

Student Guide

Course: Lock and Key Systems

Lesson: Course Introduction

Course Information

Purpose	Provide a thorough understanding of the lock and key systems used by the DoD
Audience	Military, civilian, and contractor personnel responsible for physical security
Pass/Fail %	75% on final examination
Estimated completion time	90 minutes

Course Overview

Protecting DoD assets, including classified information, is imperative for our national security. Locking devices are an important part of ensuring DoD assets are protected from loss or compromise. Locks are used to secure many types of doors such as doors to buildings, ammunition bunkers, storage areas and offices, safes, and filing cabinets.

Security requirements for classified contracts are stated in DoD 5220.22-M, the National Industrial Security Program Operating Manual (NISPOM). Any additional security requirements levied upon a contractor must be specifically addressed in the contract.

In this course you will learn about various types of lock and key systems and their purposes as well as which ones are authorized for protecting sensitive or classified DoD assets. You will also learn how to properly protect and account for lock and key systems.

Course Objectives

- Identify common types of locking devices
- Identify the primary parts of a locking device
- Identify considerations when choosing a lock
- Define master key systems
- Identify types of locks used by the DoD and their purposes
- Identify the specifications each lock must meet, where applicable
- Identify the requirements and recommendations for safeguarding and changing combinations
- Identify the requirements and recommendations for key control

Course Structure

- Course Introduction
- Lock and Key Basics
- Key-operated Locks
- Combination Locks
- Course Conclusion

Student Guide

Course: Lock and Key Systems

Lesson: Lock and Key Basics

Lesson Introduction

Before you learn about the specific types of locks used by the Department of Defense (DoD) and their purposes, there are some general concepts related to lock and key systems that you should know. This lesson will familiarize you with these concepts.

The lesson objectives are:

- Identify common types of locking devices
- Define master key systems
- Identify the primary parts of a locking device
- Identify considerations when choosing a lock

Overview

1. Background and Purpose

Lock and key systems are mechanical, electronic, or electromechanical devices used on doors or containers to restrict access to the area or property enclosed. Lock and key systems have been in use for centuries. The earliest locks date back to ancient Egypt. The design used in the Pharaoh's palaces can be found in modern variations of lock design. This design consisted of a wooden housing containing wooden pegs of varying length, fitted into holes bored into the top of a wooden bolt. To open the lock, a person inserted a long wooden key with pegs of specific lengths into the bolt.

Today, lock and key systems are much more sophisticated, but they serve the same functions. They are the first line of defense against unauthorized entry or theft. In this capacity, locks actually provide several different levels of deterrence. First, locks provide psychological deterrence because they can be *perceived* as impediments to successful intrusion. It's much easier to enter something that is not locked! Locks also deter surreptitious entry. This means an intruder is less likely to be able to use stealth or secrecy to enter an area. If an area is locked, the likelihood that someone can enter without detection is pretty slim. Finally, locks provide deterrence against forced entry. A good lock requires the intruder to consider how much force would be required to break into a facility, and whether that noise could cause them to be detected and captured. If a good locking mechanism is employed, it is likely the intruder will search for a less secure facility to enter.

2. DoD Lock Program

The DoD provides guidance to ensure that locks provide the appropriate level of protection for materials they are safeguarding. DoDM 5200.01, Volumes 1 through 4, DoD information Security Program, outlines the regulations for safeguarding information which includes lock and key systems. In addition, there are several Federal and military specifications that further outline requirements for lock and key systems used within the DoD and by contractors for the DoD. The DoD Lock Program can also provide key information. The DoD Lock Program is designated as the technical authority for locking and storage systems used for protection of classified information and are responsible for the management, operation, and support functions for development, testing, and procurement of locking devices and systems used within the DoD and by contractors of the DoD. You can reach the DoD Lock Program online:
<http://www.cdse.edu/catalog/elearning/PY104-resources.html>

Lock and Key Systems

1. Types

Locks can be categorized in two ways. One way to think of a lock system is how it opens. That is, does it open with a key? Or with a combination? Another way to think of a lock system is whether it is fixed or portable. Is it built into a door or container? Or is it movable, like a padlock, which can easily be attached and detached? You will see key-operated *built-in* locks, as well as key-operated *padlocks*. Similarly, you will see *combination* built-in locks, as well as *combination* padlocks. Later in this course, you will learn more about specific models of locks approved for use and you will learn more about the official specifications these locks must meet.

