Welcome!

Patient Safety Fundamentals for HC Architects – Part 1

HC 101 Series

Tuesday, August 9, 2016

2:00 pm – 3:00 pm ET
1:00 pm – 2:00 pm CT
12:00 am – 1:00 pm MT
11:00 am – 12:00 pm PT

Moderator
Tom Clark
Clark/Kjos Architects

Presenter
John Kreidich
McCarthy Building Companies

Academy of Architecture for Health (AAH)
On-line Professional Development

The Academy's multi-channel on-line approach provides emerging professionals, journeymen, and master professionals with convenient and economical opportunities to develop their chosen area of interest.

The HC 101 Series sessions are tailored to provide budding healthcare design professionals with conceptual and practical primer-level knowledge.

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Course Purpose & Objectives

To enable and enhance your ability to:

1. Comprehend the relationship between the Life Safety Code and Authorities having Jurisdiction and CMS.
2. Understand the reasoning behind defend-in-place versus evacuation response to fire in a hospital.
3. Identify appropriate elements of fire and smoke containment in hospital design including fire barriers, smoke barriers and smoke partitions.
4. Employ rated assemblies and engineering judgments in design of fire barriers, smoke barriers and smoke partitions.

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All attendees will be eligible to receive:
1 AIA LU/HSW (AIA continuing education)

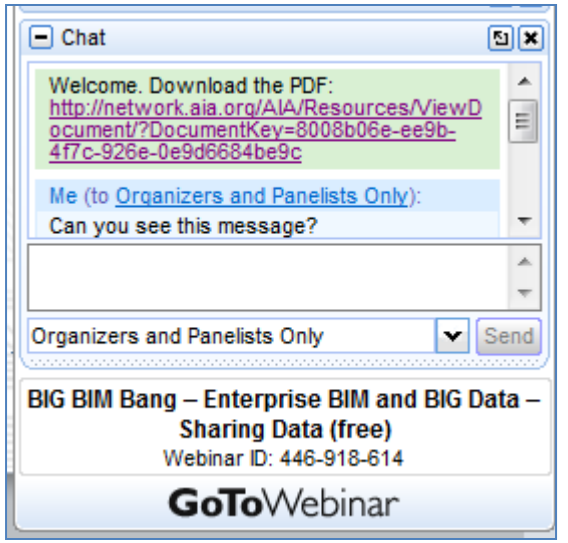
In order to receive credit, each attendee must complete the webinar survey/report form **at the conclusion of the presentation**.

Follow the link provided:

- **in the Chat box** at the conclusion of the live presentation;
- **in the follow-up email** you (*or the person who registered your site*) will receive one hour after the webinar.

To Post Questions or Comments:

Submit a question to the moderator via the chat box.



Content-related questions will be answered during the Q&A portion as time allows.

Tech support questions will be answered by AIA staff promptly.

Patient Safety in Acute Care Hospital Design

Presented by John Kreidich AIA, CHC, LEED AP B+C

Two areas of primary concern:

1. **Life-Safety** – assuring that occupants in the event of a fire are protected from smoke as well as fire – an exit stair is of no use to a bedridden patient.
2. **Environmental Safety** – assuring that occupants are not exposed to materials posing a threat to life or health.

Today we will focus on the first area of concern – Life Safety.

The Life Safety Code and its relationship with Authorities having Jurisdiction and CMS

Leominster Daily

Receives All-Time High Appropriation Bil

By Unit

BELIEVE MORE THAN 50 PERISH TODAY AS BLAZE SWEEPS ILLINOIS HOSPITAL

CHARGED WITH DISAPPEARING WITH $884.660

FORTNIGHTLY CLUB HAS PRESIDENT'S DAY EVENT AND GREETS STATE HEAD

INSTALLATION IS CONDUCTED BY THE O. E. S.

One Estimate Figures To 58 As Number D

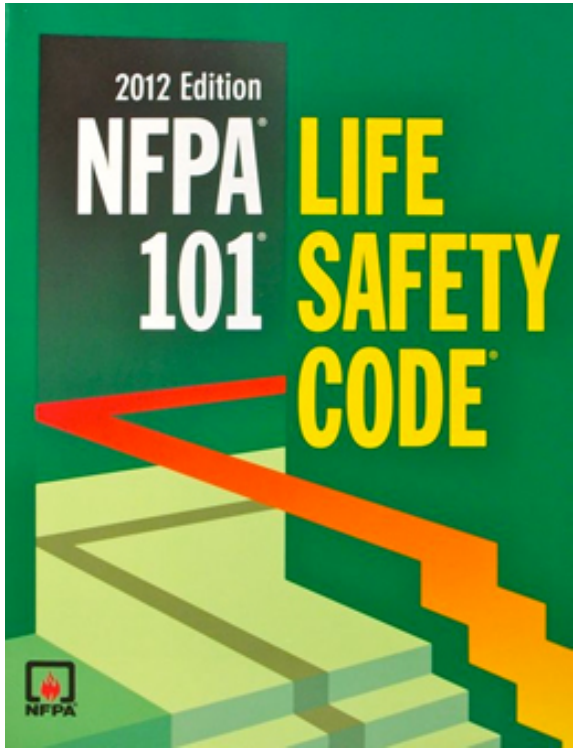
NAME COMMITTEE FUND CAMPAIGN AT ST. CECILIA'S

www.rarenewspapers.com-

*A fire at St. Anthony Hospital in Effingham, IL, in 1949, **actually killed 74** people, both patients and staff.*

