NAVAL FACILITIES ENGINEERING SERVICE CENTER
Port Hueneme, California 93043-4370

USER'S GUIDE
UG-2045-SHR

DEPARTMENT OF DEFENSE

PHYSICAL SECURITY EQUIPMENT GUIDE

DoD Lock Program
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TABLE OF CONTENTS

	Page
CHAPTER 1 INTRODUCTION	1-1
PURPOSE AND SCOPE	1-1
BACKGROUND	1-1
GUIDE ORGANIZATION	1-1
CHAPTER 2 ENTRY/EXIT CONTROL	2-1
ACCESS CONTROL SYSTEMS	2-1
Functional Description	2-1
Card Systems	2-1
Biometric Systems	2-2
Selection and Ordering Guide	2-5
Installation and Service	2-5
METAL AND EXPLOSIVES DETECTORS	2-6
Metal Detectors and X-Ray Equipment	2-6
Functional Description	2-6
Selection and Ordering Guide	2-7
Installation and Service	2-7
Explosives Detectors	2-8
Functional Description	2-8
Selection and Ordering Guide	2-9
Installation and Service	2-9
CHAPTER 3 SECURITY CONTAINERS/SAFES	3-1
SECURITY CONTAINERS	3-1
Functional Description	3-1
Selection and Ordering Guide	3-5
Installation and Service	3-11
BURGLARY-RESISTANT, FIRE-RESISTANT, AND MEDIA (DATA) SAFES	3-11
Functional Description	3-11
Selection and Ordering Guide	3-12
Installation and Service	3-14
VAULT DOORS	3-14
Functional Description	3-14
Selection and Ordering Guide	3-17
Installation and Service	3-18

TABLE OF CONTENTS (Continued)

	Page
MODULAR VAULT SYSTEMS	3-18
Functional Description	3-18
Selection and Ordering Guide	3-19
Installation and Service	3-19
PERSONAL SAFES	3-19
Functional Description	3-19
Selection and Ordering Guide	3-19
Installation and Service	3-20
CHAPTER 4 LOCKS AND LOCKSETS	4-1
COMBINATION LOCKS	4-1
Functional Description	4-1
Selection and Ordering Guide	4-3
Installation and Service	4-3
CYLINDRICAL, DEADBOLT, MORTISE, DROP-BOLT, RIM, AND UNIT LOCKS	4-4
Functional Description	4-4
Selection and Ordering Guide	4-6
Installation and Service	4-6
PADLOCKS	4-6
Functional Description	4-6
Selection and Ordering Guide	4-8
Installation and Service	4-8
INTERCHANGEABLE-CORE LOCKS	4-8
Functional Description	4-8
Selection and Ordering Guide	4-10
Installation and Service	4-10
SLIDING DOOR LOCKS	4-10
Functional Description	4-10
Selection and Ordering Guide	4-11
Installation and Service	4-11

TABLE OF CONTENTS (Continued)

	Page
MAGNETIC LOCKS	4-11
Functional Description	4-11
Selection and Ordering Guide	4-12
Installation and Service	4-12
OFFICE EQUIPMENT LOCKS AND CAM/CABINET LOCKS	4-12
Functional Description	4-12
Selection and Ordering Guide	4-13
Installation and Service	4-13
ELECTRIC STRIKES	4-13
Functional Description	4-13
Selection and Ordering Guide	4-13
Installation and Service	4-15
CHAPTER 5 KEY CONTROL	5-1
INDEXED KEY CONTROL CABINETS	5-1
Functional Description	5-1
Selection and Ordering Guide	5-2
Installation and Service	5-3
KEY-CONTROL SOFTWARE	5-3
Functional Description	5-3
Selection and Ordering Guide	5-4
Installation and Service	5-4
CHAPTER 6 SECURITY SEALS AND TAMPER-INDICATING DEVICES	6-1
MECHANICAL AND ELECTROMECHANICAL SECURITY SEALS	6-1
Functional Description	6-1
Selection and Ordering Guide	6-5
Installation and Service	6-5
ADHESIVE SECURITY SEALS AND TIDS	6-5
Functional Description	6-5
Selection and Ordering Guide	6-6
Installation	6-7

TABLE OF CONTENTS (Continued)

Page

CHAPTER 7 SECURITY HARDWARE 7-1

HINGE-SIDE DOOR PROTECTION 7-1

Functional Description 7-1
Selection and Ordering Guide 7-1
Installation and Service 7-2

EXIT DEVICES AND EMERGENCY EXIT HARDWARE 7-2

Functional Description 7-2
Selection and Ordering Guide 7-4
Installation and Maintenance 7-5

SECURITY CHAINS 7-5

Functional Description 7-5
Selection and Ordering Guide 7-5
Installation and Maintenance 7-5

WEAPONS RACKS 7-7

Functional Description 7-7
Selection and Ordering Guide 7-7
Installation and Maintenance 7-7

SECURITY HASPS 7-7

Functional Description 7-7
Selection and Ordering Guide 7-8
Installation and Maintenance 7-8

CHAPTER 8 MISCELLANEOUS SECURITY EQUIPMENT 8-1

ROUTINE AND EMERGENCY DESTRUCTION EQUIPMENT 8-1

Functional Description 8-1
Selection and Ordering Guide 8-2
Installation and Service 8-3

SECURITY COMMAND AND CONTROL CONSOLES 8-3

Functional Description 8-3
Selection and Ordering Guide 8-4
Installation and Service 8-4

CHAPTER 9 REFERENCES 9-1

TABLE OF CONTENTS (Continued)

	Page
GLOSSARY	Glossary - 1
APPENDIX A - MANUFACTURER LISTINGS	A-1
Access Control Systems	A-1
Continuous Hinges	A-3
Door Hardware, Locks, and Padlocks	A-4
Electric Strikes	A-5
Exit Hardware	A-5
Information and Emergency Destruction Equipment	A-6
Key Control Cabinets	A-6
Manual and Electric Turnstiles	A-7
Metal and Explosives Detectors	A-7
Modular Vaults	A-8
Office Equipment Locks	A-9
Security Safes and Containers	A-9
Security Seals and Tamper-Indicating Devices	A-11
Vault Doors	A-12

LIST OF FIGURES

2-1	Closed circuit television	2-1
2-2	Magnetic strip access control card	2-1
2-3	Bar code card	2-2
2-4	Proximity card	2-2
2-5	Hollerith card	2-2
2-6	Voice pattern access control system	2-2
2-7	Fingerprint access control system	2-2
2-8	Hand geometry access control system	2-3
2-9	Eye retina access control system	2-3
2-10	Signature system	2-3
2-11	Manual and electric turnstiles	2-4
2-12	Hand-held metal detector	2-7
2-13	Freestanding metal detector	2-7
2-14	X-ray metal detector	2-7
2-15	Portable explosives detector	2-8
2-16	Vapor detection system in use	2-8
2-17	MobileSearch™ system in action, scanning truckload of TV monitors	2-8
2-18	Backscatter image of car with cocaine simulant in trunk	2-8
2-19	Transmission image of van carrying power supplies and rifles.	2-9
2-20	Backscatter imager of van carrying power supplies and rifles	2-9
2-21	Transmission image of "boombox" with 2 pistols, 1 traditional and 1 plastic Glock 17	2-9
2-22	Backscatter image of "boombox" with 2 concealed pistols, 1 traditional and 1 plastic Glock 17	2-9
3-1	GSA Class 5 container	3-1
3-2	GSA single lock Class 6 container	3-2

TABLE OF CONTENTS (Continued)

Page

LIST OF FIGURES (Continued)

3-3 Optional accessories for containers 3-2
3-4 GSA label 3-3
3-5 Certification label 3-3
3-6 Identification label 3-3
3-7 GSA multi-lock Class 6 container 3-3
3-8 Map and plan container 3-4
3-9 Weapons storage containers 3-4
3-10 IPS container 3-5
3-11 Optional Form 89 3-13
3-12 Container anchoring methods 3-14
3-13 Burglary-resistant safe 3-15
3-14 Safe with encasement 3-15
3-15 Safe with steel cladding 3-15
3-16 Typical GSA-approved vault door 3-17
3-17 Vault door day gate 3-18
3-18 Modular vault system 3-19
3-19 Personal safes 3-20

4-1 Mechanical combination lock 4-1
4-2 Electromechanical combination lock 4-1
4-3 Combination deadbolt lock 4-2
4-4 Combination change key 4-3
4-5 Cylindrical key-in-knob or key-in-lever locks 4-5
4-6 Deadbolt lock 4-5
4-7 Mortise lock 4-5
4-8 Drop-bolt lock 4-5
4-9 Rim cylinder 4-5
4-10 Mortised cylinder 4-6
4-11 Unit lockset 4-6
4-12 Front-reading combination padlock 4-7
4-13 Bottom-reading combination padlock 4-7
4-14 S&G Model 8077 combination padlock 4-8
4-15 S&G Model 833C high-security padlock 4-8
4-16 Low-security padlocks 4-8
4-17 Interchangeable-core system 4-10
4-18 Security door pin 4-10
4-19 Keyed security pin 4-11
4-20 Security ("Charley") bar 4-11
4-21 Magnetic door lock 4-11
4-22 Type I equipment lock 4-12
4-23 Type II equipment lock 4-13
4-24 Type III and IV equipment lock 4-14
4-25 Electric strike 4-14
4-26 Inside of electric strike 4-14
4-27 Handing method 4-14

5-1 Wall-mounted key cabinet 5-1

TABLE OF CONTENTS (Continued)

Page

LIST OF FIGURES (Continued)

5-2 Assorted key cabinets and trays 5-1
5-3 Key control software unit 5-4

6-1 Lead-wire seal 6-1
6-2 Flat and ball strap seals 6-2
6-3 Steel and plastic shackle padlock seals 6-2
6-4 Wire and metal crimp seals 6-2
6-5 Bag strap seals 6-3
6-6 Cup seals 6-3
6-7 Bolt seal 6-3
6-8 Crimp cable loop seals 6-3
6-9 Railroad car door seals 6-3
6-10 Cable loop seal with snap-off twist bolt 6-3
6-11 Pull-tight sliding loop seals 6-4
6-12 Zipper-lock transport envelopes 6-4
6-13 Flag and cone cable seal 6-4
6-14 Reusable electromechanical seal 6-4
6-15 Document and package seals 6-6
6-16 Identification and anti-alteration overlay seals 6-6
6-17 Tamper resistant/indicating seal 6-6

7-1 Continuous hinge 7-1
7-2 Pin-and-socket hinge 7-1
7-3 Rim exit device 7-2
7-4 Mortise exit device 7-2
7-5 Surface vertical rod exit device 7-2
7-6 Concealed vertical rod exit device 7-3
7-7 Exit device with a safety alarm 7-3
7-8 Type I, Class I chain 7-5
7-9 Small arms storage rack 7-7
7-10 Mark 2 Mod 9 hasp 7-7
7-11 Wall mounting box 7-8

8-1 Shredding machines 8-1
8-2 Pulverizer and disintegrator 8-2
8-3 Volume shredder 8-2
8-4 Material destruction container 8-2
8-5 Wet-process pulper 8-3
8-6 Portable document destruction device 8-3
8-7 Double-bay console 8-4
8-8 Expanded capacities console 8-4

LIST OF TABLES

2-1 Access Control Systems 2-4
2-2 Access Control Systems Advantages and Disadvantages 2-6

TABLE OF CONTENTS (Continued)

Page

LIST OF TABLES (Continued)

3-1 Minimum Attack Requirements for GSA-Approved Security Containers 3-3
3-2 Security Container Requirements Documentation 3-6
3-3 Security Filing Cabinets Dimensions and Weights 3-6
3-4 Security Filing Cabinets Available through the Federal Supply Schedule 3-7
3-5 Security Map and Plan Containers Dimensions and Weights 3-10
3-6 Security Containers Available through the Federal Supply Schedule (Reference: AA-F-363) ... 3-10
3-7 Security Communications Containers Available through the Federal Supply Schedule 3-10
3-8 UL Standard 687 Classification Summary 3-16
3-9 GSA Vault Doors Available through the Federal Supply Schedule 3-20

4-1 Classification of Mounted Combination Locks 4-3
4-2 Combination Locks Available through Federal Supply Schedule 4-4
4-3 Cylindrical Lockset Configurations 4-5
4-4 Locksets Available through the Federal Supply Schedule 4-7
4-5 Federal Supply Schedule Security Padlocks Listing 4-9
4-6 Electric Strike Selection Guide 4-15

5-1 Key Control Cabinets 5-3
5-2 Key Capacities 5-5

6-1 Anti-Pilferage Seals 6-8

7-1 Exit Devices for Single Doors 7-3
7-2 Exit Devices 7-4
7-3 Type I - Class 1 Welded Steel, Alloy Chain 7-6
7-4 Type I - Class 4 Welded Steel, Proof Coil Chain 7-6
7-5 High-Security Hasps 7-8

8-1 Routine and Emergency Destruction Equipment 8-5

CHAPTER 1

INTRODUCTION

PURPOSE AND SCOPE

This user's guide serves as a reference document on physical security equipment for security personnel. It is not comprehensive, but serves as an overview and guide for security personnel to properly select and use security equipment.

