



2021 Model Code Update

Lori Greene, DAHC/CDC, FDHI, FDAI, CCPR

Lori Greene

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- 35 years working in the industry
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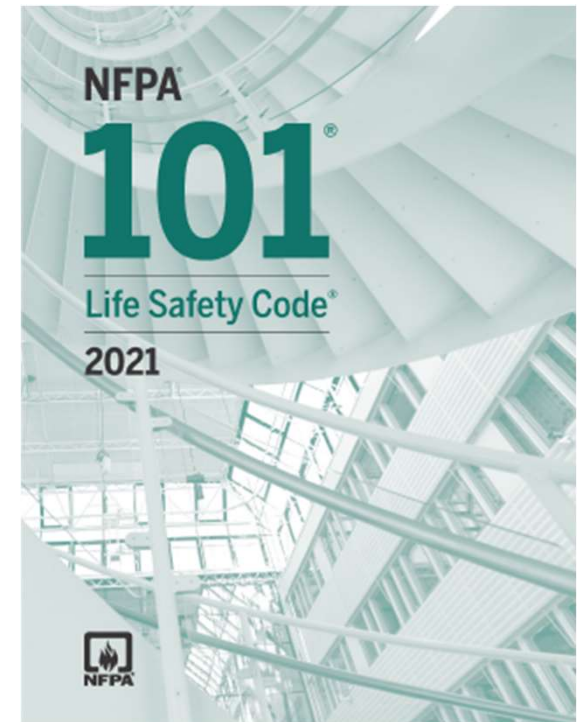
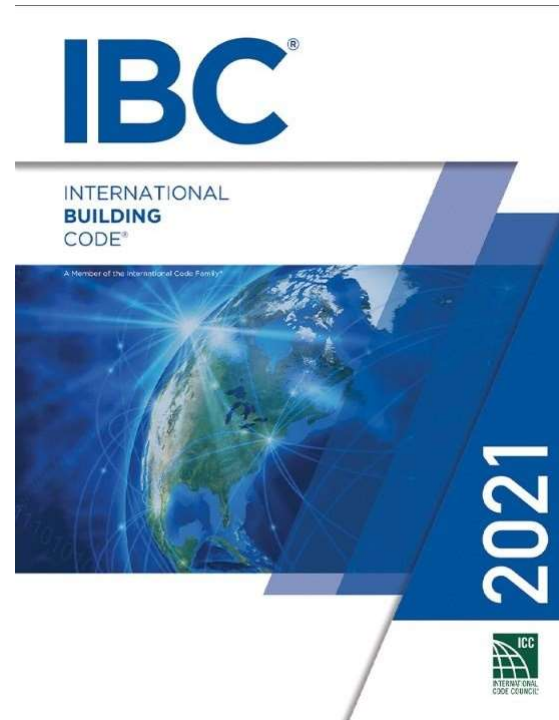


Code Development

- 2021 editions now available
- 2024 process began in January
- Changes don't apply until adopted
- Clarifications may help before adoption
- State/local modifications



2021 Model Codes



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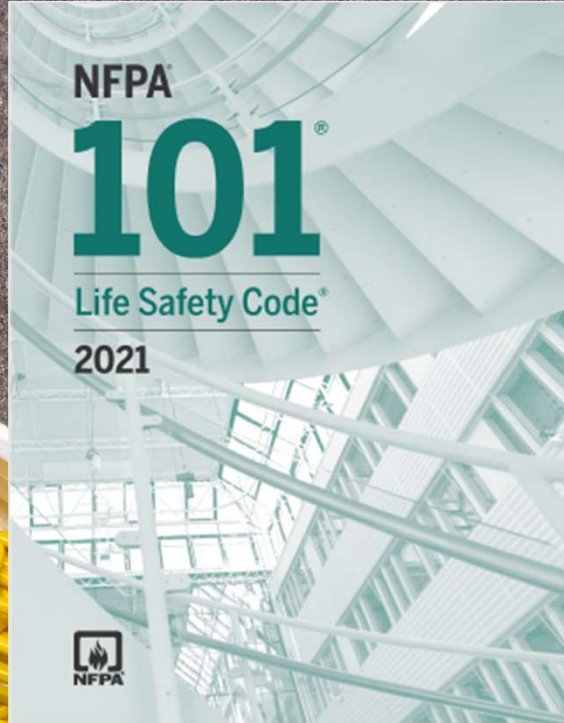
Authority Having Jurisdiction (AHJ)

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





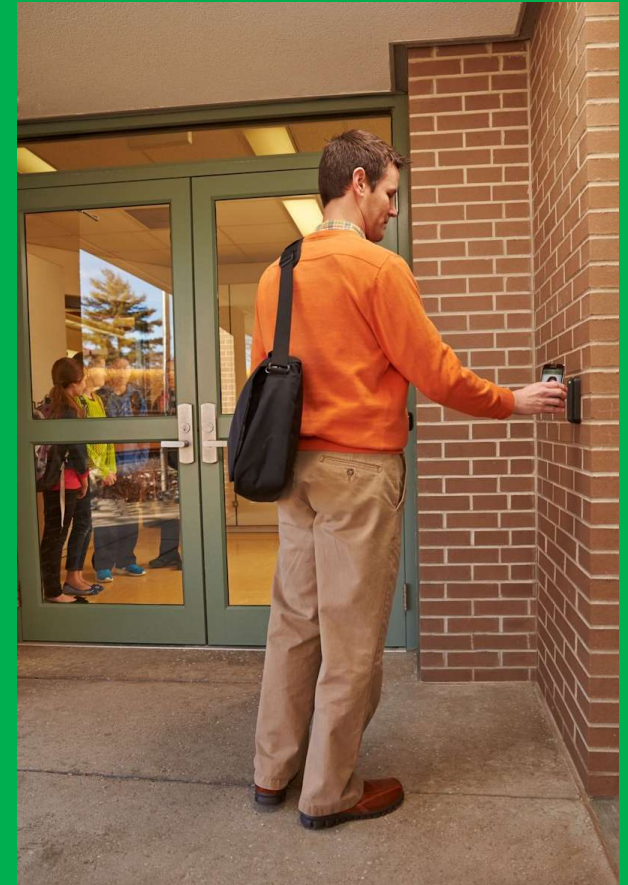
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Special Locking Arrangements

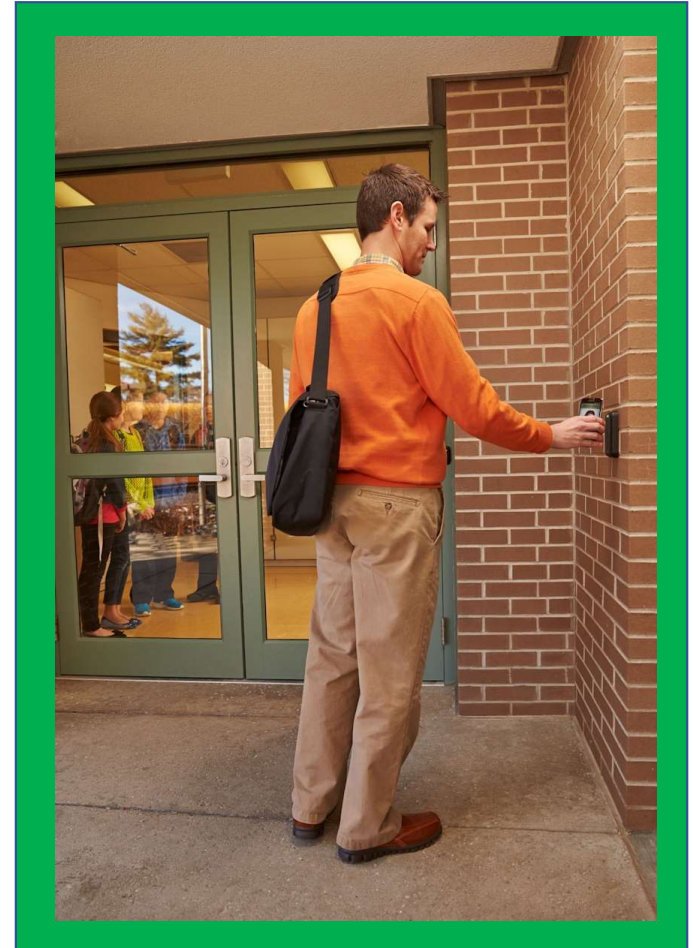
- Delayed Egress
- Sensor Release (Electromagnetic Locks)
- Door Hardware Release (Electromagnetic Locks)
- Stairwell Reentry
- Elevator Lobby Egress
- Controlled Egress in Health Care

