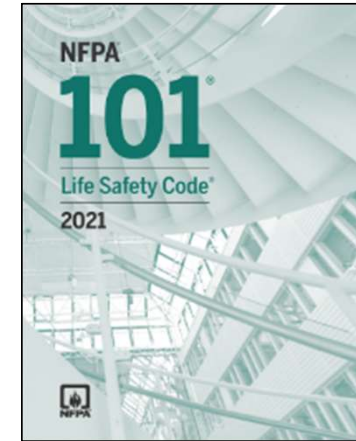
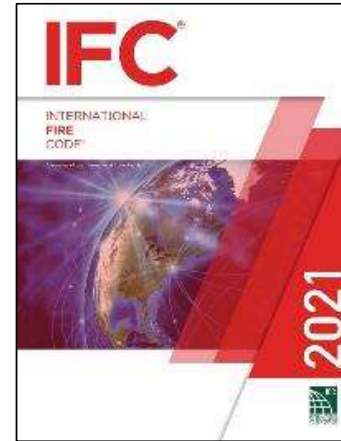
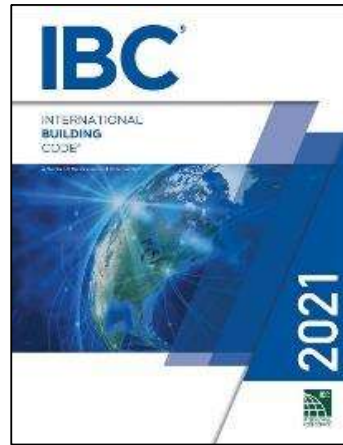


# ***CRASH COURSE IN CODES***

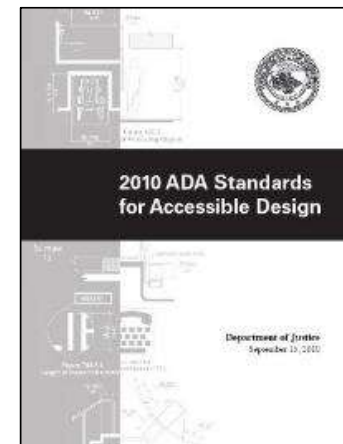
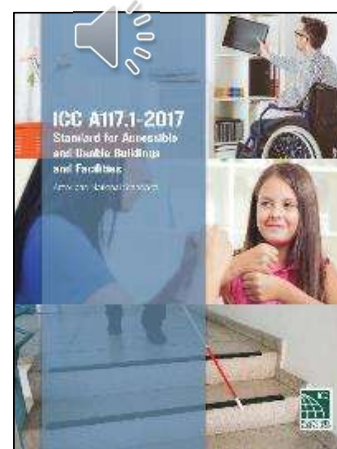
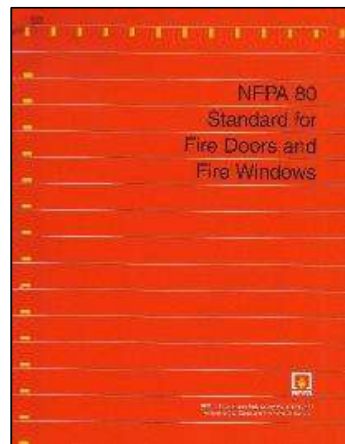
Lori Greene, DAHC/CDC, FDAI, CCPR  
Manager, Codes & Resources - Allegion



First...  
4 things to  
know about  
codes:



1) Which  
code  
applies?



# Authority Having Jurisdiction (AHJ)

- Building Inspector
- Fire Marshal
- Accreditation Inspector
- Health Inspector
- Plumbing Inspector
- Electrical Inspector
- Insurance Inspector
- Other Code Officials/Inspectors





# Occupancy Type

2) Which occupancy classification or use group applies?

- Assembly
- Business
- Educational
- Factory and Industrial
- High Hazard
- Institutional
- Mercantile
- Residential
- Storage
- Utility & Maintenance

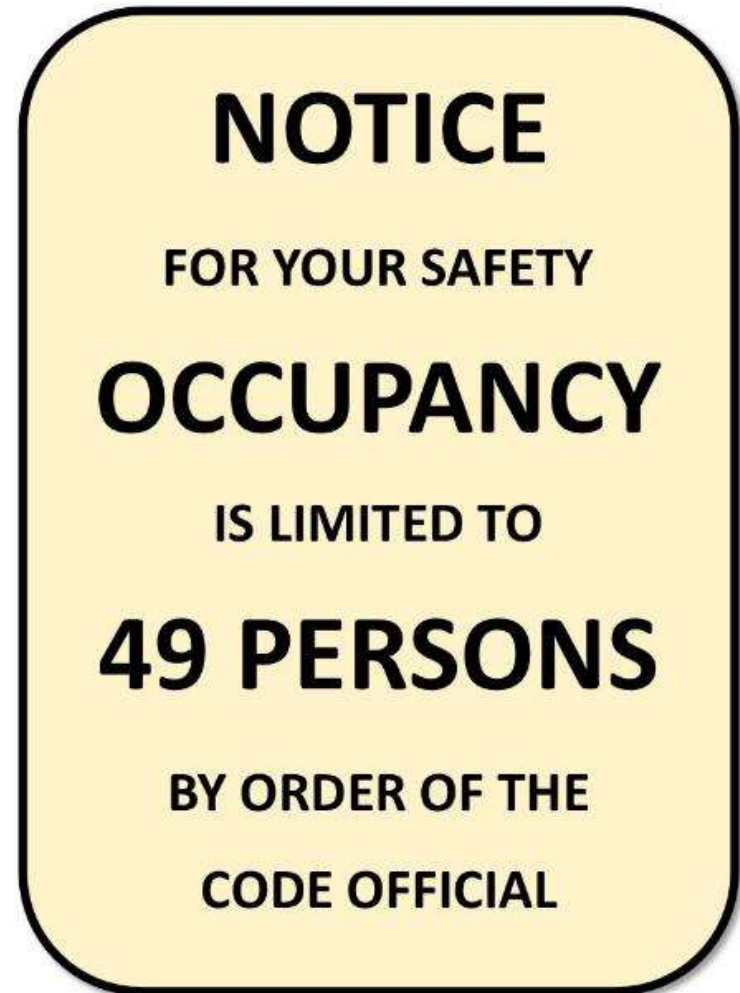


# Occupant Load

3) What is the calculated occupant load of the building or space?