2. Master Key Systems

A master key system is a system with two or more levels of key operation where there is a single master key that fits *all* of the locks in a facility or group of facilities. Examples of acceptable use of master key systems in the DoD include general office areas and barracks.

Let's look at how a master key system works. Let's use the example of barracks at a military installation. At this facility, there is one great grand master key that can open *all* of the entrances and individual room locks in the barracks on this installation. On the second level, there are two grand master keys. The first grand master key opens all of the locks in Barracks 1. The second grand master key opens all of the locks in Barracks 2. On the third level in Barracks 1, there is one master key to open all of the building entrances, another one for the living areas, and another for the storage rooms. The same is true for each type of room in Barracks 2.

The primary advantage of a master key system is the convenience to its owner or manager. If someone gets locked out of their living area late at night, a facility manager can easily open it using a master key.

However, there are some significant disadvantages to a master key system. First, loss of the master key would require a large expense in rekeying or replacing all of the locks

associated with the master key. It is also easier to make impressions of a single master key versus copying a number of individual keys. Also, it is easier to pick a master key system because there are more combinations of pin settings that can open the lock.

3. Lock Components

Although there are many different types of locks, they all share three components. They are the locking device, the switching device, and the operating mechanism.

The locking device is the part of the system that physically keeps the area or container secured or locked. Examples of locking devices are latches and bolts.

The switching device is the element that authorizes the locking device to open. Examples of switching devices include keys, cards, combinations, or biometrics such as fingerprints, iris scans, or voice recognition.

The operating mechanism is the part of the system that interacts with the switching device to allow or deny entry into a given area or container. A cylinder is an example of an operating mechanism.

4. Considerations in Selecting a System

When selecting a lock, there are a variety of factors to weigh. Here are some high level considerations for determining what lock and key system to use. One general principle holds true: the greater the level of protection you require, the greater the cost and level of effort your locking solution will demand. A major consideration is cost versus strength or complexity of a lock. You must weigh the cost of the lock and the level of effort to install it against the required level of security. Generally, the less expensive the lock, the easier it is to defeat. The level of security you need also affects other choices. You must also consider user access to a lock. Do you want more or fewer people to have access? This affects your decision about whether to use a combination, key, access card, or biometrics. You must also consider what restrictions you want to impose on lock operation. If the lock is securing a high security item, it should remain locked at all times. If the lock is securing a low security item such as office supplies, perhaps it can remain unlocked during certain times, such as working hours. You must also consider how the door relocks. Does it close and lock automatically or do you need to lock it manually, for example with a key or by spinning a dial? When choosing a lock for a door that encloses spaces that contain people, life safety is a key consideration. The lock you use must allow people to escape in an emergency.

a. Life Safety

Locks with emergency egress hardware, like the S&G 2980 PDL and LKM 7000, were put into practice after fatal accidents occurred in which people could not escape. In 1911, 146 employees were trapped and killed in a blazing fire at the Triangle Shirtwaist Company in New York. Some doors were locked, and others were unlocked but only opened

inward, so they were pushed shut with the onslaught of people trying to escape. Emergency egress hardware is installed to allow exit by pushing on a push bar or panic bar hardware from the inside so the door automatically unlocks and swings outward. Today, many countries' building codes require them on all fire and emergency exits.

Review Activity

Try answering the following questions. When you are finished, see the Answer Key at the end of this Student Guide to check your answers.

Question 1

Which of the following are true of master key systems? Select all that apply.

- The great grand master key opens all of the locks in the system.
- Replacing a lost master key is inexpensive.
- They are convenient for managers.
- They are not authorized for DoD use in barracks.
- Because of their inherent security risks, their use is discouraged.

Question 2

Match each example of a lock component to its appropriate description.

Parts of a locking device:	Example	Examples: A. Cylinder B. Combination C. Latch
Switching device: authorizes the operating mechanism to open the lock		
Operating mechanism: interacts with the switching device to allow or deny entry		
Locking device: physically secures area or container		

Lesson Conclusion

In this lesson you learned about common types of locking devices, master key systems, the primary parts of a locking device, and factors to consider when choosing a locking system.