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)



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.*





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Maximum Door Width

- Deleted: *[The maximum width of a swinging door leaf shall be 48 inches (1219 mm) nominal.]*
- Removed from the IBC in 2021
- Removed from NFPA 101 >20 years ago



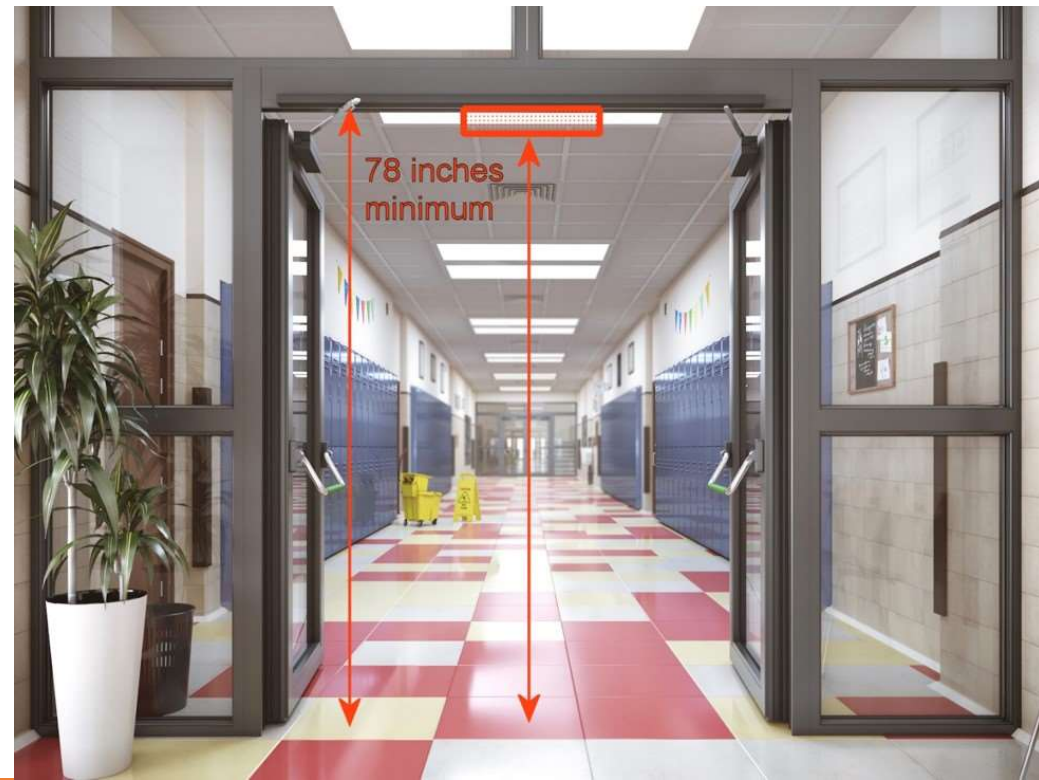
Balanced Doors

- *Egress door types. Egress doors shall be of the side-hinged swinging door, pivoted door, or balanced door types.*
- Clarifications made to both the 2021 IBC and NFPA 101
- Remember, panic hardware on balanced doors must be touchpad style!



Projections into Clear Opening Height

- ADA/A117.1: *Door closers and door stops shall be permitted to be 78 inches minimum above the floor.*
- 2021 IBC: *Door closers, overhead door stops, power door operators, and electromagnetic door locks shall be permitted to be 78 inches (1980 mm) minimum above the floor.*



Restroom Privacy

- 2021 IBC
- *Privacy. Doors to family or assisted-use toilet and bathing rooms shall be securable from within the room and be provided with an “occupied” indicator.*



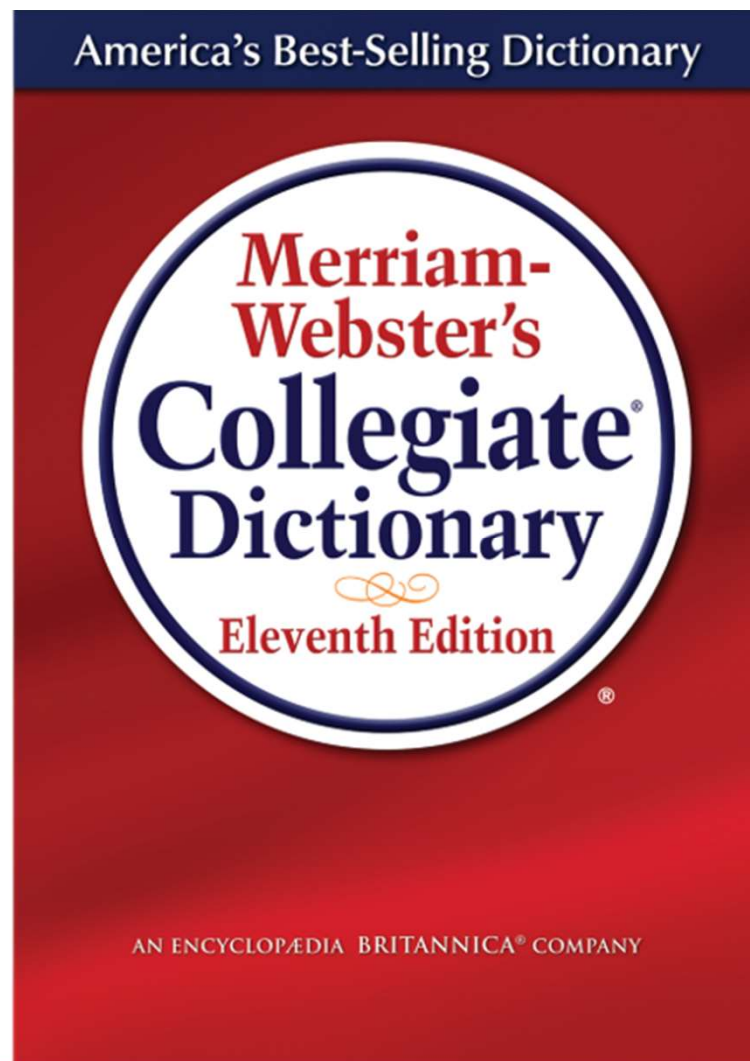
Unlatching

- 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.*
- Changed from “one operation”
- NFPA 101-2021 - similar language



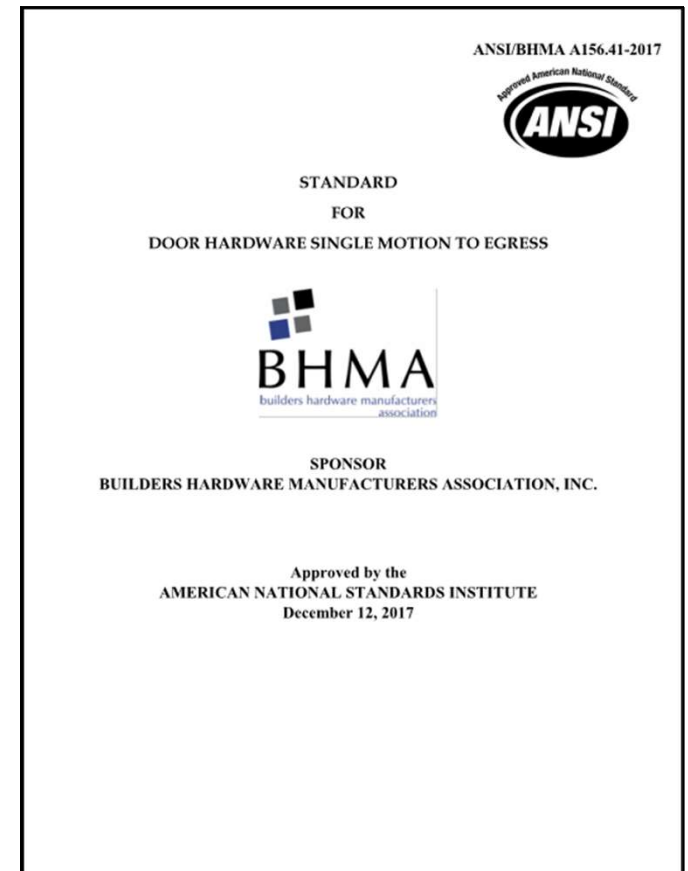
Terms Not Defined

- IBC: If terms are not defined in other I-Codes, *such terms shall have ordinarily accepted meanings such as the context implies.*
- NFPA 101: *Merriam-Webster's Collegiate Dictionary, 11th edition, shall be the source for the ordinarily accepted meaning.*

