

Stairwell Reentry

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The concept of stairwell reentry can be a confusing one, especially because of the variation between the requirements of the *International Building Code (IBC)* and *NFPA 101 – The Life Safety Code*. Most stairwells are designed to provide a safe means of egress for building occupants, protected by fire barriers and opening protectives (fire door assemblies). This type of stairwell is typically called an exit or exit enclosure.

The purpose of the stairwell reentry requirements is to enable building occupants to leave a stairwell if it becomes compromised during a fire, and cross through a tenant space to find another exit. Another reason for this section of the model codes is to allow firefighter access from the stairwell to the fire on a tenant floor.

International Building Code (IBC)

The IBC includes different requirements for interior stairway doors and stair discharge doors. The stair

discharge door is the door at the bottom of the stairs that leads to the exterior or to a continuation of the egress path to the exit discharge. The IBC states that the stairway discharge door must be openable from the egress side and may only be locked from the opposite side.

This code language is helpful because in some jurisdictions, the fire department may request that the stair discharge door unlock automatically during a fire to aid firefighting efforts. An Authority Having Jurisdiction (AHJ) may require this, but it is not common since it is not required by the IBC and may create security problems, especially if the doors are automatically unlocked by the fire alarm system (refer to the NFPA 101 requirements below).

The requirements of the IBC include the following options for interior stair doors (not the stair discharge):

1. Doors may be openable from both sides without the use of a key or

special knowledge or effort. To accomplish this, a passage set or fire exit hardware with passage function trim would be used, as passage hardware would be freely openable from both sides. Options 2 and 3 below address locking the stair side of interior stair doors, but note that the doors must provide free egress to the stair on the egress side unless a delayed egress or controlled egress lock is used.

2. A high-rise building is defined by the IBC as “a building with an occupied floor located more than 75 feet above the lowest level of fire department vehicle access.” For high-rise buildings, the IBC allows stairway doors—other than the exit discharge doors—to be locked on the stair side. These locked doors must be able to be unlocked simultaneously without unlatching upon a signal from the fire command center. When this application is used in a high-rise building, the

stair is also required to have a telephone or other two-way communication system that is connected to an approved constantly-attended station. This system must be located at not less than every fifth floor in each high-rise stairway where the doors are locked on the stair side.

3. If the stairway is serving four stories or less, the interior doors may also be locked on the stair side if they can be remotely released without unlatching by a switch at the fire command center. If there is no fire command center, the switch may be placed in a location inside the main entrance to the building, for activation by emergency personnel. The differences between the requirements for high-rise buildings and stairs serving four stories or less are the location of the switch and the need for a stairway communication system.

Options 2 and 3 leave a loophole: what if a stair serves more than four stories but does not qualify as a high-rise building? This issue in the code was discovered in time to address it in the 2018 edition of the IBC. A change will be made that clears this up: when a stair serves any amount of levels but is not a high rise building, it can comply with either option 1 or 3 above and a stairway communication system (2) is not required. Option 3 will no longer be limited to stairs serving four stories or less.

The IBC also has two exceptions that apply to stairwell reentry. Under certain circumstances, buildings may be allowed to have only one exit stairway. An example of this is an air traffic control tower. When the building has one exit stair, there is little value in unlocking the stairwell doors for reentry, since there isn't another stair for a building occupant to use. When a stair door is lockable on the stair side in a Group B (Business), F (Factory and Industrial), M (Mercantile), or S (Storage) occupancy, the IBC allows the doors to be locked on the stair side and does not require remote unlocking.

This also applies to Group R-2 (Residential) occupancies where the only interior access to the dwelling unit is from a single exit stairway. R-2 occupancies include apartment buildings, dormitories, hotels, and similar types of residential buildings.

NFPA 101 – The Life Safety Code

NFPA 101's requirements have some similarities to the IBC, but also several variations. As with the IBC, stair doors may have passage sets or passage function trim for fire exit hardware, so the doors will be operable in both directions. NFPA 101 also includes the option for remote unlocking, except that instead of doors being unlocked via a switch at the fire command center, the doors are required to be unlocked automatically upon initiation of the fire alarm system. Again, this applies to the stair side lever only; not to the hardware on the egress side of the door.

There are two other options and some exemptions allowed by NFPA 101 that are not covered by the IBC. According to NFPA 101, stairs serving four stories or less may be locked mechanically, and are not required to be unlocked remotely. NFPA 101 also allows selected reentry, where some stair doors are allowed to be locked mechanically, and others must allow reentry. For selected reentry:

- At least two levels within the stair enclosure must allow reentry.
- There cannot be more than four locked levels between levels that allow reentry.
- Either the top level or the next-to-stop level must allow reentry.
- Signage is required on the stair side of each door, either identifying the door as a reentry floor, or directing building occupants to the next reentry floors in both directions.

Several exemptions are noted in the occupancy chapters of NFPA 101. Check the occupancy chapters for exemptions related to:

- Existing installations in some non-high-rise buildings.

- Existing installations in some high-rise buildings protected throughout by a sprinkler system.
- Existing approved installations.
- Buildings with a single exit stair (similar to the IBC).
- Some healthcare occupancies as addressed in Chapter 18.
- Detention and correctional occupancies as addressed in Chapter 22.

These options and exemptions allowed by NFPA 101 would only apply where NFPA 101 has been adopted as the applicable code, and the facility is not required to meet the IBC requirements. Since the IBC does not include mechanical locks or selected reentry, a building designed to comply with the IBC would not be able to employ these security methods without permission from the AHJ.

Conclusion

The locking hardware typically used on stair doors that are lockable on the stair side are fail-safe locksets or fail-safe trim for fire exit hardware (in some cases electromagnetic locks—also fail safe—may be used). This ensures that the doors will unlock during a fire, even if the power in the building has been cut. An electric strike may not be used to accommodate stairwell reentry, because a fail-safe electric strike cannot be used on a fire door as it does not ensure positive latching.

In some cases there may be floors of a building that are not ideal for stairwell reentry; perhaps they contain equipment that would not be easy to navigate around or could be hazardous to building occupants who are not familiar with it. The model codes don't address this situation, so it's best to consult the AHJ for assistance. ■



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