BACKGROUND

Physical security measures:

- Safeguard personnel
- Reduces the potential for unauthorized access to equipment, facilities, material, and documents
- Protects against espionage, damage, and theft

The purpose of physical security is to make unauthorized access so difficult that an intruder will be deterred from attempting to penetrate a facility or will be forced to take actions that will result in his detection and apprehension.

GUIDE ORGANIZATION

This user's guide contains eight chapters. **Chapter 1** presents an introduction to the guide. **Chapters 2** through **8** discuss specific types of physical security equipment. Sections within each chapter provide a functional description of the equipment types, selection and ordering information, and installation and service information. **Appendix A** provides information on the manufacturers of the different types of physical security equipment. The **Glossary**provides definitions for the technical terms used in this user's guide. Contact the DoD Lock Program Technical Office Hotline: DSN: 551-1212 or (805) 982-1212; 1-800-290-7607; Fax: DSN: 551-1253 or (805) 982-1253 for additional information or information on products not included in this user's guide.

NOTE

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CHAPTER 2

ENTRY/EXIT CONTROL

ACCESS CONTROL SYSTEMS

Functional Description

Access control systems allow authorized personnel and material to move through normal access routes while detecting and delaying movement of unauthorized personnel and material. Access control adds little, if any, enhancement to a structure's physical barriers. The use of electrically operated locks and strikes with access control systems may actually reduce penetration delay times for doors. Thus, access control systems must be integrated with other components of the overall physical security system to be effective. This will ensure that personnel seeking entry to the protected area are queued at the control point(s). There are many different types of access control systems and they vary extensively in their complexity and capabilities. Personal computers have significantly increased the capabilities of these systems.

In the most simple systems, control of personnel access to protected areas is based on a basic authorization criterion, such as a photo identification badge or credential. Once authorization is established, access is granted by waving the person through the control point or by issuing a key, combination, or code to a lock installed at the control point.

Systems requiring less manpower that use closed circuit television (CCTV) and either a stored image or a picture badge to compare with the person seeking access (Figure 2-1) are also available. In systems using the stored image, the individual controlling access, likely located at a central location, compares the stored image of the authorized person with the person seeking access on the CCTV monitor and allows access remotely.

Card Systems

Card access control systems use a card encoded with data that is scanned by a reader at the entry control point. If the reader determines the card valid, it deactivates the locking system and grants access to the person with the card. Several different methods are used in encoding information on cards. The most common are:

- Magnetic stripe
- Bar code
- Proximity
- Wiegand wire
- Hollerith

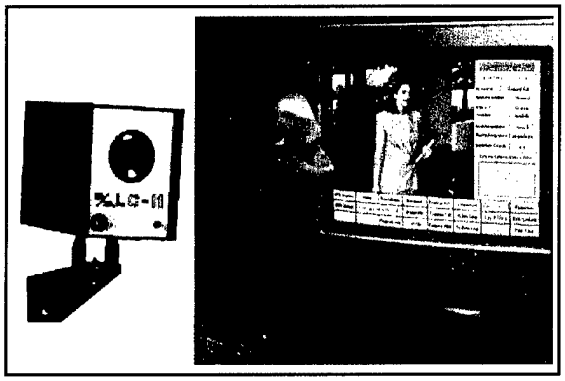


Figure 2-1. Closed circuit television.

Magnetic cards (Figure 2-2) use a magnetic stripe on which data is encoded. These cards are similar to common credit cards. Card holders may be required to use a personal identification number (PIN).

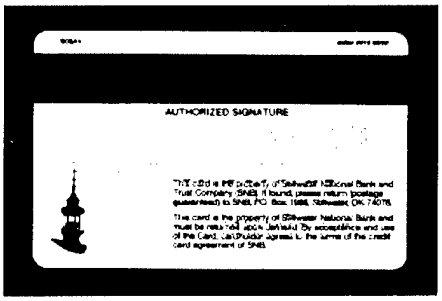


Figure 2-2. Magnetic strip access control card.

Bar code cards encode data with a series of vertical or horizontal stripes (Figure 2-3). The cards are read optically by a photodetector cell. Card holders may be required to use a PIN.

Proximity cards have embedded radio frequency circuits that create resonance frequencies that are read by the card readers. Unlike other card systems, the proximity card does not require that the card be inserted into a reader. This allows the reader to be installed behind a wall to protect it from vandalism and/or harsh environments and allows individuals carrying large parcels to enter without having to swipe their card through a card reader (Figure 2-4).

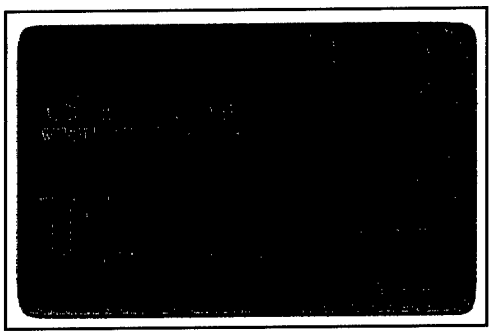


Figure 2-3. Bar code card.

Figure 2-4. Proximity card.

In **Wiegand wire cards**, specially processed small-diameter magnetized wire segments are embedded to form a pattern that, when passed through a reader, produces a sequence of voltage pulses that converts to a code.

Hollerith cards have a pattern of small holes punched into the card that represents data to the card reader (Figure 2-5). Most Hollerith cards are read by an optical reader that reads the light pattern passing through the holes.

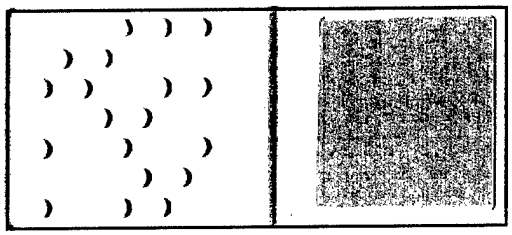


Figure 2-5. Hollerith card.

Biometric Systems

Recent advanced access control systems use biometric technology. Biometric systems use human characteristics that are individually unique. These include:

- Voice pattern
- Fingerprint
- Hand geometry
- Eye retina
- Signature

Voice patterns are designated characteristics that are recorded electronically when a person is given authorized facility access. Thereafter, when the individual seeks access, the person's voice pattern is measured against the recorded characteristic and, if the measurements are within system tolerances, access is granted. The shape and movement of the tongue, throat, and vocal cords make a person's voice unique. Voice pattern samples are recorded and digitized into a system (Figure 2-6). A person seeking access speaks a specific word or phrase into a microphone and the computer compares the voice to the samples previously recorded.

Figure 2-6. Voice pattern access control system.

Fingerprint systems electronically record fingerprints to include the minute variations in the loops, whorls, and arches (Figure 2-7). Variations are compared against the recorded fingerprint at the access control point. These systems can read fingerprints that are partially illegible from dirt or other causes.

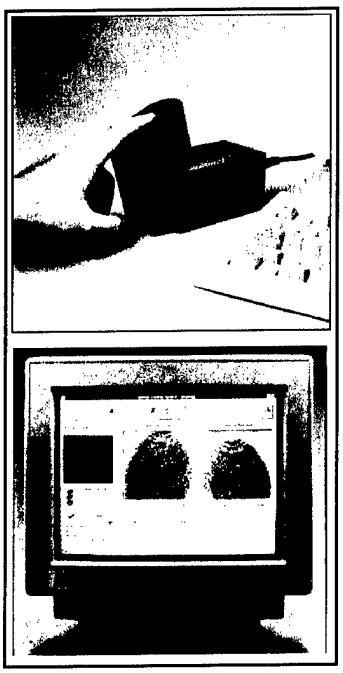


Figure 2-7. Fingerprint access control system.

Hand geometry uses the silhouette of a hand, finger length, and hand proportions, along with the curvature and webbing between fingers. For example, translucency of webbing between the fingers can be measured by a photosensitive device and electronically recorded. The person seeking access places a hand on a glass template with an overhead light source, and a photosensor measures the light intensity through the webbing (Figure 2-8). This measurement is then compared with the recorded data and access is granted if within tolerance.

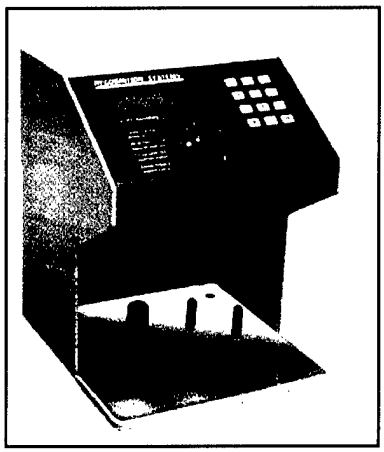


Figure 2-8. Hand geometry access control system.

Eye retinas are as unique to a person as fingerprints. In these systems, low-intensity infrared light is reflected and recorded from numerous checkpoints on the retina. The reflected pattern is then converted to a digital profile. This computer-stored pattern is compared at the entry control point through a lens and access is granted or denied based on the comparison (Figure 2-9).

Signature systems do not compare the actual form of signature. Comparison is made in the dynamics of the changes in downward pressure and vertical and horizontal pen movements when writing the signature. Several signatures are obtained to form a base comparator code. This code is compared at the entry control point using sensors built into a pen or electronic pad (Figure 2-10).

Note the numeric key pads associated with the hand geometry system in Figure 2-8 and the eye retina system in Figure 2-9. The combination of systems and the availability of system options are numerous. Systems that use personal computers to record and store access control information offer useful options such as recording names and time of entry and departure of all personnel entering and leaving a protected area. They may also be programmed to permit entry only at specific times to all or selected personnel. Table 2-1 summarizes basic access control systems.

Security turnstiles (Figure 2-11) provide an effective method of controlling personnel entry in heavy traffic areas and also provide a means to reduce possibility of "tailgating." Tailgating refers to one or more persons following an authorized person through the control point into the secured area. For example, a valid card is inserted into the card reader opening the door to the secured area and two individuals pass through the door. The turnstile design permits only one person at a time to pass through, reducing the possibility of tailgating.

Figure 2-9. Eye retina access control system.

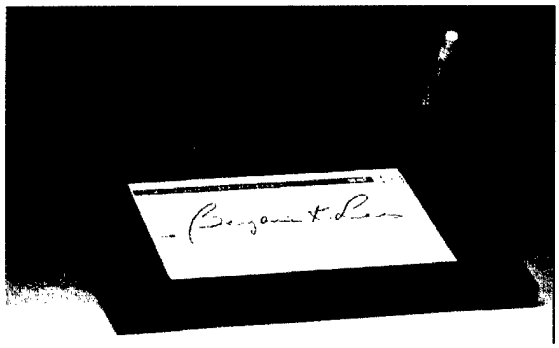
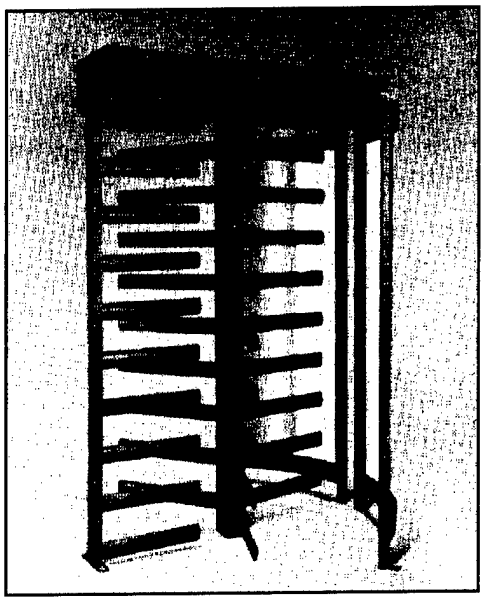


Figure 2-10. Signature system.