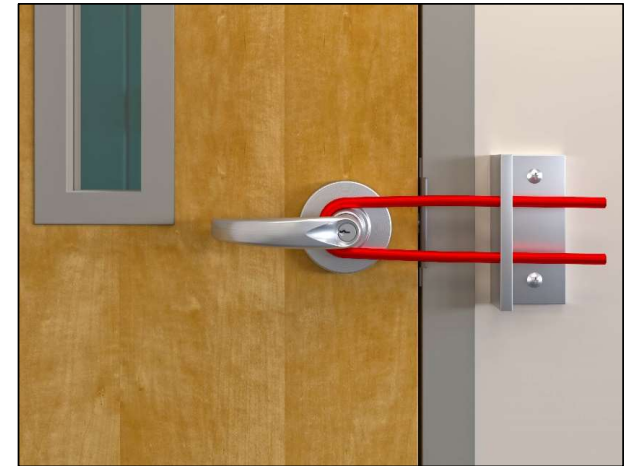


BHMA A156.41-2017

- Standard for Door Hardware Single Motion to Egress
- Definitions:
 - Single Operation Egress
 - Unlatch
 - Lockset
- *A single operation of less than 90 degrees of rotation shall allow the door to be opened.*



Classroom Barricade Devices



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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.*

NFPA 101 TIA 1436

- Modified the 2018 edition of NFPA 101
- Two non-simultaneous releasing motions are allowed for K-12 classroom doors in existing schools
- All other requirements of 101 must be met
- Applies to jurisdictions that have adopted the 2018 edition of NFPA 101
- Carried forward to the 2021 edition
- Intent is to allow a separate deadbolt



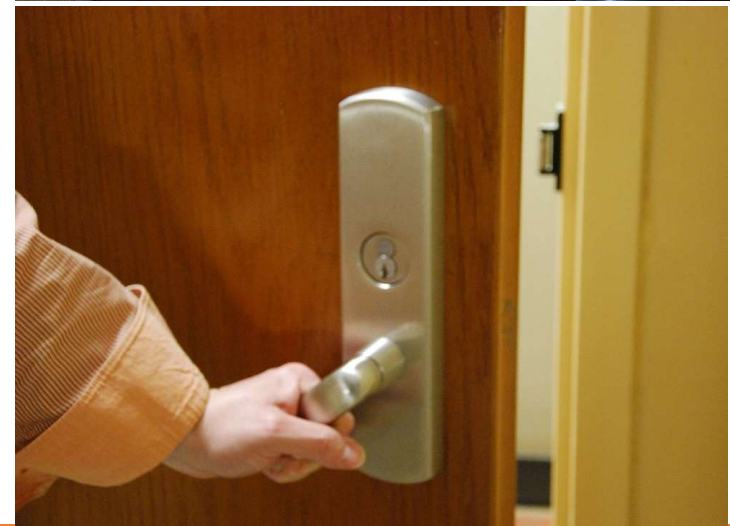
Opening Force

- 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



Operable Force

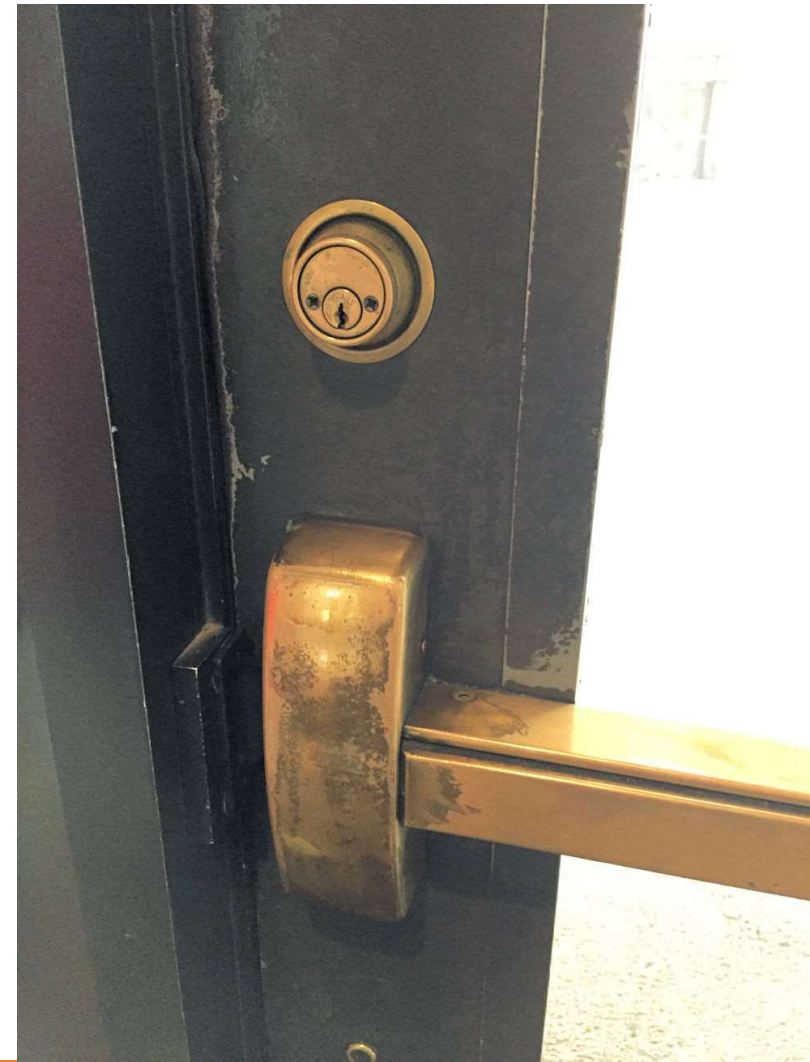
- Pushing or pulling motion: 15 pounds, maximum
- Rotational motion: 28 inch-pounds, maximum
- Consistent with ICC A117.1
- ADA: 5 pounds, maximum



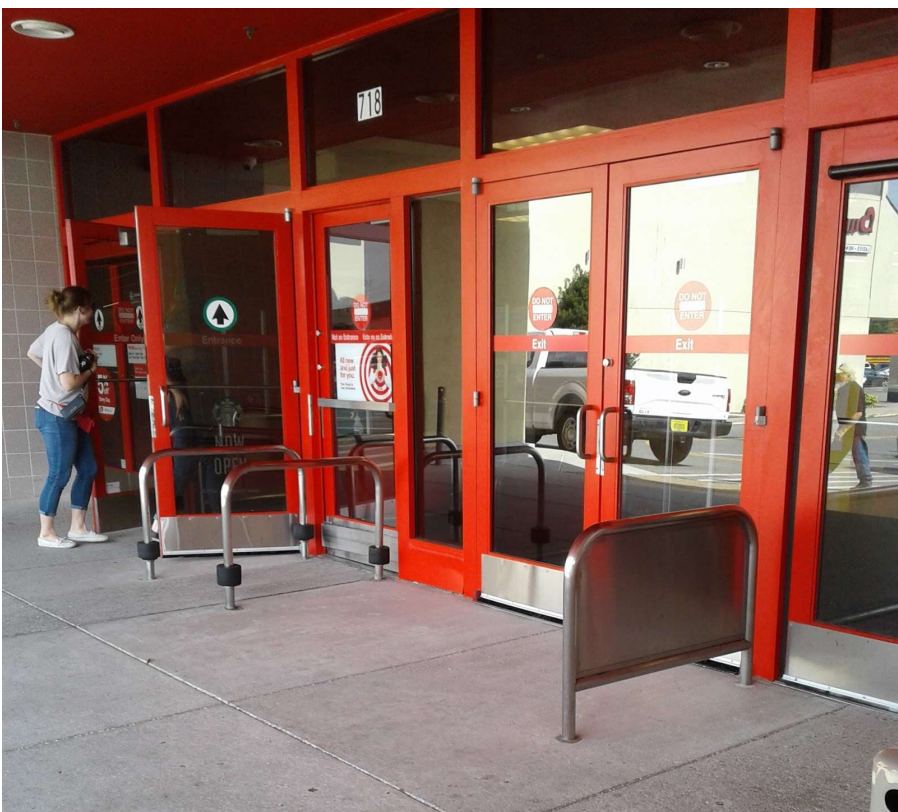
Key-Operated Locks



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Key-Operated Locks

2015 IBC Redline Version



2. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main ~~exterior~~ door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:

- 2.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE ~~BUILDING~~ IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background. ~~and~~