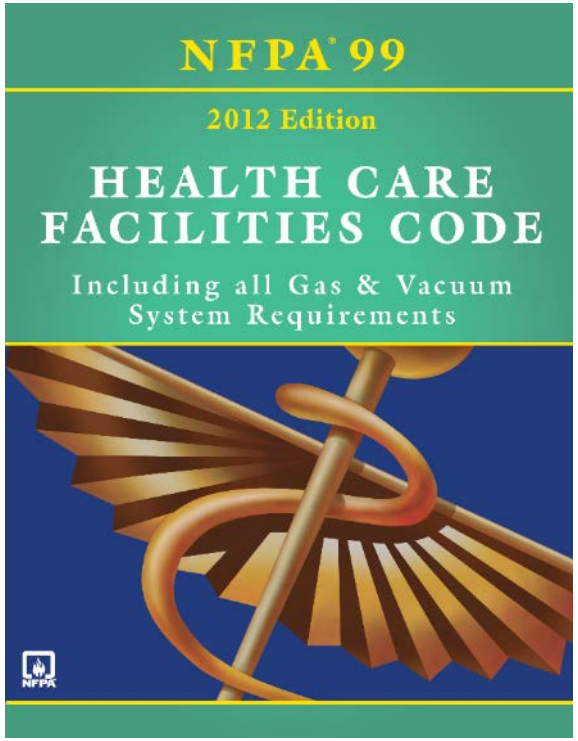
The **Life Safety Code** exists today primarily because **devastating, catastrophic fires in the twentieth century** focused national attention on the inadequacies of life safety features in buildings.

The Life Safety Code is published as NFPA 101



Despite its title, the standard is not a legal code, is not published as an instrument of law, and has **no statutory authority in its own right**. However, it is deliberately crafted with language suitable for mandatory application to facilitate adoption into law by those empowered to do so.

The Health Care Facilities Code is published as NFPA 99



This code is referenced regularly throughout NFPA 101. Its focus is more on the MEP and operational aspects of health care facilities.

From the perspective of design and programming it gives criteria for provisions to maintain operation during events such as earthquakes or hurricanes.

Authorities Having Jurisdiction (AHJ)

When some or all of the Code is adopted as regulations in a jurisdiction, it can be enforced by inspectors from local zoning boards, fire departments, building inspectors, fire marshals or other bodies and **authorities having jurisdiction**.

Authorities Having Jurisdiction (AHJ) are typically the federal, state, county and/or municipal building inspectors. Jurisdictions can overlap and may even disagree.

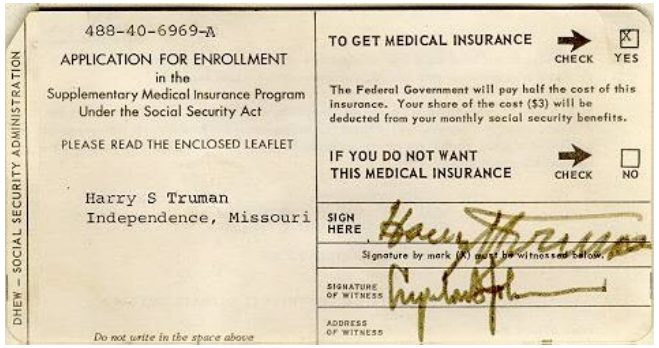
Joint Commission on Accreditation of Hospitals

The Joint Commission

Hospital regulation as we know it began in **1918**, when the American College of Surgeons began inspecting hospitals using a single-page document called The Minimum Standard for Hospitals.

In **1951**, the American College of Physicians, the American Hospital Association, the American Medical Association, and the Canadian Medical Association joined forces to create the Joint Commission on Accreditation of Hospitals (**now called the Joint Commission**) as a way to provide voluntary inspection and accreditation of hospitals.

Centers for Medicare & Medicaid Services (CMS)



In 1965, the federal government established the Centers for Medicare & Medicaid Services (CMS). **Hospitals that were accredited by the Joint Commission were deemed to be in compliance with the Medicare Conditions of Participation** & therefore qualified for Medicare and Medicaid reimbursement.

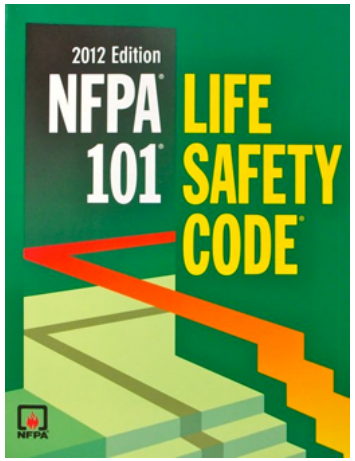
In the late 1960s, federal rulemaking implementing the use of the Life Safety Code was approved and finalized that as of 1/1/1970, facilities had to meet the provisions of the **Life Safety Code 1967 edition** in order to continue to satisfy Conditions of Participation (COP) to qualify for Medicare/Medicaid reimbursement.