Answer Key

Question 1

- The great grand master key opens all of the locks in the system.
- Replacing a lost master key is inexpensive.
- They are convenient for managers.
- They are not authorized for DoD use in barracks.
- Because of their inherent security risks, their use is discouraged.

Question 2

Parts of a locking device:	Example
Switching device: authorizes the operating mechanism to open the lock	[B]
Operating mechanism: interacts with the switching device to allow or deny entry	[A]
Locking device: physically secures area or container	[C]

Student Guide

Course: Lock and Key Systems

Lesson: Key-Operated Locks

Lesson Introduction

In this lesson, you will learn about the types of key-operated locks used by the DoD and their primary features. You will also learn some best practices for key control.

The lesson objectives are:

- Identify types and components of key-operated locks used by the DoD
- Identify best practices for key control

Key-Operated Lock Types

1. Built-in Locks

Some key-operated locks are built into the door or container they are securing. These are also known as *mortise* locks, because their case is recessed, or *mortised* into a door or container. Examples of key-operated locks include locks built into doors, locks built into doorknobs or latches, and deadbolt locks. Built-in key-operated locks are considered low security locking devices, because they provide only limited resistance to forced or surreptitious entry. For this reason, the locks shown here are not approved for the protection of classified information.

a. Mortise Locks

Mortise locks are typically found in building entrance doors, office doors, and storage closets. The most common type has a doorknob or thumb latch on each side of the door. Either knob will operate the latch. These locks come in a number of configurations that can be locked from the inside or the outside by either a thumb turn or a key or from the edge of the door by a pushbutton or a rocker switch.

b. Cylindrical Locks

The cylindrical lock is the most common of all door locks in use today. They are used to secure office doors, storerooms, and exterior doors. It is named for the locking cylinder located in the knob or lever. Some cylindrical locks require a key to lock and unlock them. Others unlock with a key, but must be locked by pushing or rotating a button on the inside knob. This type of lock is strictly low security.

c. Deadbolt Locks

Deadbolt locks, also referred to as tubular deadbolts, are similar to cylindrical locks in that they are mounted in a hole cut through the door. When the bolt is extended, applying force to the end of the deadbolt lock will not retract it. Deadbolts, when used with a cylindrical lock, provide the best security when the bolt extends far enough into the jamb—that is, at least one inch.

2. Padlocks

Padlocks are portable locks used to protect against theft, vandalism, sabotage, espionage, unauthorized use, and harm. Some authorized padlocks are typically used to deter unauthorized entry. They provide limited resistance to forced entry and only minimal resistance to surreptitious entry. For this reason, they are not authorized to protect classified information. DoD does authorize the use of some medium-security padlocks, such as the Sargent & Greenleaf (S&G) 826 padlock. For high-security protection, DoD authorizes the use of these two models: the S&G 833C and 951.

a. High Security

DoD-authorized padlocks used for high security protection include the S&G 833C and the S&G 951, in conjunction with high-security shrouded hasps NAPEC 0957-1 and 2, 0958-1 and 2, and the NAPEC 1300 shipboard hasp. They have the most advanced security features such as special barrier materials inside the body and shackle to resist attacks by cutting, drilling, sawing, or wedging.

How Do Key-Operated Locks Work?

1. Components

All locks share three basic components: the locking device; the switching device; and the operating mechanism. In a key-operated lock, the locking device may be a latch or a bolt. The switching device is a key. And the operating mechanism is a cylinder. Let's look more closely at some different kinds of cylinders.

