

AIA 1-hour Presentation – FF 10 (2018 Edition)

Fire & Smoke Rated Curtains

Revised 6/2021

PREFACE

Please review the new script and incorporate it into your personal style of presenting. It is important to become thoroughly acquainted with the material so you may speak freely and make eye contact with your audience. You will sound more knowledgeable and appear more professional.

We have made significant changes to many of the slides as well as the order in which they are presented. Additional information includes the D500S and the D400 technologies. There is a decrease in code details related to regulatory acceptance, however, it is important to be sensitive to the needs of the attendees and address particular concerns they may have with regulatory questions and approval inquiries.

Many slides now have fewer words and more imagery. When graphics predominate, the script provides adequate information that you as the presenter may study and learn beforehand. You will better engage with your audience if you are not trying to read a content-heavy slide.

Conversely, when a slide has more copy, the script is silent. The content of this slide is meant to be presented in your own words and style. The slide becomes supplemental to the content.

Please do not attempt to promote code concepts, test data or compliance issues that are not specifically referred to in the script or slides. Repeating principles you have heard someone else use that are not confirmed by your own experience often discredits both you and McKeon. Answering questions with “I don’t know but I will find out for you” is more credible than an attempt to respond beyond your knowledge.

By simplifying basic code principles, changing script and slides to illustrate concepts rather than using long narratives, we think you will find it much easier to both learn and present this 1-hour AIA program. The new order of presentation is designed to tell the “fabric” story beginning with Draft Curtains and ending with the ultimate “Hose Stream” technology.

If you have additional questions or concerns, please do not hesitate to contact us.

David Dodge, VP, Business and Code Development

Slide 1

You will enjoy this slide the most by allowing the audience to view the fire burning before the first mouse click.

Click #1 - A FF curtain will drop and become the backdrop of the title slide as the title information populates the screen.

Slide 2

(Social Media)

Slide 3

(AIA Accreditation)

Slide 4

(Copyright)

Slide 5

(The objectives are designed to follow the flow of the fabric technology evolution from simple draft curtains to hose tested opening protectives)

Slide 6

Today, we will begin by examining a relatively new technology within the fire and smoke-rated opening protective industry. The deployable draft curtain.

Slide 7

(Review the information on the slide emphasizing this system functions the same as any other vertical rolling assembly with the same components less the side guides)

Slide 8

NFPA 13 defines the materials used for constructing draft curtains for applications in escalator openings and exit access stairways as non-combustible.

Slide 9

The primary use for draft curtains in the code are for protecting openings associated with escalators and other openings that comply with Section 712. Whenever you have frequented these applications you may have noticed something that may have seemed odd to you.

Click #1

And that is multiple gaps in the configuration of the draft stop around escalators, regardless of the material used for the applications. This gap is perfectly acceptable, let's examine why.

The guidelines for complying draft curtains are as follows:

- Draft curtains are not required to be constructed of fire-rated materials
- Draft curtains simply resist NOT STOP the passage of smoke
- Draft curtains can be deployable, no requirement for being fixed in place
- Draft curtains are not required to be fastened in side-guides
- Draft curtains function in connection with closely-spaced sprinklers

In essence, draft curtains are designed to force hot smoke and gasses back against associated NFPA 13 compliant closely spaced sprinklers causing them to activate. Remember, draft curtains are not intended to stop smoke from migrating vertically through the opening.

Even though draft curtains are referenced for use in the IBC, the definition of the curtains is no longer in the code. The code simply points to NFPA 13 of which the guidelines above are detailed.

Slide 10

Here we are able to see the pointer in the IBC sending us to NFPA 13 for the layout of the curtains and the sprinkler heads. Before we look at the NFPA 13 criteria, let's first examine this language wherein draft curtains are allowed to take the place of a shaft wall. Note, the criteria speaks of the escalator itself somewhat blocking the opening. The next slide helps us understand what that means.

