

Fire & Smoke Rated Curtains

The Myths and the Facts

Definitions

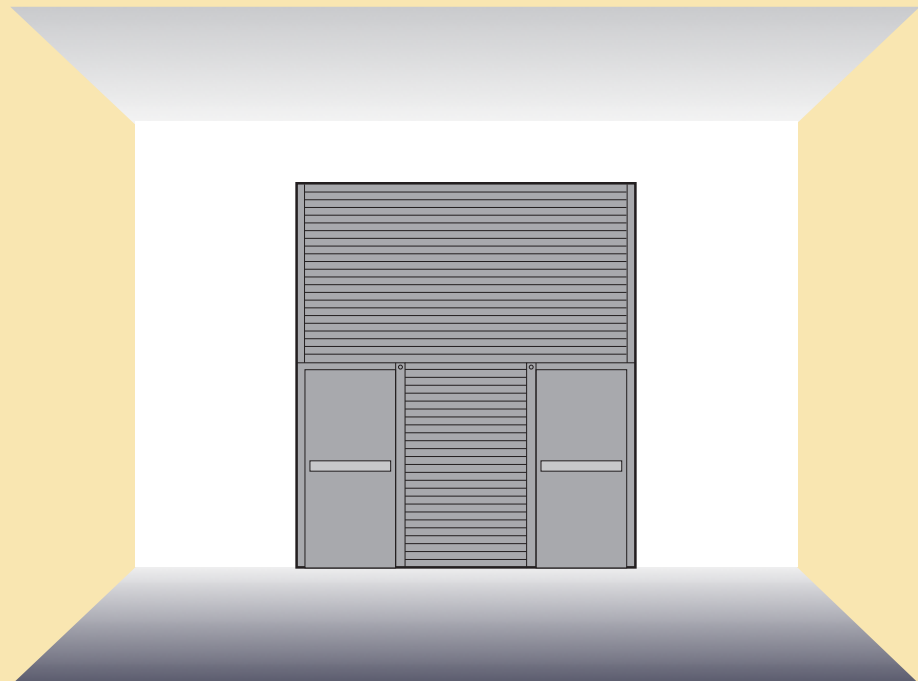
- **Fire Walls** – Section 706
- **Fire Barriers** – Section 707
- **Fire Partitions** – Section 708
- **Smoke Barriers** – Section 709
- **Smoke Partitions** – Section 710

Fire Walls

Section 706

A fire-resistance-rated wall having protected openings, which restricts the spread of fire and extends continuously from the foundation to or through the roof, with sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall. (202)

- **Fire Ratings** (*Table 706.4*)
 - 2-hour
 - 3-hour
 - 4-hour
- **Opening Protection** (*706.8*)
- **Design Notes**
- **Applications**

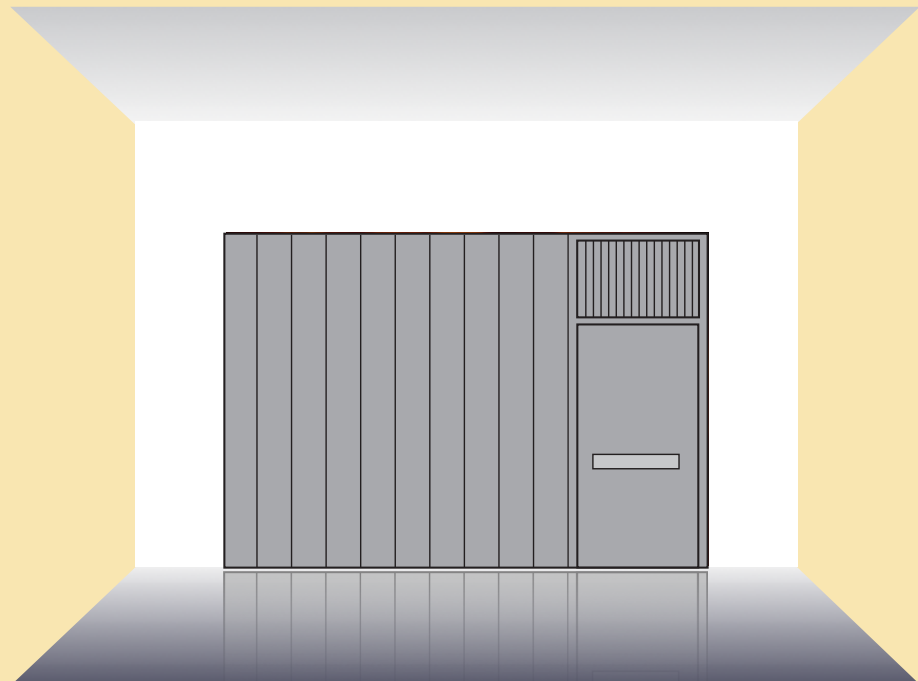


Fire Barriers

Section 707

A fire-resistance-rated wall assembly of materials designed to restrict the spread of fire in which continuity is maintained. (202)