2. Cylinders

A cylinder is the mechanism that operates most key-operated locking devices. There are several types of cylinders: the mortise cylinder, the rim cylinder, the interchangeable core cylinder, and the cylindrical lock cylinder.

a. Mortise Cylinder

Mortise cylinders are used on locking units that are mortised, or built into a door. They are installed by screw-in threads. Typical mortise cylinder applications include aluminum framed doors on building entrances.

b. Rim Cylinder

Rim cylinders operate locks that attach to the surface of the door. Rim cylinders are installed with long screws that hold the cylinder in the door from the inside. An example of a rim cylinder application would be an inward opening or front door.

c. Interchangeable Core Cylinder

An interchangeable core cylinder is a small, self-contained lock cylinder that can be extracted from its housing via a special control key. They are designed to fit into a variety of cylinder housings that comply with standard size specifications and are produced by a variety of lock manufacturers. Because they can easily be switched out, interchangeable core cylinders minimize the effort and costs involved in rekeying locks.

d. Cylindrical Lock Cylinder

Cylindrical locks are the most common type of mortise door locks in use today. A cylindrical lock is a lock constructed with a cylinder that a locksmith can easily unscrew to facilitate rekeying. Key-operated locks authorized for safeguarding classified information must have the UL-437 Medeco high security key cylinder.

3. Pin Tumblers

The pin tumbler is a lock mechanism that uses pins of varying lengths to prevent the lock from opening without the correct key. Pin tumblers are most commonly employed in cylinder locks, but may also be found in tubular locks. Different countermeasures can be built into a pin tumbler cylinder to make it more resistant to picking.

One countermeasure is the spool, or mushroom pin. It has that name because it resembles an empty spool of thread, or a mushroom. It is resistant to picking because the thin mid-section of the spool causes the pin to falsely set. This causes the lock to remain closed instead of being picked open. Another countermeasure is angled pins and side bar springs in the cylinder. This makes the lock less susceptible to being picked. Having a bottom locking plate, that is, having pins on both the top and bottom of the cylinder also makes picking harder.

a. How Does It Work?

When a properly cut key is inserted into the keyhole, the pins will rise and fall, causing them to align exactly at the shear point. This allows the plug to rotate, permitting the lock to open. When the key is not in the lock, the pins straddle the shear point, preventing the plug from rotating and unlocking.

Key Control

1. Best Practices

Keys and locks must be protected at all times. Here are some best practices for protecting them. Appoint a key and lock custodian to ensure proper custody and handling of keys and locks used for the protection of classified information. While the key and lock custodian has specific responsibilities, *everyone* is responsible for ensuring keys are properly safeguarded. For example, everyone is responsible for ensuring keys are not removed from certain premises, some classified storage areas. Everyone is also responsible for ensuring master keys are not created unless specifically authorized.

a. Responsibilities

The key and lock custodian should follow these guidelines. Protect keys and spare locks in a secure container at the same level of protection afforded the material or information being secured. Keep a key and lock control register to identify keys for each lock and their current location and custody. Audit keys and locks each month, and inventory keys with each change of custody. Change or rotate locks at least once a year, and replace them if a key is compromised or lost.

Review Activity

Try answering the following questions. When you are finished, see the Answer Key at the end of this Student Guide to check your answers.

Question 1

You are choosing locking systems for various areas in your facility. What decisions would you make when considering the locking system for each area? For each question, select the best answer.

You need to decide what type of locking system to use for a storage closet. The closet does not hold classified or sensitive information, but you want to deter entry. Which type of key-operated lock should you use?

- A built-in lock
- A padlock

You are making a decision about the locking system to be used in an area that stores bulk Confidential or Secret material. Which type of key-operated lock should you use?

- A built-in lock
- A padlock

The area you are securing contains conventional arms, ammunition, and explosives (AA&E). Which type of key-operated lock should you use?

- A medium security padlock
- A deadbolt lock

Question 2

You have chosen locking systems for several areas in your facility. Which of the following guidelines should you now follow when considering key control? Select all that apply.

- Protect keys and locks at the same level as classified information they are safeguarding.
- Maintain a key and lock register.
- Replace keys and locks if they are lost or compromised.
- Do not remove keys from certain premises.
- Do not create master keys.
- Appoint a key and lock custodian to ensure proper custody and handling of locks and keys.
- Inventory keys at each change of custody.

Lesson Conclusion

In this lesson you learned about the types of key-operated locks, how they work, and some best practices for proper key control.

Answer Key

Question 1

You need to decide what type of locking system to use for a storage closet. The closet does not hold classified or sensitive information, but you want to deter entry. Which type of key-operated lock should you use?