Area / Occupant Load Factor =  
calculated occupant Load

Ex: 1000sf classroom /  
20sf/occupant = calculated  
occupant load of 50 occupants



# What is the purpose of the door?

- Fire Door Assemblies
- Doors in a Means of Egress
- Doors on an Accessible Route







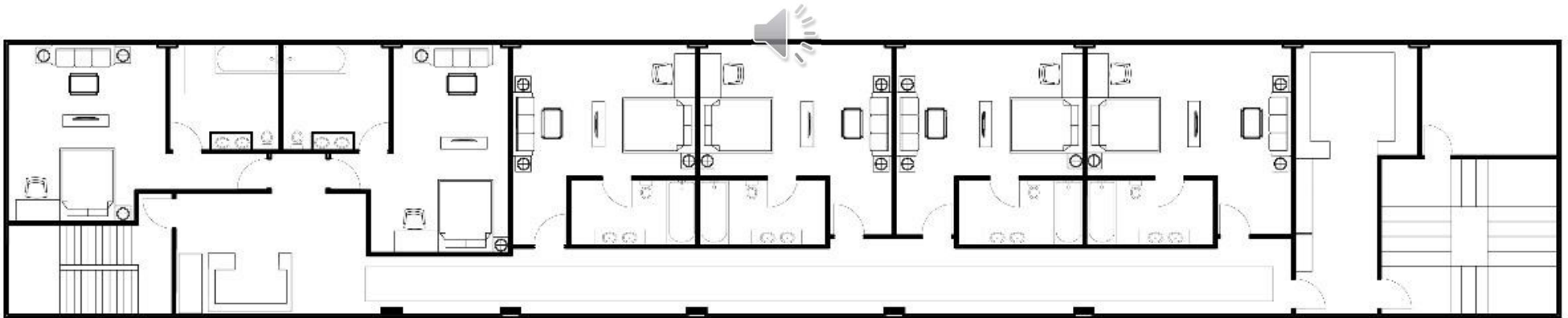
FLOOR 7



Fire Door  
Assemblies

# What's the purpose of a fire door assembly?

- Compartmentalization
- Deter the spread of fire
- Passive fire protection



*Image Source: Wikipedia*







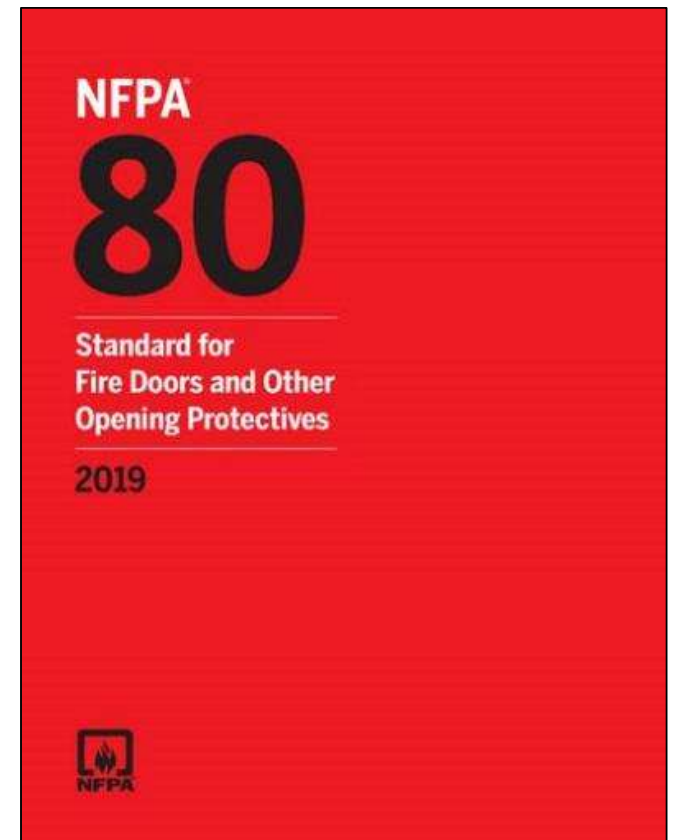
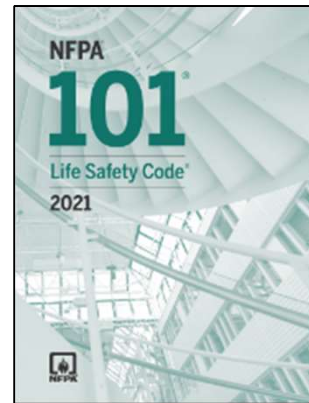


Images: Scott Strassburg



# Where are the requirements for fire doors found?

- NFPA 80 – Standard for Fire Doors and Other Opening Protectives
- Adopted Building Code
- Adopted Fire Code





# How do you identify a fire door assembly?



# Extraneous labels on fire door assemblies

- NFPA 101-2021: *Where a door or door frame that is not required to be fire protection-rated is equipped with a fire protection listing label, the door and the door frame shall not be required to meet NFPA 80.*



# Which doors in a building are typically fire doors?

- Stairwells
- Corridors to dwelling units and sleeping units
- Incidental use areas
- Some cross-corridor doors
- Doors in walls separating two buildings



# Does every component require a listing?

## 4.2.7 Components.

4.2.7.1 A fire door assembly shall consist of components that are separate products incorporated into the assembly and are allowed to have their own subcomponents.