- **Fire Ratings** (*Table 707.3*)
 - 1-hour
 - 2-hour
 - 3-hour
 - 4-hour
- **Opening Protection** (*707.6*)
- **Design Notes**
- **Applications**

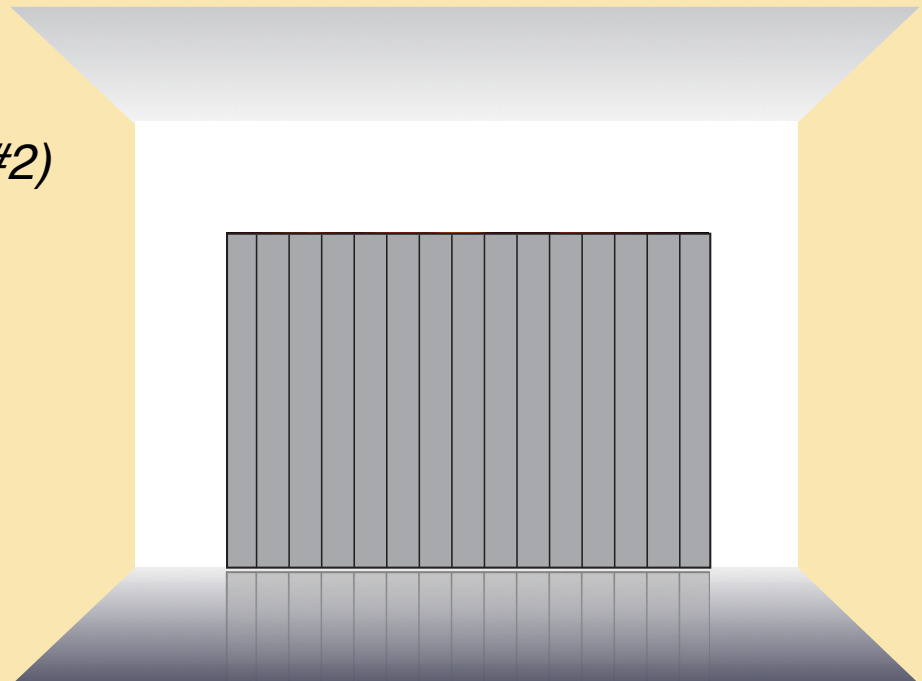


Fire Partitions

Section 708

A vertical assembly of materials designed to restrict the spread of fire in which openings are protected. (202)

- **Fire Ratings** (*Table 708.3*)
 - 1-hour
 - 1/2-hour (*708.3, Exceptions #1 & #2*)
- **Opening Protection**
- **Design Notes**
- **Applications**

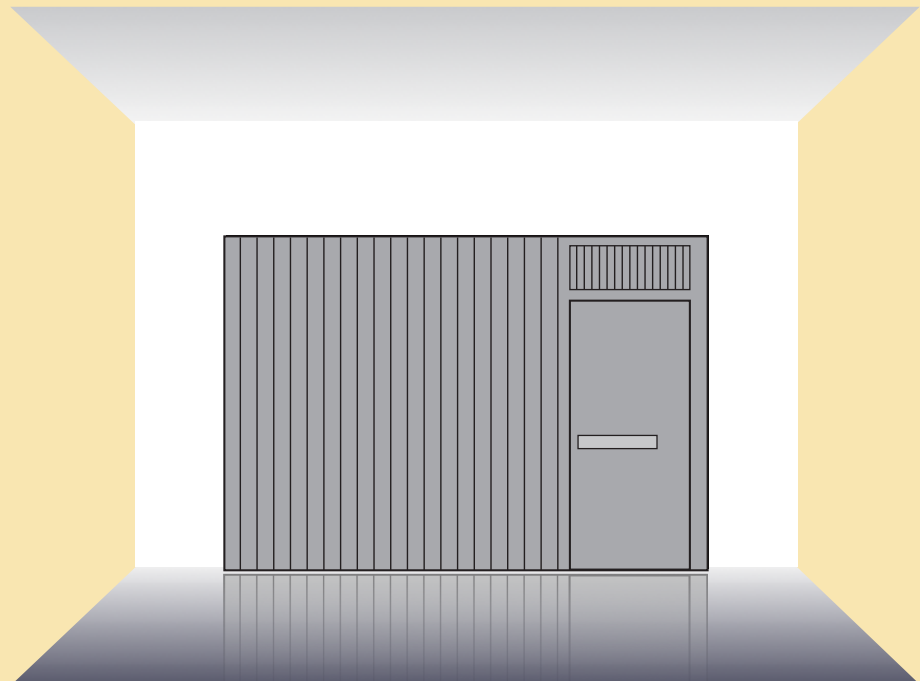


Smoke Barriers

Section 709

A continuous membrane, either vertical or horizontal, such as a wall, floor, or ceiling assembly that is designed and constructed to restrict the movement of smoke. (202)

- **Fire Ratings** (709.3)
1-hour
- **Opening Protection**
- **Design Notes**
- **Applications**

