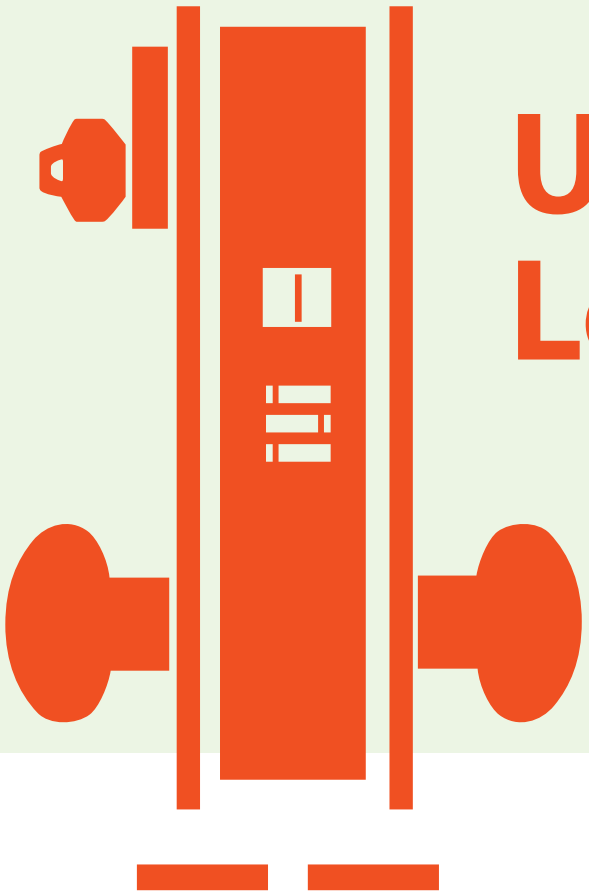


# Understanding Lock Functions

Determining which lock function is appropriate for which door can drive a specifier crazy.

By Melany Whalin, CSI

**As openings become increasingly complex,** so too are the options for securing them. A typical manufacturer's catalog can offer upwards of 50 different lock functions, making it difficult or even impossible to remember how each function works.

Determining which lock function is appropriate for each door is one of the challenges specifiers must deal with, particularly in schools where tragedies like the one at Sandy Hook have renewed controversy over how best to secure classroom doors during a lockdown event.

Fortunately, the vast majority of locks specified use one of just six mechanical lock functions. That knowledge, combined with a basic understanding of electromechanical locks and a few deadbolt functions, represents a fairly comprehensive understanding of common lock functions.

Let's begin with an overview of the most common functions for mechanical locks. Note that all of these functions allow free egress at all times.

**PASSAGE SETS** are used where doors do not need to lock. There is no key cylinder and no means to lock a passage set.

**PRIVACY SETS** are often used for single-occupant restrooms or dressing rooms. They can be locked from the inside with a thumbturn or push button/turn for privacy, and they are typically unlocked from the outside using a tool rather than a key. There are several variations on this function, including a hospital privacy, which has a thumbturn on both the inside and outside to allow hospital staff quick access to the bathroom. Some privacy functions may also incorporate an indicator to show the locked/unlocked status of the door.

**STOREROOM LOCKS** are used when the outside lever should remain locked at all times. A key is used to retract the latchbolt and open the door; when the key is removed, the door is locked on the outside. There is no ability to lock or unlock the outside knob or lever from the inside. Typical locations for a storeroom lock are secure storage

**Choosing the appropriate lock function is a vital component of maintaining the balance between life safety and security concerns.**

Photos and illustrations courtesy of Allegion

rooms, mechanical rooms, and electrical rooms that do not require panic hardware. When a storeroom lock is specified, a door closer may also be needed to ensure that the door is not left open, defeating security.