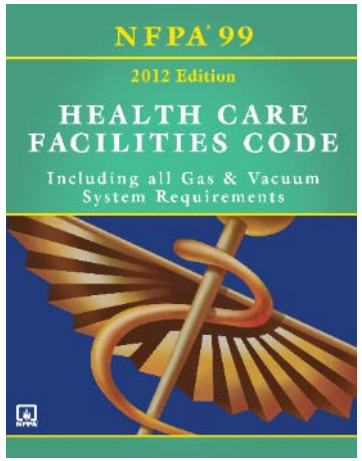
Upcoming Break for Questions and Comments

www.agilecoach.ca, July 16, 2015

What are your thoughts on the relationship of The Life Safety Code with Authorities having Jurisdiction and CMS?

CMS Adopts 2012 Editions NFPA 101 & NFPA 99





The U.S. Centers for Medicare & Medicaid Services (CMS) now require health care facilities to migrate from using the 2000 edition of **NFPA 101**®, Life Safety Code® (LSC) to the **2012 edition**; and mandate direct compliance with the **2012 edition** of **NFPA 99**, Health Care Facilities Code, for the first time.

Healthcare facilities are expected to update and comply with NFPA 101 and NFPA 99, respectively **by November 7, 2016**.

CMS Modifications to NFPA 101 & NFPA 99

CMS determined it knew more about patient protection than the national, industry-wide consensus-based committees that produce NFPA codes.

Consequently it made modifications to NFPA 101 and 99 that are summarized in the following slides.

CMS Modifications to NFPA 101 & NFPA 99

1. Corridor doors and doors to rooms containing flammable or combustible materials must be provided with positive latching hardware. Roller latches are prohibited on such doors under the CMS rule.
2. In consideration of a recommendation by the state survey agency or accrediting organization, CMS may waive specific provisions of the *Life Safety Code* that would result in unreasonable hardships but only if the waiver will not adversely affect the health and safety of the patients.

CMS Modifications to NFPA 101 & NFPA 99

3. Hospitals may install alcohol-based hand rub dispensers in its facility if the dispensers are installed in a manner that adequately protects against inappropriate access. This requirement from CMS differs from the Life Safety Code, which doesn't have any requirements against inappropriate access.
4. When a sprinkler system is shut down for more than 10 hours, hospitals must either evacuate the building or portion of the building affected by the system outage until the system is back in service or establish a fire watch until the system is back in service.

CMS Modifications to NFPA 101 & NFPA 99

5. Buildings must have an outside window or outside door in every sleeping room, and for any building constructed after 60 days past the publication date of the rule, the sill height must not exceed 36 inches above the floor. Windows in atrium walls are considered outside windows for the purposes of this requirement. The sill height requirement does not apply to newborn nurseries and rooms intended for occupancy for less than 24 hours. The sill height in special nursing care areas of new occupancies must not exceed 60 inches.

CMS Modifications to NFPA 101 & NFPA 99

For an ASHE monograph exploring the specific differences between the 2000 and 2012 editions of the Life Safety Code

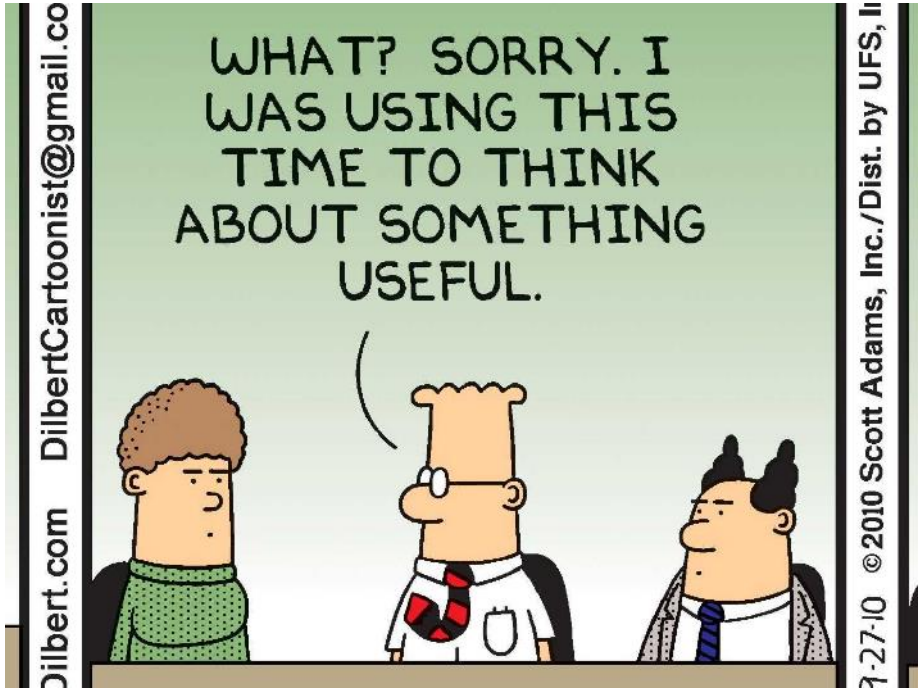
Visit
http://www.ashe.org/management_monographs/mg2013crowley.shtml.

