

Door Locking Options in Schools

National Clearinghouse for Educational Facilities

Doors as Means of Egress

Doors serve a variety of needs and purposes in schools:

- **Exterior doors** provide building security and protection from the elements.
- **Interior doors** control the movement of people among school spaces, help control noise and air flow, and act as flame and smoke barriers during a fire. In a lockdown, they serve as safety barriers.

From a security perspective, the most important function of a door is to **control entry**. Entry control involves the configuration, strength, durability, and composition of the door, its hinges and its frame, and the control and effectiveness of its latching and locking hardware.

From the standpoint of fire safety, however, a door's **exit function** is the ruling factor, one that is highly regulated by building and fire codes that classify doors as part of a building's **means of egress**.

Means of egress is defined as “a continuous and unobstructed way of travel from any point in a building or structure to a public way”¹ — that is, it is the unobstructed route from inside every school classroom or space to outside the building. An **egress door** is any door along this egress route.

In occupied buildings, egress doors can prevent entry but they can *never* prevent exit. This iron-clad rule is the product of over a century of fire safety regulation, molded by numerous tragic and sometimes horrendous building fires, and refined by decades of research and experience. Its success is evidenced by the fact that fire deaths in schools are rare.²

Egress doors are regulated by the following building and fire code provisions:

International Building Code (IBC), 2006 edition, and the International Fire Code (IFC), 2006 Edition:³

- Section 1008.1.8. Egress doors shall be readily openable from the egress side without the use of a key or special knowledge or effort.

National Fire Protection Association's Life Safety Code (NFPA 101), 2006 edition:⁴

- Section 7.2.1.5.1. Doors shall be arranged to open readily from the egress side whenever the building is occupied.
- Section 7.2.1.5.2. Locks, if provided, shall not require the use of a key, a tool, or special knowledge or effort for operation from the egress side.
- Section 7.2.1.5.6. Key operation shall be permitted, provided that the key cannot be removed when the door is locked from the side from which egress is to be made (per Sections 14.2.2.2.3 and 15.2.2.2.3, *New and Existing Educational Occupancies*).

In addition to these requirements, fire and safety regulations mandate that doors in spaces that can be occupied by more than 50 people (usually 1000 square feet) must be equipped with panic bars.⁵ This applies to any large space in a school, and to the school itself.

Exterior Doors

The need for unrestricted egress to the outside poses problems for all building types, but especially schools because it makes it easy for students to let others inside. There are many stories about school staff illegally chaining exit doors shut to keep out strangers and contraband. As dangerous as this practice is, one can empathize with school administrators trying to balance competing safety concerns.

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Prepared under a grant from the U.S. Department of Education, Office of Safe and Drug-Free Schools

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For schools with automatic sprinkler systems, a partial solution to this problem is the use of **delayed egress locks** that sound an alarm when panic bars are pushed and delay door opening for up to 15 seconds.⁶

Most schools do not have sprinklers, however, so this solution has limited application. In addition, the time delay may be detrimental in situations where a very rapid exit is necessary.

Access-controlled egress doors are permitted in all schools.⁷ Their latches can be electronically controlled from the reception area or school office. Such doors must be readily opened by a push from the inside and meet a number of other safety requirements. They cannot include delayed egress locks, but otherwise may be installed in virtually any school. Supplemented by an intercom, and by a security camera when the entry is not visible from the reception area, they are an excellent entry control device.

Electronically-controlled keyless door locks are available as hard-wired (usually networked) and wireless, stand-alone models. The latter can cost considerably less when retrofitting. Hard-wired models, however, are superior when it comes to instantaneously canceling access or otherwise reprogramming doors. Wireless models have to be reprogrammed individually, either manually or by using portable electronic devices that download information at each door. In either case, their controls can be based on anything from push-button codes to proximity cards, biometric readers, or any combination of entry methods desired. In both cases, access can be time- and date-stamped to track who enters the building, and can be programmed to limit access to defined days and hours, customized for each access card or code.

In many schools, older model panic exit hardware is being replaced by **flush push bar** hardware that cannot be chained shut.

Classroom Doors

For decades, **classroom function** locksets have been standard for classroom doors. A key cylinder is located on the outside of the door. When the door is locked, no one can enter the classroom, but those inside the classroom can exit unimpeded.

If the door is unlocked and a school lockdown occurs, however, the teacher must open the door, step into the hallway, lock the door, step back inside the classroom, and close the door — a time-consuming process with a potentially dangerous exposure. One way around this dilemma is to keep the door latch “locked” at all times, whether the door is open or closed. But this allows students in unsupervised classrooms to lock others out, simply by shutting the door.