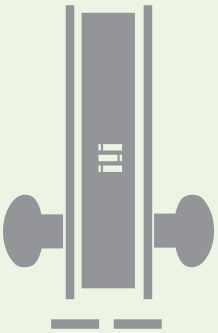
**OFFICE LOCKS** may be controlled by a key in the outside cylinder or by a thumbturn or push button/turn on the inside. The outside lever may be left in a locked or unlocked position, and the use of the thumbturn/button provides convenience to the user but may also allow an unauthorized person to control the lock. This lock should be used where unauthorized use of the lock is not a concern—perhaps an individual office or a storage closet that does not need to be secured at all times.

**CLASSROOM LOCKS** are controlled by a key in the outside cylinder, which locks or unlocks the outside lever. The lock can be left in the locked or unlocked state by using the key, and there is no means of locking or unlocking the outside knob or lever from the inside. This function was originally designed for schools to prevent students from tampering with the lock, but most new schools have classroom security locks (see below). A classroom lock might be used for a common office corridor or suite entry, where key control of the lock is needed and a thumbturn or push button/turn is not desired.

**CLASSROOM SECURITY LOCKS** allow control of the outside lever via key cylinders on both the inside and outside of the door. This allows a teacher to lock the classroom door during a lockdown event without opening the door and possibly being exposed to an intruder in the corridor. In some jurisdictions these locks are required by law or by state guidelines for school classrooms. The cylinder on the classroom side of the door does not prevent egress; it controls the outside lever and is typically keyed so that all of the inside cylinders on classroom doors are operated by the same key or by any key in the school's key system ("maison keying"). Classroom security locks are not restricted to classrooms and can be used in any location where key control of the outside lever is required from the inside of the room.

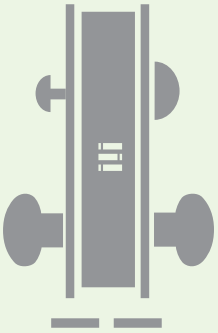
**DEADBOLTS** may be required for additional security and are typically combined in a mortise lock with one of the functions already listed or as a separate lock. If a door is part of a means of egress, it must unlatch with one operation (with some exceptions for residential dwelling units), so deadbolts are often installed on doors with push/pull hardware. One example is a door to a restroom with multiple toilet stalls, where the door would typically be push/pull (no lock) but may need to be locked if there is a plumbing problem.

Most deadbolts have a cylinder on the outside to project or retract the bolt. On the inside, there may be a thumbturn or key cylinder. If the door is in a means of egress (including the means of egress from a restroom), an occupant must be able to unlatch the door without a key, tool or special knowledge or effort, so the applications for a key cylinder on the egress side are limited.



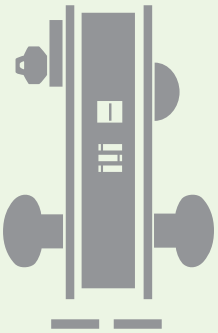
## Passage latch

Latchbolt retracted by knob/lever from either side at all times. Inside lever is always free for immediate egress.



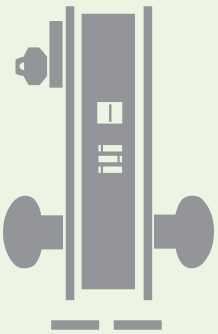
## Bath/bedroom privacy lock

Latchbolt retracted by knob/lever from either side unless outside is locked by inside thumbturn. Turning inside knob/lever or closing door unlocks outside knob/lever. To unlock from outside, remove emergency button, insert emergency thumbturn (furnished) in access hole and rotate. Inside lever is always free for immediate egress.



## Office and inner entry lock

Latchbolt retracted by knob/lever from either side unless outside is made inoperative by key outside or by turning inside thumbturn. When outside is locked, latchbolt is retracted by key outside or by knob/lever inside. Outside knob/lever remains locked until thumbturn is returned to vertical or unlocked by key. Auxillary latch deadlocks latchbolt when door is closed. Inside lever is always free for immediate egress.



## Classroom lock

Latchbolt retracted by knob/lever from either side unless outside is locked by key. Inside knob/lever always free for immediate exit. Auxillary latch deadlocks latchbolt when door is closed. Inside lever is always free for immediate egress.