ASHE
American Society for Healthcare Engineering
of the American Hospital Association

For an ASHE webinar explaining CMS Adoption of the 2012 Edition of NFPA 99 and What It Means for Health Care Facilities - Thursday, September 15

Visit
http://www.ashe.org/education/webinars/index.shtml
to learn more or register for this event.

Break for Questions and Comments



What are your thoughts on the relationship of The Life Safety Code with Authorities having Jurisdiction and CMS?

Hospital Fire Fighting Defend-in-place Strategy

Fight vs. Flight – Real World

- Many occupancies require a “defend in place” strategy due to size, scope of an evacuation
  - Hi-rise buildings
  - Healthcare
  - Hotels
  - Large places of assembly

“A Defend In Place Strategy Must Be Included In All Life Safety Plans as a part of the Chain of Survival”

Hospital patients are generally not capable of taking self-preserving action during a fire – many are literally unconscious. Given the limited number of staff available to move patients on short notice, hospitals need to minimize patient movement.

Hospital Fire Fighting Defend-in-place Strategy

https://www.youtube.com/watch?v=dE7Isx5Jkqk&feature=youtu.be&t=63

National Fire Protection Association

Elements of Fire and Smoke Containment

FIRE BARRIER	SMOKE BARRIER	SMOKE PARTITION
Shall have 1/2 to 3 hour fire resistant construction – enclosures for shafts, exit access stairways, exit access ramps, interior exit ramps, exit passageway walls, isolating hazardous areas, and separating occupancies	Shall be one hour fire resistant construction (with the exception of some atrium separation walls) – wall assemblies, vertical shafts, and vestibules; constructed in the same manner as the equivalent fire barriers	Does not need to be one hour fire resistant construction – corridor walls in I-2 occupancies (IBC only)
	Smoke barriers form compartments (areas of refuge); can be comprised of both walls & ceiling/floor assemblies	Smoke Partitions form corridors
Shall be continuous to the floor / roof deck above	Shall be continuous from outside wall to outside wall; must continue to the floor / roof deck above	Shall extend from the floor to the underside of the floor or roof deck above; can stop at a ceiling that limits the transfer of smoke
Fire protection rated dampers are required in ducts that penetrate fire barriers with a fire resistance greater than one hour	Requires smoke (not fire/smoke) dampers for ducted and unducted openings, unless the ducted opening only serves one smoke compartment	Only requires smoke dampers for unducted air transfer openings
Do not necessarily make an effective smoke barrier	Restricts the movement of smoke	Limits the transfer of smoke (are not as substantial as smoke barriers)

Fire Barriers

Fire barriers can be used to separate occupancies, isolate hazardous areas, create a horizontal exit, enclose an exit or create a shaft. They have fire resistance ratings measured in hours, ranging from half an hour to three hours.

Intumescent Fire Barrier Systems

Intumescent material commonly used as a fire barrier is ineffective at controlling smoke

<- **Intumescent reaction triggered by heat**

Fire Barrier / Fire Wall

https://www.youtube.com/watch?v=i_BjOLknl3M **Marty Huie** http://www.buildingcode.info/

FIRE BARRIER
Shall have 1/2 to 3 hour fire resistant construction – enclosures for shafts, exit access stairways, exit access ramps, interior exit ramps, exit passageway walls, isolating hazardous areas, and separating occupancies
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Elements of Fire and Smoke Containment

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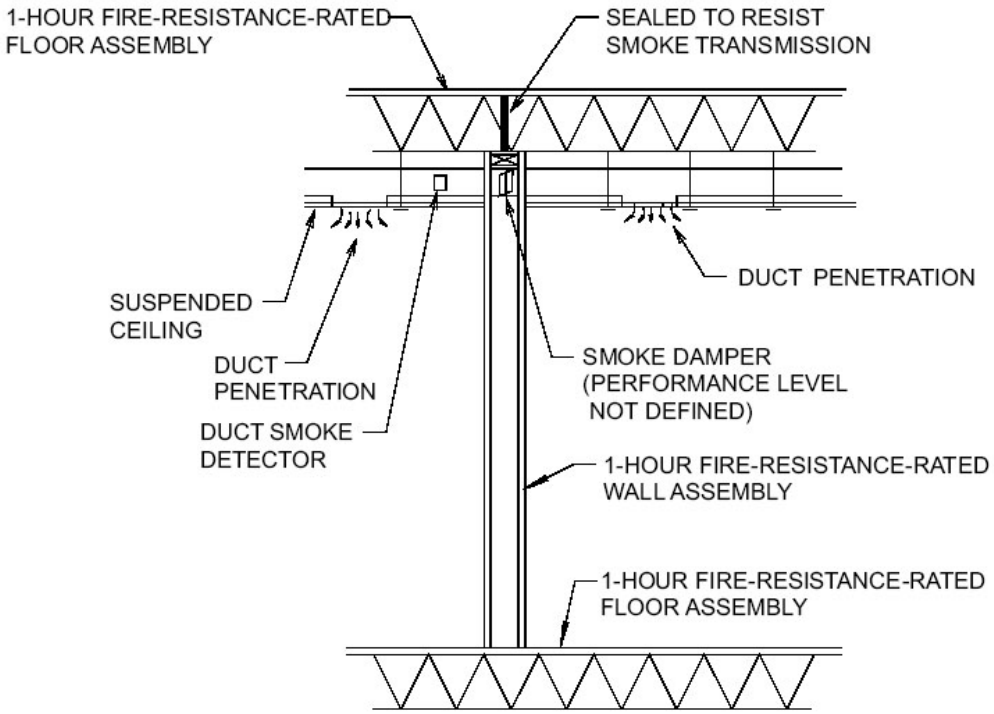
Smoke Barrier / Smoke Zone

