

EXIT HARDWARE AND ALARMS

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Doors Are Also for Getting Out

As your child leaves school, as your parents leave the hospital, and as you leave a theater, all of you activate some type of exit hardware. As long as you are just leaving these buildings, the exit hardware is simply convenient.

However, if you are a disabled person, it may be one reason you can be in the building at all. As you leave, the door opens easily and it closes itself. In the case of an emergency, the exit hardware on those doors could save your life. It has been designed with that in mind, as you'll learn in this lesson. This lesson will help you appreciate doors as exits.



Local building codes, National Fire Protection Association (NFPA) Life Safety Codes, and the American Disabilities Act (ADA) all govern the installation and repair of exit hardware. You learned a lot about the ADA and fire codes in Lesson 8. Now you'll learn more that will help you to provide and maintain safe exits for your customers.

You'll also learn about other basics of exit hardware. You've been introduced to hand of door. Now you'll learn all the various hand-of-door positions. You'll learn about the questions you should ask yourself to select the right exit hardware.

With exit hardware, you'll be working with both single and double doors. This lesson introduces you to the hardware you'll need for both. In addition, we'll address some specific situations and how you can handle them.

You'll run into some strange words in this lesson, such as astragal and mullion. But by the end, they won't be strange. In fact, you'll be on your way to being an expert in the meaning of the words and the use of the hardware!

Pay attention to the types of exit doors we introduce in this lesson. See if you can remember any you have ever walked through that are not covered here. As you go about your daily life from now on, pay attention to the doors you go through. What kind of exit hardware do you observe? Can you identify any security devices on the reverse double doors you use? Do you notice any local alarms? Are they added to an existing lock or is the lock an exit alarm type?

By involving yourself in this aspect of Locksmithing, you are assuming the responsibility of providing, installing, and maintaining exit hardware for your customers. It's a real responsibility. You won't just be making life easier for your customers and their employees, clients, or students. You'll be making life safer!

Objectives

When you have completed this lesson, you should be able to

- ☞ List the five basic things you must know about a door before you install or repair exit hardware for that door.
- ☞ Recognize various hand-of-door positions.
- ☞ List and explain the three rules you must follow when installing or repairing exit hardware on a fire door.
- ☞ Identify two examples of accident hazard exit hardware.
- ☞ List the five criteria you should consider when selecting an exit device.
- ☞ Describe the four basic types of exit devices.
- ☞ Name the exit device that is the most popular and considered the most secure for single doors.
- ☞ Describe the three types of auxiliary exit hardware most commonly used on double doors.
- ☞ Identify standard door applications for double doors.
- ☞ Describe four security devices for reverse double doors.
- ☞ Describe the checks you should make before installing a local alarm.
- ☞ List two types of alarms for doors without existing locks.



Main Ideas

1. Exit Hardware Basics
2. Selection Criteria
3. Applications
4. Application Issues
5. Local Alarms and Their Applications

Exit Hardware Basics

As a professional locksmith, you must know a lot about installing, repairing, and maintaining door hardware. But that is not enough if you are to be a truly professional locksmith. You must also know a lot about doors. When you install or repair exit hardware, you must know five basic things about the door.

1. How the door is hung
2. The hand of the door
3. Whether it is a fire door
4. Whether the door requires accident hazard hardware
5. The applicable legal requirements

How Is the Door Hung?

You may never hang a door for a customer. However, knowing how a door is hung may help you determine why the door hardware does not operate properly. You learned about that in Lesson 7: Lock Servicing. Knowing how a door is hung can also help you to open it when a key is lost or broken. You learned about that in Lesson 9: Professional Opening Techniques.

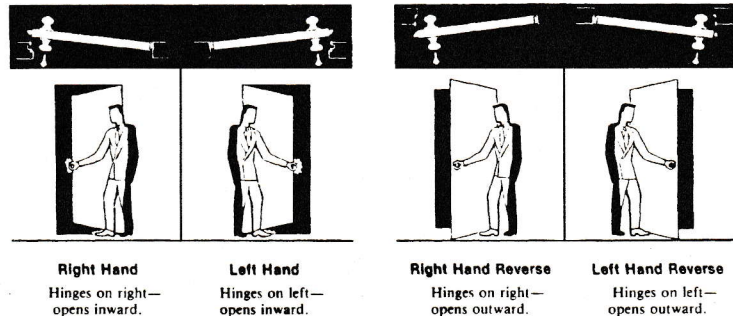
What Is the Hand of Door?

You need to know about **hand of door**, or how a door swings. Stand on the locked (outside) side of the door. If the door swings to the right when it is opened, it is a right-hand door. If it swings to the left when opened, it is a left-hand door. Study the drawing below to understand hand of door.



Hand of Door—The direction a door swings

Hand of Door



(courtesy of Anderson Lock Co.)



Reversed Door—A door that swings out toward the locked side

If the door swings out toward you when it is opened, it is called a **reversed door**. So a door swinging out and to the left is a left-handed, reverse door.

You will install exit hardware on reverse doors. Why is that? When exiting a public building or a business, you don't want folks having to stop and think about which way the door opens or how the exit hardware works. And in the case of an emergency, you want them to get out. With people pushing to get out and crowding around the doors, it would be impossible to pull the door to you. The only way to open the door would be to push it out.

For public safety, codes have been developed that require public and business building exit doors to be reverse doors. All exit hardware you install must facilitate safe exiting.

In fact, you'll find the requirements for exit hardware in the National Fire Protection Association Life Safety Codes (NFPA 101).

Local codes also may require that any door with an exit sign, illuminated or not, is an exit door. All hardware on exit doors also must conform to local codes. We'll discuss more about codes later in this section.

Is It a Fire Door?



Fire Door—A door with a label or sticker that corresponds to a label or sticker on the door frame telling you what type of hardware must be installed on the door to protect the fire-rating on the door

If you install or repair exit hardware on a **fire door**, that door will be labeled to indicate it is a fire door. You must follow the three rules listed below or

- you may invalidate the fire-rating of the door and
- you may find yourself legally liable should an injury occur that is related to the operation of the door.

1. You must take great care to install the correct hardware correctly.



Fire-Rated Hardware—Hardware that has received a fire-rated approval from a qualified agency after withstanding various fire tests

If a door is labeled a fire door, you must use **fire-rated hardware**. Fire-rated hardware usually has an Underwriter's Laboratories (UL) sticker attached. However, Underwriter's Laboratories is only one of many testing agencies. Be sure to look for the fire-rating sticker on the hardware, whatever the agency. You also can obtain fire-rating approval specifications from lockset manufacturers.

When you replace hardware on a fire door, you must conform to what the door is prepared for. You may upgrade the rating of your hardware, but you may not downgrade. And never change the configuration of the hardware.

The exit hardware on fire labeled doors must not allow the door to remain open manually. Exit hardware for fire doors must be able to latch freely at all times in order to protect the area from fire and smoke.

2. You must not install more hardware than what is allowed by the door manufacturer.

Fire doors usually come to the building or job site with pre-drilled holes to accept either a knob lock or a mortise lock. You can drill the cylinder hole to accept the type of mortise lock you are using. However, *you may not add other hardware*. For example, you may not add a door viewer (peephole) unless the door is prepped for that application.

This is a very important issue. If you do anything to a door that it is not set up to accept, then you void the manufacturer's warranty. If anyone should be injured due to the failure of the door to perform properly, *you will be held legally responsible. Even if the owner signs a release*, you will be held liable in the event of a mishap involving the door and its function.

3. You must not remove or paint over the label on the door or on the door frame.

Does the Door Require Accident Hazard Exit Hardware?



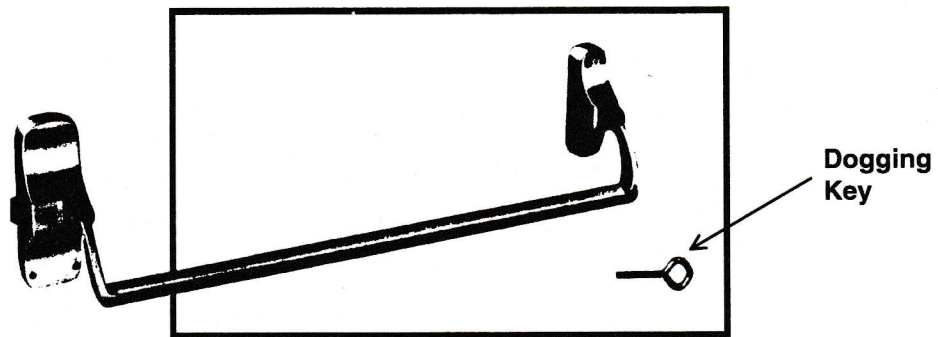
Accident Hazard Hardware—
Locking device that uses a touch
bar or cross bar and can be left
open manually

If it is not a fire door but is an exit door that must conform to the building safety code, it does require **accident hazard exit hardware**.

As with fire doors, the exit hardware must provide the ability to leave the building freely and easily, especially in an emergency situation. Folks must not be required to think about how to open the door.

However, the latching and cycle test requirements are not as strict as they are for fire doors. Two examples of accident hazard exit hardware are the crossbar and the touchbar.

Crossbar Exit Device



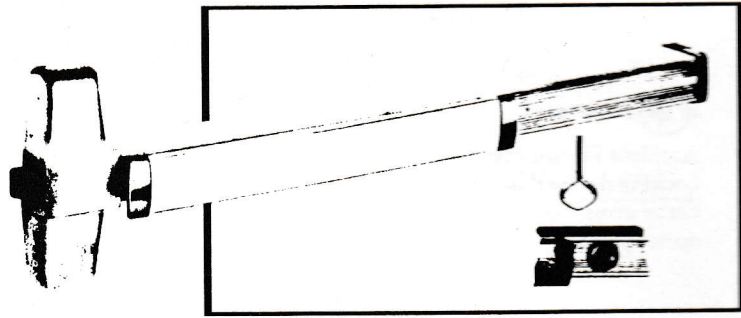
(courtesy of Von Duprin)



Dog—A small device that holds
or grips a catch

If you retract the latch on a crossbar exit device and hold it down with a **dog**, you have an accident hazard hardware device. The crossbar exit pictured above uses a dogging screw that is operated by a dogging key.