A thumbturn on the inside may freely project and retract the deadbolt, or in the case of a classroom function deadbolt, the thumbturn will retract the deadbolt but will not project it.

A classroom function deadbolt prevents an unauthorized person from projecting the deadbolt to secure a room without permission but provides for safe egress by allowing the thumbturn to retract the deadbolt if someone is accidentally locked inside the room by someone projecting the bolt with a key.

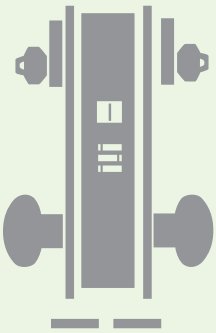
**ELECTRIFIED LOCKSETS** are among the various types of electrified products that can be used as part of an access control system. Electrified lock functions for mortise or cylindrical locks are actually fairly simple. There are two functions that are most commonly used: electrically locked (fail-safe) or electrically unlocked (fail-secure).

When electricity is applied to an electrically locked (EL) mortise lock, the outside lever is locked, but on most electrified lock functions, the inside lever always allows free egress. When electricity is removed from the lock, the outside lever is unlocked, making it fail-safe. The locking of the outside lever can also be controlled by a key that retracts the latch momentarily, but with an access control system, it's best to limit the use of keys. A fail-safe electrified lock is typically used when entry from the access side of the door is required during a fire; a stairwell door would be equipped with a fail-safe electrified lock to meet the stairwell reentry requirements. The outside lever of a fail-safe lock will be unlocked during a power failure, which affects security.

When electricity is applied to an electrically unlocked (EU) mortise lock, the outside lever is unlocked, and the inside lever always allows free egress on most functions. When electricity is removed from the lock, the outside lever is locked, making it fail-secure. The locking of the outside lever can also be controlled by a key that retracts the latch momentarily, though this should be limited for maximum control of the system. Fail-secure electrified locks are more common than fail-safe locks, as they provide security even when no power is applied. Most codes do not require the lever on the outside or access side of the door to be unlocked during a fire alarm or power failure, with the exception of stairway doors with a locked lever on the stair side.

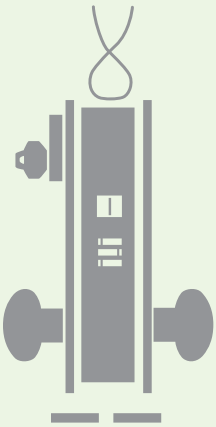
## Securing Classrooms

The National Association of State Fire Marshals (NASFM) has recently published a set of guidelines with regard to safely securing classroom



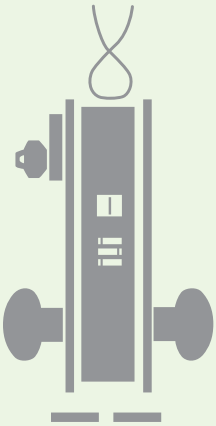
## Classroom security lock

Latchbolt retracted by knob/lever from either side unless outside is locked by key from either side. When locked, latchbolt retracted by key outside or knob/lever inside. Auxillary latch deadlocks latchbolt when door is locked. Inside lever is always free for immediate egress.



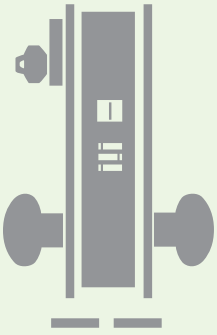
## Electrically locked (fail–safe)

Outside knob/lever continuously locked by 24V AC or DC. Latchbolt retracted by key outside or by knob/lever inside. Switch or power failures allow outside knob/lever to retract latchbolt. Auxillary latch deadlocks latchbolt when door is closed. Inside knob/lever is always free for immediate exit.