https://www.youtube.com/watch?v=gxAQ8g7sO_s **Marty Huie** http://www.buildingcode.info/

SMOKE BARRIER
Shall be one hour fire resistant construction (with the exception of some atrium separation walls) – wall assemblies, vertical shafts, and vestibules; constructed in the same manner as the equivalent fire barriers
Smoke Barriers form compartments (areas of refuge); can be comprised of both walls & ceiling/floor assemblies
Shall be continuous from outside wall to outside wall; must continue to the floor / roof deck above
Requires smoke (not fire/smoke) dampers for ducted and unducted openings, unless the ducted opening only serves one smoke compartment
Restricts the movement of smoke

Smoke barriers



These barriers serve to restrict the movement of smoke protected by a fire resistance **rating of at least one hour**

Elements of Fire and Smoke Containment

FIRE BARRIER	SMOKE BARRIER	SMOKE PARTITION
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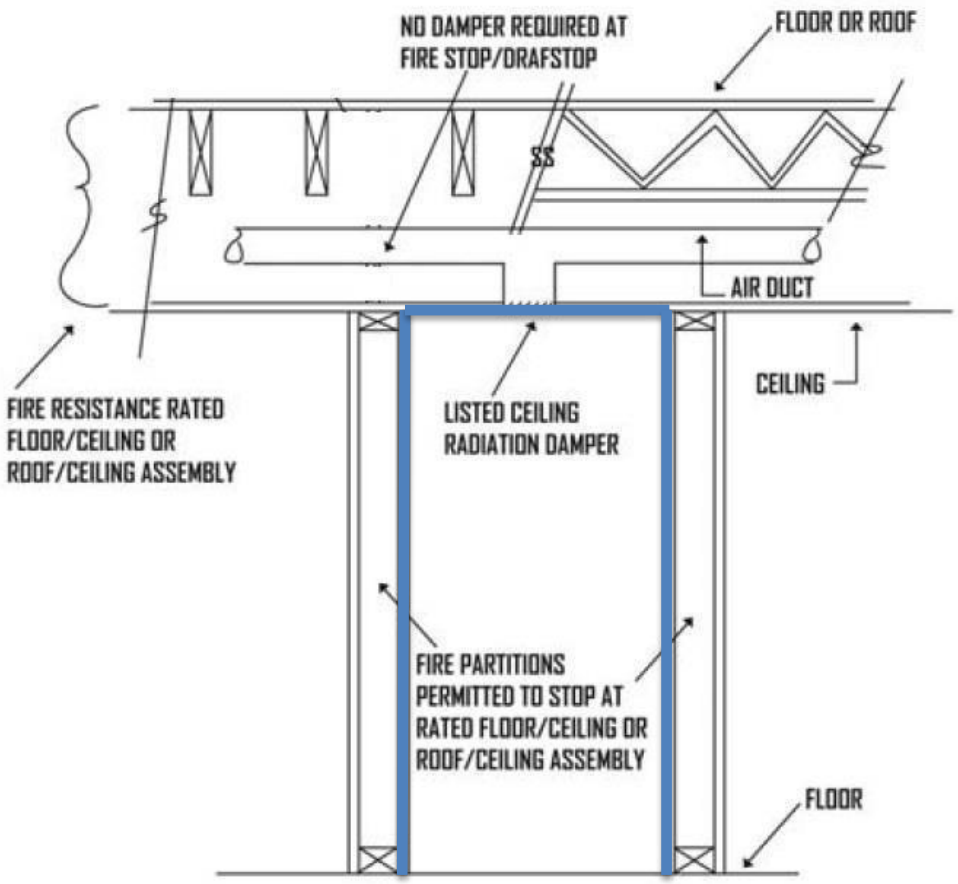
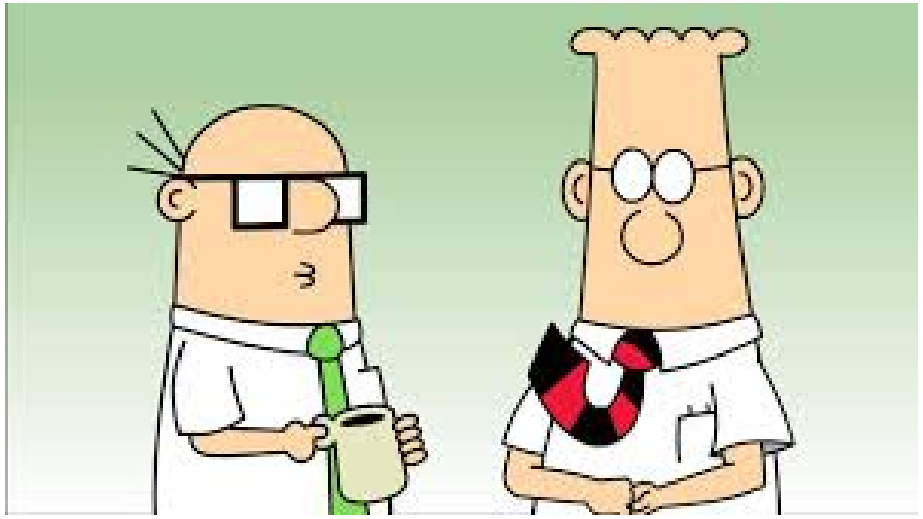
Smoke partitions