Dogging down a door is an application or function that lets the latch of an exit device be retracted continuously for long periods of time. For example, the front door of a building may be left open all day long using a dogging device. You may not use this type of hardware on a fire-labeled door.

Touchbar Exit Device

(courtesy of Von Duprin)

The touchbar exit device is also an accident hazard hardware device. It can be dogged down with either a dogging key or a cylinder. A cylinder provides additional security because a key is required to dog down the exit device.

You may have to explain to your local authority having jurisdiction (AHJ) how the inside cylinder works, so they do not issue a violation for having a double cylinder lock in place.

The touchbar exit device has two advantages over the crossbar exit device.

1. It requires less maintenance.
2. When you have a pair of doors, it prevents chaining the doors together from the inside.

What Legal Requirements Apply?

As a locksmith who installs and repairs exit hardware you must know about

- your local building codes and fire codes that apply to door hardware.
- the National Fire Protections Association (NFPA) Codes.
- the Americans with Disabilities Act (ADA).

You can find out about your local building codes and fire codes that apply to door hardware by contacting your local and state authorities.

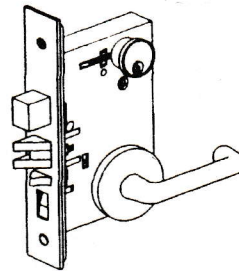
NFPA 101 deals with the Life Safety Codes. NFPA 80 deals with fire doors and fire windows. And NFPA 70 covers electrical codes. Knowing the electrical codes will be a big advantage for certain applications. The codes tell you how the job must be done and who is authorized to perform the work. You can find out NFPA codes by contacting the NFPA.

You learned a lot about fire-rated locksets in Lesson 8: Lockset Functions, Finishes, and Requirements. You may want to review the Requirements section of that lesson now.

When you that section of Lesson 8 now, you'll find information about the Americans with Disabilities Act (ADA). Read that information along with the information below to prepare yourself for installing exit hardware that conforms with the ADA.

The Americans With Disabilities Act... The door opens to new compliance requirements.

The *Americans With Disabilities Act* was signed into law on July 26, 1990. This new federal law will have implications on the application of door hardware products as they are specified by architects and door hardware professionals. As a manufacturer of a full line of life safety and security products, Corbin Architectural Hardware wants to help in the understanding of this law. This summary relates directly to the application and compliance of Locksets, Exit Devices, Door Controls and other door operating devices as referenced in the *Americans With Disabilities Act* and in the American National Standards Institute (ANSI) A117.1.



Mortise Lockset
CORBIN 9500/9700 Series

What buildings need to be in compliance?

New public accommodations and commercial facilities built for occupancy after January 26, 1993, must be accessible to individuals with disabilities, including those using wheelchairs.

Alterations made to existing public accommodations and commercial facilities after January 26, 1992, must be made to render the facilities readily accessible to and usable by individuals with disabilities, including those who use wheelchairs, to the maximum extent possible.

Commercial Facilities:

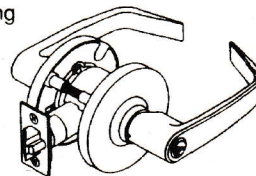
Number of Employees:

More than 25	Compliance by January 26, 1992
Between 10 and 25	Compliance by July 26, 1992
Less than 10	Compliance by January 26, 1993

Summary of requirements:

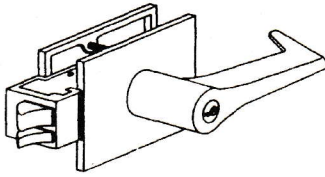
Locksets/Exit devices

Handles, pulls, latches, locks and other operating devices on accessible doors shall have a shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist to operate. Lever operated mechanisms, push type mechanisms and U-shaped handles are acceptable designs. Doors to hazardous areas shall have hardware complying with Tactile Warnings.



Heavy Duty Lever Lockset
CORBIN 800 Series

(courtesy of Corbin Russwin)



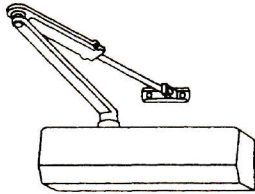
Unit Lockset
CORBIN 300 Series

Tactile warnings

Doors to hazardous areas that might prove dangerous to a blind person (i.e. doors to loading platforms, boiler rooms) shall be made identifiable to the touch by a textured surface on the door handle, pull or other operating hardware. This textured surface may be made by knurling or roughening or by a material applied to the contact surface. Such textured surfaces shall not be provided for emergency exit doors or any doors other than those to hazardous areas.

Door Closers

If a door has a closer, the sweep period of the closer shall be adjusted so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3" (75mm) from the latch, measured to the leading edge of the door.



Door Closer
CORBIN 120 Series

Door opening force

The maximum force for pushing or pulling open a door shall be as follows:

- Fire doors shall have the minimum opening force allowable by the appropriate administrative authority.

Other doors

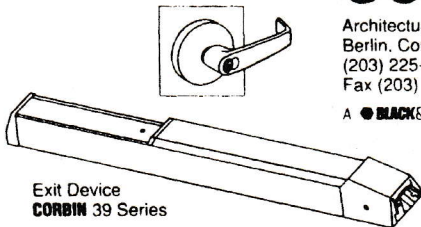
- Exterior hinged doors shall not exceed 8.5 lbs. opening force. In high-rise buildings, air pressure differentials may require a modification of this specification in order to meet the functional intent.
- Interior hinged doors shall not exceed 5 lbs. opening force.

Contact us for more information regarding Corbin Locksets, Exit Devices, Door Controls, Key Systems and Accessories that are in compliance with the *Americans with Disabilities Act*.

CORBIN

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Fax (203) 828-7266

A ● BLACK & DECKER COMPANY

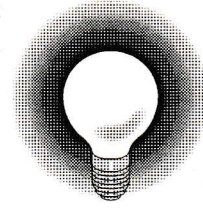


Exit Device
CORBIN 39 Series

(courtesy of Corbin Russwin)

Organize the Main Ideas

This outline will help you organize the information in this section of the lesson. Read through the outline and jot down what you remember about each of the topics listed. If you can't remember details related to one or more of the topics, you may wish to reread the text before you go on.



1. Exit Hardware Basics

a. How Is the Door Hung?

b. What Is the Hand of Door?

c. Is It a Fire Door?

1) You must take great care to install the correct hardware correctly.

2) You must not install more hardware than what is allowed by the door manufacturer.

3) You must not remove or paint over the label on the door or on the door frame.

d. Does the Door Require Accident Hazard Exit Hardware?

e. What Legal Requirements Apply?

Check Your Knowledge 1



This quiz will help you check what you've learned in this section of the lesson. Read through the questions and jot down your answers. Then check those against the suggested answers at the end of this lesson. If your answers differ greatly from the suggested answers, you may wish to reread the text before you go on.

1. List the five things you must know about a door before you install or repair exit hardware.
2. A door is a right-hand door if it hinges on the _____ and opens _____. (Fill in the blanks.)
3. A door is a left-hand door if it hinges on the _____ and opens _____. (Fill in the blanks.)
4. If the door swings out toward you when it is opened, it is called a _____ door. (Fill in the blank.)
5. If a door is labeled a fire door, you must use _____ hardware. (Fill in the blank.)
6. When you replace hardware on a fire door, you may downgrade the rating of your hardware and change the configuration of the hardware. (True or False?)
7. When repairing or installing a fire door, you may not add hardware additional to that provided by the manufacturer even if the owner signs a release. (True or False?)
8. Once you have completed your installation or repair on a fire door, you may paint over or remove the label on the door or on the door frame. (True or False?)
9. List two examples of accident hazard exit hardware.

Selection Criteria

You should always base the selection of an exit device on the five criteria listed below.

1. Is it a fire door?
2. What is the design of the door?
3. What is the opening measurement?
4. What is the door width and height?
5. What is the design of available devices?

1. Is It a Fire Door?

Once again we cannot stress enough the importance of using an approved fire device for fire-labeled doors and frames.

2. What Is the Design of the Door?

Door design includes

- the width of the entire door and
- door styles.

Some wide doors may not accommodate a touch bar device. Some very narrow doors require non-standard devices. You'll often find very narrow wood or metal doors with glass installations. In the case of decorative trims that cannot be altered, you may need to use a crossbar or install raised pads to accommodate a touchbar.

3. What Is the Opening Measurement?

The opening measurement is the clearance from the device to the door stop when the door is open. The ADA requires a minimum door opening of 32" measured from the door stop to the face of the door (or protruding lock trim) at a 90-degree angle. Because of this restriction, many crossbar devices could become obsolete. A touchpad device may be a better choice in any case.

4. What Is the Door Width and Height?

Exit hardware must cover the width of the door to at least the minimum standards of that door design or your code requirements. The height of the door is critical when using surface vertical rods or concealed vertical rods. Some devices have height limits, and you must be aware of them.