4.2.7.2\* Except where restricted by individual published listings, a fire door assembly shall be permitted to consist of the labeled, listed, or classified components of different organizations that are acceptable to the AHJ.



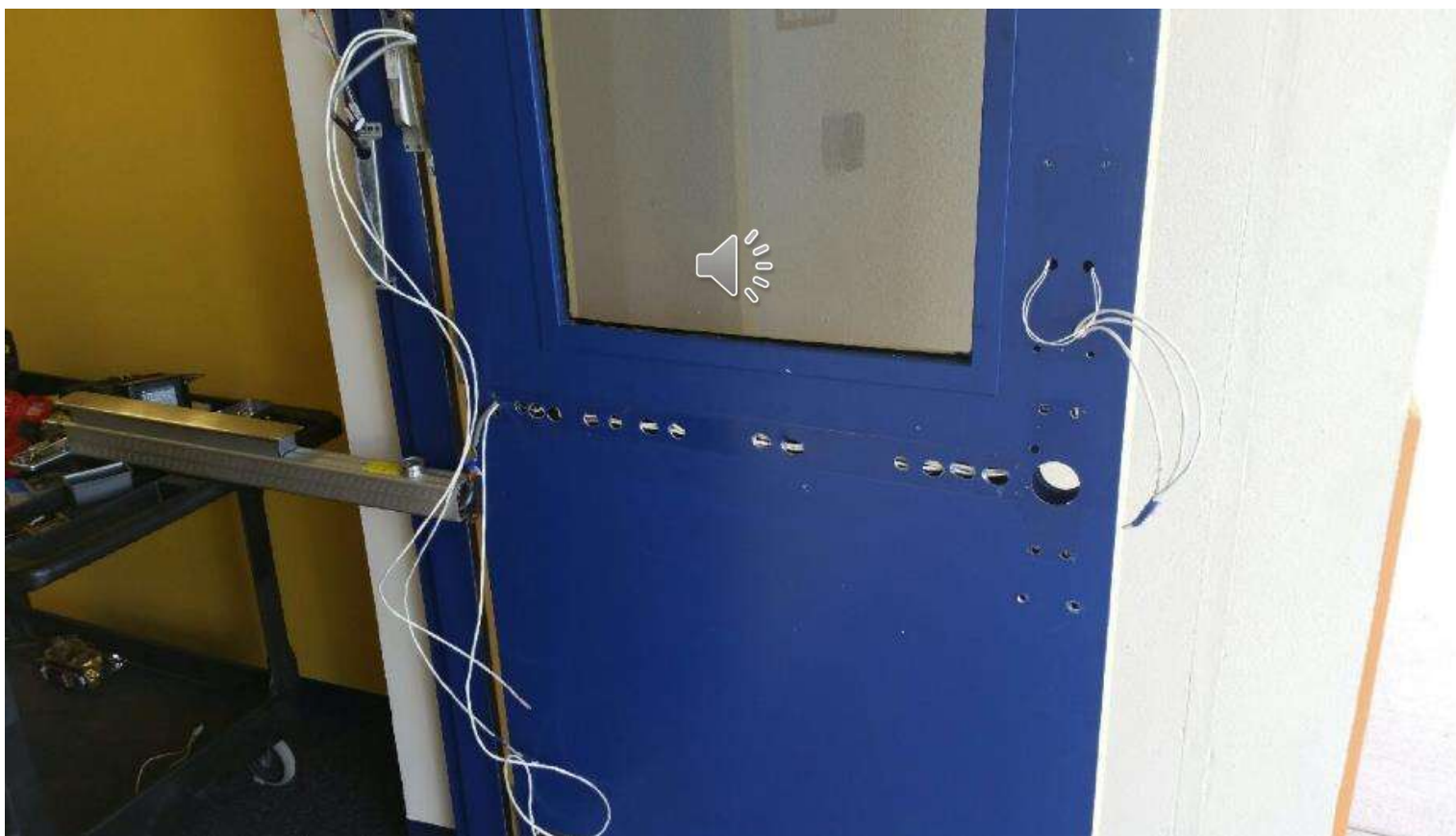
# Can an existing fire door/frame be prepped in the field for new hardware?

- Job Site Preparations
- Field Modifications
- Relabeling




Images: Jimmy Resedean Jr.

Can an existing fire door be prepped for a raceway?



# Can an existing fire door be prepped for a raceway?

**4.1.3.2.4** When performed at the job site, drilling raceways for wires or preparation for fire pins shall be in accordance with the door manufacturer's listing  and when permitted by the laboratory with which the door is listed.

**4.1.3.2.5** Where the door manufacturer's listing does not contain provisions for drilling raceways, the raceways shall be considered field modifications in accordance with 5.1.5.1.