Key-Operated Locks

- NFPA 101-2021: Exterior door assemblies and interior door assemblies to an individual tenant space or to a single tenant space shall be permitted to have key-operated locks from the egress side, provided that all of the following criteria are met:
 - Allowed by occupancy chapter
 - Unlocked when building is occupied
 - Lock readily distinguishable as locked
 - Signage
 - Key immediately available to any occupant when locked



Thumbturn Deadbolts in a Means of Egress

- The IBC section called “Bolt Locks” addresses flush bolts and surface bolts on pairs of doors – NOT deadbolts.
- Thumbturn deadbolts are OK if:
 - Door unlatches 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)
 - Door does not require panic hardware



Egress from Exterior Spaces



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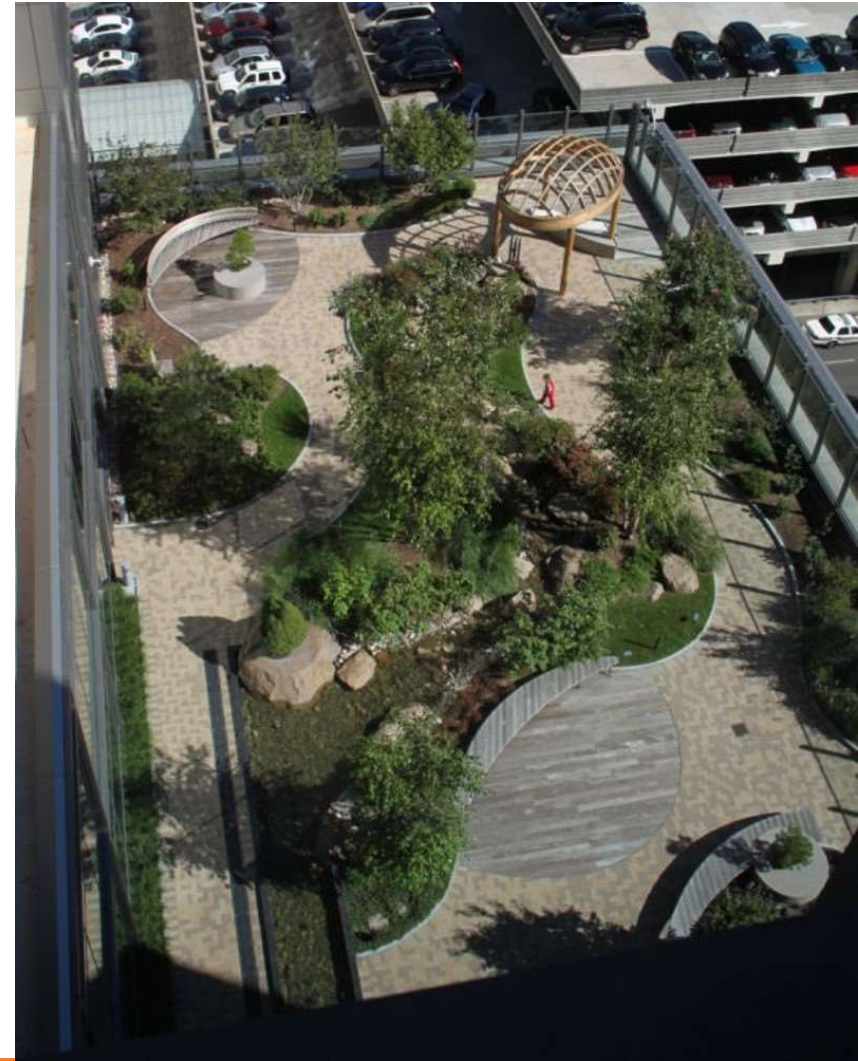
Egress from Exterior Spaces

- 2021 IBC
- Exterior spaces with egress route through interior of building
- Applies to exterior spaces that are not egress courts
- Max occupant load 300 people
- Approved locking device is allowed – readily distinguishable as locked



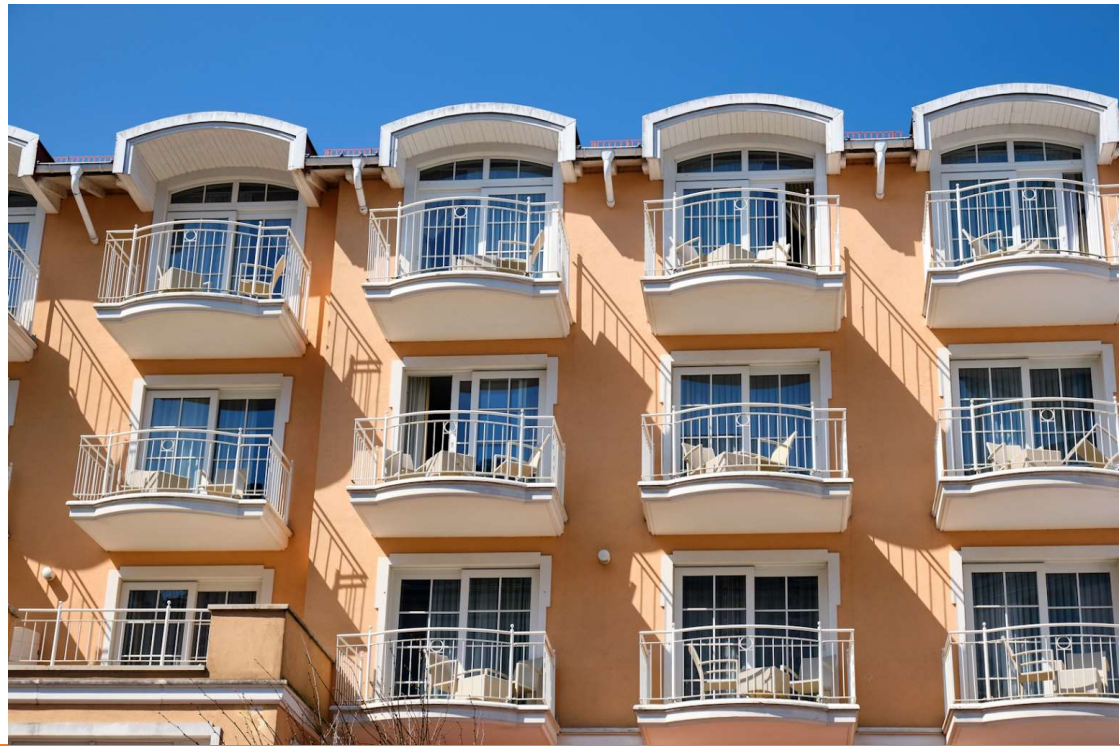
Egress from Exterior Spaces

- At least one weatherproof telephone or two-way communication system with instructional signage
- Signage - THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED
- Clear window or glazed opening, at least 5 square feet in area at each exit access door



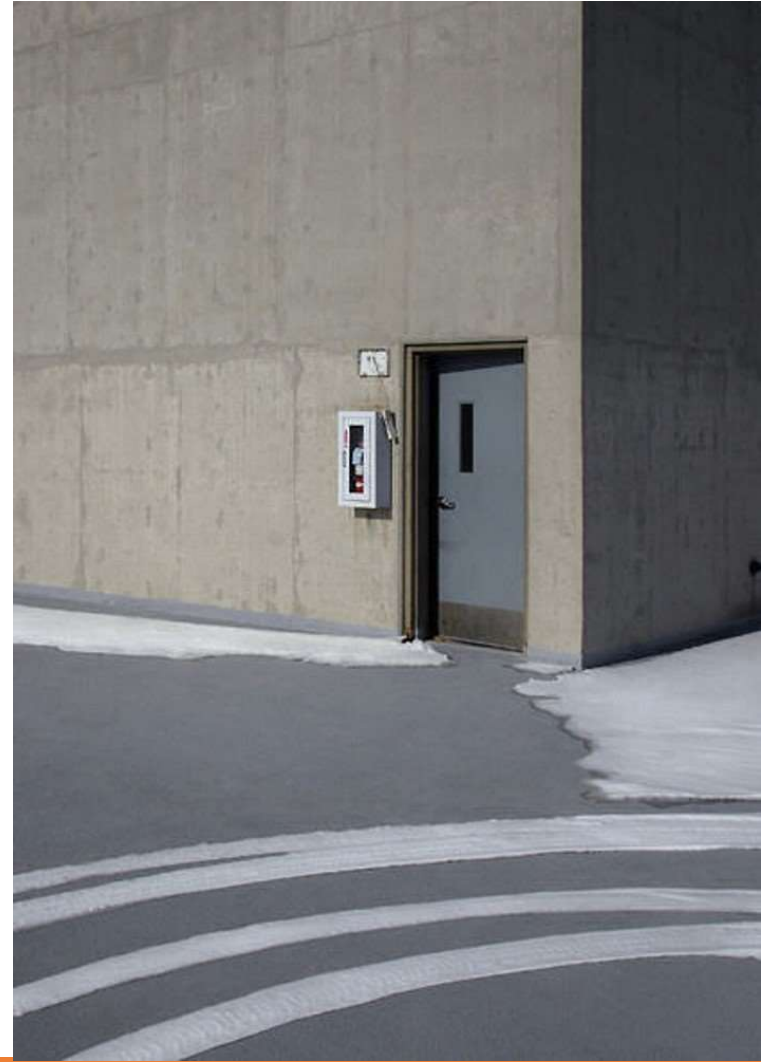
Egress from Exterior Spaces

- Balconies, decks, or exterior spaces may be locked on the outside when serving:
 - Individual dwelling/sleeping units
 - Private office space – exterior space 250 square feet, maximum
- Telephone, etc. not required