Though not as substantial as smoke barriers, **smoke partitions** also are designed to limit the movement of smoke throughout a structure.

Examples of smoke partitions can include **corridors**, walls that enclose a sprinkler-protected hazardous area, or lay-in acoustical tile ceiling with ducted HVAC.

Upcoming Break for Questions and Comments on:



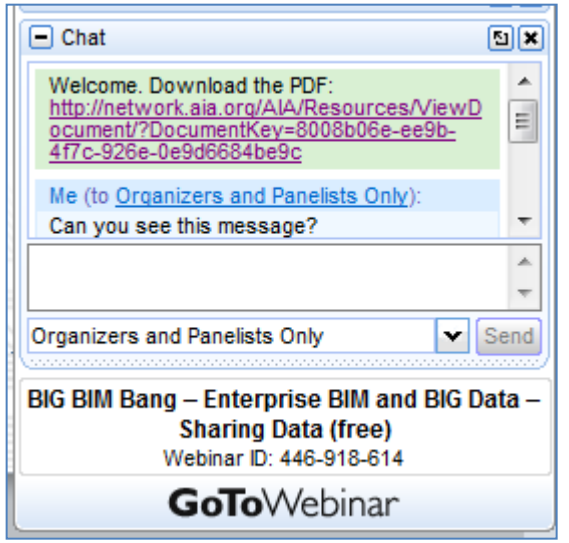
http://www.businessinsider.com , Courtesy of Scott Adams

- Defend-in-place vs. Evacuation
- Elements of Fire and Smoke Containment

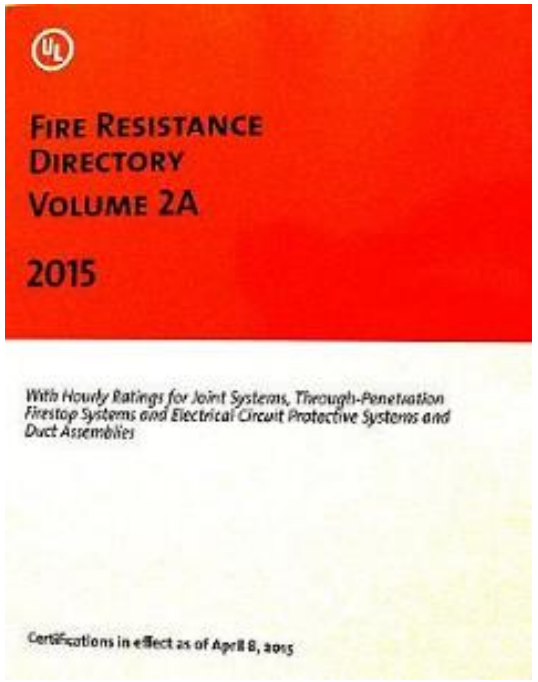
Q&A time

If you have questions for today's presenters, please submit them to the moderator via the chat box.

Content-related questions will be answered during this Q&A portion as time allows.



Rated Assemblies



UL listed assemblies are assured of acceptance.

Source document:

UL FIRE RESISTANCE DIRECTORY

Rated Assemblies – Example Documentation

ONLINE CERTIFICATIONS DIRECTORY

System No. W-L-7129
XHEZ.W-L-7129
Through-penetration Firestop Systems

Page Bottom

Design/System/Construction/Assembly Usage Disclaimer

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Certified products, equipment, system, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered Certified.