# How can existing holes be filled when new hardware is installed?

- Filling fastener holes
- Manufacturers' listings

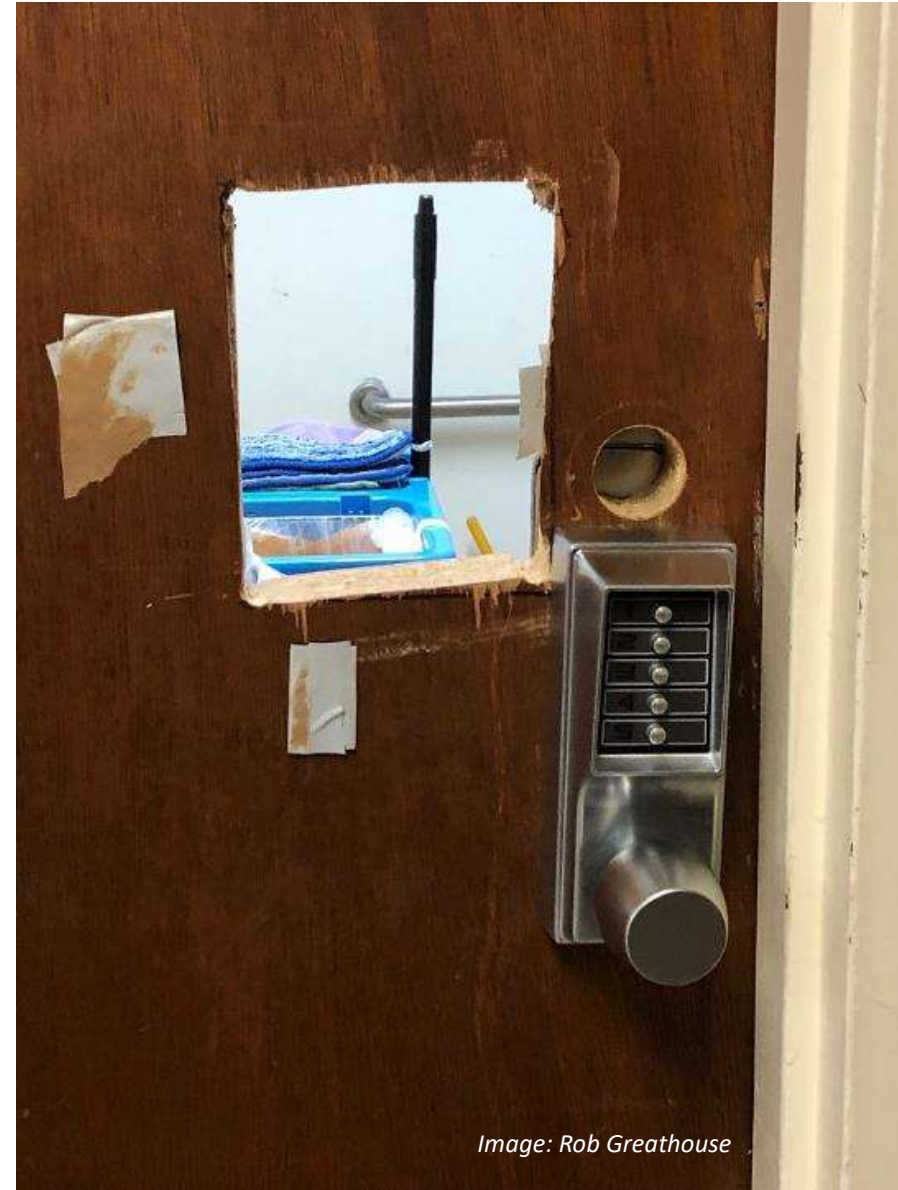
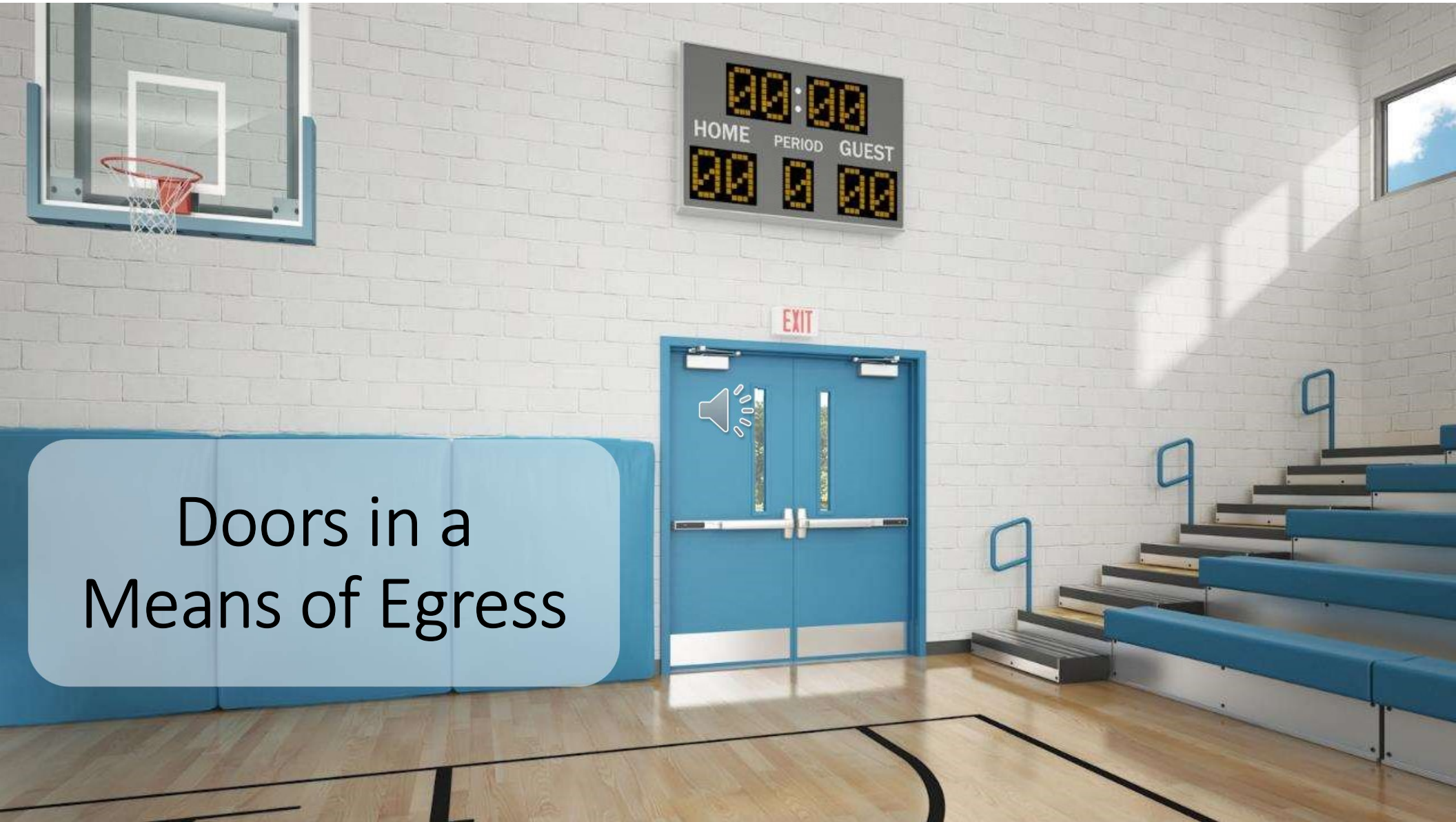