Roof Access/Egress

- NFPA 101-2021: *If a stair enclosure allows access to the roof of the building, the door assembly to the roof either shall be kept locked, preventing access to the roof, or shall allow re-entry from the roof.*



Roof Access/Egress

- IBC-2018 - clarifications made
- *Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the building from the roof.*
- *Yards, patios, occupied roofs, courts and similar outdoor areas accessible to and usable by the building occupants shall be provided with means of egress as required by this chapter.*



Extraneous Labels on Fire Door Assemblies

- NFPA 101: *Existing life safety features obvious to the public, if not required by the Code, shall be either maintained or removed.*
- Annex A: *Where a door that is not required to be fire protection-rated is equipped with a fire protection listing label, it is not the intent of 4.6.12.3 to require such door to be self- or automatic-closing due merely to the presence of the label.*





BEFORE



AFTER

2021 Model Code Update

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.*



Terminated Stops

- IBC-2021
- Terminated stop is now defined
- 6 inches maximum
- Prohibited where doors are required to limit air infiltration without an artificial bottom seal (limited locations)
- Allowed elsewhere – including fire door assemblies



Panic Hardware



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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

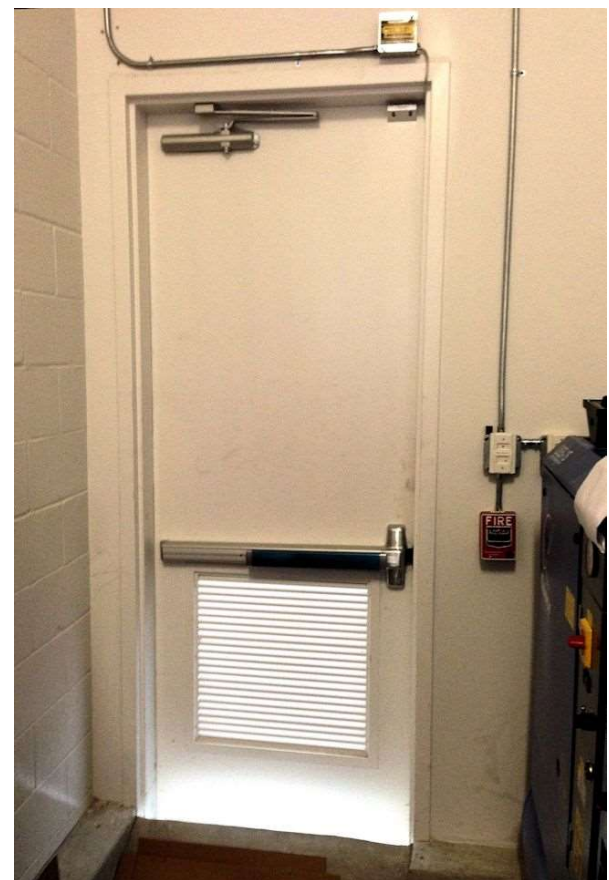
Refrigeration Machinery Rooms

- 2021 IBC: *Refrigeration machinery rooms larger than 1,000 square feet (93 m²) shall have not less than two exit or exit access doorways that swing in the direction of egress travel and shall be equipped with panic hardware or fire exit hardware.*



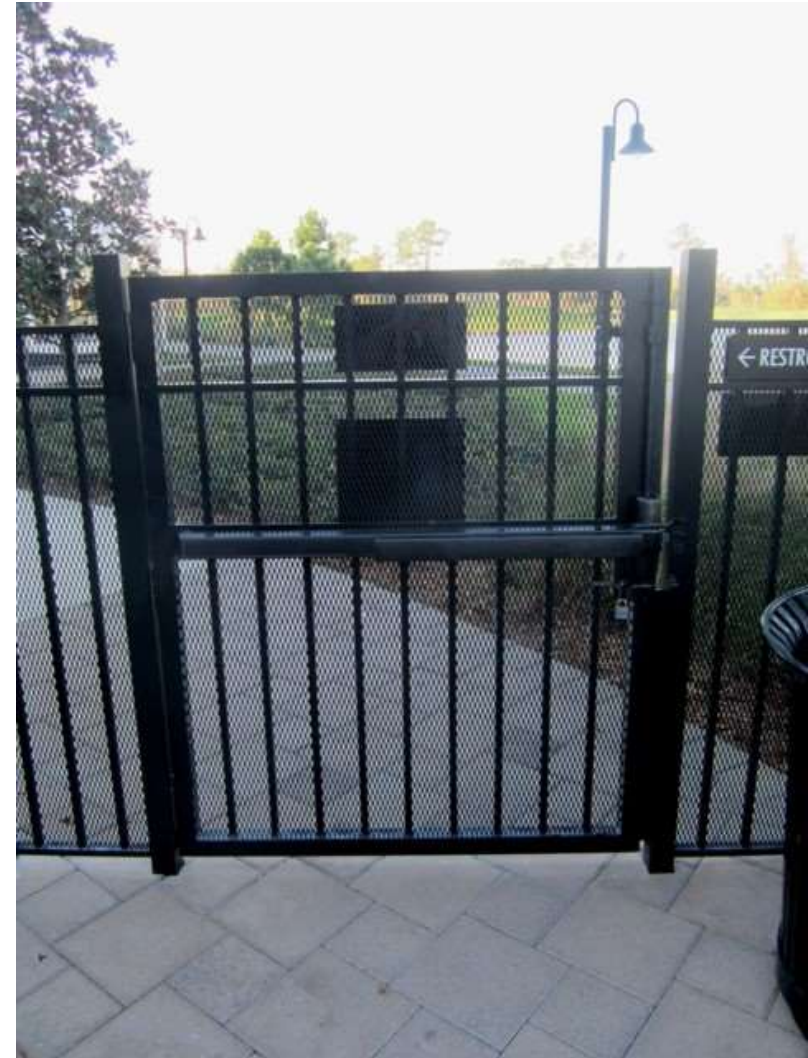
Rooms with Electrical Equipment

- 2021 IBC requires panic hardware for doors (within 25 feet of the equipment working space) serving:
 - Transformer vaults
 - Rooms for batteries or energy storage systems
 - Modular data centers
 - Rooms with electrical equipment rated 800 amperes or more that contain overcurrent devices, switching devices or control devices
- Not completely consistent with NFPA 70



