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Standard Practice for Installation of Exit Devices in Security Areas[1]

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1. Scope

1.1 This practice provides information for the installation of exit devices used in areas of security to achieve the greatest security possible without violating the requirements and spirit of NFPA 101.

1.2 Security of a high level is not always possible with these products but the use of certain types and functions of exit devices will afford a much higher degree of security than the use of other types and functions.

1.3 The values as stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

F476 Test Methods for Security of Swinging Door Assemblies

2.2 *Builders Hardware Manufacturers Association Standards:*

BHMA A 156.3 Exit Devices[3]

BHMA A 156.5 Auxiliary Locks and Associated Products[3]

2.3 *National Fire Protection Agency Standards:*

NFPA 80 Fire Doors and Windows[4]

NFPA 101 Code for Safety to Life from Fire in Buildings and Structures[4]

2.4 *Underwriters Laboratories Standards:*

UL 305 Panic Hardware[5]

UL 1034 Burglary Resistant Electric Locking Mechanisms[5]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *astragal*—a vertical molding attached to the meeting edge of a leaf or both leaves of a pair of doors.

3.1.2 *coordinator*—a device that holds the active door of a pair open until the inactive door has preceded it in the closing cycle.

3.1.3 *exit device*—a locking device always operable from the inside (egress side) by pushing on an activating mechanism usually called a push pad or cross bar.

3.1.4 *mortise device*—a lock mechanism that is installed into a cavity provided in the edge of a door.

3.1.5 *mullion*—a vertical member in an opening for two doors permitting each door to be operated independently from the other.

3.1.6 *rim device*—a single lock mechanism applied to the surface of a door.

3.1.7 *vertical rod device*—a top and bottom lock mechanism connected by rods, either surface or concealed, to the activating mechanism.

4. Significance and Use

4.1 This practice is not meant to include products other than exit devices except to the extent that such products directly relate to the use of exit devices. When other products are described, the security attributes of the other products are described generally in the documents referenced in Section 2.

5. General

5.1 NFPA 101 and many building codes require exit devices in certain locations and should be consulted.

5.2 UL 305 and BHMA A156.3 have specific requirements for the performance of exit devices and should be consulted.

5.3 Exit devices for fire doors require a label designating them as "fire exit hardware." This means they have been investigated for both fire resistance and panic. Exit devices used on non-fire doors require a listing for panic. These labels and listings shall be by a nationally recognized, independent testing laboratory. A periodic examination service is also required.

NOTE 1—For more information on exit devices, see NFPA 80.

[1] This practice is under the jurisdiction of ASTM Committee F12 on Security Systems and Equipment and is the direct responsibility of Subcommittee F12.50 on Locking Devices.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from Builders Hardware Manufacturers Association, 60 E. 42 nd St., Rm 1807, New York, NY, 10017.

[4] Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

[5] Available from Underwriters Laboratory, Inc., 333 Pfingsten Road, Northbrook, IL 60062.

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6. Installation Guidelines

6.1 *Doors and Frames:*

6.1.1 Doors and frames installed in locations where exit devices are used for purposes of security should have minimum clearances at the head, jambs, and meeting stiles (if in pairs) and at a threshold or sill.

6.1.2 Doors and frames should be of sufficient strength and rigidity so as not to fail a spreading or impact test of the appropriate level as defined in Test Methods F476. Where applicable, doors and frames should be reinforced to receive fasteners described in 6.8.

6.2 *Associated Hardware:*

6.2.1 Hinges or pivots used to hang doors should be of a type where the unauthorized separation of the hinge side of the door from the frame is hindered. This can be achieved by including design features in which the hinge leaves are locked together.

6.2.2 Doors should be self-closing so that when the exit device is activated from the egress side, the door will automatically return to the closed and locked position and not stay open. This can be achieved through the use of door closing devices.

6.2.3 Electric strikes (see BHMA A156.5 and UL 1034) may be used for security areas. These can be arranged to signal an unlocked condition or an open door. Some electric strikes may not be used on fire doors.

6.2.4 Astragals can add to the security of a pair of doors by making it more difficult to probe the clearance at the meeting stiles and trip the opening mechanism. However, it is important that the astragals do not inhibit the independent action of each leaf if both leaves are active.

6.3 *Exit Device Functions:*

6.3.1 Functions of exit devices range from those having no operation of any kind on the exterior (secure) side of the door to those that are knob, lever, or thumbpiece-operated on the exterior side.

6.3.2 The most secure function is the one having no operation on the exterior side (usually called “exit only function”).

6.3.3 The second most secure functions are operated by key only from the exterior side and are otherwise always locked (usually called “night latch function”).