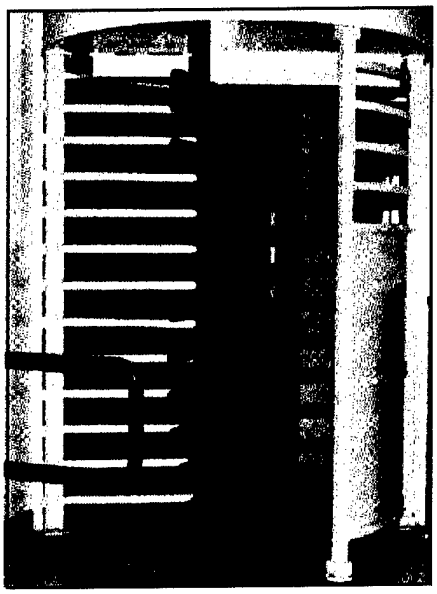
The turnstiles shown in Figure 2-11 are available in manual or electric models. The electric model is compatible with all types of access control systems.

Table 2-1. Access Control Systems

System Type	Access Control System	Description
Manual Identification	Photo ID Badges or Credentials	Guard visually checks credential or photograph, or compares badge with duplicate badge held at each entry point. The guard then exchanges duplicate badge with employee's badge if they match.
Machine-Enhanced	CCTV System	Uses CCTV camera, monitor, electric door strike, and security guard. If person seeking access is cleared for entry, guard pushes button to release an electric door strike.
Automated	Mechanical Push-Button Combination Locks	Uses combination push-button panel to deactivate locking device. Combinations can be preset to limit access to authorized individuals only. Also available with key bypass features.
	Electronic Push-Button Locks	Uses programmable push-button panels with preset codes to release electric door strikes, electrified deadbolt locks, automatic door openers, parking gates, and other types of electric door locks. Electronic push-button locks can also be used with card readers to provide added protection.
	Electronic Card Readers	Uses various methods to read access control cards to limit access to only authorized individuals. Card readers available include: optical coding, magnetic coding, magnetic stripping, passive electronic coding, and active electronic coding. Control cards can be used alone or with an electronic push-button combination device.
	Biometric Systems	Uses unique individual physical characteristics for personnel identification.



(a) Manual turnstile



(b) Electric turnstile

Figure 2-11. Manual and electric turnstiles.

Selection and Ordering Guide

The degrees of sophistication, capability, and cost vary greatly among access control systems. Selecting an access control system depends on the value of protected assets, number of persons using the system, type of facility, and the level of control required.

System error rates are also important. Access control system errors are grouped into two groups: **Type I** errors reject a person who is authorized access. **Type II** errors accept a person who is not authorized access. While Type II errors cause a breach in security, Type I errors can affect employee morale, increase the time in the queue, and adversely affect production and performance. Check the manufacturer's performance specifications for error rates.

Another important consideration is the number of personnel requiring access at specific times. For example, if 300 personnel enter and exit a protected area during a shift change, the access control system must have a rapid response time for granting or rejecting entry. One solution to the queuing problem is to have multiple access points, each integrated into the control system.

Environmental considerations are important in selecting systems. Temperature, extreme humidity, and the presence of local electromagnetic interference may adversely affect systems. Planning is a key factor in selecting and using an effective access control system. A list of key planning considerations for selecting access control systems is:

a. What is the number of required control points?

b. How many people are expected to use each control point, and how often?

c. What are the security requirements for each protected area?

d. Are different access levels required?

e. What are the environmental conditions at the control point?

f. What are the Type I and Type II error rates for the equipment being considered?

g. What is the system processing speed? Will it handle the number of people expected?

h. Is the equipment compatible with other elements of the security system?

i. What are the system maintenance requirements? What is the mean time between failure of the system and its components under the expected use? Who will maintain the system?

j. What is the access enrollment time for an individual? Is it user friendly? What are the qualification requirements for the person managing the enrollment?

k. Is the system expandable to meet future growth requirements?

l. Does the system have a backup power source in case of power failure?

m. Will the system detect tampering?

n. What are the audit requirements?

Other considerations may apply depending on local conditions and requirements. Table 2-2 lists advantages and disadvantages of some of the basic systems.

All associated expenses should be included in evaluating cost for access control systems. While a photo identification system may appear inexpensive when compared to an automated card reader system, the additional cost for the guard required with the photo identification system must be considered. Over time, automated systems normally are more cost effective.

Access control systems are available through the Federal Supply Schedule (FSS) for "Alarm and Signal Systems: Miscellaneous Alarms and Signals" (FSS Group 63, Part I, FSS Class 6350). Photographic supplies and equipment for photo identification badges are available through the FSS for "Photographic Supplies and Equipment" (FSS Group 67, Parts II and III, Section B, FSS Class 6720).

Appendix A lists manufacturers of access control systems and equipment.

Installation and Service

Users should refer to specific manufacturer's instructions for installation and service requirements. Proper maintenance of an access control system is necessary to provide a properly operating security system.

Poor installation or the wrong hardware may degrade the equipment and the facility security system. Scheduled preventive maintenance will keep the access control systems in proper working order.

Table 2-2. Access Control Systems Advantages and Disadvantages

System	Advantages	Disadvantages
Photo ID	• Low cost (depending on the number of guards required to man control points). • High throughput rate. • Not affected by the environment. • Counterfeiting can be reduced by engraving logos on front of ID cards.	• ID cards easily counterfeited. • ID cards can be stolen and altered. • Human complacency. • Guard fatigue or inattention during high throughput rates. • Access codes, combinations, and keys can be compromised. (Note: Using CCTV with stored images reduces the use of counterfeit or stolen cards.) • Guard cost is a recurring annual cost.
Card Readers	• Automated system reduces guard force requirements. • Versatile, can record and produce a variety of data such as log in/log out times for each individual. • Variety of card encoding methods. • Medium rate of throughput. Higher throughput can be achieved using proximity reader systems.	• Lost or stolen cards can be used by someone for unauthorized access. • Possible Type I and Type II error rates. • Passback - someone uses a card to gain access then passes back the card to another person to use at a later time. • Tailgating - when one or more individuals follow a user granted access through the control point before the door closes. • Cards may be affected by electromagnetic interference. • Environmental extremes may affect card readers, particularly those located outdoors.
Biometric Systems	• Least vulnerable to compromise and defeat. • Does not require active knowledge or possession by an individual of codes, cards, or keys to gain access.	• Enrollment time. • High cost. • Possible Type I and Type II error rates. • Some physical characteristics change over time or because of illness. Voice patterns change with age. • Dental work, severe colds, etc. may also affect voice patterns. • Heart conditions may affect eye retina patterns. • Tailgating may happen.

METAL AND EXPLOSIVES DETECTORS

Metal Detectors and X-Ray Equipment

Functional Description

Metal detectors used with access control equipment can perform two functions: (1) Detect the presence of concealed metal objects and (2) determine the size of those objects.

Metal is detected by measuring the change in an established magnetic field when dense metal or ferrous materials are moved through the field. The antenna of a detector sets up a magnetic field around itself. As the antenna of the detector is brought near metal or metal is moved past the antenna, the pitch from a tone generator increases, thereby alerting the operator to the presence of metal. Measurement capabilities are adjustable allowing for varying the amount of metal desired to be detected.

X-ray systems are used to inspect packages and luggage for concealed weapons and explosives. Some systems can only detect objects made of materials possessing high atomic numbers, such as steel, tin, aluminum, and iron. Other systems can detect materials with both high and low atomic numbers. X-ray systems

can detect guns, knives, and explosive devices (provided heavy wire is used with the electric detonating device). Other systems normally use two television monitors, one to display high atomic number materials and the other for low atomic number materials. Color systems presently available use only one monitor to view both types of materials. Specific colors are assigned to high and low atomic number materials. Such systems can detect and discriminate among plastics, metals, and explosives in firearms and bombs.

Selection and Ordering Guide

Metal detectors come in three basic configurations:

- Hand-held (Figure 2-12)
- Freestanding or walk-through (Figure 2-13)
- X-ray (Figure 2-14)

Hand-held devices are small, wand-like probes with circular or elliptically-shaped antennas. These detectors can be used to pinpoint the location of concealed metal objects after initial detection has been made by a freestanding detector.

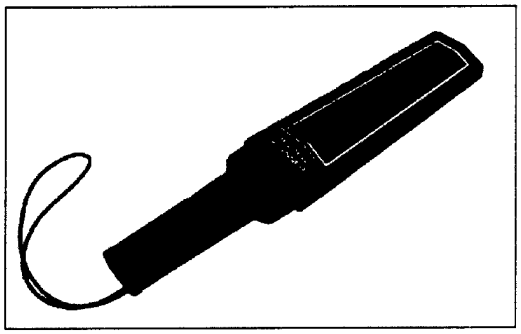


Figure 2-12. Hand-held metal detector.

Freestanding or walk-through (see Figure 2-13) metal detectors provide a passageway through the antenna loop. When metal objects passing through the loop exceed the preset size, an alarm is activated. Some models have a number of antenna loops within the passageway. This feature allows more accurate object location without additional hand-held detectors. Multiple-loop detectors may not be as flexible or cost effective as the joint use of a walk-through and hand-held detector. Walk-through detectors must meet National Institute of Justice (NIJ) Standard 0601.00.

X-ray equipment models may be portable or stationary. Some models operate like a fluoroscope, where images of objects are projected onto a TV screen, while

Figure 2-13. Freestanding metal detector.

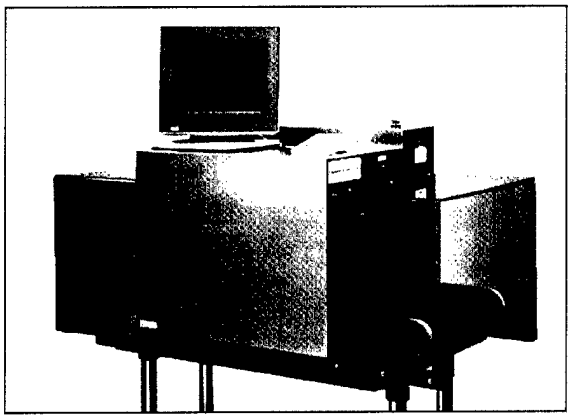


Figure 2-14. X-ray metal detector.

others operate radiographically through negative development. Figure 2-14 shows an X-ray system used for routine mass screening of parcels or baggage.

Metal detectors and X-ray equipment are found in Federal Supply Schedule Group 84, Part VI, Section A under Special Item Number 426-4K.

Installation and Service

Follow manufacturer's instructions for installation, maintenance, and operation. Equipment operators must be well trained to efficiently detect weapons and

explosive devices. Detection effectiveness may be maintained through periodic testing of operators and equipment. For service, contact the manufacturer.

Explosives Detectors

Functional Description

There are a many operating principles used in explosive detection equipment. The most common detection principles are trace detection systems, vapor detection systems, and x-ray and gamma ray imaging systems. Each method of detection has associated capabilities and limitations. Explosive detection equipment (EDE) can cost anywhere from a few hundred to several million dollars, depending on the capability of the device.

Trace detection systems work on the principle that minute quantities of explosive residue remain after handling improvised explosive devices (IED), and that those residues may be detected after sampling and analysis. Wiping a suspect area with a small cloth or mesh screen and inserting it into the device for analysis does sampling. Trace detection devices are most useful in personnel and individual package searches.

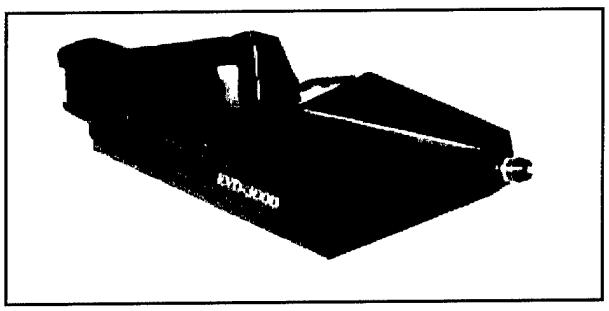


Figure 2-15. Portable explosives detector

Vapor detection systems work on the principle that all things have a measurable, consistent vapor pressure associated with them. IED's have an associated vapor pressure that may be detected through sampling. The method of sampling in these devices is typically done by drawing in a sample of air with a vacuum-like device (Figure 2-15). Vapor detection systems usually work best on searches involving large packages, car trunks, etc.