Slide 11

(Review the criteria to help attendees understand this issue, there is a full explanation found on pages 33 – 36 in the 2018 edition of Fire Systems, A Guide to Code Compliance).

Slide 12

The NFPA 13 illustration defines the draft curtain parameters with an 18" drop (minimum) along with location and spacing with the closely spaced sprinkler heads. However, the draft curtain does not have to be in place unless there is fire and the building goes into alarm.

Slide 13

Let's look at an example of applying the draft curtain provisions as deployable systems.

Slide 14

Barney's of NY found this application appealing due the absence of fixed barriers. Notice in the photo the gaps are either side and the close proximity of the sprinkler heads.

Slide 15

The same basic rules apply for use of the draft curtain provisions in exit access stairway openings.

Slide 16

As long as the opening in the floor is not greater than 50% of the area of the stairs and landings, the code considers the opening blocked enough to apply the same application for protection avoiding shaft walls or other methods of vertical separation.

Slide 17

Draft curtains tucked away in the ceiling until needed. Remember, in B & M occupancies there is not limit to the number of floors penetrated and protected with only draft curtains. All other occupancies we are limited to 4 floors.

Slide 18

Deployable draft curtains were used in the following applications as a component of an alternate methods approach.

Slide 19

Under an alternate methods approval this extremely large airport design composed of numerous high space unprotected areas, used these unusually tall draft curtains in varied lengths to attempt control of smoke migration. The idea was to push as much smoke possible vertically to smoke and heat vents providing a tenable environment for building occupant egress. Full separation of all the odd shaped areas was near impossible with fixed solid walls or other partitions for mitigating smoke migration.

Slide 20

This separation originated as a large full height rolling steel door in order to separate the restaurant from the rest of the structure, an occupancy separation. After increasing the capacity and volume of the sprinkler system the regulatory officials felt the draft curtain would suffice because it would help to activate the sprinkler system sooner thereby deleting the need for full separation.

Slide 21

Let's examine non-fire rated fabrics that are smoke rated.

Slide 22

(Review all of the basic components helping attendees to understand these systems work like all other vertical rolling assemblies)

Slide 23

This technology complies with UL1784 as a smoke rated material.

Slide 24

There are numerous applications for smoke rated assemblies throughout the building code. We will begin by examining elevator lobby applications.

Slide 25

An IBC compliant elevator lobby created with a smoke partition wherein egress was not required through curtain due to the front entrance located at one end of the lobby.

Slide 26

Once the fire protective curtains are deployed a code complying elevator lobby has been created. Note the means of egress compliant exit features in this assembly. These egress features can be used in a required path of egress.

Slide 27

The smoke rated fabric assemblies can be used at the point of access to the elevator car. Let's take a look at several different applications.

Slide 28

The egress feature swings and self-latches closed.

Slide 29

It can be pushed open with less than 30 lbs of force.

Slide 30

Multiple egress features in one curtain.

Slide 31

The bottom bar is ADA compliant.

Slide 32

Occupancy type I-2 applies to facilities that provide medical care on a 24-hour basis and include hospitals, nursing homes, foster care and psychiatric hospitals. Since these types of facilities are required to compartmentalize into 1-hour fire rated and UL1784 smoke rated compartments not greater than 22,500 square feet in size, the corridors are not required to be fire rated but smoke rated only. The smoke rated curtains help to solve several separation challenges in these institutional occupancies.

Slide 33

The second floor of this hospital two-story space features a large waiting area that overlooks an offset first story waiting area. As you can see from the amount of light in the space, both waiting areas have exceptional views both to each other and to the outside.

Slide 34

This outpatient pharmacy in a very large children's hospital borders the smoke rated corridor. Section 407.2 requires corridors to be both continuous to the exit and to separate other areas of the hospital from the exit path the corridor provides. Section 407.3 requires the corridor to be constructed as smoke partition walls.