Image: Rob Greathouse





# Doors in a Means of Egress



# Is it an egress door?

- IBC: *Means of egress doors shall meet the requirements of this section...Doors provided for egress purposes in numbers greater than required by this code shall meet the requirements of this section.*





# What is a means of egress?

- A continuous and unobstructed way of travel from any point in a building or structure to a public way
- Not every egress door has an exit sign











# Unlatching

- 2021 IBC: *Unlatching. The unlatching of any door or leaf for egress shall require not more than one motion in a single linear or rotational direction to release all latching and all locking devices.*
- NFPA 101-2021 - similar language




# Thumbturn Deadbolts in a Means of Egress

- Thumbturn deadbolts are typically OK if:
  - No key, tool, special knowledge or effort for egress
  - No tight grasping, pinching, or twisting of the wrist
  - Releasing hardware between 34-48 inches AFF (some exceptions)
  - Door does not require panic hardware
  - Door unlatches with one releasing motion for egress (some exceptions)

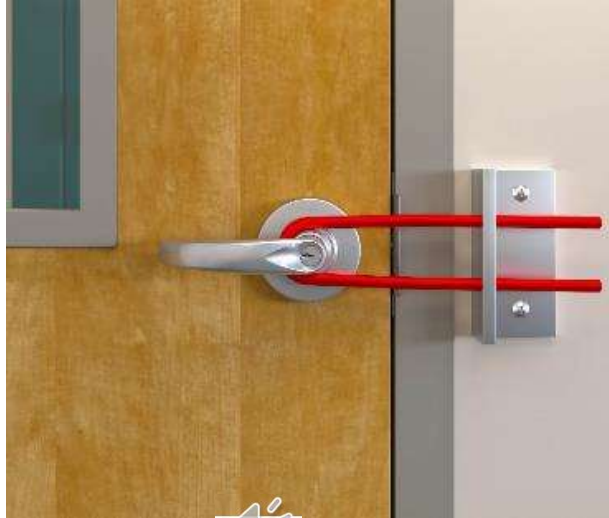




# Thumbturn Deadbolts in a Means of Egress


- Entrance door to a residential dwelling unit or sleeping unit – occupant load of 10 or less
- Existing classroom doors where NFPA 101 2018/2021 has been adopted 





# Classroom Barricade Devices

# Combined Code Requirements

- Unlatch with one motion\*
- No key/tool/special knowledge/effort for egress
- No tight grasping/pinching/twisting of the wrist
- Releasing hardware 34-48 inches AFF 
- Authorized access from outside (new in 2018)
- Panic hardware when serving 50+ occupants
- Hardware on fire doors listed to UL 10C
- NFPA 80 limits alterations to fire doors
- State and local codes may vary



*\*2 non-simultaneous releasing motion for existing classroom doors are now allowed in some jurisdictions.*

Where are double-cylinder deadbolts allowed?





# Where are double-cylinder deadbolts allowed?

- IBC:
  - Main door or doors
  - Group A with an occupant load of 300 or less, Group B, F, M, and S, and in places of religious worship
  - Lock readily distinguishable as locked
  - Signage
  - May be revoked by the AHJ



Photo: Architectural Openings Division 08

Where are double-cylinder deadbolts allowed?







# Where are double-cylinder deadbolts allowed?

**R311.2 Egress door.** Not less than one egress door shall be provided for each *dwelling unit*. The egress door shall be side-hinged, and shall provide a clear width of not less than 32 inches (813 mm) where measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). The clear height of the door opening shall be not less than 78 inches (1981 mm) in height measured from the top of the threshold to the bottom of the stop. Other doors shall not be required to comply with these minimum dimensions. Egress doors shall be readily openable from inside the *dwelling* without the use of a key or special knowledge or effort.



Where is panic hardware required by code?



# Where is panic hardware required by code?

- **International Building Code (IBC) and International Fire Code (IFC)**

- Use Group A – Assembly with an occupant load of 50 people or more
- Use Group E – Educational with an occupant load of 50 people or more
- Use Group H – High Hazard with any occupant load

- **NFPA 101 – Life Safety Code**

- Assembly Occupancy with an occupant load of 100 people or more
- Educational Occupancy with an occupant load of 100 people or more
- Day Care Occupancy with an occupant load of 100 people or more
- High Hazard Contents Areas with an occupant load of more than 5 people


Applies  
to doors  
in the  
egress  
path that  
lock or  
latch

Where is it acceptable by code to have electrified hardware that is locked in the direction of egress and unlocks upon fire alarm activation? 🔊

**EMERGENCY EXIT ONLY**  
**PICK UP PHONE FOR EMERGENCY EXIT**



# Fail Safe vs. Fail Secure

- Fail Safe (AKA Electrically Locked)
  - When power fails, door is unlocked on access/ingress side
- Fail Secure (AKA Electrically Unlocked) 
  - When power fails, door is locked on access/ingress side
- Both types typically allow free egress.