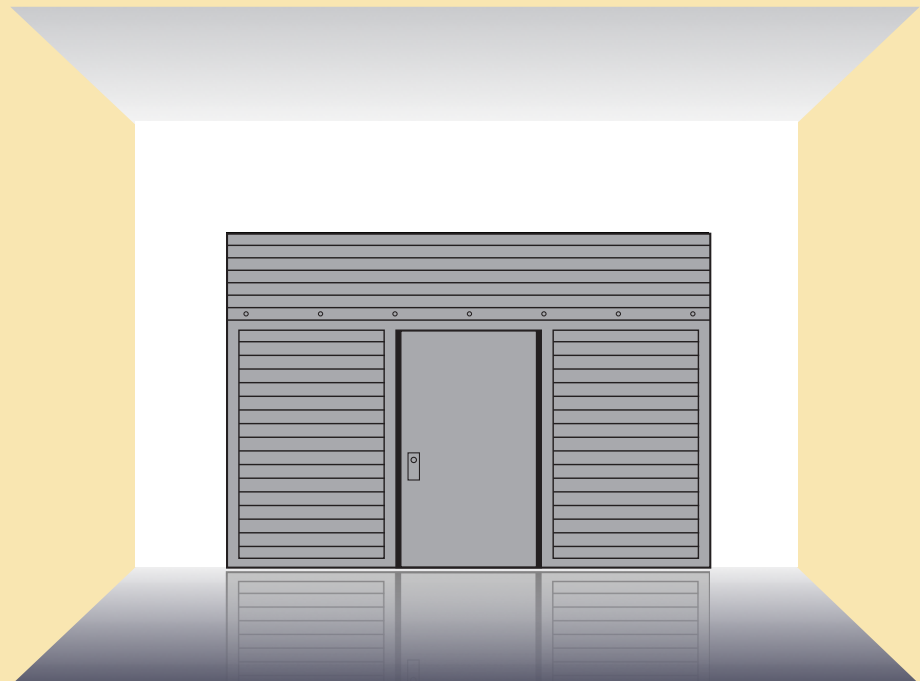


Smoke Partitions

Section 710

A partition constructed to limit the transfer or passage of smoke. (710.4)

- **Fire Ratings** (*Table 710.3*)
Non-rated
- **Opening Protection**
- **Design Notes**
- **Applications**



BUILDING CODE REQUIREMENTS

Opening Protectives

Section 716 (2015)

**TABLE 716.5
OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS**

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE RATED GLAZING MARKING DOOR VISION PANEL	MINIMUM SIDELIGHT/ TRANSFORM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDELITE/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
Fire Walls and fire barriers having a required fire-resistance rating greater than 1 hour	4	3	Not Permitted	Not Permitted	Not Permitted	4	Not Permitted	W-240
	3	3	Not Permitted	Not Permitted	Not Permitted	3	Not Permitted	W-180
	2	1 1/2	100 sq. in.	≤ 100 sq.in. = D-H-90 > 100 sq.in. = D-H-W-90	Not Permitted	2	Not Permitted	W-120
	1 1/2	1 1/2	100 sq. in.	≤ 100 sq.in. = D-H-90 > 100 sq.in. = D-H-W-90	Not Permitted	1 1/2	Not Permitted	W-90
Shaft, exit enclosures and exit passageways	2	1 1/2	100 sq. in.	≤ 100 sq.in. = D-H-90 > 100 sq.in. = D-H-T- or D-H-T-W-90	Not Permitted	2	Not Permitted	W-120
Fire Barriers having a required fire-resistance rating of 1 hour: ...	1	1	100 sq. in.	≤ 100 sq.in. = D-H-60 > 100 sq.in. = D-H-T- or D-H-T-W-60	Not Permitted	1	Not Permitted	W-60
					Fire protection			
Other fire barriers	1	3/4	Maximum size tested	D-H-NT-45	3/4		D-H-NT-45	
Fire Partitions: Corridor walls	1 0.5	1/3 1/3	Maximum size tested	D-20	3/4 1/3		D-H-NT-45 D-H-NT-20	
Other fire partitions	1 0.5	3/4 1/3	Maximum size tested	D-H-45 D-H-20	3/4 1/3		D-H-45 D-H-20	

BUILDING CODE REQUIREMENTS

Opening Protectives

Section 715 (2009) or 716 (2012, 2015)

TABLE 715.4 / 716.5
FIRE DOOR AND FIRE SHUTTER FIRE PROTECTION RATINGS

TYPE OF ASSEMBLY	REQUIRED ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)
Fire Walls and Fire Barriers having a required fire-resistance rating greater than 1 hour	4 3 2 1 1/2	3 3 ^a 1 1/2 1 1/2
Fire Barriers having a required fire-resistance rating of 1 hour: Shaft, exit enclosure and exit passageway walls Other fire barriers	1 1	1 3/4
Fire Partitions: Corridor walls Other fire partitions	1 0.5 1 0.5	1/3 ^b 1/3 ^b 3/4 1/3
Exterior walls	3 2 1	1 1/2 1 1/2 3/4
Smoke Barriers	1	1/3 ^b