5. What Is the Design of Available Devices?

The four basic types of exit devices are

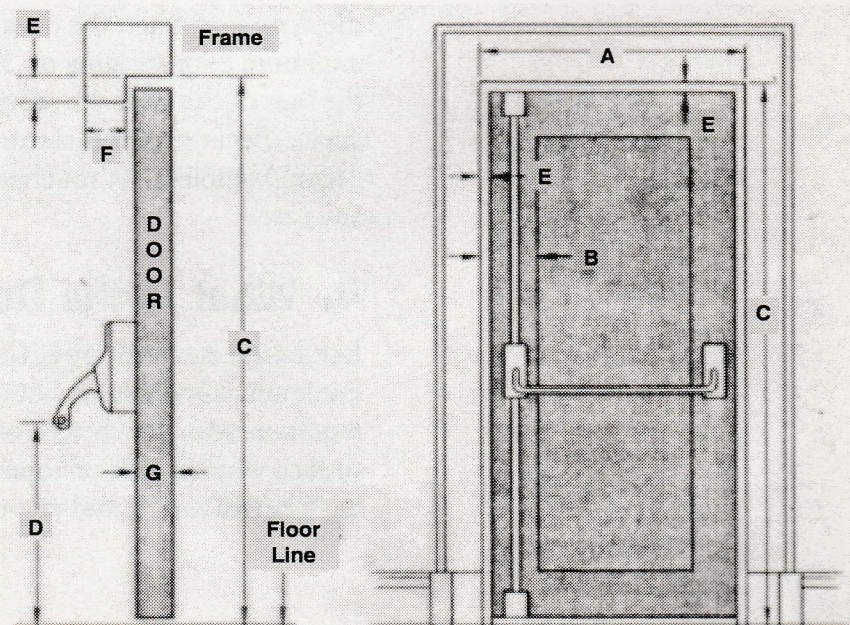
- rim,
- mortise,
- surface vertical rods, and
- concealed vertical rods.

The designs of these devices will determine which is right for the job. Rim exit devices are surface applied and have a single latching point. A mortise exit device functions exactly like a regular mortise lock, except it has either a touchbar or crossbar attached. Surface vertical rods are mounted on the surface of the door with top and bottom latching. Concealed vertical rods are mounted in a cavity of the door with top and bottom latching.

Criteria for Non-Standard Devices

When smaller or larger than normal doors are required, you must specify the door detail dimensions listed below.

- A. Door Width
- B. Width of Stile
- C. Door Height
- D. Height of Crossbar from floor to center of bar (required for vertical rod devices only), if other than 37"
- E. Thickness of Stop
- F. Thickness of Door, if other than 1:"



(courtesy of Corbin Russwin)

Applications

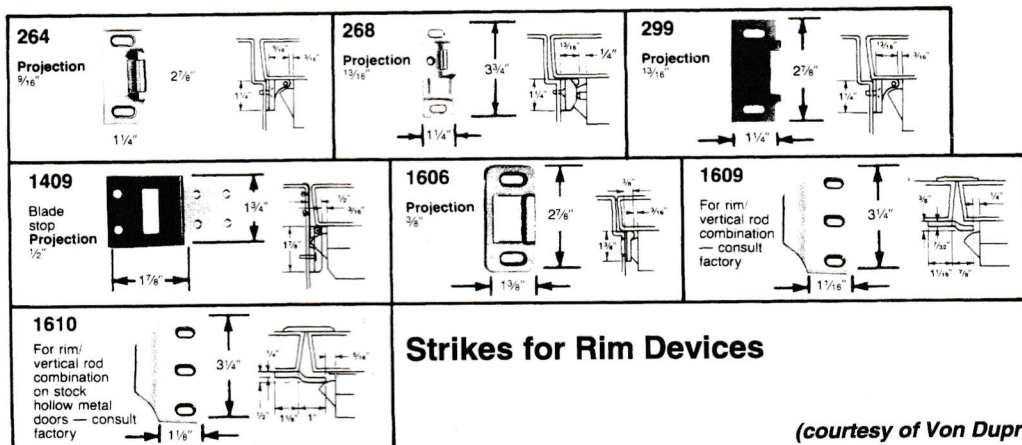
When considering exit device applications, your main focus will be on whether you are dealing with a single door or a double door.

Single Doors

Single-door applications are generally the easiest to deal with. All four types of exit devices work on a single door. Do you remember what those types are? If not, look back to the last section and find out!

In a single-door application, the rim type is by far the most popular application. And by industry standards, it's the most secure. The strike is on the door stop either as a cup in a pre-formed jam or a surface roller strike that you install.

When using a surface-mounted strike, many locksmith professionals prefer those that secure with three screws, allowing for adjustment. In addition, having the latching of the device recessed and behind the door provides the most security.



(courtesy of Von Duprin)

Double Doors

When considering double-door applications, you need to know more about auxiliary hardware than with single doors. All four types of exit hardware also work with double doors. However, the auxiliary hardware determines which type works best, or even at all. The three types of auxiliary hardware commonly used on double doors are

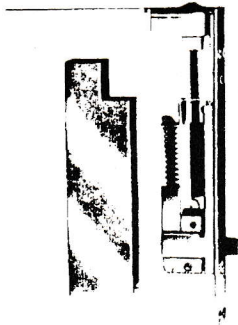
- flush bolts,
- automatic door coordinators, and
- astragals.

Flush Bolts

With some double doors, one door is used while the second is rendered inactive. The inactive door usually is secured by flush bolts that are either manually or automatically activated. The automatic flush bolts require periodic lubrication and occasional adjustment.

Whenever you use flush bolts, abuse or neglect when activating or deactivating the inactive door can lead to a bent rod. This is the most common problem with flush bolts and can happen with both automatic and manual types. You can replace a bent rod with thread of the appropriate size. Your local hardware stores likely carry rods of varying sizes.

**291D-
Automatic
for Wood Covered
Composite Doors**



**292D-
Automatic
for Metal Door**



**294D-
for Wood Covered
Composite Doors
Set Consisting of
1 Self-Latching and
1 Automatic**



**293D-
for Metal Doors
Set Consisting of
1 Self-Latching and
1 Automatic**

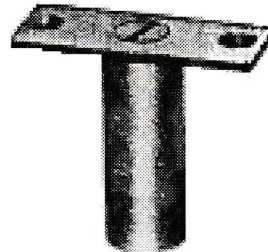


AUTOMATIC

(courtesy of Hager Hinges)

Flush bolts may use either a cup or a dust-proof strike on the recessed hole for the bolt. Due to door settling, this hole may need to be cleaned or filed open. This is the second most common problem with flush bolts. Cleaning of the bottom strike hole is something that people do not always think of.

**280X
Dust Proof Strike**



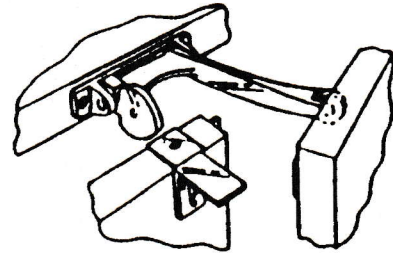
(courtesy of Hager Hinges)

Automatic Door Coordinators

Double doors with one active and one inactive door and with automatic flush bolts often use an automatic door coordinator. There are two types of door coordinators.

The first is a gravity device. You usually install it in the header of the door frame. It prevents the active door from closing until the inactive door is closed.

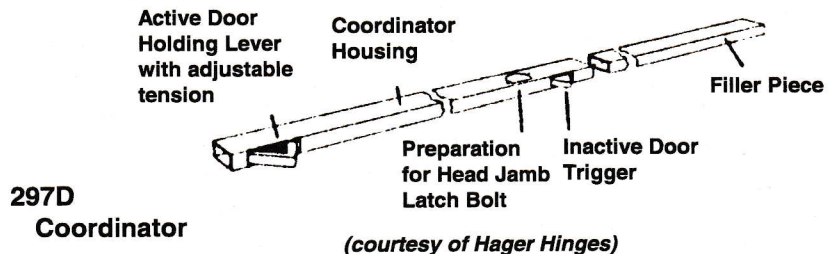
296D
Coordinating Device



(courtesy of Hager Hinges)

The second and newer style prevents the active door from closing until the inactive door has latched. You install this device on the door stop at the top of the door jam.

This device does the same thing, by preventing the active door from closing until the inactive door has latched.



297D
Coordinator

(courtesy of Hager Hinges)

As a professional locksmith, you should learn how to adjust door closers. Your ability to adjust for coordination of the closing of the doors and for closure speed will be valuable to your customers. You will learn about door closers in Lesson 13.

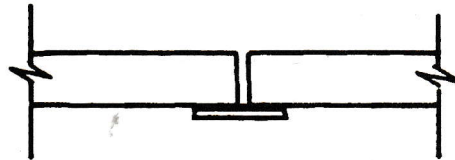
Automatic door coordinators need periodic lubrication. Whenever you are working on a door that has these, lubricate them for your customer.

Astragals

Made of wood or metal, you usually find astragals on metal doors. The purpose is security. An astragal protects the latching mechanics of the door from being tampered with. It prevents anyone from sliding a rod between the doors to activate the crossbar or touchbar. And it provides a surface for weather-stripping. Whenever a set of doors has an astragal, it should also have an automatic door coordinator.

The two types are the overlapping astragal and the split astragal.

Overlapping Astragal



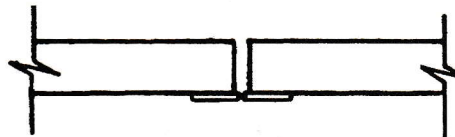
(courtesy of DHI)

You usually install an astragal on the active door overlapping the inactive door. The astragal usually has the same clearance height as the doors. Most often, double doors come with an astragal, but you can install one on non-labeled doors.

You should use either tamper proof screws or hex bolts for this type of installation.

Split Astragal

The split astragal is actually two astragals mounted on both doors equally with a small gap between them.



(courtesy of DHI)

Double-Door Applications

The six accepted standard door applications for double doors are listed below.