XHEZ - Through-penetration Firestop Systems

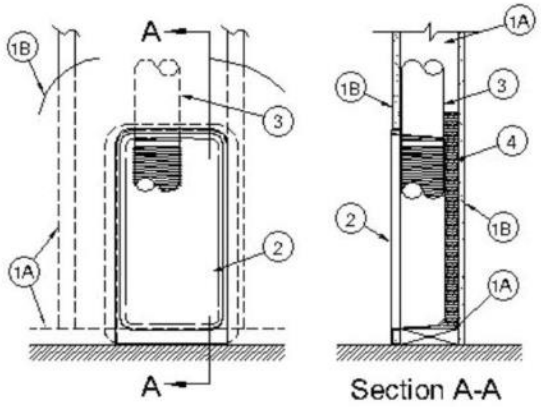
See General Information for Through-penetration Firestop Systems

System No. W-L-7129

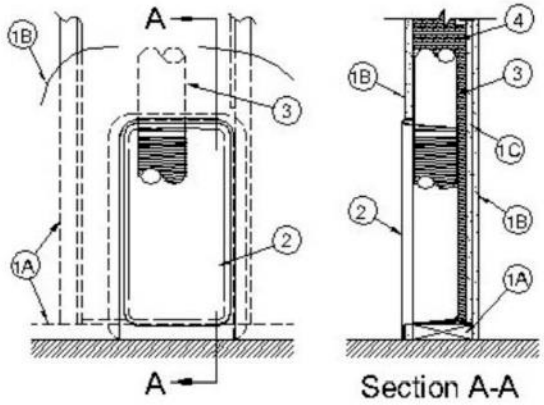
October 08, 2015

F Ratings — 1/2 and 1 Hr (See Items 1, 1A and 4)

T Ratings — 1/2 and 1 Hr (See Items 1 and 1A)



CONFIGURATION A



CONFIGURATION B

1. **Wall Assembly — Configuration A** — The fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs** — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of min nom 2 by 6 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 6 in. (152.4 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board*** — One layer of nom 5/8 in. (16 mm) thick gypsum board each side of wall, as specified in the individual Wall and Partition Design. See Item 2 for cutout in gypsum board on one side of wall for dryer box.

The hourly F and T Rating of the firestop system for Configuration A is 1/2 Hr.

1A. **Wall Assembly — Configuration B** — The fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs** — Wall framing to consist of wood studs or steel channel studs. Wood studs to consist of min nom 2 by 6 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 6 in. (152.4 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board*** — One layer of nom 5/8 in. (16 mm) thick gypsum board each side of wall, as specified in the individual Wall and Partition Design. See Item 2 for cutout in gypsum board on one side of wall for dryer box.

C. **Gypsum Board*** — An additional layer of gypsum board shall be cut to fit ID of stud cavity and installed flush with edge of studs on non-penetrated face of wall. Additional layer of gypsum board to be attached to min 1 by 2 in. (25 by 51 mm) wood nailing strips with fasteners spaced max 18 in. (457 mm) OC around periphery of board. Nailing strips to be secured to wood studs and plates with fasteners spaced max 18 in. (457 mm) OC. Nailing strips may be discontinuous and terminate max 1 in. (25 mm) from vent duct and cabinet interfaces with plates and studs.

The hourly F and T Rating of the firestop system for Configuration B is equal to 1 Hr.

2. **Cabinet*** — Recessed fixture intended for dryer appliance exhaust duct installed per manufacturer's installation instructions in one side of wall assembly. Cutout in gypsum board for top exhaust device is max 9-1/2 in. (241 mm) wide by 18-1/4 in. (464 mm) high. Cutout in gypsum board for bottom exhaust duct is max 14 in. (356 mm) wide by 16 in. (406 mm) high. For Dryerbox Model 480, cutout in gypsum board for device is max 15 in. (381 mm) wide by 22-1/2 in. (572 mm) high. Max gap between cabinet and gypsum board around periphery of cutout shall be 1/8 in. (3.2 mm). Gap shall be sealed with UL Classified sealant or caulk (see Fill, Void or Cavity Material (XHHW) category in the Fire Resistance Directory for names of manufacturers) or dry wall compound.

IN-O-VATE TECHNOLOGIES — Dryerbox Modal 350, 425, 480, 3D, or 4D

3. **Steel Vent Duct** — Max 4 in. (102 mm) diam by min 26 gauge rigid steel dryer duct friction fitted into top or bottom opening of the cabinet (Item 2) for purposes of venting to the exterior. Vent duct to be routed entirely within fire rated construction from the cabinet to the exterior of the building. Vent duct to be firestopped in accordance with an appropriate F-A-7000, F-C-7000 or F-E-7000 Series firestop system where it passes through the top plate or sole plate of the chase wall in which it is routed.

4. **Insulation** — Required for Dryerbox Models 350, 425, 3D and 4D in wood stud walls as specified in Table below. The spaces between the sides of the cabinet and the studs and the space immediately above the cabinet are to be tightly packed with glass fiber batt or mineral wool batt insulation. For firestop systems with 1 Hr F Rating, the entire stud cavity containing the cabinet shall be filled with min R19 glass fiber batt insulation or mineral wool insulation with additional pieces of insulation applied as needed to completely fill all voids around the cabinet and vent duct to the full depth of the stud cavity. Any glass fiber or mineral wool batt material bearing the UL Classification Marking as to Fire Resistance may be used.

See **Batts and Blankets*** (BZJZ) Category for names of Classified companies.