- A built-in lock
- A padlock

You are making a decision about the locking system to be used in an area that stores bulk Confidential or Secret material. Which type of key-operated lock should you use?

- A built-in lock
- A padlock

The area you are securing contains conventional arms, ammunition, and explosives (AA&E). Which type of key-operated lock should you use?

- A medium security padlock
- A deadbolt lock

Question 2

- Protect keys and locks at the same level as classified information they are safeguarding.
- Maintain a key and lock register.
- Replace keys and locks if they are lost or compromised.
- Do not remove keys from certain premises.
- Do not create master keys.
- Appoint a key and lock custodian to ensure proper custody and handling of locks and keys.

- Inventory keys at each change of custody.

Student Guide

Course: Lock and Key Systems

Lesson: Combination Locks

Lesson Introduction

In this lesson, you will learn about the types of combination locks used by the DoD and their primary features and specifications. You will also learn some best practices for creating, protecting, and changing combinations.

The lesson objectives are:

- Identify types and components of combination locks used by the DoD and their purposes
- Identify the specifications each lock must meet in order to secure certain types of material or information
- Identify the requirements and recommendations for creating, protecting, and changing combinations

Combination Lock Types

1. Overview

Combination locks are used on security containers, vaults, and other secure rooms. There are two types of combination locks: padlock and built-in. There are also two types of built-in combination locks: electromechanical and mechanical. Let's take a closer look at each type of combination lock and their uses, features, and specifications.

2. Electromechanical Built-in Locks

Electromechanical combination locks are used for securing classified information. Electromechanical locks meet the most stringent combination lock requirements which are outlined in Federal Specification FF-L-2740 series. These locks are the KabaMas X-07, X-08, X-09, X-10, CDX-07, CDX-08, CDX-09 and CDX-10 locks, and the Sargent and Greenleaf, or S&G, 2740, S&G 2740B, and S&G 2890 PDL. The X-10, CDX-10, and S&G 2740B are new locks and fall under the latest specification in the FF-L-2740 series, FF-L-2740B. The remainder of locks shown here fall under FF-L-2740 requirements. The X-10, CDX-10, S&G 2740B, as well as the S&G 2890 PDL, are the most current locks and are the ones currently being manufactured. The Kaba Mas do not use a dial with imprinted numbers. Instead, they use a liquid crystal display known as an LCD. When using these locks, it is not necessary to count the number of rotations of the dial. Instead, the user simply turns the dial and stops when the correct number appears in the LCD. In addition, these locks are self-powered and require no batteries or outside power source. The S&G electromechanical combination locks operate much like the S&G 2937 mechanical combination lock. For the S&G 2740B, the dialing

sequence is dial left 2 full rotations, then direct dial right-left-right to all combination numbers. However, unlike the mechanical lock, the dial can be rotated more than the minimum number of rotations for entry of any combination number in case you overshoot the desired combination number. This lock is powered by a main battery which is a CR123A lithium camera-type battery and it also houses a long-life battery which is a CR2450 coin cell battery. Both batteries are on the underside of the lock cover.

The information in the box below will not be on the test, but it may provide you with useful background and insights.

Federal Specification FF-L-2740 series contains requirements that are the most stringent for any group of combination locks. Minimum requirements provide for:

- 20 man-hours of resistance to surreptitious entry by manipulation, radiological analysis, and emanation analysis
- 30 man-minutes of covert entry
- Mechanical tests of the bolt and lock case

a. Features

Here are the features of these electromechanical locks.

ELECTROMECHANICAL COMBINATION LOCKS											
Models	X-07	X-08	X-09	X-10	CDX-07	CDX-08	CDX-09	CDX-10	S&G 2740	S&G 2740B	S&G 2890PDL
For use on	Containers	Containers	Containers	Containers	Doors and vaults	Doors and vaults	Doors and vaults	Doors and vaults	Containers	Containers	Doors and vaults
Color	Black	Black	Gray	Gray	Black	Black	Gray	Gray	Black	Black	Black
Dial size	Small	Large	Large	Large	Small	Large	Large	Large	Large	Large	Large
Dial rotation	Left-right-left	Right only	Left-right-left	Left-right-left	Left-right-left	Right only	Left-right-left	Left-right-left	Left-right-left-right, at least 4 complete	left 2 full rotations, then direct dial right-left-right to all combination numbers	Left-right-left-right, at least 4 complete