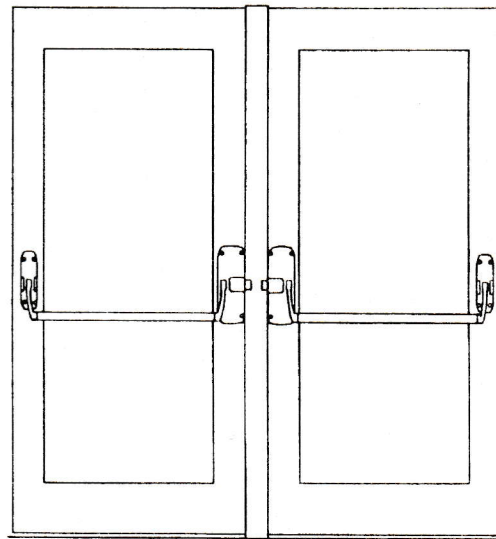
- Rim by Rim with Mullion and doors opening in same direction
- Mortise by Mortise with Mullion and doors opening in same direction
- Double Egress with Two Vertical Rods (door opens in opposite directions)
- Mortise Lock with Surface-Mounted Vertical Rod with doors opening in same direction
- Vertical Rod by Vertical Rod with doors opening in same direction
- Rim Lock with Surface-Mounted Vertical Rod



Egress—Place or way to go out; an exit

Rim by Rim and Mortise by Mortise

These two are so similar that we will discuss them together. However, the illustration below shows only the rim by rim application.



(courtesy of Von Duprin)



Mullion—A vertical center piece used in double-door openings for stability, security, and insulation

Both the rim by rim and the mortise by mortise latch onto a **mullion**. A mullion is a piece of metal that is installed vertically between the two doors.

Mullion

No. 0568

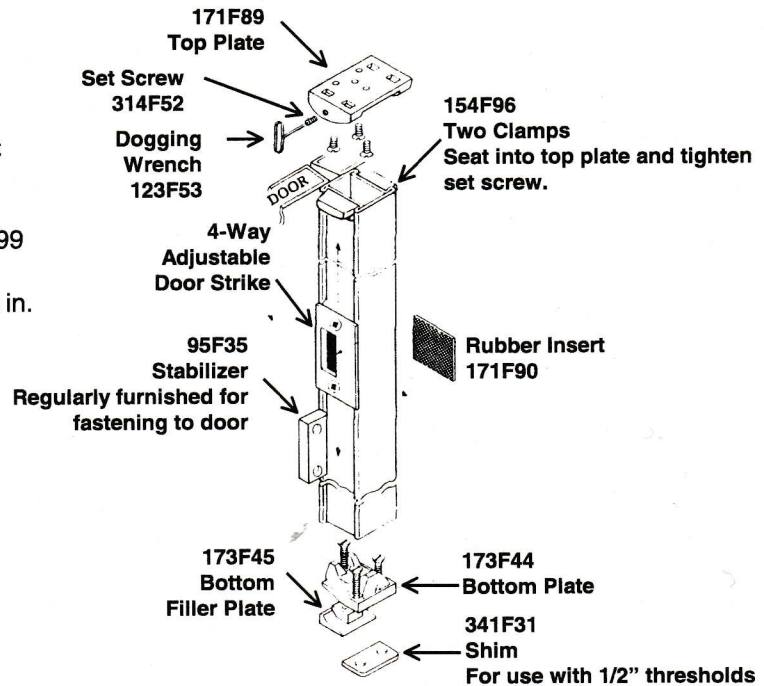
For use with all devices except "Fortune 29" series.

Size: 2-3/8 x 2-3/8 in.

Adjustable Strike: No. 154F99

Top Plate: 2-3/8 x 4-1/8 in.

Bottom Plate: 2-5/32 x 2-3/8 in.



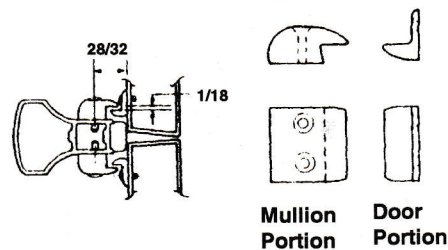
(courtesy of Corbin Russwin)

Usually, you attach the mullion separately to the door frame and the threshold. In the past, the mullion was sometimes a part of the frame and not removable. Industry standards are now such that we install removable mullions. This allows double egress when needed, as when moving large objects through the double doorway.

The mullion can be dogged into place. Newer styles use a keyed locking mullion. They can be ordered with either a recessed strike or a surface strike, whichever application works best.

When you install mullions on a double door, make sure you install stabilizers on the mullion and door. Stabilizers interlock the door with the mullion when the door is closed. That way, no one can pry the doors open.

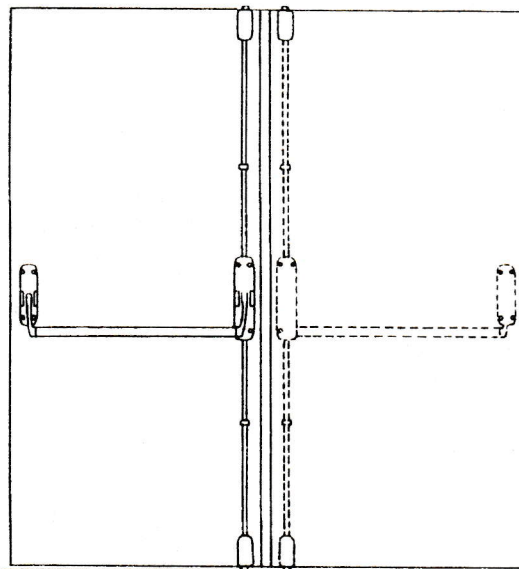
Stabilizer



(courtesy of Corbin Russwin)

Double Egress with Two Vertical Rods

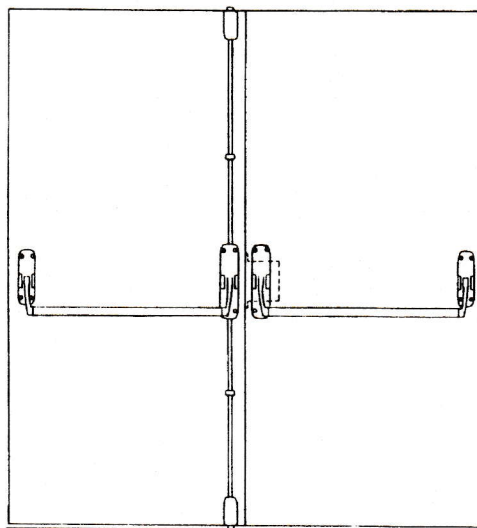
Generally, this application is used inside a commercial or institutional building when you are trying to control the direction of the users. One door opens from one side and the other from the other side. In other words, the doors open from opposite directions.



(courtesy of Von Duprin)

Mortise Lock with Surface-Mounted Vertical Rod

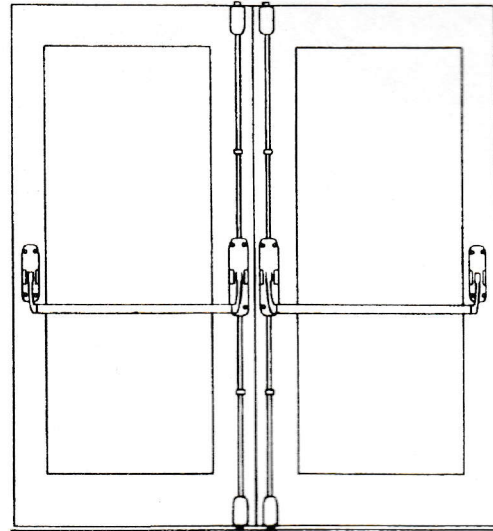
In this application, both doors open in the same direction. The only special requirement is an open back strike for the mortise latch. Then if the vertical rod door is opened, it can close over the extending latch of the mortise lock.



(courtesy of Von Duprin)

Vertical Rod by Vertical Rod

This application with the doors opening in the same direction is very common. You should not use an overlapping astragal.



(courtesy of Von Duprin)

Rim Lock with Surface-Mounted Vertical Rod

This application requires a flat or overlapping strike for the rim device. It is a perfect application for a door coordinator.

Vertical Rods

Vertical rods, whether surface or concealed, offer the maximum amount of door opening for the user. However, they also require you as a professional locksmith to have more knowledge and provide more maintenance than other applications.

One of the keys to installing and maintaining vertical rods is to know how they latch. Vertical rods are controlled by top latching mechanisms. When the mechanism retracts, it pulls and holds the bottom rod.

When adjusting vertical rods, always adjust the top first. Once the top rod is working, add the bottom rod and adjust its length to latch properly.

Surface Vertical Rod Exit Device



Bottom Rod

(courtesy of Steel Door Institute)

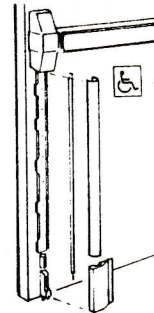
When working with concealed vertical rods, make sure you double nut the rods to the device and use external washers. This prevents them from coming apart.

Vertical Concealed Rod Exit Device



(courtesy of Steel Door Institute)

Because surface vertical rods take a lot of abuse, most manufacturers provide rod and latch guards to protect the bottom half.

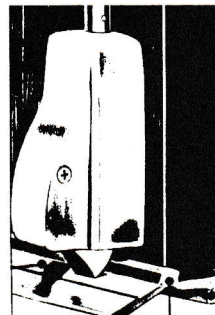


Indicates this device is approved for disabled persons

(courtesy of Von Duprin)

In the past, the threshold was used to secure the bottom latch on vertical rod applications. The ADA recognizes that the lip of the threshold or the degree of slant may be too steep for use by those with disabilities. So what is more acceptable is a recessed strike in the floor or threshold.