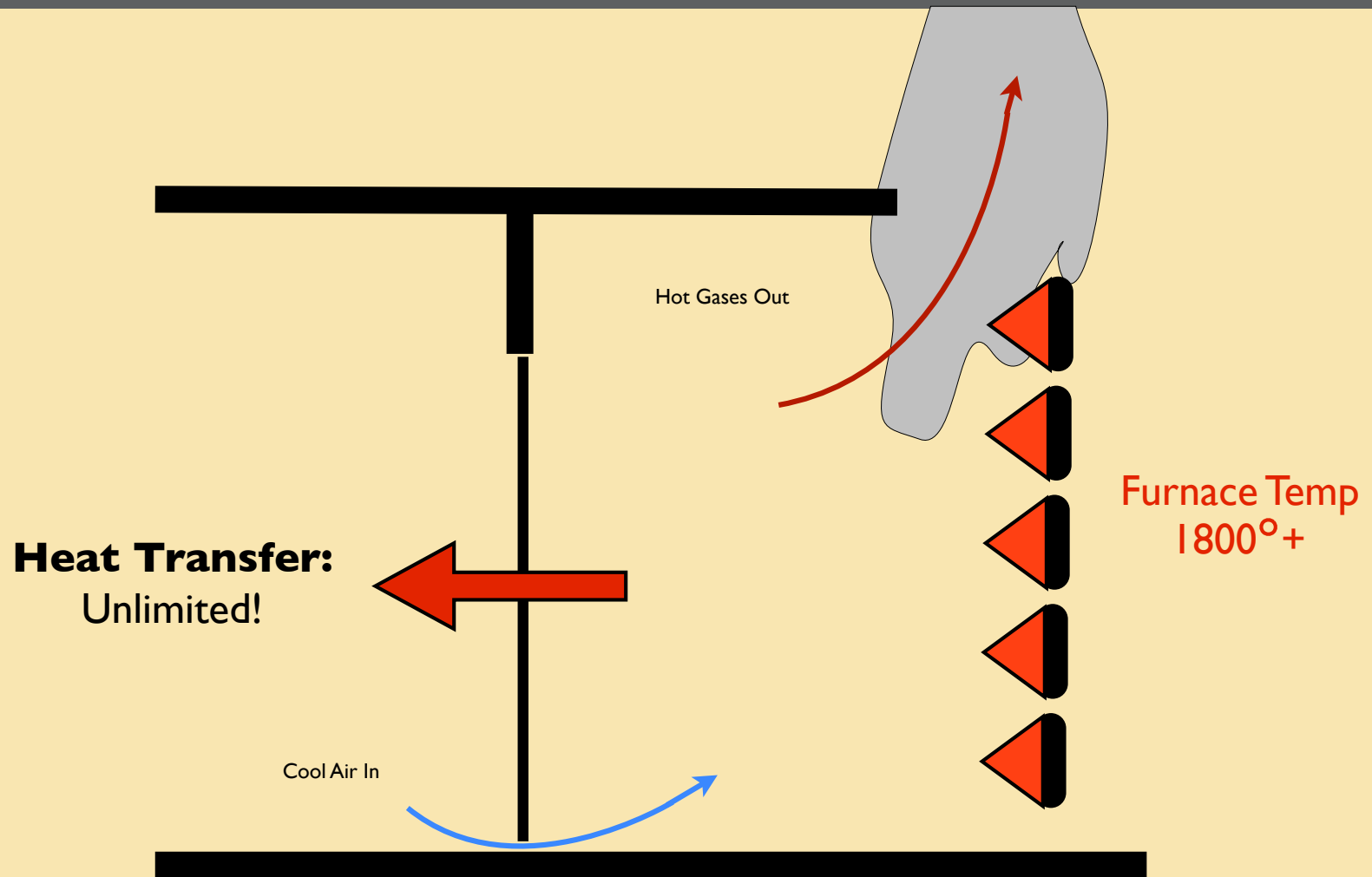
a. Two doors, each with a fire protection rating of 1 1/2 hours, installed on opposite side of the same opening in a fire wall, shall be deemed equivalent in fire protection rating to one 3-hour door.

b. For testing requirements, see Section 715.4.3.