## Electrically unlocked (fail–secure)

Outside knob/lever continuously unlocked by 24V AC or DC. Latchbolt retracted by key outside or knob/lever inside. Auxillary latch deadlocks latchbolt when door is closed. Inside lever is always free for immediate egress.



## Storeroom lock

Latchbolt retracted by key outside or by knob/lever inside. Outside knob/lever is always inoperative. Auxiliary latch deadlocks latchbolt when door is closed. Inside lever is always free for immediate egress.

doors in schools. Code change proposals have been submitted by the Builders Hardware Manufacturers Association (BHMA) that would modify the model codes to require classroom doors to be lockable from inside the classroom without opening the door, as well as requiring a means of unlocking the door from the ingress side for staff or emergency responder access.

The NASFM guidelines and BHMA code change proposals do not state specifically how the locking of classroom doors is to be accomplished, which gives schools some degree of flexibility, although there are current model code requirements addressing free egress, fire protection, and accessibility that must be followed if these codes have been adopted by the state or local jurisdiction.

There are several lock functions that may be used in schools, each of which is compliant with current codes and allows authorized access by staff and emergency responders. However, there are pros and cons to each function.

### Classroom Security Function

This lock allows a teacher to lock the outside lever without opening the door by inserting a key in the key cylinder on the inside lever. The inside lever always allows free egress. An indicator can be supplied as an integral part of the lock, which will help teachers confirm that the lock has been put into lockdown.

- **PROS:** The outside lever can be locked from within the classroom only by a staff member with a key. Unauthorized people will not be able to lock the classroom door if they don't have access to the key.
- **CONS:** Use of the key to initiate a lockdown requires a staff member to find the key, insert it in the lock, and turn it in the right direction. This can be difficult during an emergency situation, as fine-motor skills may be compromised. If school staff have not repeatedly practiced locking the door with the key, they may be confused about how to lock the door or whether the door is actually locked. An indicator can help to overcome that uncertainty, and procedures for distribution and possession of keys as well as drills and practice will result in more efficient lockdowns.

### Entrance/Office Function

The outside lever is locked by turning a thumbturn or pushing a button on the inside lever. The inside lever always allows free egress.

- **PROS:** It is easy to lock the outside lever without opening the door.
- **CONS:** Anyone is able to lock the door, including someone who may want to secure a classroom to commit an assault, theft, vandalism or other crime. If this lock function is used, staff should carry keys to unlock the door from the outside in case of unauthorized lockdown.

### Storeroom or Standard Classroom Function

A storeroom function always requires a key to retract the latch and enter the room. A classroom lock can be locked or unlocked using a key in the outside lever. For both functions, the inside lever always allows free egress. Many schools have existing classroom locks, and some have instituted a policy in which the classroom is kept locked at all times, making it perform similar to a storeroom function lock.

- **PROS:** Often for budgetary reasons, existing locks may be kept in the locked position at all times. If the door is closed, the door is locked.
- **CONS:** This can be inconvenient if the door is kept closed and students need to enter the room after class begins. In the case of classroom locks that could be left unlocked, procedures must be followed to ensure that the outside lever is always kept locked.

### Electronic Classroom Lock

Pressing a button on a fob worn by staff members can lock the door. Some locks can be locked remotely or as a system-wide lockdown. The inside lever always allows free egress.

- **PROS:** The use of the fob removes the concern about the fine-motor skills necessary for inserting and turning a key but does require staff to wear the fob. Lockdown cannot be initiated by an unauthorized person who is not in possession of the fob.
- **CONS:** The cost of replacing existing locks with an electronic product may not be feasible for all facilities.

## Conclusion

Choosing the appropriate lock function is a vital component of maintaining the balance between life safety and security concerns. If you find yourself unsure as to which of the many options is the right choice for a specific application or if a project requires a different lock function, talk to a door hardware consultant before making a selection.

**MELANY WHALIN, CSI,** is a marketing manager at Allegion, working to educate the architectural community on security, door hardware and access control. For help with code compliance and product application, explore idighardware.com, where you can ask specific questions using the Help button.