Newer **classroom security function** locksets add a key cylinder to the classroom side of the door so the door can be locked without leaving the room. These locksets are designated by their American National Standards Institute (ANSI) specification, F88.⁸ Their lever-handled version is ADA compliant. Replacement ANSI F88 locksets can be installed for several hundred dollars per door.

Thousands of schools located in mild climates have classrooms that open directly to the outdoors, as do portable classrooms in all climates. Their doors can be upgraded with **exterior grade** ANSI F88 locksets.

Summary

- **Any means used prevent exiting through a door on the egress path when the school is occupied is unsafe and strictly illegal.**
- **Access-controlled egress doors** at the building entrance, used in conjunction with an intercom and, if needed, a security camera, allow visitors to be screened before being “buzzed in.”
- **Delayed egress locks** may be used in schools with automatic sprinklers.
- Interior doors may be more rapidly locked down, and made ADA-compliant, by upgrading them with lever-handled **ANSI F88 locksets**.
- Consider replacing older model panic exit hardware with **flush push bar** hardware that cannot be chained shut.
- Whenever door handles, latches, or locks are changed, check with local fire officials to ensure they meet building and fire safety regulations.
- A description of the many different and sometimes conflicting door functions associated with school safety and security is provided on the following table:

Safety- and Security-Related Functions of School Doors

HAZARD	ENTRY FUNCTION	EXIT FUNCTION	NOTES
Hurricanes	--	--	Schools are evacuated prior to hurricanes. When a school is used as community shelter during a hurricane, its exterior doors must be able to withstand strong wind forces.
Tornados and high winds	--	--	Interior doors must allow the rapid movement of occupants to areas of refuge. Exterior doors must be able to withstand strong wind forces.
Floods	--	--	Schools are evacuated prior to or early on in a flood, so there are no special requirements for doors. Schools that survive floods are sometimes used as post-flood community shelters, but there are no special requirements for doors.
Earthquakes	--	--	Occupants are sheltered-in-place until major shocks have passed, then the school is evacuated. Schools that survive earthquakes are sometimes used as post-earthquake community shelters, but there are no special requirements for doors.
Fires	Allow entry of fire and rescue personnel.	Allow direct, unimpeded occupant egress to the exterior from all occupied spaces, at all times.	Interior doors are critical for preventing the spread of flames, heat, and smoke during a fire by acting as barriers between spaces.
Tripping and falling accidents	--	--	Doors must be wide enough to prevent crowding and consequent tripping and falling.
Vandalism and theft	Prevent unauthorized entry into the school and designated spaces within it.	Slow or prevent the exit of unauthorized people within the school if police are called.	
Bullying, fighting, drug use, and other disruptive or problematic behavior	Prevent students from entering unsupervised or unauthorized spaces. Allow rapid entry of school staff when problems arise.	Prevent students from barricading themselves in unauthorized or unsupervised spaces.	Doors must be wide enough to prevent crowding and consequent shoving and fighting.
Shootings and other forms of extreme violence	Prevent entry of dangerous people and goods into the school and into occupied spaces within it. Facilitate rapid lockdowns. Allow rapid entry of police and rescue personnel.	Prevent perpetrators from barricading themselves in a classroom or other space, particularly if holding hostages.	Classroom doors can act as a shield, protecting those inside the classroom from violent behavior outside.
CBR (chemical, biological, or radiological) accidents or attacks			Exterior doors help prevent contaminated outside air from entering the school. Interior doors help prevent the spread of contaminants within the school.

Additional Information

- *School Safety: Hardware Choices for Safety and Security*. Dean S. Carl. Doors and Hardware magazine. August 1999.
<http://www.allbusiness.com/fabricated-metal-product-manufacturing/architectural/294444-1.html>.
- *Understanding the Basics of School Locking Hardware*. T.J. Gottwalt. Doors and Hardware magazine. October 2003.
http://goliath.ecnext.com/coms2/qi_0199-1182919/Understanding-the-basics-of-school.html
- *Belleview School District Centralizes Access Control*. Doors and Hardware magazine. December 2008.
<http://www.entrepreneur.com/tradejournals/article/191961913.html>
- Visit the Door and Hardware Institute at www.dhi.org and its associated Foundation for the Advancement of Life Safety and Security at <http://www.lifesafetyandsecurity.org>.