The X-07, X-08, X-09, X-10, and the S&G 2740 and 2740B are for use on security containers, and the CDX-07, CDX-08, CDX-09, CDX-10, and S&G 2890 PDL are for use on doors and vaults. The X-07 and CDX-07 locks are black with a small dial. The X-07 and CDX-07 locks' dial rotations are left-right-left. The X-08, CDX-08, S&G 2740, S&G 2740B, and S&G 2890 PDL locks are black with a large dial. The X-08 and CDX-08 locks' dial rotations are unique—they are always turned to the right, except when first powering up the locks. The S&G 2740 and S&G 2890 PDL locks' dial rotations are left-right-left-right with at least 4 complete rotations. The S&G 2740B lock dial rotation is dial left 2 full rotations,

then direct dial right-left-right to all combination numbers. The X-09, CDX-09, X-10, and CDX-10 locks look like the X-08 and CDX-08 locks except that they are gray instead of black. Their dial rotation is left-right-left like the X-07 and CDX-07 locks.

3. Mechanical Built-in Locks

The S&G 2937 is the only approved mechanical combination lock under Federal Specification FF-L-2937, used for storage of secret and confidential information under field conditions and in military platforms, AA&E, and other sensitive DoD assets. It is typically mounted on 1 and 2 drawer field safes and armory and vault doors storing AA&E. The combination can only be changed with a key. The lock operates entirely by mechanical means and contains no electronics.

4. Padlocks

Combination padlocks are used for the storage of Secret or Confidential information such as approved bulk and temporary indoor storage areas. Components may place additional restrictions on the use of these locks or require supplemental controls, such as intrusion detection systems or security guards, when they are used to secure classified information. These locks must comply with Federal Specification FF-P-110. The S&G 8077 meets this specification.

How Do Combination Locks Work?

1. Overview

As you know, all locks share three basic components: the locking device which keeps area or container secured, the switching device which authorizes the cylinder to operate and open the locking device, and the operating mechanism which interacts with the switching device to allow or deny entry into a given area or container. In a combination lock, the locking device is a bolt. The switching device is a combination. And the operating mechanism is a wheel pack which is a collective set of devices that work together to “know” the combination.

2. Operating Electromechanical Locks

Let's take a closer look at how to operate an electromechanical built-in lock. Under the resource tab, you will find printable job aids with instructions on operating the current X-10 and S&G 2740B locks, as well as the X-07, X-08, X-09, and S&G 2740 locks. You will also find brief videos demonstrating how to operate these locks.

3. Changing Combinations on Electromechanical Locks

Now let's look at how to change the combination on an electromechanical built-in lock. We will look at the current X-10 and S&G 2740B locks, as well as the X-07, X-08, X-09, and S&G 2740 locks. Under the resource tab, you will find printable job aids with

instructions on how to change the combination for each of these electromechanical built-in locks. You will also find brief videos demonstrating how to change the combination of these locks.

Best Practices

1. Creating and Protecting Combinations

There are some best practices you should follow for creating and protecting combinations. These will help ensure you maximize the security your lock provides. It is important that your cleared employees know what they can and cannot do when it comes to creating, protecting, and changing combinations. Good security education is the key to safeguarding combinations.

a. Creating Combinations

Here are some guidelines for creating combinations to security containers and vaults. You should create a combination that is easy to remember, so that you don't have to write it down. A good way to do this is to think of a word that you would easily remember, but that others wouldn't easily guess. Take the first six letters of that word then envision a telephone keypad to find the numbers that correspond to the letters in your word. For example, if your word is Harley, then the corresponding combination numbers would be 42-75-39. Do not use any numbers that can be attributed to you or your organization such as Social Security numbers, telephone numbers, building numbers, or birth dates. Additionally, do not use number patterns such as 22-33-44, word patterns such as escape, ranger, mad dog, or secret, which can be easily related to where you work, or foul or vulgar words.

b. Protecting Combinations

Here are some guidelines for protecting combinations. Allow only a minimum number of authorized persons to have knowledge of a combination. Maintain a record of all persons who have knowledge of the combination. Protect the combination in accordance with the highest classification of information authorized for storage in the container. If a record is made of a combination, mark the record with the highest classification of information authorized for storage in the container. Then safeguard the record accordingly.