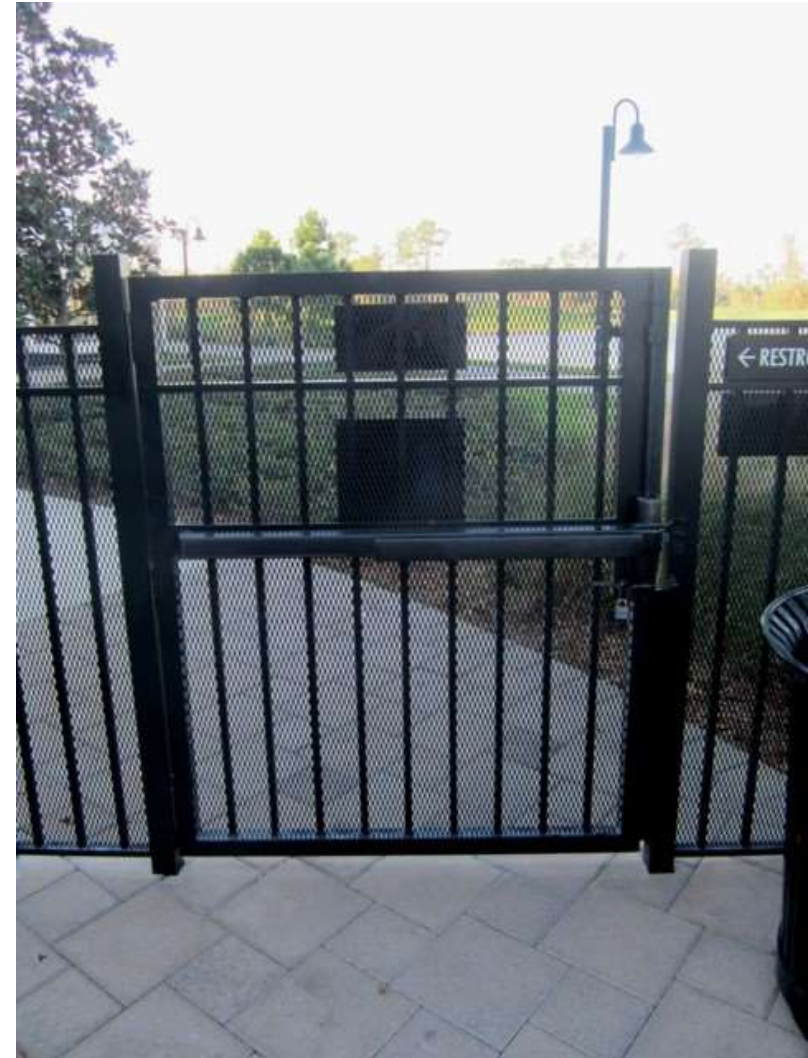
Pool Doors and Gates

- International Swimming Pool and Spa Code
- Outswinging doors and gates (swing away from pool)
- Self-latching door/gate – pairs may have one fixed leaf
- No openings $>1/2$ inch within 18 inches of the latch
- Service doors locked when not in use
- Door between equipment room and indoor pool must have “automatic closer and automatic lock”



Pool Door/Gates Hardware

- Self-Locking Doors/Gates
 - Public Pools/Spas – 34-48 inches AFF
 - Residential Pools/Spas – not greater than 54 inches AFF
- Non-Self-Locking Doors/Gates:
 - Public Pools/Spas – 52-54 inches AFF
 - Residential Pools/Spas – not less than 54 inches AFF
 - Private Pools/Spas – release mechanism at least 3 inches below top of gate on pool side



Public Entrances

- 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



Public Entrances

- ICC A117.1
 - *404.3.1 Public entrances Where an automatic door or gate is required at a building or facility public entrance, it shall be a full powered automatic or a low-energy automatic door or gate.*
 - *404.3.2 Vestibules Where an entrance includes a vestibule, at least one exterior door or gate and one interior door or gate in the vestibule shall have the same type of automatic door or gate opener.*



Monitored Sensors for Automatic Operators

- 2017 edition of BHMA A156.10 – Standard for Power-Operated Pedestrian Doors
- Requires safety sensors to be monitored
- If safety sensor is defective – door can not open automatically
- Applies to power-operated pedestrian doors
- Applies to low-energy automatic operators if they are actuated by a motion sensor



To comply with A156.19, low-energy operators must be initiated by a “KNOWING ACT”.

- *Knowing Act: Any conscious action with the expected result of opening a door. This includes but is not limited to:*
 - *wall or jamb-mounted contact or non-contact switches such as push plates;*
 - *the action of manual opening (pushing or pulling) a door;*
 - *controlled access devices such as keypads, card readers, wireless transmitters and keyswitches.*



Monitored Sensors for Automatic Operators

- 2017 edition of BHMA A156.10 – Standard for Power-Operated Pedestrian Doors
- Requires safety sensors to be monitored
- If safety sensor is defective – door can not open automatically
- Applies to power-operated pedestrian doors
- Applies to low-energy automatic operators if they are actuated by a motion sensor



Touchless Actuators

- BHMA A156.19: *Fixed non-contact switches should have a detection range no greater than 12 in. (305mm) to ensure a knowing act is utilized to activate the door.*



Stand-by Power for Automatic Operators

- ADA Standards and A117.1
- Required when an automatic door does not have the proper maneuvering clearance on the egress side



Power-Operated Fire Doors

- NFPA 80:
- *6.1.3.4 Power-Operated Fire Doors.*
Power-operated fire doors shall be equipped with a releasing device that shall automatically disconnect the power operator at the time of fire, allowing a self-closing or automatic device to close and latch the door regardless of power failure or manual operation.



Recessed Doors

- Obstruction within 18 inches of the latch side
- If more than 8 inches deep measured to face of door
- Maneuvering clearance for forward approach is required
- Or provide auto operator (with standby power if recess is on egress side)



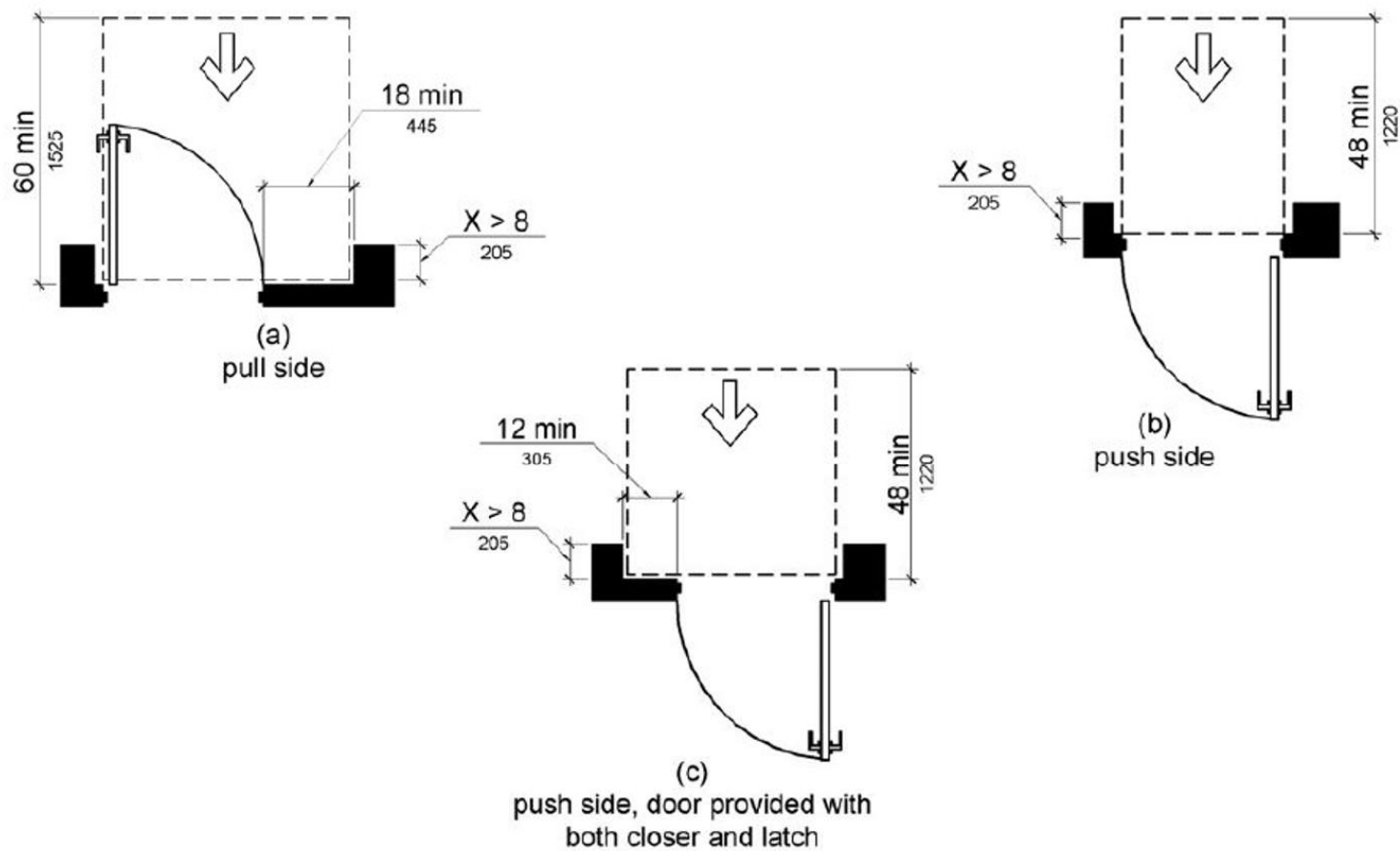
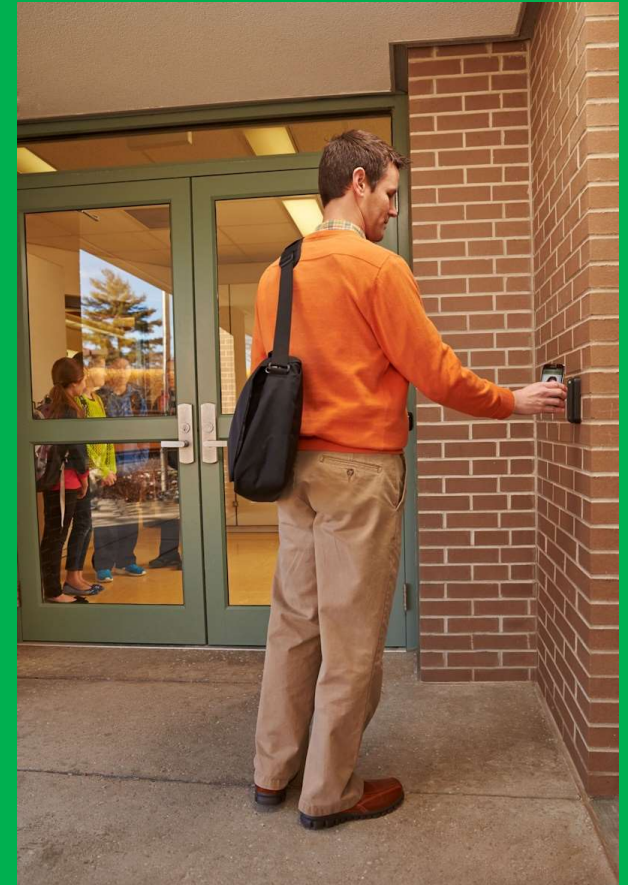