California Department of Education Recommendations

The following is excerpted from *Safety and Security* by the California Department of Education, School Safety and Violence Prevention Office, 2002, pages 5-7,
http://web.archive.org/web/20040331234412/http://www.cde.ca.gov/c/hallenge/tk_pdf/sf2.pdf

Entrances, doors, and controlled access to campuses

- Building access requirements should be carefully evaluated. The fewer doors—especially those equipped with locksets—the fewer security problems that could arise. Doors that are key-controlled should be equipped with contacts for alarm installation purposes.
- Exterior exit doors do not need handles and locks on the outside.
- Doors should be constructed of steel, aluminum alloy, or solid-core hardwood. If necessary, glass doors should be fully framed and equipped with burglar-resistant tempered glass.
- Double doors should be secured with heavy-duty, multiple-point, long flush bolts.
- All exit doors with panic push-bars should also be equipped with deadbolt locks to prevent easy exit by criminals or vandals.
- There should be no recessed doorways.
- Interior doors should be equipped to prevent criminals or vandals from locking hall doors from inside a classroom or office in order to slow down security officers' pursuit.
- Door hinges should have non-removable pins to prevent burglaries.
- Locks should be placed on all doors to high-risk areas, such as computer labs.
- There should be no surface-mounted locks or locks having knob-mounted key access.
- Exterior doors should have as little exposed hardware as possible.
- If lever handles are required, recurve handles can be used or pulls can be installed that are designed to reduce access by persons using pry-bars.
- Door frames should be constructed of pry-proof metal.
- There are newer squeeze-bar units, referred to as "panic hardware," which have no exposed bar to pry or bend. These units should be the flush-mounted push type. Panic bars should be protected by "pick plates," easily installed door security devices that can prevent tools and plastic cards from releasing the bolt.

- Heavy-duty mullions (vertical strips dividing panes or windows) or astragals (narrow moldings) can be used on the inside of double doors.
- Exterior swinging doors should have a minimum 1-inch deadbolt lock with a 1-inch throw bolt with a hardened steel insert, a free-turning steel or brass tapered guard, and double cylinder locks if glass is located within 40 inches of the locking mechanism.
- The armored strike plate should be securely fastened to the door frame in direct alignment to receive the latch easily.
- Attractive, sturdy kick plates can be used to minimize damage to doors.
- Heavy-duty metal or solid-core wooden doors should be used at entrances to areas containing expensive items. These areas include classrooms, storerooms, and custodians' rooms. Interior doorway doors should also be heavy-duty metal or solid-core wooden doors.

Endnotes

¹ See Section 3.3.151 of the 2006 NFPA 101. Sections 1002.1 of the 2006 IBC and IFC are similar.

² From *School Fires*, Topical Fire Research Series, Vol. 8, Issue 1, U.S. Department of Homeland Security, Washington, D.C., August 2007. For the three-year period 2003-2004-2005, the National Fire Incident Reporting System (NFIRS) database reports that the yearly national fire loss for fires on non-adult school properties is estimated to be \$85 million. Such losses are the result of an estimated annual average of 14,700 fires that required a fire department response. Fires on school properties caused an average of approximately 100 injuries. No fatalities were reported to NFIRS during this three-year period. Forty percent of school-related fires occurred outdoors on school property. Trash fires accounted for 36 percent of outside fires, and fires in open fields or woods accounted for an additional 19 percent. Forty-three percent of fires on school properties, an estimated 6,300 fires, were fires within buildings. Slightly over half of these were confined to the object where the fire started, such as a small cooking fire (20 percent) or a fire confined to a trash can (28 percent). Six percent of fires on school properties were vehicle fires.

³ See <http://www.iccsafe.org/e/category.html>

⁴ See <http://www.nfpa.org/index.asp>

⁵ Technically, "panic and fire exit hardware." See Section 1008.1.9 of the 2006 IBC and IFC. Sections 14.2.2.2 and 15.2.2.2 of the 2006 NFPA 101 allow up to 100 people.

⁶ Allowable delay time varies. See Section 1008.1.8.6 of the 2006 IBC and IFC, and Section 7.2.1.6.1 of the 2006 NFPA 101. Some areas may waive the sprinkler requirement.

⁷ See Section 1008.1.3.4 of the 2006 IBC and IFC, and Section 7.2.1.6.2 of the 2006 NFPA 101.

⁸ See <http://www.ansi.org>

Publication Notes

First published August 2008; updated March 2009.