Figure 2-16. Imaging system in use.

Imaging systems use x-rays, gamma rays, or specialized cameras to look inside boxes, packages, vehicles, and people to create images displayed on a screen (See Figures 2-16 through 2-22). These images do not detect the presence of explosives or other contraband. Instead, they create images that need to be interpreted by the operator to determine if there is cause for an alarm or further investigation.

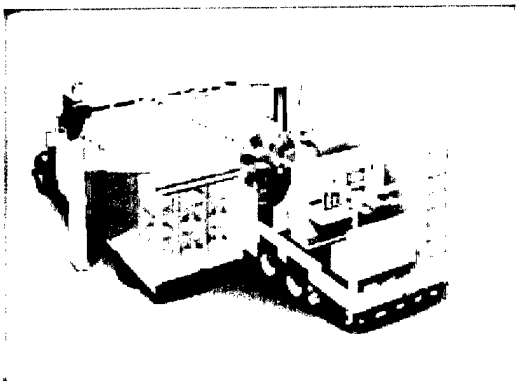


Figure 2-17. MobileSearch™ system in action, scanning truckload of TV monitors.

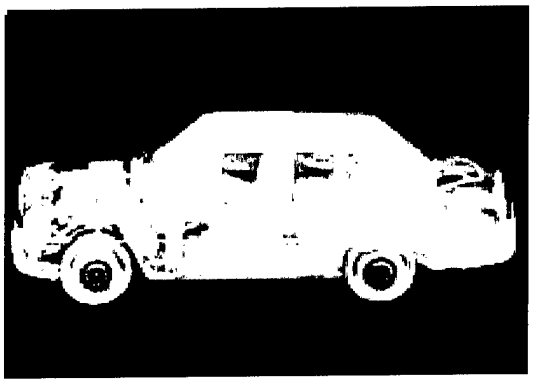


Figure 2-18. Backscatter image of car with cocaine simulant in trunk.

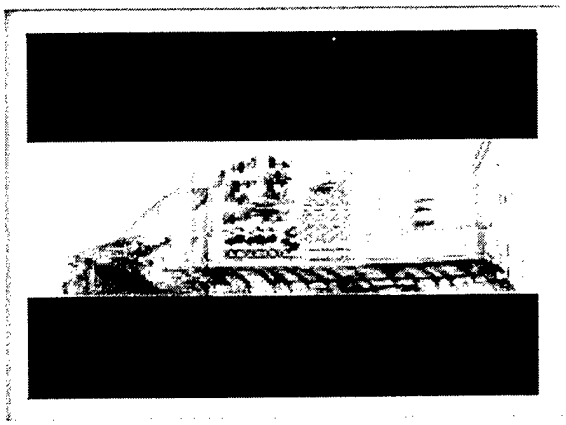


Figure 2-19. Transmission image of van carrying power supplies and rifles.

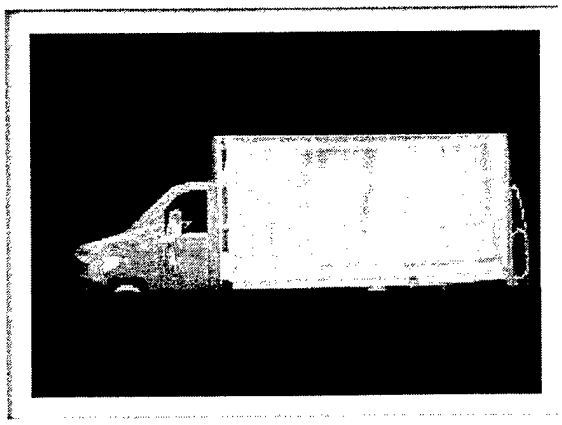


Figure 2-20. Backscatter image of van carrying power supplies and rifles.

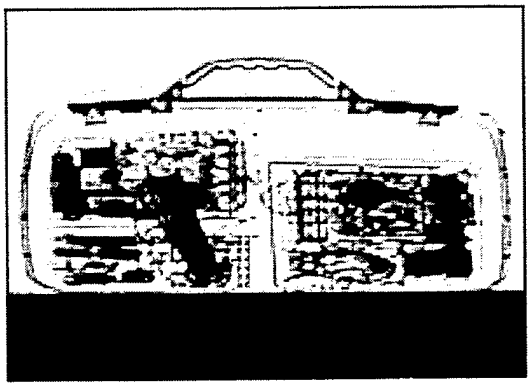


Figure 2-21. Transmission image of "boombox" with 2 pistols, 1 traditional and 1 plastic Glock 17.

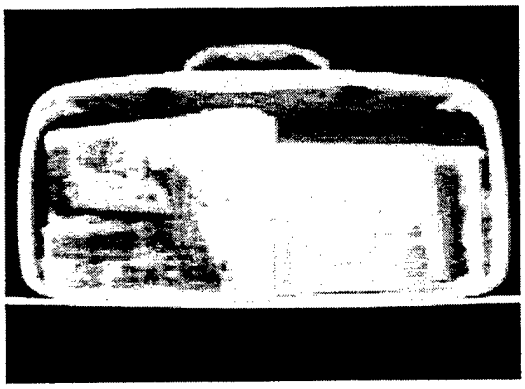


Figure 2-22. Backscatter image of "boombox" with 2 concealed pistols, 1 traditional and 1 plastic Glock 17.

Selection and Ordering Guide

There are many factors to consider when procuring EDE. Some of the most basic involve budget and manpower restrictions, since some systems can cost millions of dollars and require up to three dedicated operators. Careful research into the state of the technology, and up front development of a viable concept of operations can aid in the EDE selection process.

The Navy Explosive Detection Equipment Program website (www.explosivedetection.nfesc.navy.mil) is a valuable resource for those considering purchase of EDE. There is also an online catalog, a procurement considerations guide to EDE, and other valuable information.

Installation and Service

There are many requirements and instructions associated with the installation and service of EDE. Consult the Navy EDE website or the manufacturer for specific information.

Table 3-4. Security Filing Cabinets Available Through Federal Supply Schedule
(Reference: Federal Specification AA-F-358G)

Class	Size	Number of Drawers/Type	Lock Configuration[1]	Finish[2]	NSN
5	I	2/Legal	Single	Gray Black Parchment Walnut	7110-00-082-6111 7110-01-015-2850 7110-01-012-8739 7110-01-309-1934
5	III	4/Legal	Single	Gray Black Parchment Walnut	7110-00-082-6112 7110-01-012-8740 7110-01-012-8741 7110-01-309-1936
6	I	2/Legal	Single	Gray Black Parchment Walnut	7110-00-920-9342 7110-01-015-4638 7110-01-015-4639 7110-01-309-1956
6	II	4/Letter	Single	Gray Black Parchment Walnut	7110-01-309-1957 7110-01-309-1958 7110-01-309-1959 7110-01-309-1960
6	III	4/Legal	Single	Gray Black Parchment Walnut	7110-00-920-9343 7110-01-015-4266 7110-01-050-6060 7110-01-309-1961
6	IV	5/Letter	Single	Gray Black Parchment Walnut	7110-01-309-1962 7110-01-309-1963 7110-01-309-1964 7110-01-309-1965
6	V	5/Legal	Single	Gray Black Parchment Walnut	7110-00-919-9193 7110-01-015-6099 7110-01-015-6100 7110-01-309-1966
6	VI	2/Special	Single	Gray Black Parchment Walnut	7110-00-919-9213 7110-01-016-5802 7110-01-015-6101 7110-01-309-1967
6	VII	1/Special	Single	Gray Black Parchment Walnut	7110-00-919-9214 7110-01-015-3196 7110-01-018-4301 7110-01-309-1968

Table 3-4. Security Filing Cabinets Available Through Federal Supply Schedule (continued)

Class	Size	Number of Drawers/Type	Lock Configuration[1]	Finish[2]	NSN
6	VIII	1/Special	Single	Gray Black Parchment Walnut	7110-01-919-9306 7110-01-015-2851 7110-01-015-2852 7110-01-309-1969
6	X	2/Letter	Single	Gray Black Parchment Walnut	7110-01-309-1970 7110-01-309-1971 7110-01-309-1972 7110-01-309-1973
6	I	2/Legal	Dual	Gray Black Parchment Walnut	7110-01-264-8473 7110-01-309-1989 7110-01-309-1990 7110-01-309-2038
6	III	4/Legal	Dual	Gray Black Parchment Walnut	7110-01-264-8476 7110-01-309-1991 7110-01-309-1992 7110-01-309-1993
6	IV	5/Letter	Dual	Gray Black Parchment Walnut	7110-01-309-1998 7110-01-309-1999 7110-01-309-2000 7110-01-309-2001
6	V	5/Legal	Dual	Gray Black Parchment Walnut	7110-01-264-8477 7110-01-309-2003 **7110-01-309-2004**[3] 7110-01-309-2005
6	VI	2/Special[4]	Dual	Gray Black Parchment Walnut	7110-01-264-8481 7110-01-309-2006 7110-01-309-2007 7110-01-309-2039
6	VII	1/Special[4]	Dual	Gray Black Parchment Walnut	7110-01-264-8482 7110-01-309-2008 7110-01-309-2009 7110-01-309-2010
6	VIII	1/Special[5]	Dual	Gray Black Parchment Walnut	7110-01-264-8483 7110-01-309-2011 7110-01-309-2012 7110-01-309-2013
6	I	2/Legal	Multi	Gray Black Parchment Walnut	7110-01-029-5767 7110-01-029-8055 7110-01-030-9009 7110-01-309-1988

Table 3-4. Security Filing Cabinets Available Through Federal Supply Schedule (continued)

Class	Size	Number of Drawers/Type	Lock Configuration [1]	Finish[2]	NSN
6	IV	5/Letter	Multi	Gray Black Parchment Walnut	7110-01-309-1994 7110-01-309-1995 7110-01-309-1996 7110-01-309-1997
6	V	5/Legal	Multi	Gray Black Parchment Walnut	7110-01-029-0389 7110-01-029-8059 7110-01-029-8058 7110-01-309-2002
6	V	5/Legal	1-Dual 4-Single	Gray Black Parchment Walnut	7110-01-264-8478 7110-01-309-2014 7110-01-309-2015 7110-01-309-2016
6	V	5/Legal	2-Dual 3-Single	Gray Black Parchment Walnut	7110-01-264-8479 7110-01-309-2017 7110-01-309-2018 7110-01-309-2019
6	V	5/Legal	5-Dual	Gray Black Parchment Walnut	7110-01-264-8480 7110-01-309-2020 7110-01-309-2021 7110-01-309-2022
6	I	2/Legal	2-Dual	Gray Black Parchment Walnut	7110-01-264-8474 7110-01-309-2023 7110-01-309-2024 7110-01-309-2025
6	I	2/Legal	1-Dual 1-Single	Gray Black Parchment Walnut	7110-01-264-8475 7110-01-309-2026 7110-01-309-2027 7110-01-309-2028

[1]Lock Configuration: Single - one lock in one drawer controls all drawers
Dual - two locks in one drawer controls all drawers
Multi - independently locked drawers, one lock per drawer
Dual/Single - independently locked drawers, number of drawers controlled by one or two locks as indicated

[2]Finish: Walnut = Walnut woodgrain finish

[3]See page 3-11, left column for explanation.

[4]For use only in mobile or transportable tactical communication assemblages

[5]Field Safe: For use by military units in the field for safeguarding classified information. Locks must meet the requirements for Group 1R locks under ANSI/UL Standard 768.