4A. **Insulation** — Required for all Dryerbox Model 480 installations, and for Dryerbox Models 350, 425, 3D and 4D in steel stud walls as specified in Table below. The entire wall cavity containing the cabinet and all spaces between the cabinet and the adjacent studs and plates shall be tightly packed to full stud depth and cavity height with mineral wool batt insulation having a min density of 4 pcf (64 kg/m^3). Any min 4 pcf mineral wool batt material bearing the UL Classification Marking as to Fire Resistance or for Forming Material may be used. In addition, the wall stud cavities immediately adjacent to the cavity with the cabinet shall be insulated with min R13 glass fiber batt insulation (or min 4 pcf mineral wool batt material) for the full depth and height of the stud cavity.

See **Batts and Blankets*** (BZJZ) Category or **Forming Materials*** (XHKU) Category for names of Classified companies.

Dryerbox Models	F Rating (See Item 1)	Wall Studs	Insulation Required
350, 425, 3D and 4D	1/2	Steel and Wood	See Item 4
350, 425, 3D and 4D	1	Wood	See Item 4
350, 425, 3D and 4D	1	Steel	See Item 4A
480	1/2 and 1	Steel and Wood	See Item 4A

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Last Updated on 2015-10-08

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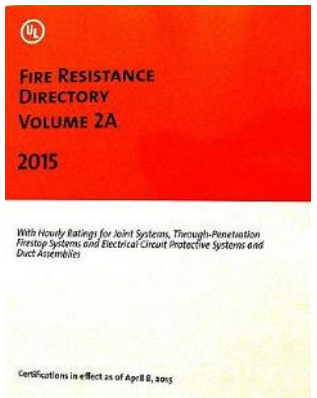


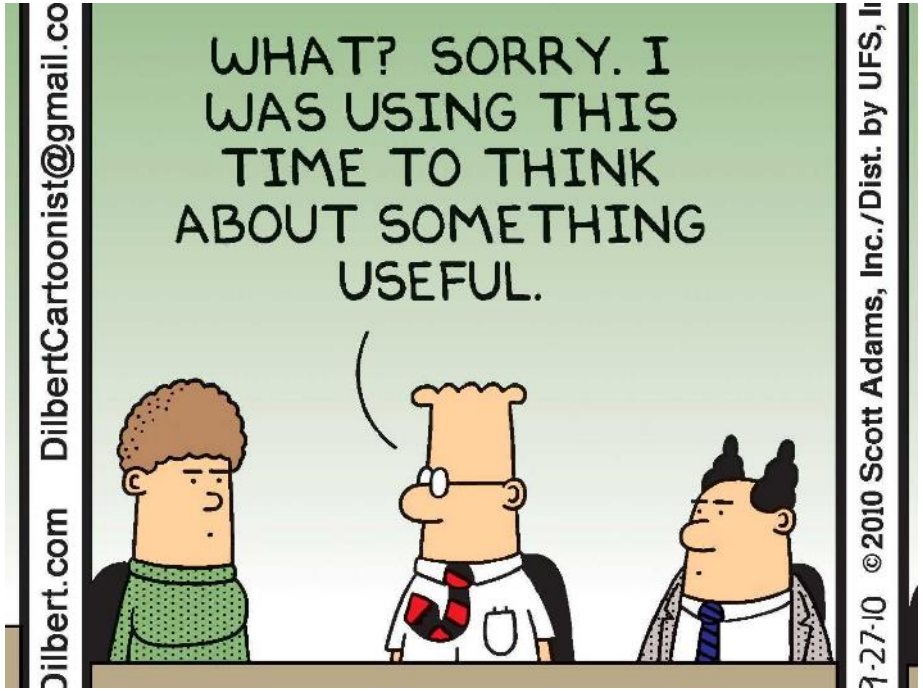
Rated Assemblies – Engineering Judgements

When field conditions differ from original design or unanticipated construction hindrances are encountered and the field conditions cannot be easily or cost effectively redesigned, design recommendations are typically **made by manufacturer qualified technical personnel** proposing alternative methods that ensure the firestop system is not compromised.

Rated Assemblies – Engineering Judgements

These are sometimes referred to as "**Engineering Judgments** or EJs". Since these recommendations are not based upon identical designs as that which were fire tested, it is important that they be developed using sound engineering principles and good judgment.

Last Chance for Questions and Comments on:



- Defend-in-place vs. Evacuation
- Elements of Fire and Smoke Containment
- Fire Rated Assemblies
- Any more on the Life Safety Code and CMS

Thank you for joining us today!

This concludes the AIA/CES Course #**AAH1601.** The webinar survey/report form URL is listed in the chat box ***and*** will be included in the follow-up email sent to you in the next hour. Earn 1 AIA LU/HSW.

Survey Link: http://bit.ly/2auhEpS.

All attendees must report credit individually by completing the webinar survey/report form within the next 3 business days. Credit will automatically appear on your transcript within 2 weeks. **Tablet and smartphone users must copy down the above survey link.**

Please direct any further questions to knowledgecommunities@aia.org.

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