Slide 35

Smoke compartmentation in healthcare occupancies falls into two categories. The first one deals with the 22,500 Sq Ft rule we spoke of earlier wherein the entire structure cannot have a space unprotected with both 1-hour fire rating and UI1784 smoke rating larger than 22,500 square feet. The second category is what is called Care Suite separation or compartmentation. This means that areas within the twenty-two-five compartments that are patient treatment and sleeping areas must be broken down into smoke compartments that are called Care Suites. These suites have square footage size limitations based upon their use.

Slide 36

In this example, we feature a critical care unit that exceeds the allowable square footage area of 10,000 Sq. Ft. (407.4.4.5.1, Exception #1). Therefore, the fire protective curtain complies with Section 407.4.4.2 wherein separation can be accomplished with the use of a smoke partition reducing the size of one large care suite into two separate ones under the 10,000 Sq. Ft. maximum requirement. Note, space for head boxes or side stacking pocket areas is limited or not available due to the excessive quantity of medical equipment and medical supply storage in care suites. The compact and light weight features of the fire protective curtain render it a perfect solution.

Slide 37

We will now look at a more complex yet simple solution using a full perimeter style smoke and draft curtain assembly.

Slide 38

Unique configurations are no challenge. This technology creates its own subtle corners with low-profile jambs. Widths to 500 feet and heights to 48 feet. Full 360 degree configurations are no problem.

Slide 39

The fabric has been tested and labeled to UL1784.

Slide 40

Let's watch how it creates its own non-obtrusive corner.

Click #1

In this video we can watch the corner fastener engage when deployed – unprecedented in the industry.

Slide 41

In this close-up of the interface mechanism we can see it looks solid, dependable and simple! By creating corners without vertical posts or mullions, odd degree corners are made simple with these slanted-teeth gears. Almost any configuration is possible in order to follow the linear design of the surrounding construction.

Slide 42

The narrow bottom bar is easily stored flush in the ceiling.

Slide 43

This technology can help us with smoke separation in atriums by reducing the volume of smoke for sizing mechanical systems. We can protect vertical space from corridors where difficult linear designs are applied and create smoke compartments in vertical spaces that are either partially open or fully open.

Slide 44

We have spent significant time with smoke only curtains. Let's examine applications and code related criteria for fire and smoke rated assemblies.

Slide 45

(Review all of the basic components helping attendees to understand these systems work like all other vertical rolling assemblies)

Slide 46

Please note, these curtains are not only rated for smoke under UL1784 but they also are labeled under UL10D for 3 hours.

Slide 47

In order to understand the meaning of UL10D we must first take a look at the recently approved code language that is currently in the 2021 IBC. Notice on the screen the language describing UL10D without the hose stream.

Slide 48

The reason for this wording in the 2021 IBC is due to the scope statement in the UL10D standard. Let's read it together and focus on the underlined statements. Fire endurance means the ability of the tested material to disallow flame-through and flash-through during the opening protective burn test. Previously, one slide indicated this fire endurance was achieved for 3 hours. The challenge comes when we realize the same assembly must also endure a hose stream at the end of the burn in order to be labeled greater than 20 minutes.

Slide 49

The code confirms that unless you pass a hose stream at the completion of the burn, regardless of the amount of time you passed the burn, the greatest label that can be affixed to the assembly is 20 minutes if you fail the hose stream test.

Slide 50

On this table we learn the only walls that will accommodate 20 minute labeled doors are Fire Partitions and Smoke Barriers. Typical core and shell wall assemblies such as shaft enclosures, occupancy separations, etc., are required to have opening protectives that must pass the hose stream test since they must be constructed using Fire Barrier walls or for area separation, Fire Wall walls.

Slide 51

This is burn test of our own fabric. We knew it would not pass the hose stream, nonetheless we wanted to witness the reasons why.

Click #1

What we are seeing is the point of time immediately after the burn portion of the test. The laboratory technicians are quickly rolling the door and frame away from the furnace portal in order to administer the hose stream. See for yourself why this fabric assembly, typical of all fabrics on the market, cannot be labeled for greater than 20 minutes.