# Special Locking Arrangements


- Delayed Egress
- Sensor Release (Electromagnetic Locks)
- Door Hardware Release (Electromagnetic Locks)
- Stairwell Reentry
- Elevator Lobby Egress
- Controlled Egress in Health Care

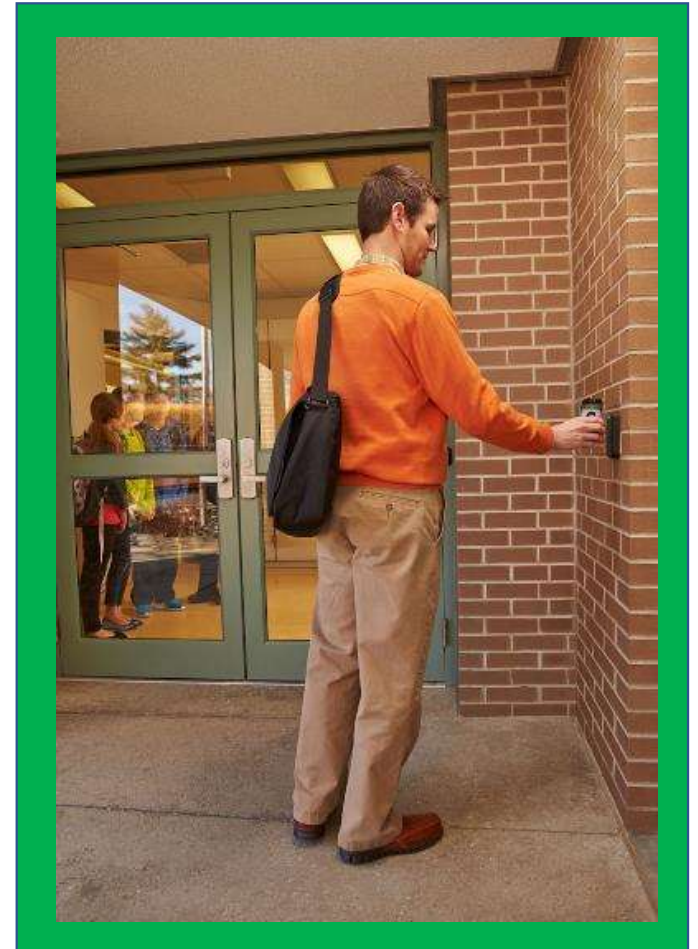


Normal Locking Arrangements



# Normal Locking Arrangements

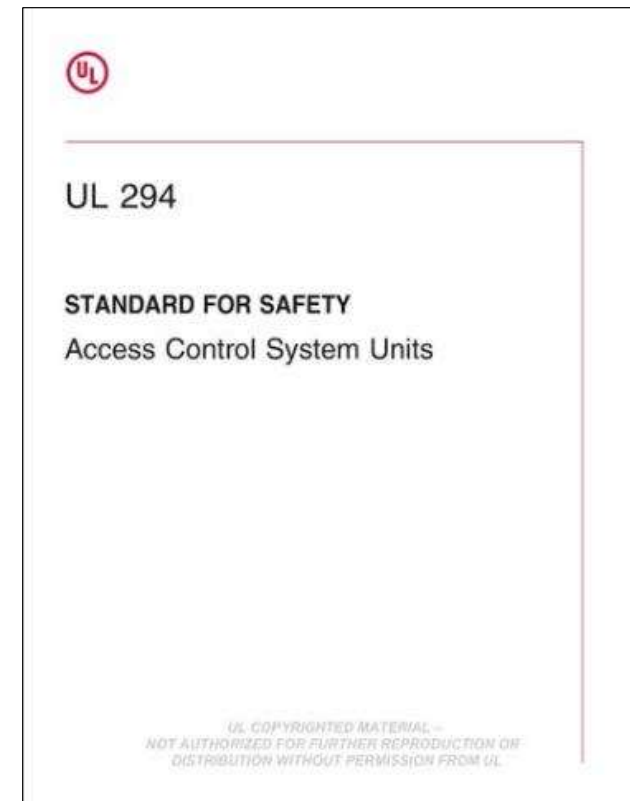
- Unlatch with one releasing motion for egress (some exceptions)
- No key, tool, special knowledge or effort for egress 
- No tight grasping, pinching, or twisting of the wrist
- Releasing hardware between 34-48 inches AFF (some exceptions)



# When is the UL 294 listing required?

- **IS NOT** required by code for all access control systems
- **IS** required by code for:

• Delayed Egress Locks	<b>15 Second Delay</b>
• Controlled Egress Locks	<b>Health Care Only</b>
• Sensor Release	<b>Typically</b>
• Door-Hardware Release	<b>Electromagnetic Locks</b>
• Elevator Lobby Locks	<b>NFPA 101 Only</b>
• Stairwell Reentry	<b>NFPA 101-2021 Only</b>





Which code requirements apply to electromagnetic locks?



# Sensor Release

- Typically applies to electromagnetic locks
- Section previously called Access-Controlled Egress Doors
- Release methods:
  - Sensor above door
  - Auxiliary push button
  - Fire alarm activation
  - Loss of power
- UL 294 listing required



# Door Hardware Release

- Typically applies to electromagnetic locks
- Release methods:
  - Switch in door-mounted hardware
  - Loss of power
- Not required: auxiliary push button and fire alarm release
- UL 294 listing required



# Is battery backup allowed for mag-locks?

- Codes require mag-locks to unlock upon loss of power, but “loss of power” is not defined.
- NFPA 72 Interpretation - if the fire alarm system and mag-locks are on the same back-up power system, this would meet the intent of the code.
- Do not specify or supply separate battery back-up in the power supply for mag-locks.






# Stairwell Reentry

- Allows building occupants to leave the stairwell and reenter the building through locked stairwell doors if the stair becomes compromised during a fire.
- After leaving the stairwell, building occupants can find another exit or wait for assistance.