6.3.4 The least secure functions are those which can be locked or left unlocked by key and are operated by knob, lever, thumbpiece, or other operating trim from the exterior side.

6.4 *Exit Devices on Single Doors:*

6.4.1 Mortise-type exit devices of the exit only or night latch types function when the mortise lock mechanism is housed in a drawn steel case and is furnished with an auxiliary dead latch to afford good security.

6.4.2 Rim device types of the exit only or night latch functions also afford good security. Some manufacturers employ deadlocking latch bolts to prevent entry by shaking or vibration attacks. Others prevent entry from these type of attacks by adjusting the angle of relationship between the latch bolt and the strike. Bolt projections of ⅝ in. (15.9 mm) and ¾ in. (19.1 mm) are available. Attempting to withdraw the bolt with shim material in this type of device is not common because of the angle and distance from the edge of the door to the strike.

6.5 *Exit Devices on Pairs of Doors:*

6.5.1 Pairs of doors with exit devices are less secure than single doors so equipped. As in the case of single doors, the exit only or night latch functions are the most secure.

6.5.2 Rim devices used with mullions manufactured for the specific devices used afford reasonable security. Mullions should be the most substantial offered and installation clearances should be close.

6.5.3 In areas where mullions are not desired or permitted, pairs of doors should be equipped with astragals that do not inhibit the independent action of each leaf and vertical rod devices. The bottom bolts should resist loiding and project a minimum of ⅜ in. (9.6 mm) into a threshold. The threshold should be cut to receive the strike and the strike should be fastened securely to the floor or to a threshold incorporating a stop strip that retains a bottom latch.

6.5.4 The combined use of a vertical rod device and a mortise device with an open back strike provides little security and is not recommended for security areas.

6.5.5 The combined use of a vertical rod device and a mortise device with a closed back (conventional) strike and an overlapping astragal provides reasonable security. One difficulty with this arrangement is the required use of a coordinator which ensures the correct sequence of closing.

6.6 *Optional Security Features for Exit Devices:*

6.6.1 Exit devices are available that can be locked or unlocked on the exterior side from a remote position or central station. Individual manufacturer’s catalogs should be consulted.

6.6.2 Exit devices can be equipped with an integral mechanical or electronic mechanism signaling an unauthorized egress. When the device is operated, an audible or silent alarm can be activated. Warning signs with words such as “emergency exit only—push to open and sound the alarm” can be placed on the activating push bar or on the door above the device.

6.6.3 Exit devices with an electric mechanism to retract the latch bolt from a remote location or central station can be used when remote operation is desired. The device can also be equipped with a monitoring device to signal an unlocked, unsecure condition or an open door. Individual manufacturer’s catalogs should be consulted.

6.7 *Exit Locks:*

6.7.1 Exit locks are used on doors required for emergency exit but that are not otherwise used.

6.7.2 When doors equipped with exit locks are opened, an audible or silent alarm is generally activated. Warning signs with such words as “emergency exit only” and “push here to open—alarm will sound” are usually found on the activating cross bar of the lock.

6.7.3 Exit locks are available with dead bolts providing the highest security available for this type of lock.

6.7.4 Exit locks can be locked or unlocked on the exterior side from a remote position or control station when remote operation is desired.

6.7.5 Exit locks are available that will alarm when tampered with from the exterior side.

6.8 *Fasteners:*

6.8.1 Strikes in wood frames should be installed with threaded-to-the-head wood screws of sufficient length to penetrate a structural member at least ¾ in. (19 mm).

6.8.2 Strikes in steel frames should be installed with machine screws in reinforced, drilled, and tapped holes.

6.8.3 Strikes in aluminum frames should be installed with machine screws in holes containing a steel-threaded device such as a molly jack nut.

6.8.4 Exit devices in wood doors may be installed with threaded-to-the-head screws or, for a higher level of security, with through bolts.

6.8.5 Exit devices in steel doors may be installed with machine screws in reinforced, drilled, and tapped holes, or with through bolts.

6.8.6 Exit devices in aluminum doors should be installed with through bolts.

6.8.7 Through bolts are most secure when threaded into outside trim or dummy plates.

6.8.8 Fasteners found satisfactory in field installations are described in 6.8.1 – 6.8.7. Any system demonstrated to withstand the appropriate loads described in Test Methods F476 is satisfactory.

7. Applicable Tests

7.1 Tests described in Test Methods F476 relating to locks are appropriate for exit devices and exit locks. The higher levels of performance in Test Methods F476 may be achieved with these types of locking devices but only with certain functions.

8. Keywords

8.1 exit device; exit device installation; security; security areas

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