Table 3-5. Security Map and Plan Containers Dimensions[1] and Weights

Class/Size	Height	Width	Depth	Weight[2]
5/I	51-1/4	22	39	990
5/II	43-1/2	35-3/4	26-3/4	---
5/IV	28-1/2	23-1/4	24	---
6/I	51-1/2	22	38	1020
6V	69-3/4	34-1/2	45-1/2	---

[1] Dimensions - Maximum overall outside dimensions in inches, excluding face hardware.
[2] Weights - Maximum weight in pounds without racks, hangers, or other optional accessories

Table 3-6. Security Containers Available through the Federal Supply Schedule (Reference: AA-F-363)

Class	Size	Lock Type[1]	Configuration[2]	Finish	NSN
5	I	II	Single	Gray Black Parchment	7110-00-931-0770 7110-01-017-3546 7110-01-017-3547
5	II				
5	IV	II	Single	Gray Black Parchment	7110-00-309-2032 7110-01-309-2033 7110-01-309-2034
6/29	II	II	Single	Gray	7110-00-928-8689
6/30	V	III	Single	Gray Black Parchment	7110-00-309-2035 7110-01-309-2036 7110-01-309-2037
6/31	I	II	Single	Gray Black Parchment	7110-00-931-0771 7110-01-019-0408 7110-01-024-5958

[1] Type II - Does not have map and plan hangers and suspensions. All are style B without channel base assembly.
Type III - Have ten 2-inch high drawers for flat filing of drawings; maximum size 36" x 48" drawings.
[2] Single - One lock controls the door.

Table 3-7. Security Communications Containers Available through the Federal Supply Schedule

Model	Door	Height (in.)	Width (in.)	Depth (in.)	Special Item Number[1]
30-39	Single	30-1/2	22	39	489 -163
30-31	Single	30-1/2	22	31	489 -164
54-40	Double	54-1/2	22	40-1/2	489 -165

[1] FSS Special Item Number provides container with one UL Group 1R lock.

To obtain specific dimensions and weights for the container selected, find the size code in column 2 on the same line in Table 3-4, which in this case is "V," then combine that letter with the Class of the container to form the "Class/Size Code '6V'." Go to Table 3-4 and locate 6V in columns 1 and 2. Reading across this row (also underlined and in bold type) will provide the specific height, width, depth, and weight of the security filing cabinet specified.

All containers used to store classified material must have combination locks meeting the requirements of Federal Specification FF-L-2740. A Federal Specification FF-L-2740 combination lock will be installed in new containers being procured from manufacturers. Specifying FF-L-2740 assures that the combination lock supplied will meet DoD requirements for securing classified material.

The retrofit program replacing MIL-L-15596 combination locks in existing containers is a major ongoing effort by the DoD Lock Program. Lock replacement priorities are provided in Section C of Appendix G in DoD Regulation 5200.1R. The latest technical information concerning these locks should be obtained from the DoD Lock Program Technical Office before replacing or procuring a new security container. The Hotline number for the DoD Lock Program Technical Office is DSN: 551-1212 or (805) 982-1212.

Many filing cabinets and containers, available in various shapes and sizes, are listed by manufacturers as "security" cabinets and containers. Many of these have not been manufactured to meet the provisions of a Federal Specification for a GSA-approved container. Non-approved containers cannot be used for the storage of classified documents or material even though they may be equipped with a combination lock meeting Federal Specification FF-L-2740.

Appendix A lists manufacturers who provide GSA-approved security containers. Manufacturers should be consulted for availability of container designs, locking devices, and accessory items.

Installation and Service

Security containers are shipped from the manufacturer with a standard combination: 50-25-50. After receiving the container, an authorized and qualified locksmith should inspect the security container and locking mechanisms for proper operation. A new combination must be set before the container can be used. When a container cannot be opened with the verified combination by user personnel, it becomes "locked out." When a container is "locked out," contact your appropriately cleared facility locksmith, the DoD Lock Program, or the manufacturer for assistance. Anytime a security container is serviced or repaired, the work must be recorded on the appropriate military component service's record for the container. Keep this form as a permanent record inside the container. An example of this form (Optional Form 89) is shown in Figure 3-11.

Any GSA-approved container that weighs less than 750 pounds and is used to store currency or sensitive items such as drugs, items associated with drug abuse, or precious metals must be securely anchored to the floor or wall of the structure where the container is located. Various methods for anchoring security containers are possible. Anchoring methods must be evaluated for each specific situation to assure proper tie-down fabrication. Three possible methods are suggested for various floor surfaces as shown in Figure 3-12. These are only intended to aid in developing an appropriate means to anchor containers.

When using angle iron, use at least two pieces that run the entire length of the side of the container to which they are welded. The position of the angle iron should not interfere with drawer operation. Minimum sizes of components are also suggested in Figure 3-12. Care must be taken to never drill, burn, or punch a hole in a security container when fabricating the anchoring system. Any such damage to the container invalidates the container's security integrity for storage of classified materials.

Follow recommendations of the local security department for anchoring security cabinets. For further assistance call the DoD Lock Program Technical Hotline, DSN: 551-1212, (805) 982-1212, or 1-800-290-7607.

BURGLARY-RESISTANT, FIRE-RESISTANT, AND MEDIA (DATA) SAFES

Functional Description

Burglary-resistant safes are designed to resist forced entry techniques. Burglary-resistant safes are used to store currency, negotiable documents, controlled substances and valuables (i.e., jewels, precious metals, narcotics). Burglary-resistant safes ***cannot*** store classified materials.

Burglary-resistant safes are rated under Underwriters Laboratories, Inc. (UL) Standard 687, "Standard for Burglary-Resistant Safes." UL has developed a classification system to represent the degree of protection provided by burglary-resistant safes. The UL classification system consists of two or four letters followed by a number. The following two-letter codes are used to represent the type of tools and devices that the safe can resist.

a. "TL" denotes "tool resistant," i.e., hand and power tools.

b. "TR" denotes "torch resistant," i.e., oxyacetylene cutting torch.

c. "TX" denotes "explosive resistant."

The number following a two- or four-letter code represents the number of man-minutes a safe is able to withstand the type of attack indicated by the two-letter code(s). Table 3-8 lists the different UL classifications for burglary-resistant safes and the corresponding attack tools/devices that a safe can resist for each specific classification.

When "X6" follows the letter/numeral code, the "X6" indicates that the safe is tested for protection on all six sides. The UL classification "Deposit Safe" signifies that the safe can not only withstand the same tool attacks used for the TL-15 safe but that the deposit mechanism can also withstand deposit packet "fishing attacks"" specified in Standard 687.

Table 3-8 also includes the maximum monetary amount authorized for storage by DoD 5200.8R, "Physical Security Program" in each classification. Figure 3-13 is an example of a burglary-resistant safe.

UL listed burglary-resistant safes are required to use UL Group 1, 1R, or 2 combination locks. The lock group required for each safe classification is also indicated in Table 3-8.

UL listed combination locks use a relocking trigger. The relocking trigger activates when the lock is subjected to certain attacks. Once the relocking trigger is activated, the lock will not operate normally and the safe becomes "locked out."

UL Standard 687 requires that safes weighing less than 750 pounds have a means of anchoring along with anchoring instructions. Such safes must be anchored in a larger safe, concrete block, or in some manner to the structure where the safe is located. Anchoring minimizes unauthorized removal of these safes. Figure 3-12 provides some alternative anchoring techniques. **Never** weld to a GSA safe. Safes weighing 750 pounds or more do not require anchoring.

Safes are required to be marked with the manufacturer's name or trademark, location of manufacture, date of manufacture, and have a UL listing label affixed. A summary of UL standards and DoD regulations pertaining to burglary-resistant safes follows.

- **UL Standard 687** - "Burglary-Resistant Safes"

Describes UL requirements and testing for combination locked burglary-resistant safes.

- **UL Standard 768** - "Combination Locks"

Describes UL requirements and testing for Group 1, 1R, 2M and 2 combination locks intended for attachment on doors of safes, chests, and vaults.

- **DoD 5200.8-R** - "Physical Security Program"

Another safe is the GSA-approved, tool-resistant safe. These are not the same as burglary-resistant safes. Tool-resistant safes were manufactured in accordance with Federal Specification AA-S-1518 but are no longer being manufactured. Existing tool-resistant safes may continue to be used. Tool-resistant safes that bear a "GSA Approval Label" are approved for storage of classified materials; however, tool-resistant safes must not be used to store classified materials or documents and valuables together.

Selection and Ordering Guide

Burglary-resistant safes are available in different UL classifications (levels of protection), standard sizes, and styles. Burglary-resistant safes can also be built to customer specifications. A variety of accessories are available, such as:

- intrusion detection devices
- time locks
- key locking dials
- locking bolt detents
- interior safe options

Interior safe options include inner doors, lockers, shelves, drawers, and interior container locks; however, interior safe options vary between various manufacturers.

No less than a Group 1 combination lock should be used on burglary-resistant safes. A Group 1R lock should be used if the security assessment indicates a possibility of radiological attack being used. Combination locks meeting Federal Specification FF-L-2740 requirements are recommended for storage of highly sensitive materials. Group 1 and 1R and Federal Specification FF-L-2740 compliant combination locks may be considered optional equipment when ordering.

Encasements and steel cladding for safes are also available. Figure 3-14 shows a safe in an encasement and Figure 3-15 shows how steel cladding may be used around a safe. Encasements may be filled at the factory or, to reduce shipping costs, a safe can be shipped from the factory with its encasement empty. The encasement is then filled after the safe arrives at its destination. Contact manufacturers for more information on type and availability of safes and interior/exterior options.

A list of safe manufacturers may be found in Appendix A. Safes are found in Federal Supply Schedule 71 III E under Special Item Number (SIN) 489-166.

CHAPTER 4

LOCKS AND LOCKSETS

COMBINATION LOCKS

Functional Description

Combination locks are used on security files, vaults, and strongrooms to protect weapons, money, precious metals, drugs, and on field safes to protect classified material. There are two basic types of combination locks that are mounted:

- Mechanical
- Electromechanical

A mechanical combination lock (Figure 4-1) requires aligning one or more movable numbered combination wheels by dialing a correct combination. When the combination wheels are properly aligned, the locking components are released to permit the locking bolt to retract. An electromechanical combination lock (Figure 4-2) may use a microprocessor to process and coordinate the dialed combination with the lock's correct combination.

Combination locks are typically mounted on drawers of security containers in various configurations (see Chapter 3), doors of security areas and strongrooms, as well as safes and vault doors. While the dial and dial ring are located on an exterior surface, the actual locking mechanism is located on the interior surface protected by the container or door on which it is mounted. The only portions of the lock accessible from the outside are the dial and dial ring. When combination locks are mounted on a safe or vault door, added protection is provided by the hardened steel door plates.

In October 1989, GSA published a new Federal Specification (Fed Spec), FF-L-2740, for GSA-approved combination locks used for securing classified material. The new Fed Spec replaced Military Specification (Mil Spec) MIL-L-15596, which was cancelled on 5 May 1993. FF-L-2740 requirements are more stringent than MIL-L-15596. Locks that previously passed the requirements of MIL-L-15596 do not meet all of the performance criteria of FF-L-2740. As discussed in Chapter 3, security containers, vaults, and strongrooms where classified documents or materials are stored must now use a combination lock that meets the requirements of FF-L-2740. The only exception is the GSA Field Safe.

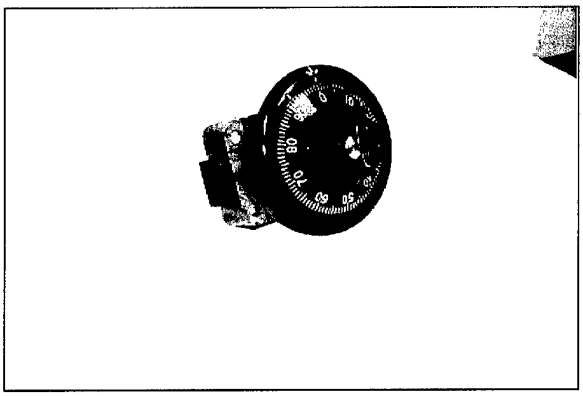


Figure 4-1. Mechanical combination lock.

Figure 4-2. Electromechanical combination lock.

Congress has directed DoD to retrofit sensitive compartmented information facilities (SCIFs), and GSA-approved security containers and vault doors used for storing SECRET (or higher) documents and material, with combination locks that meet FF-L-2740. In turn, DoD has initiated a program to replace combination locks on SCIFs and approved security containers with combination locks that meet the requirements of FF-L-2740.

DoD organizations that are presently storing classified material using combination locks that do not meet the new requirements of FF-L-2740 should call the DoD Lock Program Technical Office Hotline (DSN: 551-1212, (805) 982-1212 or Fax: DSN 551-1553 or (805) 982-1553 for proper guidance concerning their retrofit.