An example of the old style not approved by the ADA

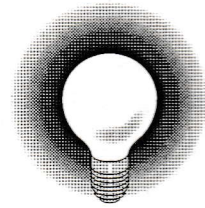


(courtesy of Von Duprin)

However, this recess collects dirt and other debris, which may prevent the latch from securing. Look for that first if a customer complains that the door will not latch properly.

Organize the Main Ideas

This outline will help you organize the information in this section of the lesson. Read through the outline and jot down what you remember about each of the topics listed. If you can't remember details related to one or more of the topics, you may wish to reread the text before you go on.



1. Applications
 - a. Single Doors

 - b. Double Doors
 - 1) Flush Bolts

 - 2) Automatic Door Coordinators

 - 3) Astragals
 - (i) Overlapping Astragals

 - (ii) Split Astragals

 - 4) Double-Door Applications
 - (i) Rim by Rim and Mortise by Mortise

 - (ii) Double Egress with Two Vertical Rods

 - (iii) Mortise Lock with Surface-Mounted Vertical Rod

 - (iv) Vertical Rod by Vertical Rod

 - 5) Vertical Rods

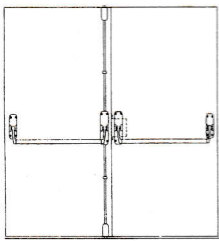
Check Your Knowledge 3



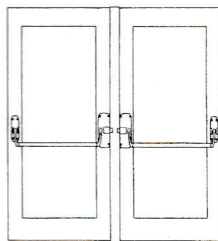
This quiz will help you check what you've learned in this section of the lesson. Read through the questions and jot down your answers. Then check those against the suggested answers at the end of this lesson. If your answers differ greatly from the suggested answers, you may wish to reread the text before you go on.

1. Only rim exit devices and surface vertical rods work on single doors. (True or False?)
2. In a single-door application, the _____ type is the most popular application and considered the most secure. (Fill in the blank.)
3. With some double doors, the inactive door usually is secured by _____ that are either manually or automatically activated. (Fill in the blanks.)
4. Double doors with one active and one inactive door and with automatic flush bolts often use an automatic door _____. (Fill in the blank.)
5. The gravity type coordinating device is usually installed on the door stop at the top of the door jam. (True or False?)
6. Flush bolts and automatic door coordinators need periodic _____. (Fill in the blank.)
7. The purpose of the _____ is security; it protects the latching mechanics of the door from being tampered with. (Fill in the blank.)

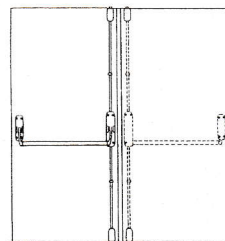
1. Identify the standard door applications pictured below by filling in the blanks.



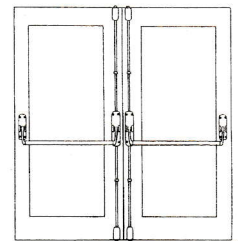
a. _____



b. _____



c. _____



d. _____

1. Both the rim by rim and the mortise by mortise latch onto a _____. (Fill in the blank.)
2. When you install mullions on a double door, make sure you install _____ on the mullion and door so no one can pry the doors open. (Fill in the blank.)

Application Issues

As a professional locksmith installing exit hardware, you must make sure that your selections meet local codes. The first step is to know what is acceptable under your local codes. Then you will be able to apply that knowledge to solving your customers' problems and meeting their needs.

In this section, we will address specific situations you likely will encounter when installing or repairing exit hardware.

Reverse Door Security Devices

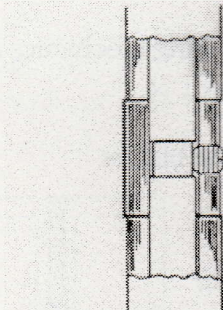
Four security devices for reverse doors are listed below.

1. Non-Removable Pins (NRP)
2. Security Studs
3. Pin the Door
4. Latch Guards

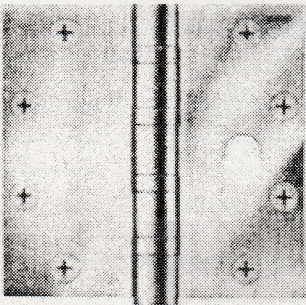
NRPs and Security Studs

When you encounter reverse doors, your first step should be to check the hinges. Some reverse door hinges have non-removable pins (NRPs) or security studs. These prevent the removal of the pins in order to pry open the door. Study the drawings below to understand NRPs and Security Studs.

Non-Removable Pins



Security Stud



- ▶ Enhanced security is available through two non-removable pin options
- ▶ **NRP** — Set screw in barrel intercepts groove in loose pin as shown. Set screw is not accessible when door is closed. Not available on size 3" and smaller
- ▶ **FSP** (Fast Spun Pin) — Tips of hinge are fast spun providing permanent non-removal of pin. Only available on five knuckle hinges
- ▶ Specify **NRP** or **FSP** when ordering

- ▶ All full mortise hinges are available with security studs for added safety
- ▶ With the door in its closed position, a stud attached to one leaf of the hinge projects into a hole in the matching leaf
- ▶ Hinged side of door cannot be moved, even with hinge pins removed because the stud prevents the leaves from being slid apart
- ▶ Specify "**with security stud**" when ordering

(courtesy of Stanley Hardware)

Pin the Door

To increase security for a customer on a reverse door, you may wish to follow the procedure below. If you do it carefully, this procedure may save money for your customer when compared with installing new hinges.

1. Install a long screw (2.5" or longer) halfway into the frame.
2. Cut off the head of the screw.
3. Close the door to mark where the head hits the door.
4. Drill an oversized hole in the door side. (This will allow the door to close over the screw.)
5. Follow steps 1 through 4 for each hinge on the door.

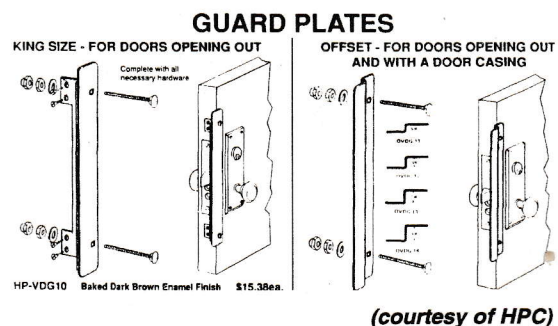
Latch Guards

When you are dealing with reverse doors, one related item to suggest is a latch guard. These promote safety and security. Latch guards are available for doors that swing in. However, most security issues deal with reverse doors. Here's what you need to know before you install a latch guard.

1. Can you put the guard on the door? Is it a fire door?
2. What kind of latch guard will fit the door?
3. What hardware application is required?
4. What finish should the latch guard have?
5. What hardware is required to mount the latch guard?

Better grades of latch guards have a carriage bolt with no slots that locks into the guard device. It should have a washer for the inside, then a nut, after which you install an acorn nut to lock it in place. The acorn nut has a finished head with no sharp edges. Thus, no one can be injured using the door.

If you use latch guards that do not supply some of these items, purchase them yourself in small quantities and appropriate sizes. That way, you can always complete your job in a professional manner.



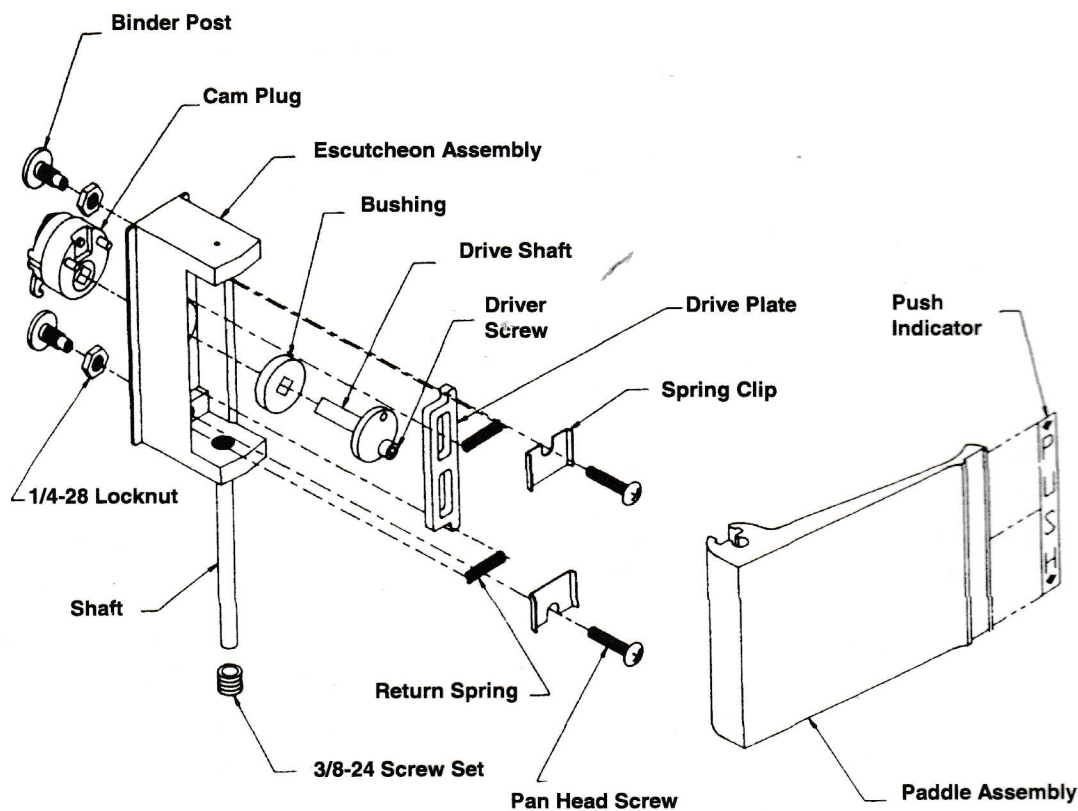
Storefront Exit Devices

Two of the most common storefront exit devices are the paddle latch and the handle. Both of these conform to most local codes on non-label fire doors and meet ADA requirements.