Figure 404.2.4.3
Maneuvering Clearances at Recessed Doors and Gates

Special Locking Arrangements

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

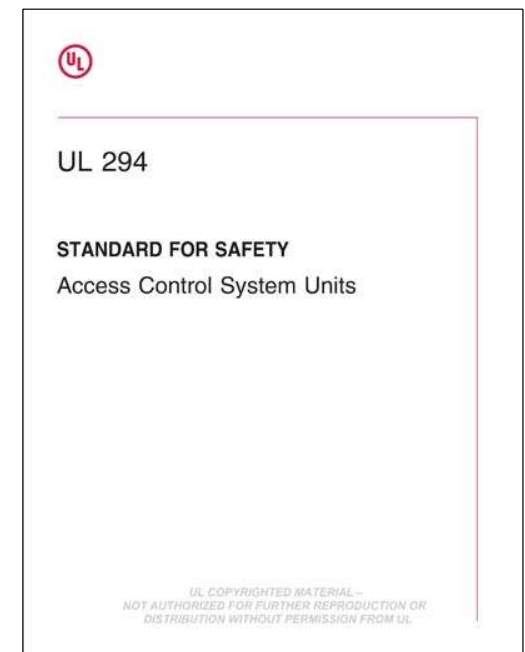
Normal Locking Arrangements



UL 294 – Standard for Access Control System Units

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

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



Access Control / Free Egress

- Reader controls access
- Hardware allows free egress
- Not a special locking arrangement
- UL 294 listing not required by the model codes



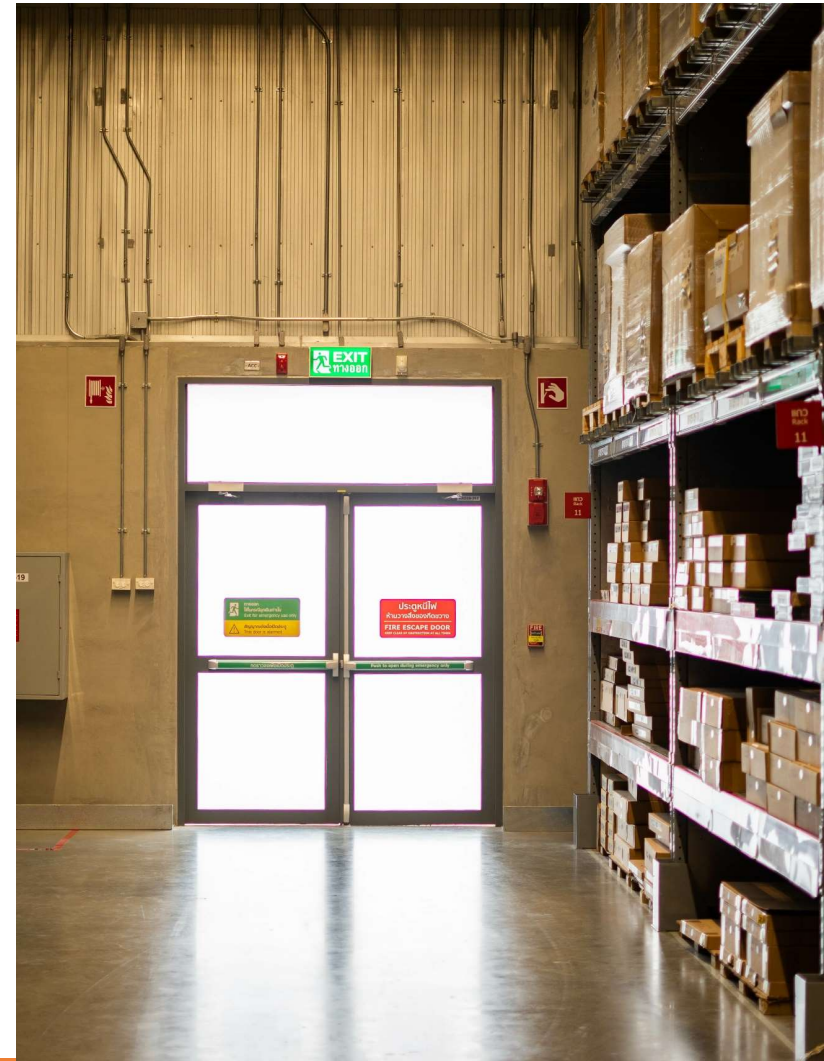
Normal Locking Arrangements

- 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)



Monitored Egress

- May have reader on egress side to shunt alarm
- Does not prevent egress
- IBC section added in 2018
- Not a special locking arrangement
- UL 294 listing not required



Delayed Egress Locks

- Delays egress for 15 seconds to prevent theft or elopement (30 seconds when approved by AHJ)
- Must allow immediate egress upon power failure and activation of fire alarm/sprinkler system
- Not allowed in all occupancy types
- UL 294 listing required



Delayed Egress Locks

- 2018 IBC Changes
 - Previous editions of the IBC did not allow delayed egress in assembly or educational use groups
 - Secondary exits from courtrooms - building must have sprinkler system
 - Classroom doors serving less than 50 occupants
- NFPA 101 has fewer limitations



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



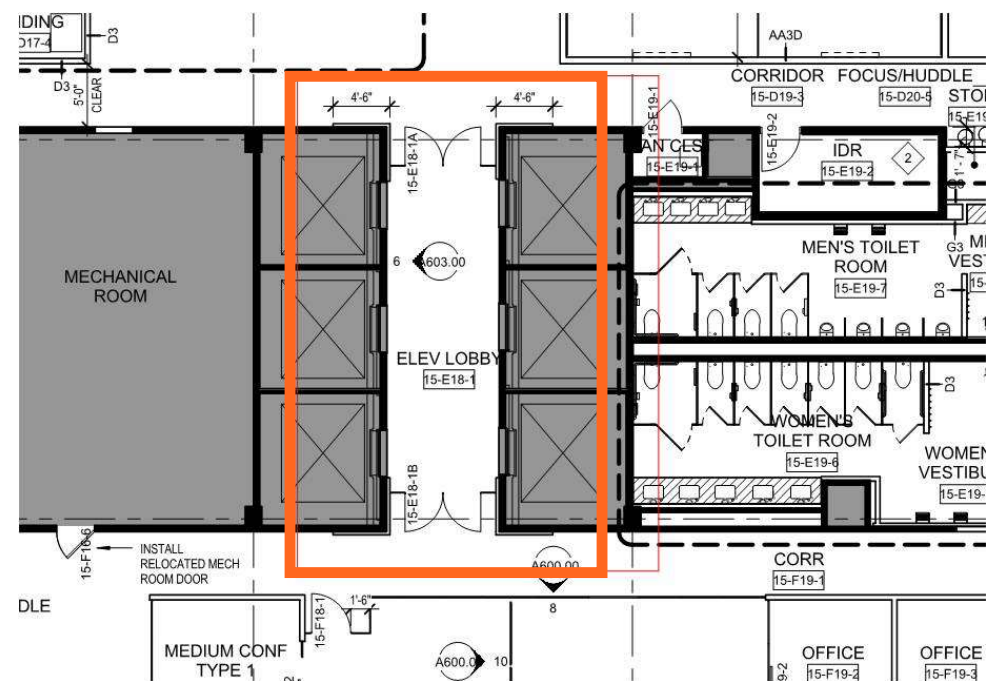
Stairwell Reentry

- Allows building occupants to leave stairwell and reenter building through locked doors
- Stair side lever unlocks:
 - upon fire alarm (NFPA 101), or
 - upon signal from fire command center or other location (IBC/IFC)
- NFPA 101 allows some doors to be mechanically locked on stair side
- **UL 294 listing IS required by 101-2021**
- **UL 294 listing IS NOT required by IBC**