Two electromechanical combination locks have met the requirements of FF-L-2470. Others may become available in the near future. These combination locks, when mounted on GSA-approved security containers, vault doors, etc., are authorized for protecting classified material up to and including TOP SECRET as well as information requiring two-person integrity (TPI). For TPI, the electromechanical locks can be electronically configured to a "dual combination" mode that requires two separate combinations be entered into the same lock to retract the bolt.

During retrofits of containers, vaults, etc., where two mechanical combination locks having met the replaced MIL-L-15596 are being used to assure TPI, it is only necessary to replace one of mechanical locks with a new lock meeting FF-L-2740. The replacement lock can be used in the "single combination" mode when used in conjunction with the other mechanical combination lock to maintain TPI.

FF-L-2740 requirements for combination locks used for storing classified material and documents exceed performance and testing requirements for all UL combination locks. However, containers, vaults, safes, and strongrooms where weapons, ammunition, money, or sensitive assets are stored, can be secured with an appropriate UL listed combination lock.

Combination locks can be classified into five groups:

- Fed Spec FF-L-2740
- UL Group 1R
- UL Group 1
- UL Group 2M
- UL Group 2

These groups are described in brief detail in Table 4-1.

The combination deadbolt lock (Figure 4-3) is designed to be used on entry doors to SCIFs, strongrooms, and other secure spaces. It is a reversible surface-mounted locking unit specifically designed for use on wood and metal doors. In essence, it is two locks in one -- a combination lock and a deadbolt.

The deadbolt section of the system features hardened steel pins and an interlocking strike and bolt to prevent jimmying or spreading of the door frame. When the locking mechanism is closed and locked, there is a release knob on the exterior of the deadbolt section of the lock that allows a person locked inside to open the door. The locking mechanism is triggered to automatically relock when the door closes again.

If the strongroom or secure space is used for the storage of sensitive assets, narcotics, or money, the combination lock only needs to meet UL 768 requirements for a Group 1 or 1R combination lock. When used for weapons or ammunition storage, the Group 1 or 1R combination lock is required. However, when the combination lock is used on the door to a SCIF, a strongroom, or secure area where classified materials, components, or documents are stored, the entire mechanism must meet the requirements of FF-L-2890.

Combination locks are available in hand-change and/or key-change versions.

Changing the combination on a hand-change lock requires removing the wheels from the lock, then changing each wheel to the new number, and replacing it into the case.

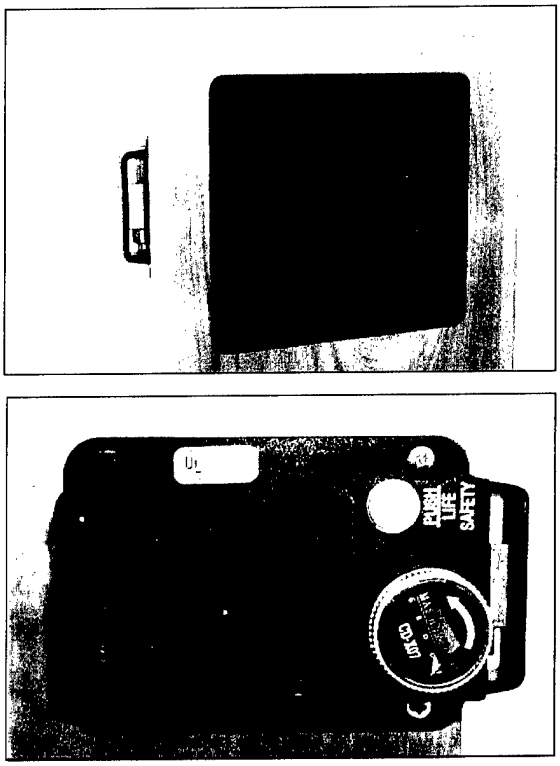


Figure 4-3. Combination deadbolt lock.

Table 4-1. Classification of Mounted Combination Locks

Grouping	Classification Requirements
Fed Spec FF-L-2740	These requirements 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; and mechanical tests of the bolt and lock case.
UL Group IR	These locks have a high degree of resistance to expert or professional manipulation. The protection against expert manipulation includes advanced construction features not found in conventional designs. This group has 20 man-hours of resistance to expert or professional manipulation and 20 man-hours of resistance to radiological attack as a minimum.
UL Group 1	These locks have the same inherent resistance to expert or professional manipulation as the Group 1R combination locks. However, they are not tested against a radiological attack.
UL Group 2M (Effective 1 Mar 1996)	These locks have a medium degree of resistance to expert or professional manipulation. This group has a 2 man-hour resistance to expert or professional manipulation. These locks are not tested against a radiological attack.
UL Group 2 (Effective 23 Aug 1994)	These locks have a much lower degree of resistance to manipulation. They are only tested for correct sequencing of the dial combinations.

Changing the combination of a key-changeable lock requires using a special change key (Figure 4-4) that is inserted into the rear of the lock case and turned, thereby unlocking the wheels. This allows the wheels to be changed by dialing in the new combination. After the new combination has been dialed in, the change key is again turned, then removed, thereby locking in the new combination. Most UL listed Group 1 or 1R locks are key changeable.

Changing the combination of the recently developed electromechanical combination lock is done by inserting a unique electronic key, having two pins, into the rear of the lock case. This key completes a circuit to allow a new combination to be entered and validated.

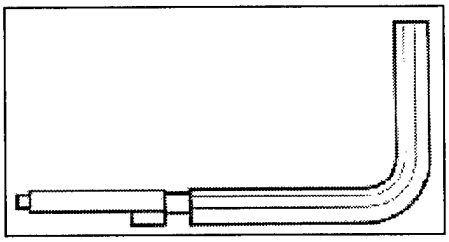


Figure 4-4. Combination change key.

Selection and Ordering Guide

Table 4-2 lists combination locks currently available through the Federal Supply Schedule. While many types of combination locks exist, only a few offer security against opening by manipulation. If the combination lock is to be used to secure classified material, a combination lock meeting the requirements of FF-L-2740 must be specified. Weapons, ammunition, money, and other sensitive assets can be secured with an appropriate UL listed combination lock. The storage of weapons requires a UL listed Group 1 combination lock. A list of combination lock manufacturers may be found in Appendix A.

Installation and Service

Usually, complete and detailed installation instructions are provided with each combination lock. However, due to the sensitive nature of mounted locks and the degree of knowledge necessary for proper installation, qualified locksmiths should be used whenever possible to install and maintain combination locks.

CYLINDRICAL, DEADBOLT, MORTISE, DROP-BOLT, RIM, AND UNIT LOCKS

Functional Description

Cylindrical Locksets. Cylindrical locksets (Figure 4-5), are often called "key-in-knob" or "key-in-lever" locks. They are used to secure offices and storerooms. These locks are distinguished by the locking cylinder being located in the center of the door knob. Some cylindrical locksets have keyways in each of the opposing knobs that require a key on either side to lock and unlock them. Others unlock with a key, but may be locked by pushing or rotating a button on the inside knob. Table 4-3 lists common configurations and descriptions for cylindrical locksets.

Deadbolt Lock. The deadbolt lock (Figure 4-6) is sometimes called a tubular deadbolt. It is mounted on the door in a manner similar to cylindrical locksets by boring holes through the door. The primary difference is in the bolt. When this bolt is extended (locked), it cannot be forced back (unlocked) by applying pressure to the end of the bolt. The deadbolt lock has potential for providing acceptable levels of protection for storerooms and other areas where greater security is desired than that provided by a low-security hasp and padlock.

Mortise Lock. A mortise lock (Figure 4-7) is named because the lock case is mortised or recessed into the edge of the door. The most common variety of mortise lock has a door knob on each side of the door; however, entrance doors often have an exterior thumb-latch, rather than a door knob, to open the door. The mortise lock can be locked from the inside by a thumb turn, or by a button on the edge of the lock case. A key is required to lock or unlock it from the outside.

Drop-Bolt Lock. The drop-bolt lock (Figure 4-8), often referred to as a "jimmy-proof lock," is normally used as an auxiliary lock, similar to a deadbolt lock. The drop-bolt lock body and the strike have interlocking leaves similar to a door hinge. When closed, locking pins in the lock body drop down into the holes provided in the strike and secure the locking system, similar to a hinge pin.

Since the lock body and the strike are interconnected with locking pins when closed, the lock essentially becomes a single unit and is extremely difficult to separate with "jimmy" type tools.

Rim Lock/Cylinder. Rim locks are mounted to the inside surface of the door and are secured by screws in the door face. Rim cylinders (Figure 4-9) are generally used with drop-bolt and other surface-mounted locks and latches. They basically consist of:

- Cylinder and ring
- Tailpiece
- Back mounting plate
- Two mounting screws

Table 4-2. Combination Locks Available through the Federal Supply Schedule

Description	Specification	National Stock Number
Combination lock, flush drilled bolt/ standard drilled bolt	FF-L-2740	5340-01-469-5776
Group 1R, mounted	UL 768	Cancelled, use Group 1
Group 1, mounted	UL 768	5340-01-375-7593
Pedestrian door, combination deadbolt lock, pinch proof extension with exterior plate, for use on personnel doors.	FF-L-2890	5340-01-469-5906
Pedestrian door, combination deadbolt exterior plate, for use on personnel doors.	FF-L-2890	5340-01-469-5897

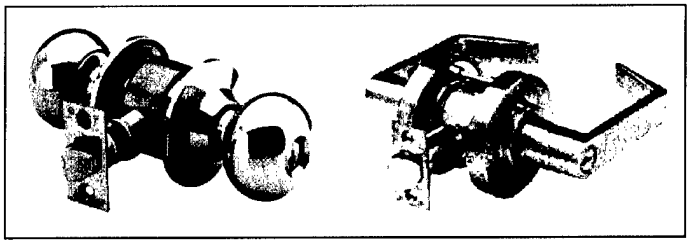


Figure 4-5. Cylindrical key-in-knob or key-in-lever locks.

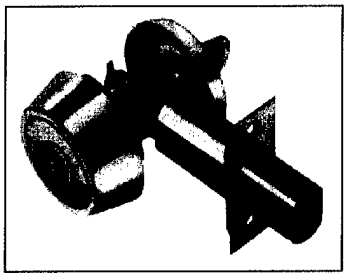


Figure 4-6. Deadbolt lock.

Figure 4-7. Mortise lock.

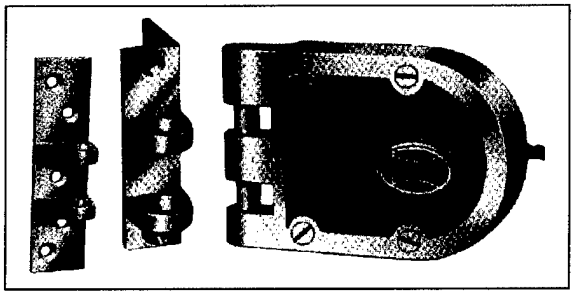


Figure 4-8. Drop-bolt lock.

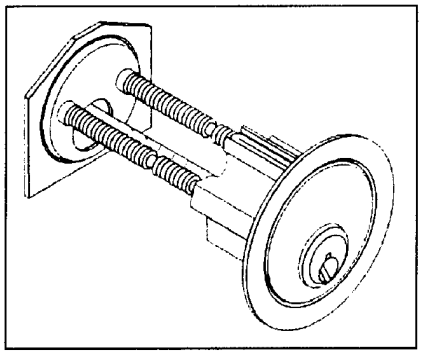


Figure 4-9. Rim cylinder.

Table 4-3. Cylindrical Lockset Configurations

Lock Function	Description	Specification
Entrance/Office	Both knobs turn freely unless the outside knob is locked by key from the outside. When outside knob is locked, the latchbolt is opened by either unlocking the outside knob with a key or by rotating the inside knob.	ANSI A156.2 Series 4000, No. F-82
Entrance/Classroom	Inside knob always free. Outside knob locked from outside by rotating key in knob. When outside knob is locked, the latchbolt is opened by either unlocking the outside knob with a key or by rotating the inside knob.	ANSI A156.2 Series 4000, No. F-86
Storeroom/Closet	Inside knob always free. Outside knob always locked. The latchbolt is opened by either rotating key in outer door or by rotating the inside knob.	ANSI A156.2 Series 4000, No. F-84

Note: American National Standards Institute (ANSI) A156.2 has been adopted by DoD.