Paddle latches are very easy to install. You can order them as a push or pull function. They are field reversible in case you order the wrong hand.

The paddle is more durable than the lever, and it is very easy to service. The most common problem with the paddle is the return spring breaking. If that happens, you should always replace both springs. In addition, check the cam plug. Make certain that it is moving freely as the latch is pulled back. It should not become stuck in one position.

The cam plug is also handed and field reversible. The illustration below shows you the parts of a latch paddle device.

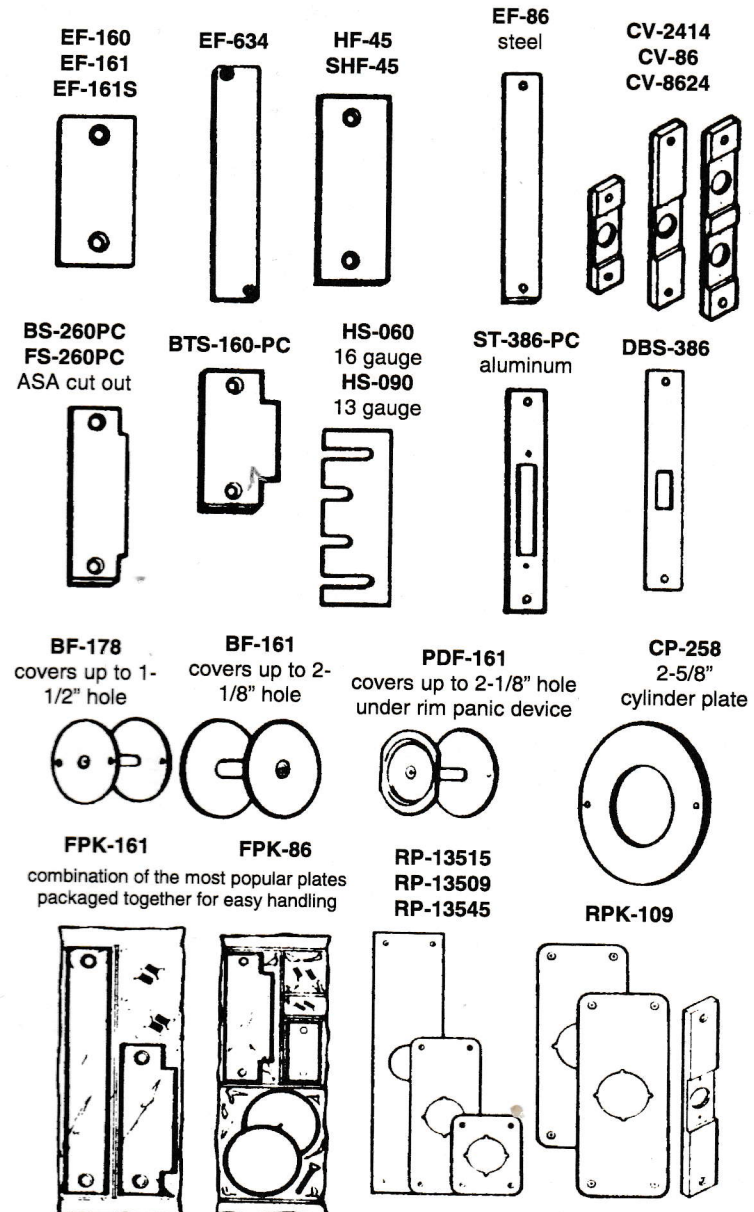


(courtesy of Adams Rite)

Cover Plates

You may be asked to change the hardware on a non-rated fire door, which is a fire door that has not been rated. In doing this, you may encounter holes in either a wood or a metal door. These holes need to be filled or covered.

Cover plates are available to maintain the integrity of the door and frame and to give the job a professional look.




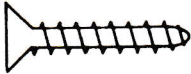




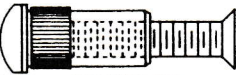


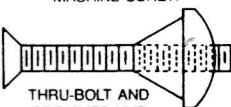


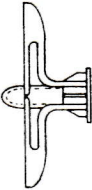


(courtesy of Don Jo)

Fasteners

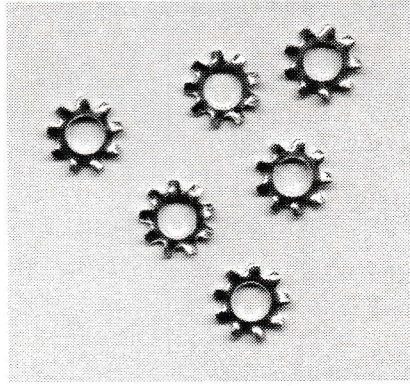
On a solid wood door, wood screws with a Phillips head might be acceptable. However, on a metal door you should use hex bolts. Machine screws or sheet metal screws will not hold up to the abuse that a device will have to handle.

The strikes, on the other hand, could be put in the jamb by tapping the appropriate screw hole to hold the strike. Always use the mounting screws recommended by the manufacturer of the device and necessary to the specific door application.

Thread Types	Head Styles	Drive Type
 MACHINE SCREW	 ROUND HEAD	 SLOTTED
 DUAL PURPOSE WOOD/SHEET METAL SCREW	 FLAT HEAD	 PHILLIPS
Specialty Fasteners	 TRUSS HEAD	 SPANNER
 SEX BOLT AND MACHINE SCREW	 PAN HEAD	 HEX
 THRU-BOLT AND GROMMET NUT	 OVAL HEAD	 PIN HEX
 TOGGLER*		

(courtesy of Glynn Johnson)

Most locksmiths do not use external washers as frequently as they should. These washers are great for securing rim cylinders in exit hardware. They are also good to use wherever there is a lot of stress in the lock. These washers are sometimes provided by some manufacturers. However, it's best to maintain a supply for rim devices that you may install.



Related exit hardware could include a bored lockset or a mortise lockset.

Once again, you will need to know what label, (if any) is on the door you are working on. For a label "A" door, or less, a Grade One lockset may be recommended. Your local code may allow you to put a Grade One lockset and a single-sided deadbolt on a rear exit door that is not labeled.

Suggestions for Continued Learning About Exit Hardware

Reference Books

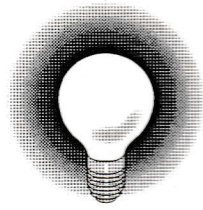
Boma International ADA Compliance Book, published by Boma, 1201 New York Avenue, N.W., Suite 300, Washington D.C. 20005, 202-408-2662

Electronic Locking Devices, by John L. Schum, published by Butterworth Publishers, a division of Reed Publishing, 80 Montvale Avenue, Stoneham, MA 02180

Get area product catalogs from local lock manufacturers.

*Contact the National Fire Protection Association (NFPA),
1 Battery March Park, Quincy, MA 02269, 800-344-3555*

Organize the Main Ideas



This outline will help you organize the information in this section of the lesson. Read through the outline and jot down what you remember about each of the topics listed. If you can't remember details related to one or more of the topics, you may wish to reread the text before you go on.

1. Application Issues
 - a. Reverse Door Security Devices
 - 1) NRPs and Security Studs
 - 2) Pin the Door
 - 3) Latch Guards
 - b. Storefront Exit Devices
 - c. Cover Plates
 - d. Fasteners

Check Your Knowledge 4



This quiz will help you check what you've learned in this section of the lesson. Read through the questions and jot down your answers. Then check those against the suggested answers at the end of this lesson. If your answers differ greatly from the suggested answers, you may wish to reread the text before you go on.

1. When a set screw in the hinge barrel intercepts a groove in the loose pin and the pin is not accessible when the door is closed, you have a reverse door security device called a _____ . (Fill in the blanks.)
2. When a stud attached to one leaf of a hinge projects into a hole in the matching leaf, you have a reverse door security device called _____ . (Fill in the blanks.)
3. If you drill an oversized hole in the door that fits over a long screw installed in the door frame, you have created a security device for a _____ door. (Fill in the blank.)
4. A _____ is a reverse door security device that installs with a washer, a nut, and an acorn nut to avoid injury to those using the door. (Fill in the blanks.)
5. Two of the most common storefront exit devices are the _____ latch and the _____ . (Fill in the blanks.)
6. If you encounter holes in either a wood or metal door when changing hardware on a non-rated fire door, _____ are available to maintain the integrity of the door and frame and to give the job a professional look. (Fill in the blanks.)
7. When choosing fasteners for exit and fire-rated hardware, you should use hex bolts on metal doors. (True or False?)
8. Whenever you are securing rim cylinders in exit hardware or wherever there is a lot of stress on the lock, you should use external washers. (True or False?)

Local Alarms and Their Applications

Local alarms can be a very valuable part of your locksmithing skills. Usually, local alarms are battery-operated, stand-alone systems. Your customers most often will request local alarms on limited usage, emergency exits. Almost all exit hardware manufacturers and some lock manufacturers provide alarm systems.

Before installing a local alarm, perform the following checks.

1. Check to see if the door has a fire label since that affects whether you can install another device.
2. Check to see if the door already has a lock and if it is functioning correctly. If not, you will also need to replace the lock.

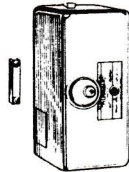
Now it is up to you and your customer to decide what kind of alarm device will fulfill the need.

Alarms for Doors with Existing Locks

Sidro, Alarm Lock, Detex, and Arrow are just some of the alarm companies that have easy-to-install exit door alarms that will not conflict with the existing lock on a door. These typically consist of

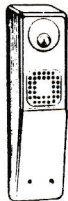
- a small key controlled device mounted on the door with four screws and
- a magnetic contact installed with two screws on the door jam.