TEST CRITERIA

NFPA 252

UL 10B (Fire Protection Rating)



TEST CRITERIA

Hose Stream

UL 10B (Fire Protection Rating)



TEST CRITERIA

Hose Stream

UL 10B (Fire Protection Rating)



TEST CRITERIA

Hose Stream

UL 10B (Fire Protection Rating)



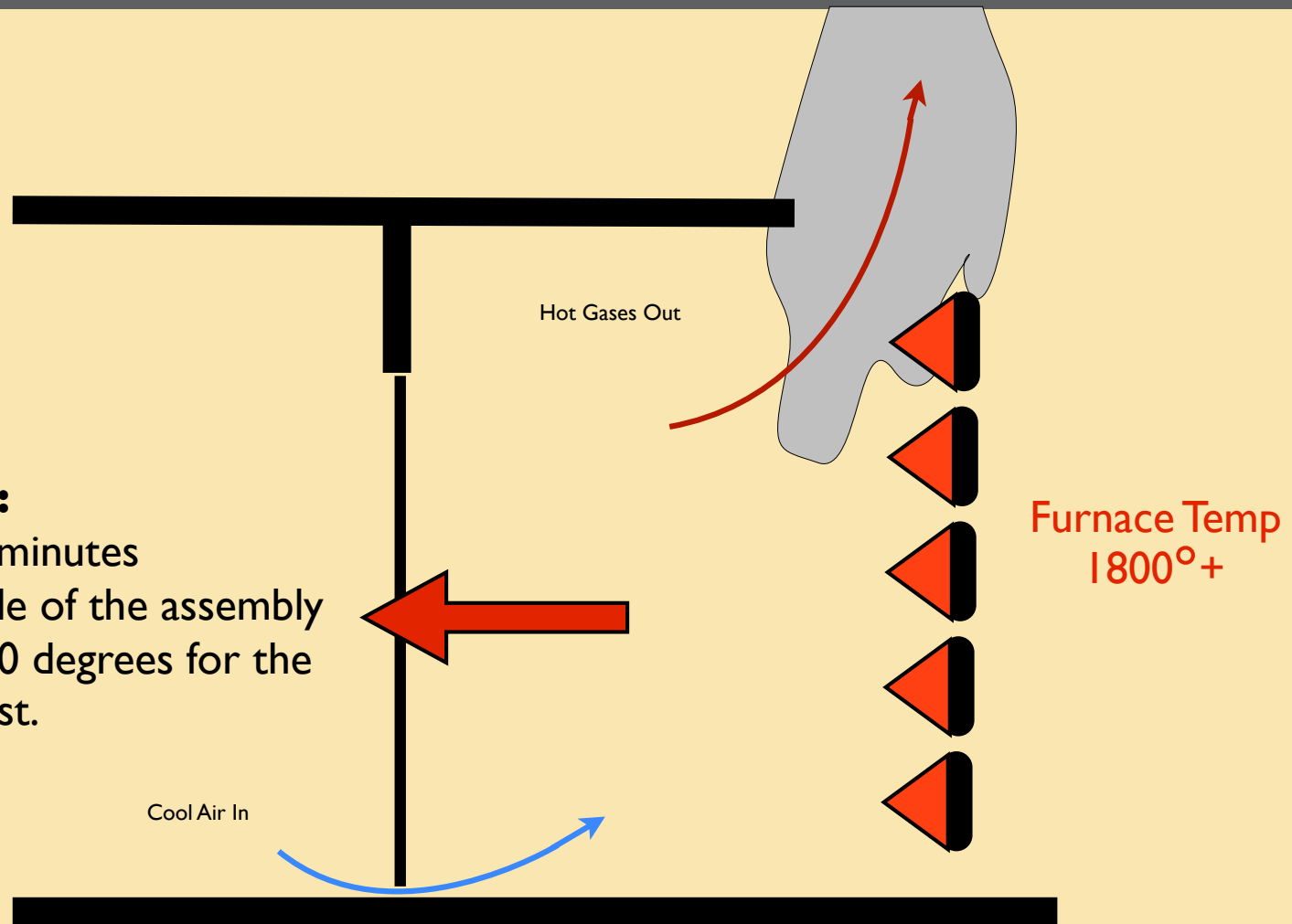
TEST CRITERIA

NFPA 252 (Fire Protection)

Temperature Rise (Fire Protection Rating)

Heat Transfer:

After the first 30 minutes the unexposed side of the assembly cannot exceed 450 degrees for the duration of the test.