The tailpiece screws are usually scored. This allows for tailoring the lock to fit varying door thicknesses by breaking off appropriate lengths as required to mount the cylinder.

Mortise Cylinders. Mortise cylinders (Figure 4-10) are similar in design to rim cylinders. Their body is similar except the outside of the body is threaded and has a locking ring for installing the cylinder in various locksets, such as mortised locksets. Instead of a tailpiece, various cams can be ordered and screwed onto the rear of the cylinder to allow interface with virtually any brand of lockset that uses a mortise cylinder. To accommodate doors of various thickness, mortise cylinders are available in a variety of lengths.

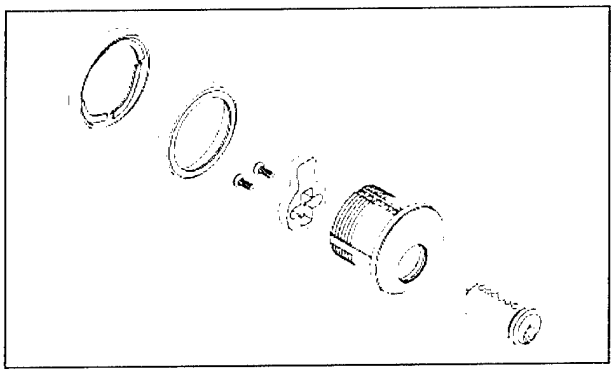


Figure 4-10. Mortised cylinder.

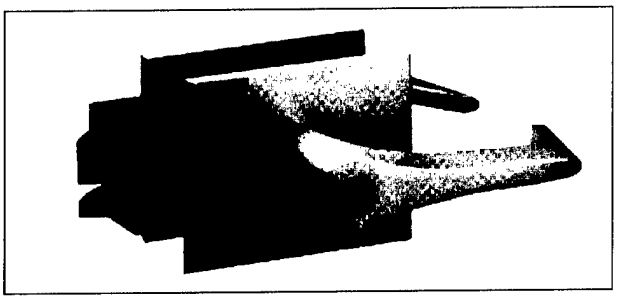


Figure 4-11. Unit lockset.

Unit Locksets. Unit locksets (Figure 4-11) are ideal wherever traffic is heavy, e.g., hospitals, commercial activities, schools, and institutional buildings of all types. The lockset is a complete one-piece unit that slides into a notch cut into the latch edge of the door. The one-size cutout of the door edge simplifies door preparation for a lockset.

Selection and Ordering Guide

Before selecting any lock hardware, the space to be secured should be closely evaluated. The best way to approach this is to think as an intruder would:

- Consider all entry points into the space: windows, skylights, ducts, ventilators, utility openings, etc.

- What is the construction and what materials are used for the walls, doors, and window frames?

- Are windows and other openings barred or otherwise secured?

The building materials that enclose the secure space should provide as much strength and deterrence as the locking hardware being added. There is little sense in installing heavy duty locking hardware and deadbolts on hollow doors.

Table 4-4 lists locksets available through the Federal Supply Schedule. In most cases, the thickness of doors must be known when ordering locking systems. Take care to observe fire codes and life safety requirements when selecting locking systems.

Most locks and locksets are available with interchangeable cylinder cores for their locking mechanisms. Interchangeable cylinder core systems are discussed in a separate section.

Most lock hardware manufacturers have a variety of knob designs. When matching a specific design, consult a hardware catalog for manufacturers' part numbers and specify knob design, keyway finish, backset, and specification. A list of lock hardware manufacturers is in Appendix A.

Cylindrical, deadbolt, and mortise locks are available in numerous natural, plated, or painted finishes. However, all grades of hardware may not be available in all functions, knob designs, backsets, and finishes.

Installation and Service

Follow the manufacturer's instructions for installation, maintenance, and service. Preventive maintenance, such as occasional cleaning of locking cylinders with solvent, then sparingly lubricating them with molybdenum disulfide powder, will keep locking systems operating.

PADLOCKS

Functional Description

Combination Padlocks. The two most common types of combination padlocks used by DoD are the front-reading, dial-type, three-position, combination padlock (Figure 4-12) and the bottom-reading, disk-type, key changeable combination padlock (Figure 4-13).

Sargent & Greenleaf (S&G) Model 8077 (including the 8077A, 8077AB, 8077AC, and 8077AD) front-reading padlocks (Figure 4-14) that are used to secure classified

materials through the level of SECRET in lockbar filing cabinets may be used until 1 October 2002. After that date, lockbar cabinets will not be authorized for storing classified materials or documents. While only S&G Model 8077AD continue to be manufactured, other models that are on hand can continue to be used. The S&G Model 8077 lock has a capacity of 125,000 combination variations and is equipped with a 5/16-inch steel shackle.

Bottom-reading combination padlocks are for convenience use and are not authorized for securing classified material. Bottom-reading padlocks and the S&G Model 8077 padlock use special keys to change combinations.

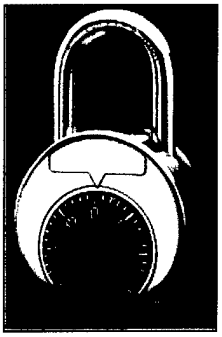


Figure 4-12. Front-reading combination padlock.

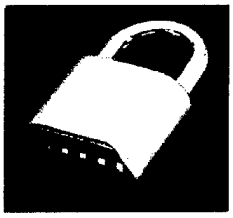


Figure 4-13. Bottom-reading combination padlock.

High-Security Padlocks. High-security padlocks afford the highest degree of security of any padlock. The only high-security padlock approved in accordance with the current revision of military specification MIL-P-43607G, is the S&G Model 833C (Figure 4-15). Padlocks manufactured in accordance with MIL-P-43607G are designed to resist forcible entry with limited hand and power tools for at least 5 minutes and surreptitious entry for at least 15 minutes when used with an approved high-security hasp. The padlock specification requires the shackle to be completely shrouded when used with an approved high-security hasp. The lock has two keys: an ***operation key*** to lock and unlock the shackle and a ***control key*** that allows disassembly of the lock for maintenance and repair.

The Model 833C padlock is designed for use with high security hasps discussed in Chapter 7.

General Field Service Padlocks. General field service padlocks are manufactured to meet the requirements of Federal Specification FF-P-2827. They are low-security padlocks that offer a high degree of protection against corrosion and deterioration caused by harsh environments. They have either a 3/8 or 1/2-inch diameter hardened shackle. General field service padlocks are used to secure steel security chains, gate hasps, cargo closures, tie-downs, warehouse and shed doors, etc. These robust padlocks provided greater serviceability in harsh

Table 4-4. Locksets Available through the Federal Supply Schedule

Type	Description	NSN
Mortise, lockset, latch bolt, tubular case (pin tumbler locking with regular bevel latch bolt)	Brass, chrome-plated (0.812-in. backset)	5340-00-598-8591
Mortise, lockset, latch bolt, tubular case (pin tumbler locking with regular bevel latch bolt)	Corrosion-resistant steel, heavy-duty material (2-in. backset)	5340-00-847-2605
Mortise, lockset, latch bolt, tubular case (pin tumbler locking with regular universal latch bolt)	Brass (US3), light-duty (2-3/8 in. backset)	5340-00-685-1202
Mortise, lockset, latch bolt, tubular case (pin tumbler locking with regular universal latch bolt)	Steel, cadmium-plated, light duty (2-3/8 in. backset)	5340-00-281-2193
Mortise, lockset, latch and deadbolt Style (pin tumbler locking with double bevel universal latch bolt)	Bronze (2-3/8-in. backset, 1-1/2-in. thick door with 2 knobs)	5340-00-355-4807
Mortise, lockset, latch and deadbolt style (pin tumbler locking with double bevel universal latch bolt)	Bronze (2-3/8-in. backset, 1-1/2-in. thick door, one knob, T-handle)	5340-00-355-4871

environments and are resistant to forced or surreptitious entry than other low-security padlocks. General field service padlocks may be obtained through the Federal Supply system using the following national stock numbers (NSN):

- 3/8-inch shackle - 5340-01-380-9430
- 1/2-inch shackle - 5340-01-380-9432

Low-Security Padlocks. Low-security padlocks are used for administrative control and for securing weapons racks, and must not be used to secure classified material. These padlocks provide only minimal resistance to forced or surreptitious entry. They are sometimes referred to as secondary locks. Low-security padlocks are available under Commercial Item Description (CID) A-A-1927D. Figure 4-16 shows examples of low-security padlocks.

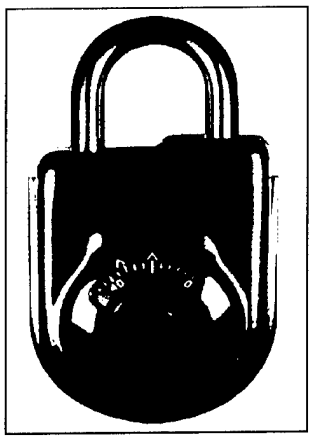


Figure 4-14. S&G Model 8077 combination padlock.

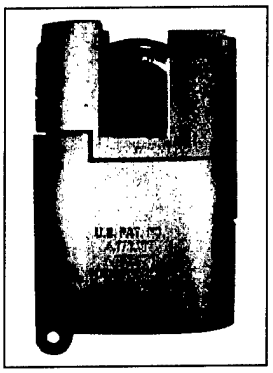


Figure 4-15. S&G Model 833C high-security padlock.

Selection and Ordering Guide

Key lock mechanisms are generally less secure than combination locks. Controlling and protecting the keys themselves is an additional security problem. Table 4-5 lists the types of padlocks available through the Federal Supply Schedule.

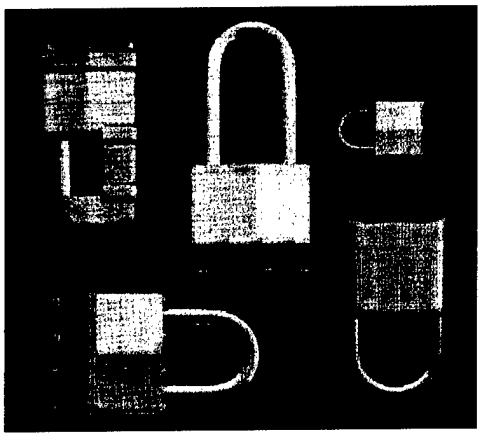


Figure 4-16. Low-security padlocks.

When used with high-security hasps, the high-security padlock provides the greatest degree of protection against forced and surreptitious entry.

Low-security padlocks are used on gates barring access to in-process/production facilities and where secondary locks are specified. There are many such locks available in addition to those shown in Table 4-5. None of the laminated and brass padlocks available through military service supply stores meet any specification and they should only be used for convenience or privacy, not for security applications. A list of padlock manufacturers is in Appendix A.

Installation and Service

Padlocks should be installed with hasps or chain that provide an equal or greater level of resistance to forced entry. A high-security padlock and hasp system is effective only when it is installed with appropriate hardware on a strong door (see Chapter 7).

Preventive maintenance, such as occasional cleaning with solvent and lubricating with molybdenum disulfide powder, will help to keep padlocks operating without trouble. Replacement cylinders for high security padlocks are available through the Federal Supply Schedule.

INTERCHANGEABLE-CORE LOCKS

Functional Description

Interchangeable cylinder core systems (Figure 4-17) have a lock core mechanism that can be removed with a "control key." When a key is lost, or there is a change of personnel, changing the lock cylinder can be done in seconds. An interchangeable-core system can become cost-effective over a short period of time since any core that is removed can be reused at other locations within the facility. All locks, locksets, and padlocks in the activity can be equipped with interchangeable cores.