Model PG10
Model 1088
Model RC6



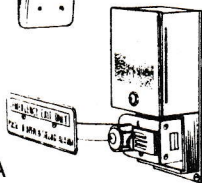
PILFERGARD PG10
Mini-Burglar Alarm Twin Action Horns Low Cost Easily Installed
 The Pilfergard PG10 is an exit door alarm designed to deter the use of the secured door by emitting a demanding urgent twin action alarm when opened by unauthorized personnel. However, the alarm can still be bypassed from inside or outside only by approved key carrying employees. This unit easily surface mounted, durable and contains two separate types of tamper proof switches. Test button verifies battery. Optional AC power supply and monitor console. Requires standard mortise (not included).

Model PG20



PILFERGARD PG20
Piezo Sounder 9 Volt Alkaline Battery Narrow Stile Design Low Battery Alert
 The Pilfergard PG20 is a sleek, modern design door alarm preferred in high visibility areas and for use with narrow stile doors. The piercing 110 db piezo sounder can be user selected for continuous alarm or 2 min. shutdown with auto reset. Unauthorized use of door will cause alarm to sound as well as flashing LED. Only key carrying employees can disable the alarm. Features include test button, low battery alert, programmable exit/entry delay, inside and outside key control, and two types of tamper proof switches. Finished in choice of metallic, silver or bronze. Optional AC power supply and monitor console. Requires standard mortise (not included).

Model 11A



PILFERGARD PG30
Proven Design Safety Compliance Instant Exit Deters Theft Warning Alarm Secure Deadbolt
 Model 11A is a security device designed to control unauthorized use of emergency exit doors. Easier to operate than the previous Model 11, this improved version maintains maximum security while complying with standard safety, fire and building codes. It provides trouble free service and deters theft from within and outside as well as permitting instant exit in case of emergency. Unauthorized use of protected door by depressing clapper, sounds alarm which can only be reset or bypassed by key. Standard features include 1 inch throw deadbolt, warning alarm, outside cylinder capability, tamper switch and long life battery pack. Can be specially ordered for remote monitoring, double doors or for use with existing panic bars. Optional AC power supply, monitor console and outside pull handle available. Cylinder not included.

(courtesy of Alarm Lock)

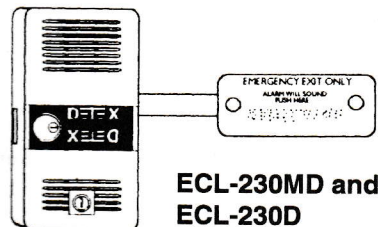
An adhesive sticker warns that the door is alarmed. The alarm warns when the battery is low with a low chirping sound similar to a smoke detector. This type of alarm requires a nine-volt battery, which is a nice feature for your customer in the low maintenance department.

Alarms for Doors without Existing Locks

You may be asked to apply an exit alarm to a door that does not have an existing lock. Or it may be a door with an existing lock that needs to be replaced. Your customer may want the deadlock function as well as some sort of alarm because the door is in a remote location. One good choice is the exit alarm deadlock. If the door is a rear door, however, you may want to apply an automatic door closer and a deadlatching alarm lock.

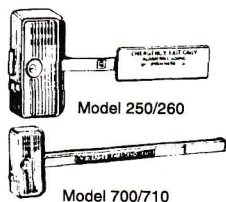
Exit Alarm Deadlocks

These alarms usually require the larger size six-volt batteries. Use the manufacturer's battery since it comes in a plastic bag that protects against leakage.



(courtesy of Detex)

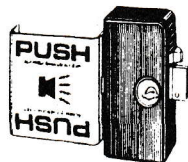
Exit alarm deadlocks generally have a separate service key in addition to the rim cylinder that operates the lock. However, alarm locks do not come with the rim cylinder. You must provide that.



PANIC EXIT ALARM DEADLOCKS

Model 250, 260, 700 and 710

The Model 250, 260, 700 and 710 are UL Listed Panic Alarm deadbolt devices which restrict unauthorized use of exit doors by sounding an alarm, yet provide immediate opening in emergencies. Door can be protected by the high security deadbolt alone or choose the deadlatch for extra security. All four models feature our most powerful dual piezo alarm, 9 volt battery, low battery alert, inside/outside cylinder capability, non-handed ease of installation and choice of metallic, sliver or duronodic finishes. The Models 250 and 700 provide changeable 2 minute alarm cutoff or manual reset. The Models 260 and 710 provide changeable 2 minute auto reset or manual restore. Optional AC power supply, monitor console, and exterior trim available. Requires standard rim cylinder (not included).



Model 80

Theftgard Model 80

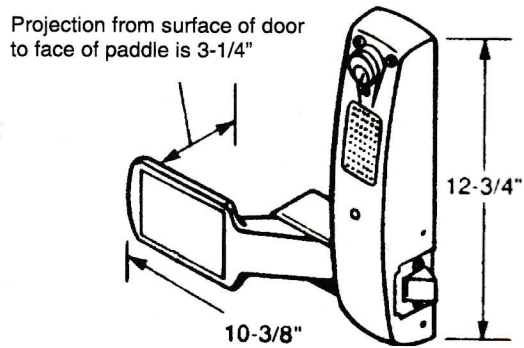
The Theftgard Model 80 Exit Alarm Double Deadlock is internally paddle activated for safe, instantaneous legal opening and reduces robbery risks and entering from outside. It features a visually effective baked red, white or green enamel steel housing, rustproof parts, rugged deadbolt, cam for outside cylinders, alarm bypass for keyholding persons, latch holdback, electrification and monitoring capability.

(courtesy of Alarm Lock)

The older style service locks were a cam lock that could be pried open. The newer styles are a screw-on cam lock that locks in every 90-degree position. Opening these by picking the lock can be time consuming. In some cases, you'll find the key code on the lock face. In others, you'll find it printed on the lock behind the protruding arm pad. You should start your own ring of service keys for whichever kind is most used in your area.

Deadlatching Alarm Locks

Instead of putting exit alarm deadlocks on rear doors, you should recommend a deadlatching alarm lock. This device lets the door latch freely with a door closer when someone exits the area. A deadlatching lock is probably the best way to secure a remote door with a local alarm.



(courtesy of Arrow Lock)

Some newer models have a delay in them. If someone activates the alarm, the latch will not retract for seven to fifteen seconds, allowing management to react to the alarm going off.

Delayed Exit Control Locks — ECL-8010 & 8015

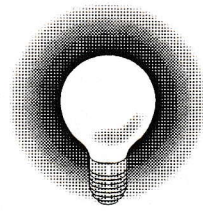


(courtesy of Detex)

In an emergency situation such as a fire, you must provide an override switch that lets folks leave the building immediately. This could involve some hard wiring on your part. So you must know your local codes and NFPA 70 or get a qualified electrician to help you wire the door. If you do the installation yourself, know your codes and make sure the override switch works. What you do determines the safety of the people who use the building.

Organize the Main Ideas

This outline will help you organize the information in this section of the lesson. Read through the outline and jot down what you remember about each of the topics listed. If you can't remember details related to one or more of the topics, you may wish to reread the text before you go on.



1. Local Alarms and Their Applications
 - a. Alarms for Doors with Existing Locks

 - b. Alarms for Doors without Existing Locks
 - 1) Exit Alarm Deadlocks

 - 2) Deadlatching Alarm Locks

Check Your Knowledge 5

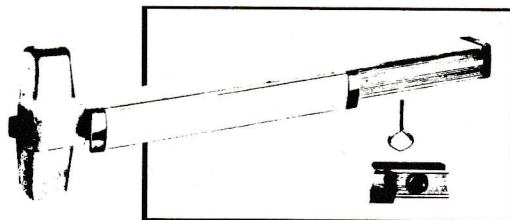
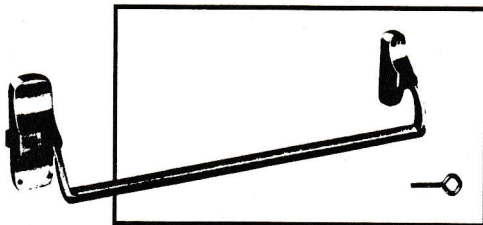


This quiz will help you check what you've learned in this section of the lesson. Read through the questions and jot down your answers. Then check those against the suggested answers at the end of this lesson. If your answers differ greatly from the suggested answers, you may wish to reread the text before you go on.

1. Before installing a local alarm, you should check the door for a _____ because that affects whether you can install another device. (Fill in the blanks.)
2. If you are installing a local alarm and the door already has a lock, you should check to see if that lock is _____. (Fill in the blank.)
3. Two types of exit alarms for doors that do not have existing locks are exit alarm _____ and _____ alarm locks. (Fill in the blanks.)
4. In an emergency situation such as a fire, you must provide an _____ that lets folks leave the building immediately. (Fill in the blanks.)

3. List and explain the three rules you must follow when installing or repairing exit hardware on a fire door.

4. Identify two examples of accident hazard exit hardware. (Write in the name of the hardware on the blanks provided.)



(courtesy of Von Duprin)

5. List the five criteria you should consider when selecting an exit device.

6. Describe the four basic types of exit devices. (Write a description next to the name of the device.)

Rim

Mortise

Surface Vertical Rods

Concealed Vertical Rods

7. Name the exit device that is the most popular and considered the most secure for single doors. (Write the name of this device below.)