2. Changing Combinations

There are also best practices for changing lock combinations. These involve who may change them, when to change them, and how to change them to make sure the change takes effect.

a. Changing Combinations – Who?

Combinations may be changed only by an authorized person, or by the Security Manager or Security Officer, or his or her designee. Do not allow a commercial locksmith to change your combination to avoid compromising the combination when it is put into the lock.

The information in the box below will not be on the test, but it may provide you with useful background and insights.

An authorized person is a person who has a need-to-know for classified information in the performance of official duties and who has been granted a personnel security clearance (PCL) at the required level.

b. Changing Combinations – When?

Here are the required times when you should and should not change combinations.

Change combinations at the initial use of an approved container or lock. Change them when anyone who has knowledge of the combination is either terminated, has his or her clearance withdrawn, suspended, or revoked, or loses his or her need-to-know unless sufficient physical security measures exist to ensure the person cannot enter the facility again. Also change combinations when a container or its combination has been compromised or suspected of compromise, or when a container has been left unlocked and unattended. When a container is taken out of service, the combination must be reset back to the factory settings. The factory setting for a built-in container lock is 50-25-50. The factory setting for a padlock is 10-20-30 or the single number 25. Additionally, combinations must be changed at other times when deemed necessary by the Security Manager or Security Officer.

Finally, so that you will be less likely to forget your new combination, it is recommended that you never change a combination on Fridays, the day before a holiday, or up to three days before going on leave.

c. Changing Combinations – How?

Before changing combinations on a drawer lock, always remember to lock the drawer open to prevent accidental drawer closure. After changing combinations, try the combination three times to ensure it works before releasing the drawer lock.

Review Activity

Try answering the following questions. When you are finished, see the Answer Key at the end of this Student Guide to check your answers.

Question 1

You are selecting combination locks for your facility and must consider the requirements and features of various combination locks. For each question, select the best answer.

You need to review the requirements that electromechanical locks meet. Which of the following specifications should you reference?

- Federal Specification FF-L-2937
- Federal Specification FF-P-110
- Federal Specification FF-L-2740 series

You need to secure classified information. Which of these locks could you use?

- X-09 electromechanical lock
- S&G 2937 mechanical lock
- S&G 8077 padlock
- All of these locks

Which locks are currently being produced?

- S&G 2740B and Kaba Mas X-10
- S&G 8088 and Kaba Mas X-09
- Kaba Mas X-07 and X-08

Question 2

You need to open a security container that has an X-09 electromechanical lock. The combination is 27-4-39. For each question, select the best answer.

What should you do first?

- Turn the dial left to the number 27.
- Turn the dial left 4 to 6 turns.
- Turn the dial right to the number 27.
- Turn the dial right 2 turns.

Now that the lock is powered and numbers appear on the LCD, what should you do?

- Dial left to the number 27.
- Dial right to the number 27.

You have dialed left and the number 27 now appears on the LCD. What should you do next?

- Dial left to the number 4.
- Dial right to the number 4.

You have dialed right to the second number, 4. The number 4 now appears on the LCD. What should you do next?

- Dial left to the number 39.
- Dial right to the number 39.

You have dialed left to the third number, 39. The number 39 now appears on the LCD. What should you do next?

- The lock is retracted; the security container may be opened.
- Turn the dial to the left to retract the lock.

- Turn the dial to the right to retract the lock.

Now you need to open a security container that has an S&G 2740 lock. What type of lock is S&G 2740?

- Mechanical combination lock
- Electromechanical combination lock
- High security operated padlock

If you overshoot your combination when dialing the S&G 2740 lock, what should you do?

- Back up to the number
- Continue rotating the dial in the same direction for an extra turn, then stop precisely on the desired number
- Restart the process all over again

You just received a security container that has the S&G 2740 Electromechanical Safe Lock with a factory setting of 50-25-50. What should you do first?

- Change the combination
- Open the lock
- Calibrate the lock

Question 3

You are responsible for creating, protecting, and changing combinations in your facility. Which of the following guidelines should you follow? Select all that apply.