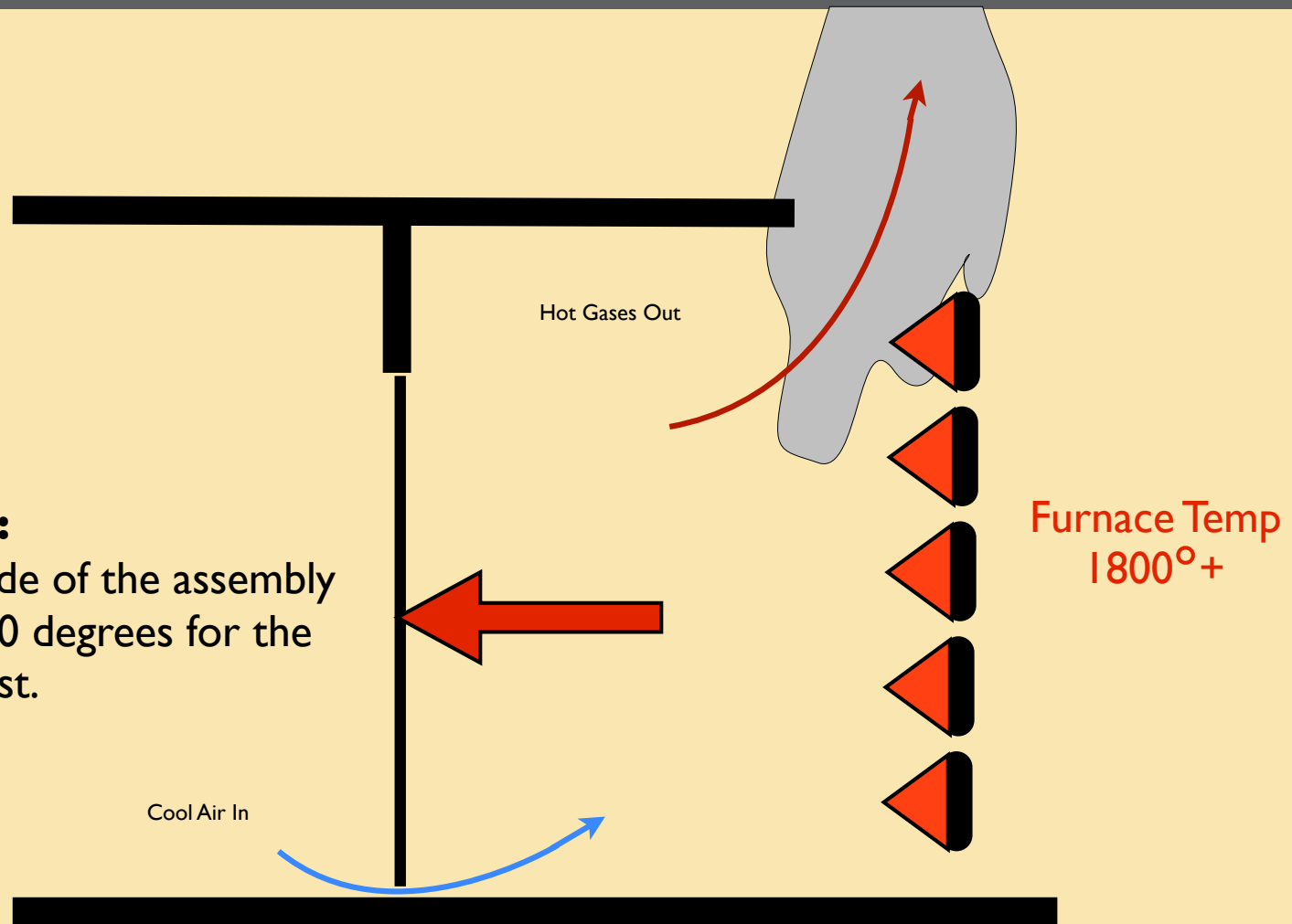
TEST CRITERIA

ASTM E-119

UL 263 (Fire Resistance Rating)

Heat Transfer:

The unexposed side of the assembly cannot exceed 250 degrees for the duration of the test.