# Which hardware?

- Stair side lever must unlock without unlatching – positive latch required for fire doors.
- Options:
  - Fail safe electromechanical locks 
  - Fail safe trim for fire exit hardware
  - Electromagnetic locks + passage sets (and required release devices for mag-locks)
- Note: Fail safe electric strikes not allowed
- Note: Does not apply to exit discharge








EXIT

BALCPA-201

Doors on an Accessible Route

# What are the accessibility requirements for operable hardware?

- No tight grasping, pinching, or twisting of the wrist to operate 
- One hand





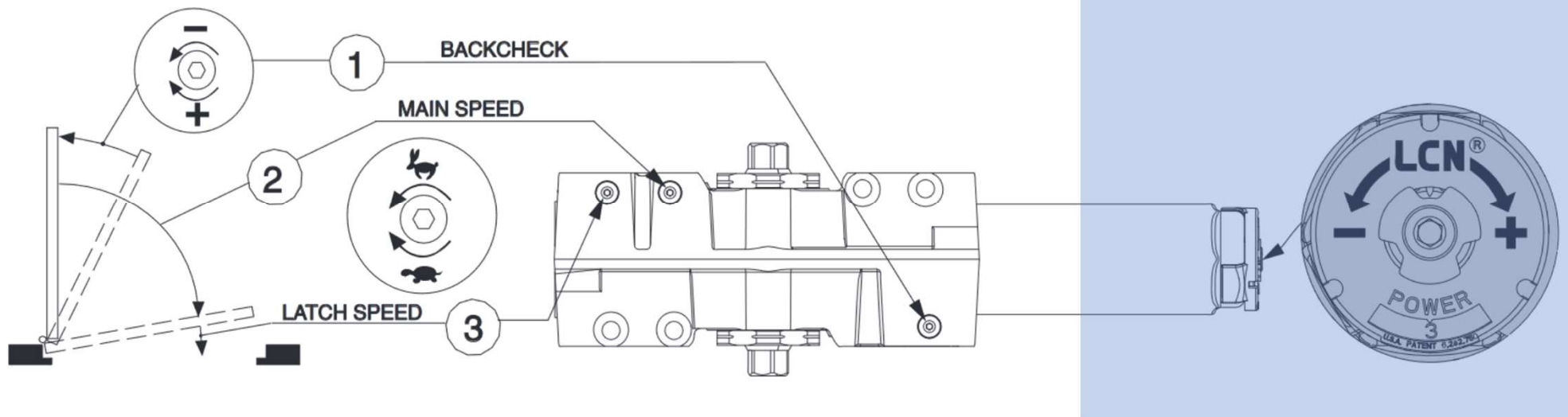
# Operable Force

- Pushing or pulling motion: 15 pounds, maximum
- Rotational motion: 28 inch-pounds, maximum
- Consistent with ICC A117.1
- ADA: 5 pounds, maximum



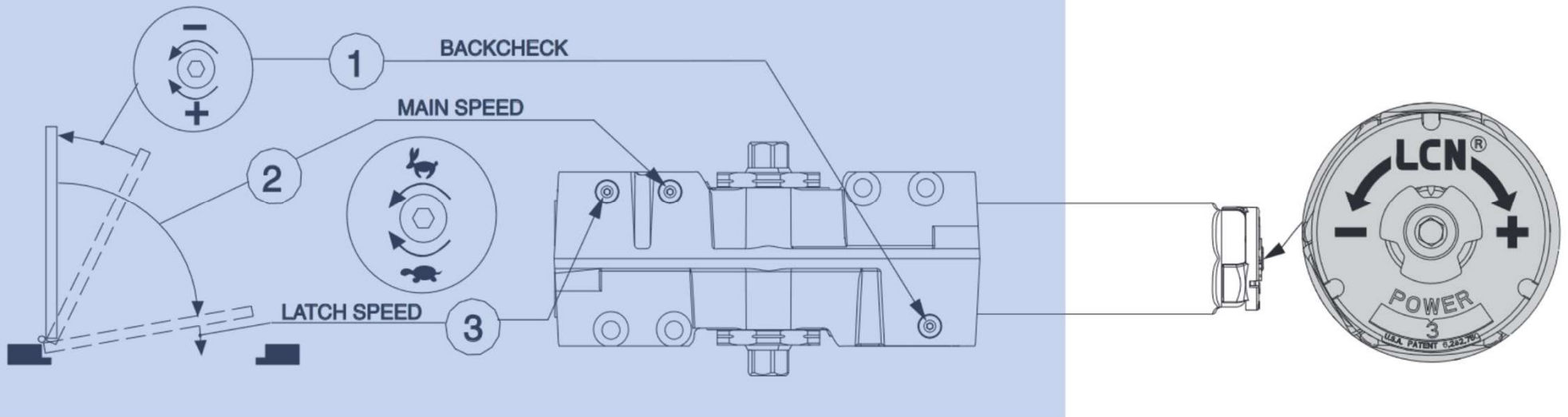
# How much opening force is allowed?

- Interior manually-operated, non-fire-rated doors: 5 pounds
- Other doors: 30 pounds to set the door in motion, 15 pounds to move door to the fully-open position



# What is the maximum closing speed allowed?

- 5 seconds, minimum – 90 degrees to 12 degrees



# What are the limitations at the bottom rail?

- 10 inches measured up from the floor – flush and smooth
- Applies to manual doors (not automatic)
- Push side of door
- Exceptions for sliding doors, doors that do not reach to within 10 inches of the floor, and some all-glass doors



*Bottom rail is too narrow.  
No projecting hardware is allowed.*



# Where are automatic operators required?

- 2021 IBC: *1105.1.1 Automatic doors. In facilities with the occupancies and building occupant loads indicated in Table 1105.1.1, public entrances that are required to be accessible shall have one door be either a full power-operated door or a low-energy power-operated door. Where the public entrance includes a vestibule, at least one door into and one door out of the vestibule shall meet the requirements of this section.*



<u>OCCUPANCY</u>	<u>BUILDING OCCUPANT LOAD GREATER THAN</u>
<u>A-1, A-2, A-3, A-4</u>	<u>300</u>
<u>B, M, R-1</u>	<u>500</u>

# Public Entrances

>300

- A-1 – Assembly - viewing of performing arts/movies
- A-2 – Assembly - food/drink consumption
- A-3 – Assembly - worship, recreation, amusement
- A-4 – Assembly - viewing of indoor sporting events

>500

- B – Business - office, professional, or service
- M – Mercantile - display and sale of merchandise
- R-1 – Residential - transient sleeping units





**There's a lot more to learn...**





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Answers to your door, hardware, and code questions from Allegion's Lori Greene.