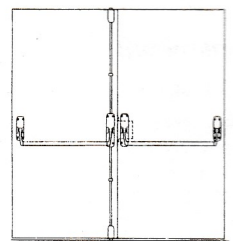
8. Describe the three types of auxiliary exit hardware most commonly used on double doors. (Write a description next to the name of the device.)

flush bolts

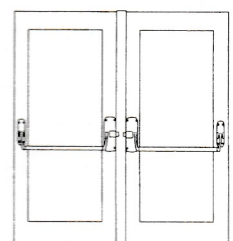
automatic door coordinators

astragals

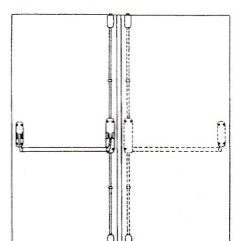
9. Identify standard door applications for double doors. (Write in the name of the door application on the blanks provided.)



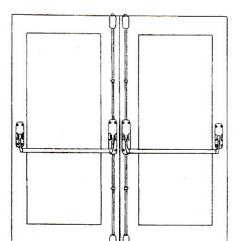
a. _____



b. _____



c. _____



d. _____

(courtesy of Von Duprin)

1. Describe four security devices for reverse double doors. (Write a description next to the name of the device.)

Non-Removable Pins

Security Studs

Pin the Door

Latch Guards

2. Describe the checks you should make before installing a local alarm.

3. List two types of alarms for doors without existing locks.



Stop for Review

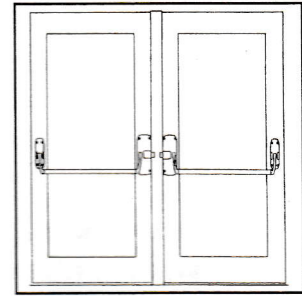
To answer the following questions, circle the letter next to the correct response. Only one correct response is provided for each question.

1. _____ is NOT one of the five things you must know about a door before you install or repair exit hardware for that door.
 - a. How the door is hung
 - b. Whether it is a fire door
 - c. The manufacturer's name
 - d. The applicable legal requirements
2. _____ is NOT one of the five things you must know about a door before you install or repair exit hardware for that door.
 - a. The hand of the door
 - b. Whether it is a fire door
 - c. Whether the door requires accident hazard hardware
 - d. Whether the customer will give you a release
3. If a door hinges on the right and opens inward, the hand of door is _____.
 - a. left hand
 - b. right-hand reverse
 - c. left-hand reverse
 - d. right hand
4. If a door hinges on the left and opens outward, the hand of door is _____.
 - a. left hand
 - b. right-hand reverse
 - c. left-hand reverse
 - d. right hand
5. If a door hinges on the right and opens outward, the hand of door is _____.
 - a. left hand
 - b. right-hand reverse
 - c. left-hand reverse
 - d. right hand
6. If a door hinges on the left and opens inward, the hand of door is _____.
 - a. left hand
 - b. right-hand reverse
 - c. left-hand reverse
 - d. right hand
7. If you install or repair exit hardware on a fire-rated door, you must NOT _____.
 - a. use fire-rated hardware
 - b. downgrade the rating of the hardware
 - c. upgrade the rating of the hardware
 - d. conform to what the door is prepared for

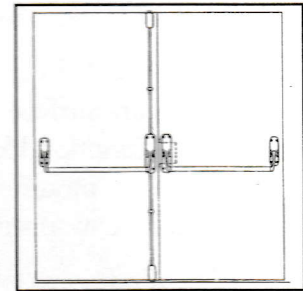
8. If you install or repair exit hardware on a fire-rated door, you must NOT _____.
 - a. drill the cylinder hole to accept the type of mortise lock you are using
 - b. upgrade the rating of the hardware
 - c. use hardware that is able to positive latch at all times
 - d. dog down the exit hardware
9. If you install or repair exit hardware on a fire-rated door, you must NOT _____.
 - a. conform to what the door is prepared for
 - b. add more hardware than what is allowed by the door manufacturer
 - c. drill the cylinder hole to accept the type of mortise lock you are using
 - d. use hardware that is able to positive latch at all times
10. If you install or repair exit hardware on a fire-rated door, you should _____.
 - a. conform to what the door is prepared for
 - b. remove or paint over the label on the door and on the door frame
 - c. dog down the exit hardware
 - d. downgrade the rating of the hardware
11. A door that is not a fire door but is an exit door that must conform to the building safety code requires _____.
 - a. non-rated fire door hardware
 - b. accident hazard exit hardware
 - c. flash bolts
 - d. you to conform to what the door is prepared for
12. Two types of accident hazard exit hardware are _____.
 - a. flush bolt and dust proof strike
 - b. coordinator and astragal
 - c. the crossbar exit device and the touchbar exit device
 - d. overlapping astragal and split astragal
13. _____ is NOT a basis for the selection of an exit device.
 - a. Whether the door is a fire door
 - b. The design of the door
 - c. A release from your customer requesting an out-of-code device
 - d. The opening measurement
14. _____ is NOT a basis for the selection of an exit device.
 - a. Whether the door is a fire door
 - b. The door height and width
 - c. The design of available devices
 - d. Whether the device is popular
15. Mortise devices are _____.
 - a. surface applied and have a single latching point
 - b. function like a regular lock, but have either a touchbar or crossbar attached
 - c. are mounted on the surface of the door with top and bottom latching
 - d. are mounted in a cavity of the door with top and bottom latching.

16. Surface vertical rod devices _____.
- are surface applied and have a single latching point
 - function like a regular lock, but have either a touchbar or crossbar attached
 - are mounted on the surface of the door with top and bottom latching
 - are mounted in a cavity of the door with top and bottom latching.
17. Rim devices _____.
- are surface applied and have a single latching point
 - function like a regular lock, but have either a touchbar or crossbar attached
 - are mounted on the surface of the door with top and bottom latching
 - are mounted in a cavity of the door with top and bottom latching.
18. Concealed vertical rod devices _____.
- are surface applied and have a single latching point
 - function like a regular lock, but have either a touchbar or crossbar attached
 - are mounted on the surface of the door with top and bottom latching
 - are mounted in a cavity of the door with top and bottom latching.
19. _____ is the most popular exit device and considered the most secure for single doors.
- The rim
 - The mortise
 - The surface vertical rod
 - The concealed vertical rod
20. _____ secure the inactive door on double doors where one is used while the second is rendered inactive.
- Automatic door coordinators
 - Flush bolts
 - Astragals
 - Stabilizers
21. _____ prevent the active door from closing until the inactive door is closed and/or latched.
- Automatic door coordinators
 - Flush bolts
 - Astragals
 - Stabilizers
22. _____ protect the latching mechanics of the door from being tampered with.
- Automatic door coordinators
 - Flush bolts
 - Astragals
 - Stabilizers

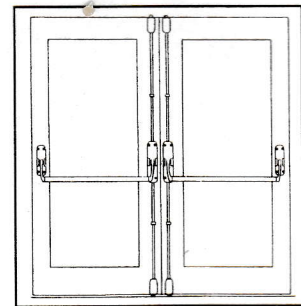
23. The illustration to the right pictures a _____.
- rim by rim with mullion and doors opening in the same direction
 - double egress with two vertical rods and doors opening in opposite directions
 - mortise lock with surface-mounted vertical rod and doors opening in the same direction
 - vertical rod by vertical rod with doors opening in same direction



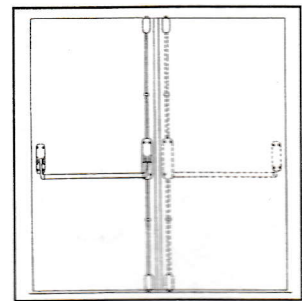
24. The illustration to the right pictures a _____.
- rim by rim with mullion and doors opening in the same direction
 - double egress with two vertical rods and doors opening in opposite directions
 - mortise lock with surface-mounted vertical rod and doors opening in the same direction
 - vertical rod by vertical rod with doors opening in same direction



25. The illustration to the right pictures a _____.
- rim by rim with mullion and doors opening in the same direction
 - double egress with two vertical rods and doors opening in opposite directions
 - mortise lock with surface-mounted vertical rod and doors opening in the same direction
 - vertical rod by vertical rod with doors opening in same direction



26. The illustration to the right pictures a _____.
- rim by rim with mullion and doors opening in the same direction
 - double egress with two vertical rods and doors opening in opposite directions
 - mortise lock with surface-mounted vertical rod and doors opening in the same direction
 - vertical rod by vertical rod with doors opening in same direction



(courtesy of Von Duprin)

27. An oversized hole drilled in a door that fits over a long screw installed in the door frame is a _____.
- security device for a reverse created by a locksmith and called "pin the door"
 - NRP
 - latch guard
 - security stud

28. A set screw in the hinge barrel that intercepts a groove in the loose pin is a _____.
- security device for a reverse created by a locksmith
 - NRP
 - latch guard
 - security stud
29. The reverse door security device that uses a washer, a nut, and an acorn nut to avoid injury to those using the door is a _____.
- security device for a reverse created by a locksmith and called "pin the door"
 - NRP
 - latch guard
 - security stud
30. A stud attached to one leaf of a hinge that projects into a hole in the matching leaf is a _____.
- security device for a reverse created by a locksmith and called "pin the door"
 - NRP
 - latch guard
 - security stud
31. _____ before installing a local alarm tells you whether you can install another device.
- Checking the manufacturer's specifications
 - Checking to see if the door already has a lock and if it is functioning correctly
 - Checking to see if the door is metal or wood
 - Checking to see if the door has a fire label
32. _____ before installing a local alarm tells you whether you need to replace or install a lock.
- Checking the manufacturer's specifications
 - Checking to see if the door already has a lock and if it is functioning correctly
 - Checking to see if the door is metal or wood
 - Checking to see if the door has a fire label
33. _____ is NOT an alarm for doors without existing locks.
- A small key controlled device mounted on the door with four screws and a magnetic contact installed with two screws on the door jam
 - An exit alarm deadlock
 - A deadlatching alarm lock
 - A delayed exit control lock