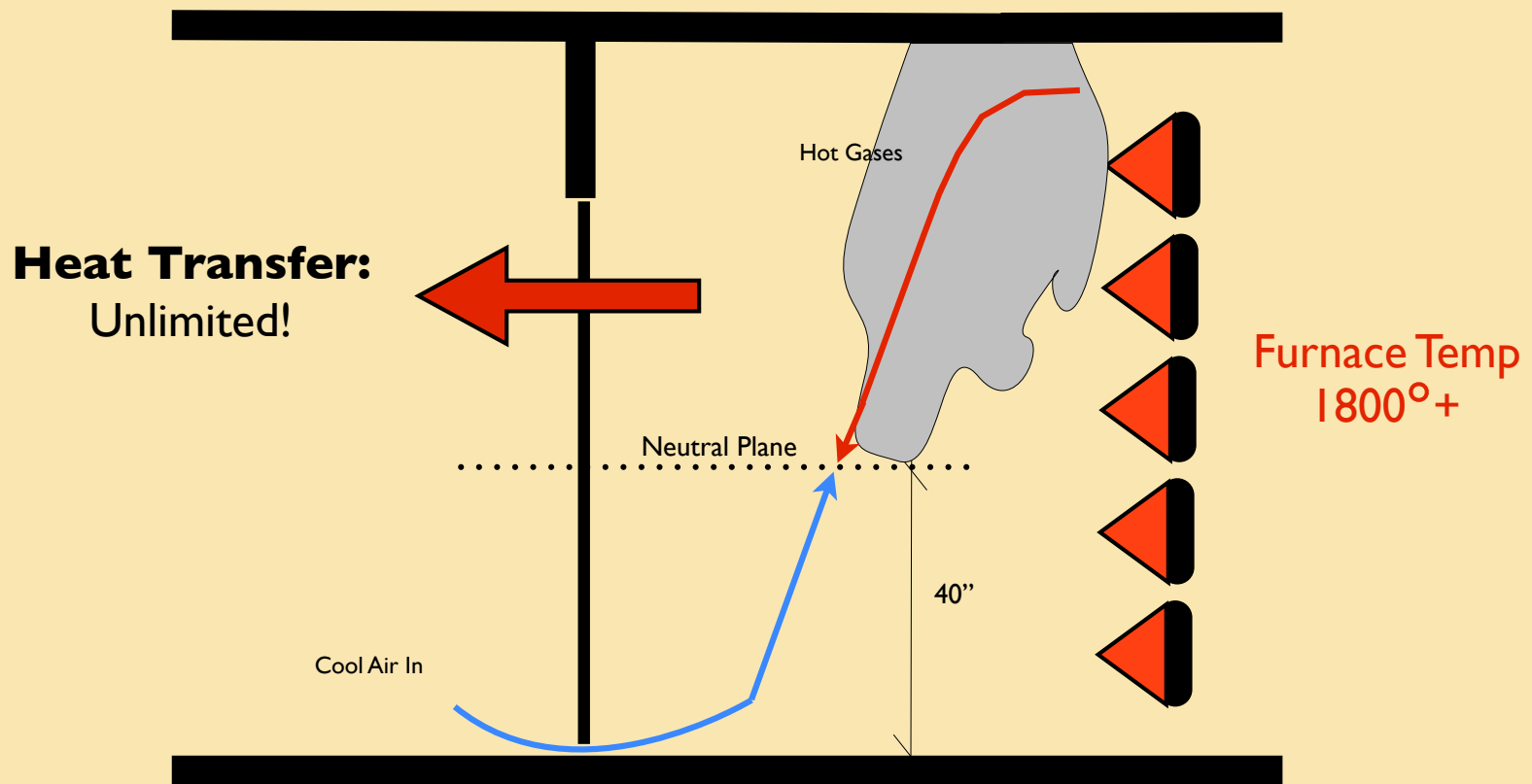


TEST CRITERIA

Positive Pressure Test

40" Neutral Plane (Fire Protection Rating)

UL 10C & 10D (UL 10D NOT adopted by the model codes)





UL 10D - Standard for Safety

Fire Tests of Fire Protective Curtain Assemblies



UL 10D

STANDARD FOR SAFETY

Fire Tests of Fire Protective Curtain
Assemblies

UL 10D - Standard for Safety

Fire Tests of Fire Protective Curtain Assemblies

INTRODUCTION

1 Scope

1.1 These requirements cover the evaluation of fire protective curtain assemblies intended to provide supplemental, passive fire protection as part of an engineered fire protection system. Fire protective curtain assemblies provide nonstructural separation only, and are not intended to be substituted for structural hourly rated partitions or opening protectives that have been tested for fire endurance and hose stream performance.

AC77

Smoke Containment



Most Widely Accepted and Trusted

www.icc-es.org | (800) 423-6587 | (562) 699-0543 *A Subsidiary of the International Code Council®*

**ACCEPTANCE CRITERIA FOR SMOKE-CONTAINMENT
SYSTEMS USED WITH FIRE-RESISTANCE-RATED ELEVATOR
HOISTWAY DOORS AND FRAMES AND AT THE INTERSECTION
OF ELEVATOR LOBBY AND CORRIDOR**

AC77

Approved June 2013

AC77

1.2 Scope

Use of either type of system would permit deletion of the separated elevator lobby required under Section 713.14.1 of the 2012 *International Building Code*[®] (IBC), Section 708.14.1 of the 2009 IBC and Section 707.14.1 of the 2006 IBC, under Exceptions 3 and 5. The smoke-containment systems evaluated in accordance with this criteria are intended for use with elevators or elevator lobbies when, in accordance with IBC Section 1003.7, the elevators are not used as a component of a required means of egress from any part of the building.

AC77

3.0 Test & Performance Requirements (Egress)

3.1.4.2 Egress from the curtain assembly shall be by both of the methods described in Sections 3.1.4.2.2 and 3.1.4.2.3. As an option, the method described in Section 3.1.4.2.1 may be employed.

3.1.4.2.1 A pass-through slot may be incorporated in the curtain assembly.

3.1.4.2.2 Manually lifting the entire curtain assembly, including the bottom bar, with an integral grab strap.

3.1.4.2.3 There must be an egress switch located on both sides of the curtain assembly, that complies with ANSI A 117.1 for operation of a powered door.

AC77

5.7 Conditions of Use

c. The smoke-containment systems recognized in this report are intended for use with elevators or elevator lobbies when, in accordance with IBC Section 1003.7, the elevators are not used as a component of a required means of egress from any part of the building. ■

2015 Cycle

Proposed FS99, 5-part code change

Part I

- Definition of a fire curtain
- New Section titled Fire & Smoke Curtains
- UL 10D

2015 Cycle

Proposed FS99, 5-part code change

FS99-12

For staff analysis of the content of UL 10D-2009 relative to CP#28, Section 3.6, please visit: <http://www.iccsafe.org/cs/codes/Documents/2012-13cycle/Proposed-A/2012ProposedStandards.pdf>.