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Today's Wordless Wednesday photo shows an



## Mobile Credentials: The key to a seamless student experience



## Last Call!

There are SO MANY great opportunities to learn





# Decoded Articles and Code Reference Guide

**Decoded**

## Access-Controlled Egress Doors

By Lori Greene, DAHG/CDC, FDAL, FDHI, CCFR

This issue continues to arise on a regular basis, so I'm hoping to clarify it once and for all. The sections entitled *Access-Controlled Egress Door*—present in both NFPA 101—Life Safety Code and past editions of the International Building Code (IBC)—have led some to believe that all doors equipped with access control readers must comply with these sections of the model codes. Although the Authority Having Jurisdiction (AHJ) has the final say on matters of code compliance, it's not the intent of the model codes for these sections to apply to all access-control doors or to all doors with electrified hardware.

The requirements of the model codes pertain to access-controlled egress doors are essentially the same, but in the 2015 edition of the IBC, the section title was changed to *Release of Electrically Locked Egress Doors*. The reason for the change was to help avoid confusion about where this section should be applied. The corresponding section in NFPA 101 is still called *Access-Controlled Egress Doors*, but the two sets of requirements are very similar despite the differing section titles.

What's an access-controlled egress door? These two sections apply to electrically/electromagnetically locked doors, where the lock is released by a sensor detecting an approaching occupant. The most common type of lock that is used in this application is an electromagnetic lock (aka mag lock), but the sections could also be used for other types of locks that are released by a sensor, for example, a power bolt. The key to these sections only apply to locks that are released by a sensor which detects an approaching occupant and unlocks the door. Most other types of electrically-actuated hardware—electronic deadbolts, electrified panic hardware, electric strikes—are released by "normal" means, like turning a lever or pushing on the touchpad of the panic hardware. These are not access-controlled egress doors.

What about mag-locks released by other means? Not all doors with electromagnetic locks are released by a sensor or required to comply with these sections of the model codes. Both the IBC and NFPA 101 also include separate sections that apply to electrically/electromagnetically locked doors that are released by door-mounted hardware incorporating a switch to release the electrified lock. Many locks used for access control are released without the use of a switch, but because mag locks require a separate release device—a sensor or a switch in the door-mounted hardware—maglock applications are typically released by one of these two types of devices.

In NFPA 101, the section for mag locks released by a switch on the door-mounted hardware is called *Electrically Controlled Egress Door Assembly*. In the IBC, this section is currently called *Electrically Locked Egress Doors*, but beginning with the 2018 edition of the IBC, this section will be called *Door Assembly Release of Electrically Locked Egress Doors*.

What are the requirements for each of these applications? To re-open applications with electromagnetic locks used for access control, typically fall into one of these two categories (or both):

**Mag Lock:** An electromagnetic lock is essentially an electromagnet in a housing that is mounted on the door frame, with a metal armature attached to the door. When the magnet is energized, it binds to the armature and locks the door. To allow access or egress, a switch must be provided to de-energize the magnet.



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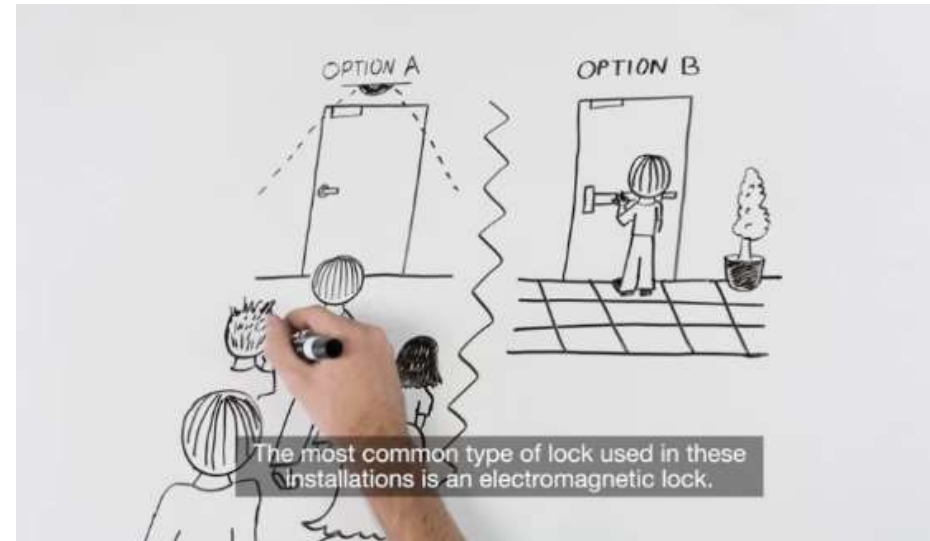


# Whiteboard Videos

- 30 videos
- +/- a dozen on codes
- [iDigHardware.com/videos](https://www.idighardware.com/videos)

# Live & Recorded Webinars

- Recordings of webinars on classroom security, panic hardware, touchless openings, electrified hardware
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## Crash Course



Thank you for watching the Crash Course in Codes! If you have questions about any of the topics covered in the class, there are articles and links below that include more information.

If you'd like to download the Allegion Code Reference Guide, a 40-page booklet that summarizes the code requirements that apply to door openings, visit [iDigHardware.com/guide](https://www.idighardware.com/guide).



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