manufacturer Name

UL File Number

CURTAIN WALL INSULATION
FOR USE IN PERIMETER FIRE CONTAINMENT
SYSTEMS. SEE UL FIRE RESISTANCE DIRECTORY.
32WL

ALSO CLASSIFIED AS UNFACED BATTS AND BLANKETS
SURFACE BURNING CHARACTERISTICS
FLAME SPREAD 0 SMOKE DEVELOPED 0

UNFACED INSULATION BATTS ALSO CLASSIFIED IN ACCORDANCE WITH ASTM E136 STANDARD TEST METHOD FOR BEHAVIOUR OF MATERIALS IN A VERTICAL TUBE FURNACE AT 750° C. ISSUE NO. 0054430

Plant ID

Manufacturer Name
Product Name

Certified To:
ASTM E 2307
ASTM E 84

Refer to Intertek's Directory of Building Products for detailed information

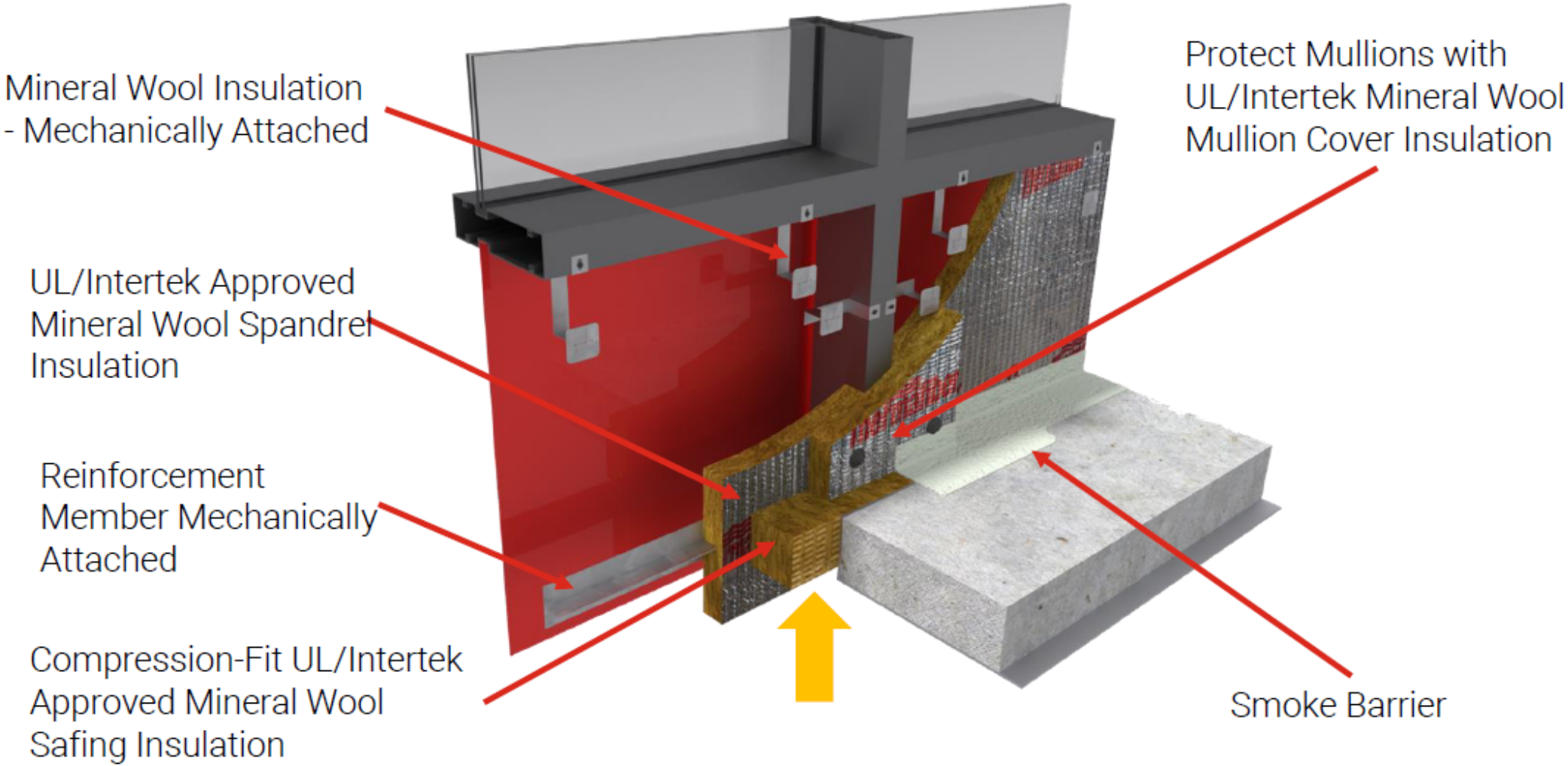
Design No. STI/JS 120-01
OPL Design No. CEJ 322 P

F Rating - 2 HOUR
 L Rating - <1 SCFM/LF
 Rated for ±6% horizontal movement @ 33% Compression (See ITEM 3A)
 Rated for ±3% vertical shear movement @ 33% Compression (See ITEM 3A)

1. **Concrete Floor Assembly** - Two-hour rated concrete floor assembly made from either lightweight or normal weight concrete with a density of 100-150 pcf, with a min. thickness of 4 in. at the joint face. Overall slab thickness may vary to accommodate various blockout depths (longitudinal recesses) formed in the concrete, to house the architectural cover plate. The blockout width may also vary without restriction.

2. **Curtain Wall Assembly** - The curtain wall assembly shall incorporate the following construction features:
 A. **Mounting Attachment** - (Not Shown) The mounting attachments to the floor slab shall be connected to the joint face of the floor slab, in accordance with the curtain wall manufacturer's instructions. Attachments are to be secured to each mullion in the perimeter joint protection region at a max. spacing of 60 in. o.c.
 B. **Aluminum Framing** - Size rectangular aluminum tubing mullions and transoms, according to the curtain wall system manufacturer's guidelines. Min. overall dimensions of the extruded framing sections are 0.100 in. thick aluminum with a minimum 3-3/4 in. depth and a minimum of 2-1/2 in. width. Mullion and transom covers are added to the external side of the framing, giving the framing system a total depth of 4 in. Mullions are to be spaced a min. of 10 in. o.c. and spandrel transoms are to be spaced a min. of 10 in. o.c. and placed a min. of 5-1/2 in. below the concrete floor (as measured from the top surface of the floor), while the upper transom (as measured from the top surface of the floor) may be located flush with the top surface of the floor, while the lower transom (as measured from the top surface of the floor) may be located flush with the top surface of the floor.
 C. **Vision Glass Panels** - Size and install panels to curtain wall manufacturer's guidelines. Use min. 1/4 in. thick, clear heat-treated glass.

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Thank You!

Questions?

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NIA's Online and Social Media Resources

NIA **NIA's Websites**
Insulation.org
InsulationOutlook.com
InsulateMetalBuildings.org

in **NIA's LinkedIn Page**
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