PART I – IBC FIRE SAFETY
Committee Action: Disapproved

Committee Reason: Disapproval was requested by the applicant based on the committee's actions on FS99-12 Parts II through V. The committee also suggested the proponent clarify how the fire and smoke curtains are tested and that definitions should not contain requirements, such as compliance to a test standard.

Assembly Action: None

2015 Cycle

Proposed FS99, 5-part code change

UL STANDARDS			consensus process is NOT.
FS99-12	IBC: 202	UL 10D-2009 <i>Outline of Investigation for Fire Tests for Fire Protective Curtains</i>	No permissive or unenforceable language was noted. No proprietary references were noted. Per UL's <i>Standards Development and Maintenance Program</i> , Outlines of Investigation "...are not consensus documents and do not require review by an STP or other external group."

2015 Cycle

Proposed FS99, 5-part code change

Part II

- Fire curtain to be used at floor penetrations

PART II – IBC FIRE SAFETY

Committee Action: Disapproved

Committee Reason: The committee disapproved this proposal for the following reasons: Lack of substantiation showing the equivalency of fire and smoke curtains and sprinklers to a shaft enclosure; heat transmission through the curtain was not

2012 ICC PUBLIC HEARING RESULTS Page 20

established; Temperature limit on unexposed surface of the curtain was not addressed; and use of alternative methods in Section 104.11 should be used rather than specifying this in the code.

Assembly Action: None

2015 Cycle

Proposed FS99, 5-part code change

Part III

- Fire curtain to protect vertical floor openings with up to a 2-hour rating

PART III – IBC FIRE SAFETY

Committee Action: Disapproved

Committee Reason: The committee disapproved this proposal for the following reasons: The testing of fire and smoke curtains is inconsistent with the testing required for other methods currently in the code to protect floor openings; The weight of water on the system needs to be addressed; and concerns were raised about the fire curtain perhaps adversely affecting the expected operation of the sprinkler system.

Assembly Action: None

2015 Cycle

Proposed FS99, 5-part code change

Part IV

- Fire curtains to separate atrium spaces from the remaining structure as fire barriers with 1-hour fire resistance ratings

PART IV – IBC GENERAL

Committee Action: Disapproved

Committee Reason: The committee disapproved this proposal for the following reasons: The ability of the fire and smoke curtain to remain in place when the atrium smoke control system was activated needs to be addressed; and lack of substantiation showing the equivalency of fire and smoke curtains and sprinklers to a fire barrier with a one hour fire-resistance rating.

Assembly Action: None

2015 Cycle

Proposed FS99, 5-part code change

Part V

- Shaft enclosures for Exit Access Stairways

PART V – IBC MEANS OF EGRESS

Committee Action: Disapproved

Committee Reason: The committee disapproved this proposal for the following reasons: Lack of substantiation showing the equivalency of fire and smoke curtains and sprinklers to a shaft enclosure; heat transmission through the curtain was not established; Temperature limit on unexposed surface of the curtain was not addressed; and use of alternative methods in Section 104.11 should be used rather than specifying this in the code.

2018 Cycle

Proposed FS102, 3-part code change

Parts I - III

- Similar in content to FS99 and included UL 10D.
- All three parts unanimously voted down with similar comments

Myths & Facts

Fire & Smoke Rated Fabric

Myth

An integrity tested opening protective.

Fact

Rated fabric breaks down as it burns. When the hose stream is introduced it fails instantly. UL 10D specifically limits its use to non-structural separation only.

Myths & Facts

Fire & Smoke Rated Fabric

Myth

UL 10D is an approved model code criteria.

Fact

UL 10D is the current 3rd party test criteria for curtain protectives but has not been adopted by the model codes. It has failed in two previous code change submission attempts during the 2015 and 2018 code development cycles.

Myths & Facts

Fire & Smoke Rated Fabric

Myth

AC77 allows use in a means of egress.

Fact

During an emergency building occupants may egress through the assembly using any of the three methods described as long as egress is limited to the point of access to an elevator car or an elevator lobby only. Both applications cannot be in a required means of egress from any part of the building.

Myths & Facts

Fire & Smoke Rated Fabric

Myth

Can be used as a fire barrier with a fire resistance rating.

Fact

Fabrics are tested as an opening protectives that transfer heat. They do not comply with ASTM E-119, UL 263 or NFPA 251 as fire-resistance rated walls. They can be successfully tested and pass UL 10B and 10C for 20 minutes only, due to hose stream failure.

Myths & Facts

Fire & Smoke Rated Fabric

Myth

Can be used to protect an opening in any of the five walls of the IBC.

Fact

Fabrics can be used in Fire Partition and Smoke Barrier walls where 20 minute opening protectives are allowed. They cannot be used in Fire Wall or Fire Barrier walls since a minimum 45 minute to 1-hour rating is required.