- Do not write a combination down.
- Do not change a lock's combination on a Friday or the day before you go on leave.
- Change a lock's combination if the container is discovered unlocked and unattended.
- Maintain records of who knows lock combinations.
- Safeguard the combination at appropriate classification level.

Lesson Conclusion

In this lesson you learned about the types of combination locks and how they work as well as best practices for creating, protecting, and changing combinations.

Answer Key

Question 1

You are selecting combination locks for your facility and must consider the requirements and features of various combination locks.

You need to review the requirements that electromechanical locks meet. Which of the following specifications should you reference?

- Federal Specification FF-L-2937
- Federal Specification FF-P-110
- Federal Specification FF-L-2740 series

You need to secure classified information. Which of these locks could you use?

- X-09 electromechanical lock
- S&G 2937 mechanical lock
- S&G 8077 padlock
- All of these locks

You are selecting combination locks for your facility and must consider the requirements and features of various combination locks. Which locks are currently being produced? use?

- S&G 2740B and Kaba Mas X-10
- S&G 8088 and Kaba Mas X-09
- Kaba Mas X-07 and X-08

Question 2

You need to open a security container that has an X-09 electromechanical lock. The combination is 27-4-39. For each question, select the best answer.

What should you do first?

- Turn the dial left to the number 27.

- Turn the dial left 4 to 6 turns.
- Turn the dial right to the number 27.
- Turn the dial right 2 turns.

Now that the lock is powered and numbers appear on the LCD, what should you do?

- Dial left to the number 27.
- Dial right to the number 27.

You have dialed left and the number 27 now appears on the LCD. What should you do next?

- Dial left to the number 4.
- Dial right to the number 4.

You have dialed right to the second number, 4. The number 4 now appears on the LCD. What should you do next?

- Dial left to the number 39.
- Dial right to the number 39.

You have dialed left to the third number, 39. The number 39 now appears on the LCD. What should you do next?

- The lock is retracted; the security container may be opened.
- Turn the dial to the left to retract the lock.
- Turn the dial to the right to retract the lock.

Now you need to open a security container that has an S&G 2740 lock. What type of lock is S&G 2740?

- Mechanical combination lock
- Electromechanical combination lock

- High security operated padlock

If you overshoot your combination when dialing the S&G 2740 lock, what should you do?

- Back up to the number
- Continue rotating the dial in the same direction for an extra turn, then stop precisely on the desired number
- Restart the process all over again

You just received a security container that has the S&G 2740 Electromechanical Safe Lock with a factory setting of 50-25-50. What should you do first?

- Change the combination
- Open the lock
- Calibrate the lock

Question 3

You are responsible for creating, protecting, and changing combinations in your facility. Which of the following guidelines should you follow? Select all that apply.

- Do not write a combination down.
- Do not change a lock's combination on a Friday or the day before you go on leave.
- Change a lock's combination if the container is discovered unlocked and unattended.
- Maintain records of who knows lock combinations.
- Safeguard the combination at appropriate classification level.

Student Guide

Course: Lock and Key Systems

Lesson: Course Conclusion

Course Summary

Protecting DoD assets, including classified information, is imperative for our national security. You learned that locking devices are an important part of ensuring that DoD assets are protected from loss or compromise. You learned about various types of lock and key systems, their purposes, and their components. You also learned how to properly protect and account for lock and key systems.

Lesson Review

Here is a list of the lessons in the course:

- Course Introduction
- Lock and Key Basics
- Key-Operated Locks
- Combination Locks
- Course Conclusion

Course Objectives

You should now be able to:

- √ Identify common types of locking devices
- √ Identify the primary parts of a locking device
- √ Identify considerations when choosing a lock
- √ Define master key systems
- √ Identify types of locks used by the DoD and their purposes
- √ Identify the specifications that each lock must meet, where applicable
- √ Identify the requirements and recommendations for key control
- √ Identify the requirements and recommendations for safeguarding and changing combinations

Conclusion

Congratulations. You have completed the Lock and Key Systems Course. To receive credit for this course, you *must* take the Lock and Key Systems examination. Please use the CDSE STEPP system to register for the online exam.