Slide 52

There are lots of uses for 20-minute rated fabric opening protective assemblies.

Slide 53

This project is a boarding school putting its primary occupancy in the category of an R-2. Even though it accommodates other occupancy types, table 1020.1 in the IBC requires all corridors in a predominantly R-2 occupancy to be ½-hour rated.

Section 716.5.3 in the opening protective section of the IBC requires that doors located in a rated corridor must have a minimum 20-minute fire rating as well as a UL1784 smoke, i.e. "S" label (716.5.3.1). Also, in most occupancy types it is allowable to have two-story openings without protection under specific conditions. However, Section 712.1.9, item #4 disallows a two-story opening in a Group R occupancy. In these applications 20 minute curtains are an adequate resolve.

Please note the two lower photos right across the hall from the upper photos.

Slide 54

This facility is an assisted living center that falls under an I-1 occupancy type wherein custodial care is required on a 24-hour basis. The same code requirements are in place as the previous R-2 occupancy type.

Slide 55

In this application, separating the atrium, the minimum fire label requirement is 1 hour. This project was approved under alternate methods using the UL10D 3-hour burn without the hose stream.

Slide 56

We are excited to introduce a new technology that will be extremely helpful for applications with limited head and side room and/or weight constraints where hose stream assemblies are required.

Slide 57

(Follow and explain the on-screen information emphasizing that the limitations we have been discussing regarding hose stream, etc., are now gone)

Slide 58

(Follow and explain the on-screen information emphasizing that the limitations we have been discussing regarding hose stream, etc., are now gone)

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Slide 61

(The onscreen copy says it all)

Slide 62

The flexible fabric egress door is not considered under the requirements of special doors. It is a conforming swing egress door by code definition.

Slide 63

Swinging doors placed in the means of egress are required to comply with the door opening force requirements, it is titled the 15-30-15 rule. As shown on the slide this means no more than 15 lbs., of force to release the mechanical latching mechanism, no more than 30 lbs., of force to set the door into motion, and no more than 15 lbs., of force to swing/push the door open to the required exit width for the space and occupant load under consideration.

The hook and loop system on the leading edge that holds the door in the closed position is attached the entire full height of the leading-edge door leaf. This is not a mechanical moving part system like a back-latch on standard door hardware. This fire-rated fastening style system serves as the door closer normally found on fire or smoke rated doors. There is not a conventional latch associated with this technology. Therefore, the first 15 of the 15-30-15 rule of opening force does not apply.

Slide 64

This chart indicates that when force is applied at the standard exit hardware level, the force to put the door in motion is less than 30 lbs., with an average of 26 lbs., of force when laboratory tested. Please note that when this egress feature is approached by a wheelchair, the force to put the door in motion is significantly less due to the bottom of the wheel chair typically engaging the curtain first (before hands) and the peel/push effect causes a much easier and quicker release. Also, please note the final requirement of opening or pushing the door to its full required open width is well within the maximum forces at only 4 lbs.

Slide 65

Section 1010 of Chapter 10, Means of Egress, designates the basic provisions for doors placed in a means of egress. On this slide the basic size of the door leaf is described.

Please note that flexible fabric swing doors are not constructed the same as hard surface swing doors. Hard surface swing doors can hinge on one side only allowing the top of the door assembly to open and close parallel with the bottom of the door. This principle allows the hard surface swing door to comply with the basic requirement of the minimum door open width of 32 inches simultaneously at the bottom and at the top of the door.

Obviously, rigid door members are not compatible with the flexible fabric door assembly because they cannot roll-up with the assembly. Therefore, the flexible fabric door egress feature cannot incorporate a minimum 32-inch opening at the full height of the door.

Please note, the flexible fabric door assembly complies with all other requirements of a conforming swing egress door for all occupant loads.

Slide 66

(Quiz)

Slide 67

(Social Media)

Slide 68

(Questions)