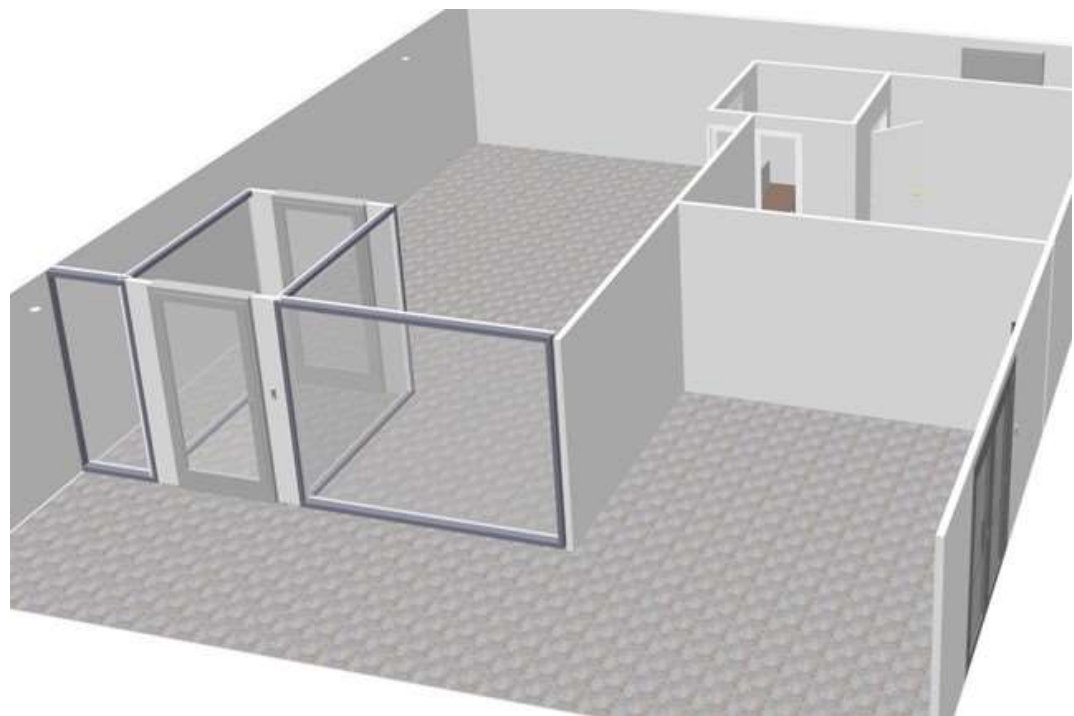
Elevator Lobby Egress

- NFPA 101 allows door from elevator lobby to tenant space to be locked if certain criteria are met – new Annex note
- IBC requires at least one code-compliant means of egress out of the elevator lobby
- Some city/state codes have modifications similar to NFPA 101
- UL 294 listing is required by NFPA 101



Interlocks

- Set of 2 or more doors
- When one door is open, the other door(s) can not be opened
- Model codes do not currently address interlocks – need AHJ approval



Fail Safe Controlled Egress Locks in Health Care

- Allowed in health care units where patients require containment for security or safety
- Fail safe locks - emergency release for evacuation
- Staff intervention
- UL 294 listing required
- NFPA 101 & IBC



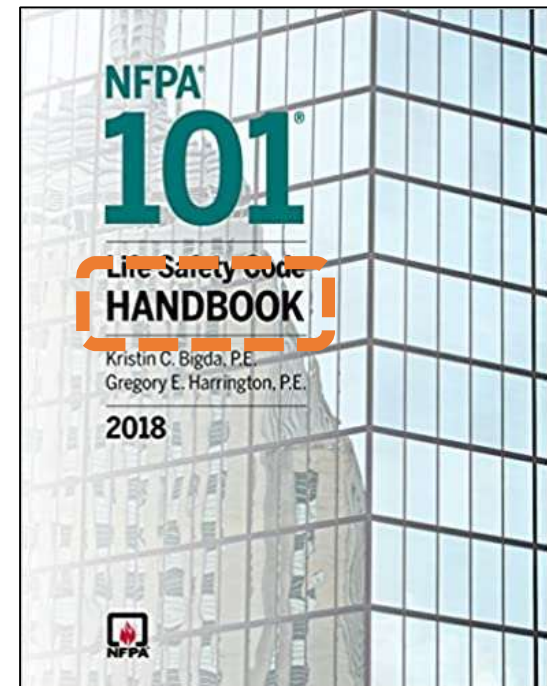
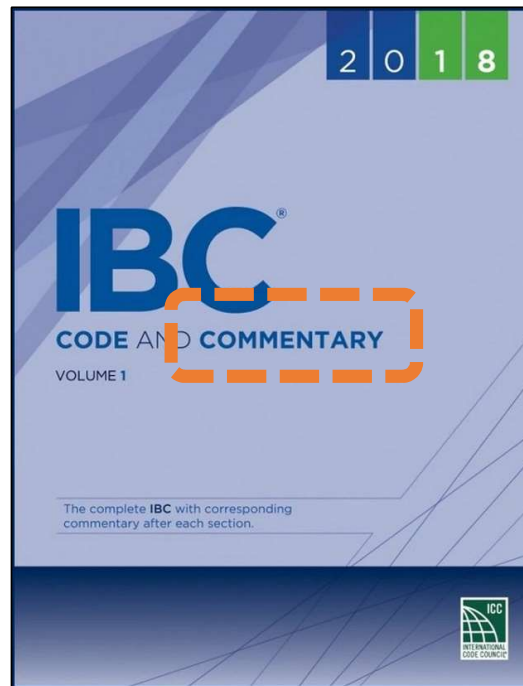
Mechanical Controlled Egress in Health Care

IBC-2021: Locks and latches. *Locks and latches shall be permitted to prevent operation of doors where any of the following exist:*

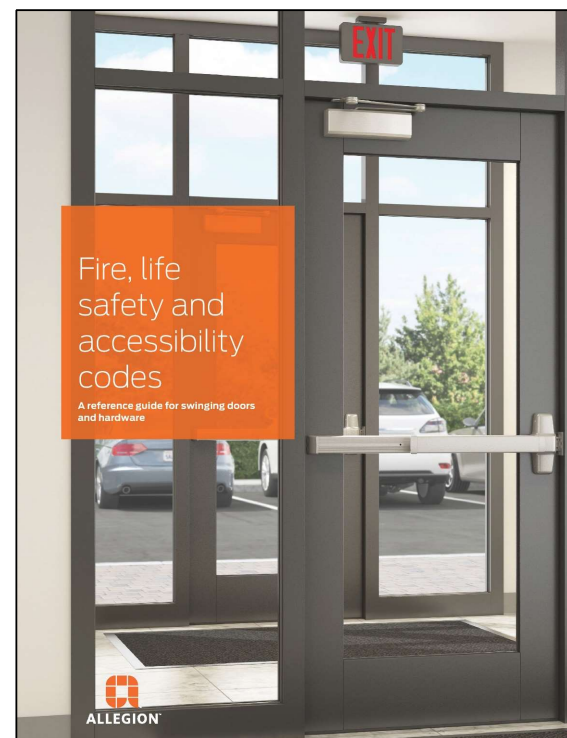
- 1. Places of detention or restraint.*
- 2. In Group I-1 Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.*

Adopted Codes and Referenced Standards

- ICCSafe.org
- NFPA.org
- Commentary/Handbook
- Referenced Standards
- **Check for state/local modifications**



Decoded Articles and Code Reference Guide



2021 Model Code Update



iDigHardware

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

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WW: Chain Reaction

Today's Wordless Wednesday photo shows an



Mobile Credentials: The key to a seamless student experience



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