Table 4-5. Federal Supply Schedule Security Padlocks Listing

Type	Description	NSN	Specification
High-Security Padlocks			
DSCP			
S&G Model 833C	High-security padlock, key operated, high security, shrouded shackle	5340-01-217-5068	MIL-P-43607G
General Field Service Padlocks			
DSCP GSA Schedule			
Padlock	General field service padlock, key-operated, non-shrouded 3/8-in. shackle	5340-01-380-9430	FF-P-2827
Padlock	General field service padlock, key-operated, non-shrouded 1/2-in. shackle	5340-01-380-9432	FF-P-2827
Low-Security Padlocks			
GSA Schedule			
Padlock	Low-security padlock, keyed	5340-01-346-4611	ASTM F883 Type PO1,Grade 2
Padlock	Low-security padlock, keyed, with chain	5340-01-346-4612	ASTM F883 Type PO1, Grade 2
Padlock	Low-security padlock, keyed, brass or bronze	5340-01-346-7462	ASTM F883 Type PO1, Grade 2
DSCP			
Padlock	Low-security padlock, steel case and shackle	5340-00-158-3805	CID A-A-1927D
Padlock	Low-security padlock, keyed, with chain, steel case and shackle	5340-00-158-3807	CID A-A-1927D
Combination Padlocks			
Padlock	Low-security combination padlock, three-position, changeable, GSA-approved	5340-00-285-6523	FF-P-110J

MIL-P-17802 for Low-Security Padlocks has been cancelled. Low-security padlocks are now purchased either through GSA under a Stock Item Purchase Description or Defense Supply Center Philadelphia using Commercial Item Description (CID) A-A-1927D.

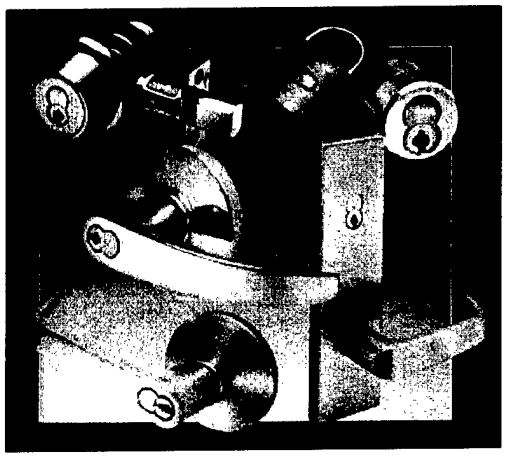


Figure 4-17. Interchangeable-core system.

Selection and Ordering Guide

Most lock hardware manufacturers provide lock bodies that accept interchangeable cores. When ordering, a decision needs to be made concerning single keying, keying-alike, and master-keying. A list of interchangeable core manufacturers is in Appendix A.

Installation and Service

Interchangeable core locks, lock bodies, and padlocks are installed the same as non-interchangeable core units. Preventive maintenance, such as occasional cleaning with solvent and lubricating with molybdenum disulfide powder, will help keep locks operating without trouble.

SLIDING DOOR LOCKS

Functional Description

Sliding door panels vary from hollow masonite-faced panels to steel-clad solid wood doors. Many sliding doors are no more than an aluminum metal frame surrounding a sheet of glass. Lock hardware furnished with "off-the-shelf" residential sliding doors, such as sliding glass patio doors, is generally weak and easily breached with a "jimmy" bar.

Due to their design for greater traffic and abuse, commercial sliding doors are more robust and thus less susceptible to hand-tool attacks.

The glass in sliding glass doors manufactured before the mid-1970s can be either plate (float) glass or tempered (heat-treated) glass. Since mid-1970, tempered glass has been federally mandated for all sliding glass doors. When struck with an attack tool, plate (float) glass breaks into random shards, which must be dealt with by an intruder in order to gain entry. On the other hand, when tempered glass is struck, it will break up and fall out of the frame in small ragged glass pebbles, thereby allowing immediate entry.

Three methods of strengthening of the window glass area against a blow-and-entry type attack are:

1. Replacing the plate or tempered glass with laminated glass (automotive windshield glass) or attack-resistant plastic (e.g., "Lexan" that is often used for riot police protective shields and headgear).

2. Attaching a sheet of attack-resistant plastic on the inside of the sliding glass door frame using screws and fender washers 6 inches or less apart. (Make sure there is sufficient clearance between the doors to allow the sliding portion to operate.)

3. Attaching a metal grid-type guard to the inside frame of glass doors with non-removable screws. (Again, assure sufficient clearance between doors for their operation.)

Aside from the vulnerability of glass in sliding glass doors, security is also difficult to maintain due to the construction of the doors. Even when the door lock is locked, the design of sliding doors often allows the sliding panel of the door to be lifted up out of their bottom channel from the exterior and removed.

There are several types of security hardware that can be used to strengthen the security of sliding doors. First, security blocks or wedges should be mounted in the upper movable door channel to prevent the door, when closed, from being lifted and removed from the frame. Holes can be drilled through the frame channel and the sliding door allowing security pins to be inserted (Figure 4-18) when the door is closed.

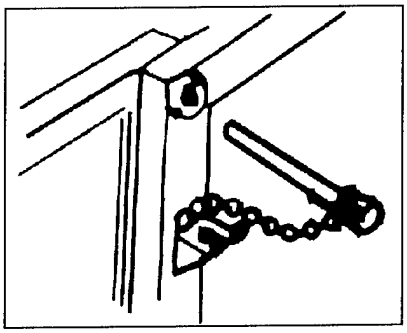


Figure 4-18. Security door pin.

Keyed security pins can be also be mounted on the door frame threshold. Keyed pins (Figure 4-19) can be pushed in and locked in place. The key is needed to unlock and remove the pin. The keyed security pins allow the door to be slightly open for ventilation, yet secure to the intruder. This is particularly beneficial for sleeping spaces.

Another effective device is a security bar (Figure 4-20), sometimes called a "Charley" bar, that is mounted and hinged so it can be extended horizontally from side frame opposite the opening door. When the sliding door is closed, the movable end of the Charley bar can be dropped and pinned into a "U"-shaped bracket mounted on the trailing edge of the movable door thereby effectively "jamming" the sliding door closed in the frame.

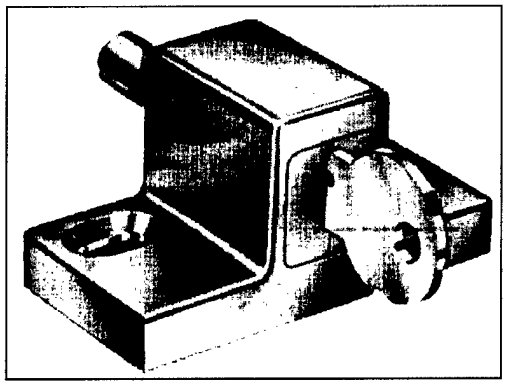


Figure 4-19. Keyed security pin.

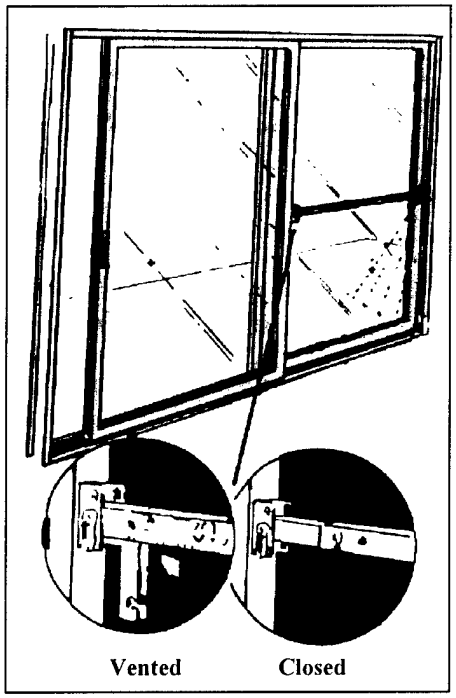


Figure 4-20. Security ("Charley") bar.

Selection and Ordering Guide

A sliding door must be evaluated for its inherent vulnerabilities. If it is a glass door, determine the best method to make the glass less vulnerable to attack.

Local hardware stores carry commercial versions of security locking pins, keyed locking pins, and security bars. In areas where hardware items are difficult to locate, simple locking pins for sliding doors can be easily fabricated. Also various forms of security bars can be fabricated locally. A list of security hardware manufacturers is in Appendix A.

Installation and Service

Installation directions normally accompany the various types and styles of sliding door locks.

Where sliding doors are lifted in a channel to be installed or removed, anti-lift wedges should be installed. When drilling holes for non-keyed security pins, the hole should be sloped slightly downward from the point of insertion. This will prevent the pin from falling out of its hole if the door is vibrated.

MAGNETIC LOCKS

Functional Description

Magnetic locks (Figure 4-21) use an electromagnet and a steel plate. The electromagnet is bolted to the overhead door frame (header). Some electromagnet models extend across the entire header while others may be as small as 6 inches in length and mount directly above the opening edge of the door. A steel plate, sized to match the electromagnet, is bolted to the top of the door so that it directly contacts the electromagnet when the door is closed. When power is applied to the electromagnet, the door is locked. When steel or steel clad doors are used, the steel plate is not needed.

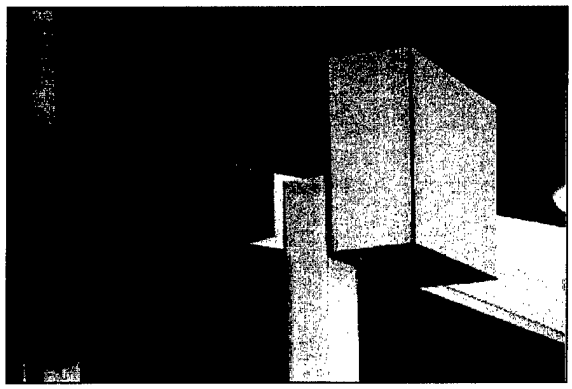


Figure 4-21. Magnetic door lock.

Magnetic locks can be used with single- or double-swing doors and sliding doors. Most electromagnets operate on 12- or 24-VAC power and are rated by their holding power, generally from 600 to 1,500 pounds. The higher the holding power, the greater the force required to overcome the door locking system. Those with lower holding power are more often used for traffic control and light-duty security. Attempts to penetrate a door having one of the higher-rated magnetic locks will likely destroy the door before the magnetic lock releases.
Attempts to penetrate a door having one of the higher-rated magnetic locks will likely destroy the door before the magnetic lock releases.

Magnetic locks require a constant 5- to 10-watt source of power when in the "lock" condition. During power outages magnetic locks fail to their "unlock" condition. To maintain magnetic locks in a "lock" condition when experiencing power outages, a backup source of power is required.

Selection and Ordering Guide

When selecting a magnetic lock, consider the operational purpose of the lock. Will it be used as a traffic-control device or is it intended to provide maximum security? The available electrical power at the site must be known in order to prescribe proper step-down power conditioners. In case of a power outage, can the lock go to an "unlock" condition or should backup power be prescribed?

The door and door frame materials must be known to procure the appropriate magnetic locking system. A wide variety of shapes and sizes exist. Consult manufacturers for application, availability of product, and hardware necessary for installation. A list of magnetic door hardware manufacturers is in Appendix A.

Installation and Service

Follow the manufacturer's instructions closely to ensure proper operation of magnetic locking systems. There is very little service required for magnetic lock systems, except when backup power sources are provided. Service of backup power sources will depend on the type of backup power being used.

OFFICE EQUIPMENT LOCKS AND CAM/ CABINET LOCKS

Functional Description

In today's highly computerized working environment, there are increasing numbers and vast variety of office equipment that is susceptible to theft. Commercial Item Description A-A-1013 describes types of office machine locks for securing various types of office equipment such as adding machines, typewriters, televisions, monitors, audio/visual equipment, medical equipment, desktop computers, and data processing equipment. The types of locks are:

1. ***Type I*** locks (Figure 4-22) are attached at a single point to a piece of equipment, which passes through the desk surface, and is attached to the desk. These cable devices can be installed singly or in pairs.

2. ***Type II*** locks (Figure 4-23) are attached through the desk surface at one point and to the equipment at two or more points. This allows the equipment to be pivoted as needed for use.

3. ***Type III*** locks (Figure 4-24) are attached to the equipment at two or more points and through the desk surface at two or more points. The head and stems of the fasteners are protected when the lock(s) is installed. Paired or multiple locking devices may be used.

4. ***Type IV*** locks are basically the same as Type III locks except rather than the base being bolted through the desk surface, an adhesive mat adheres to the desk, and the equipment is secured to the adhesive mat by means of a locking base.

Types I through III locks provide a 60-second or less delay against light-hand tool attack. Type IV locks provide 90-second delay. These devices are often referred to as anti-theft devices. Adhesive mat or multi-point connection anti-theft devices require more time to defeat than single-point anti-theft devices.

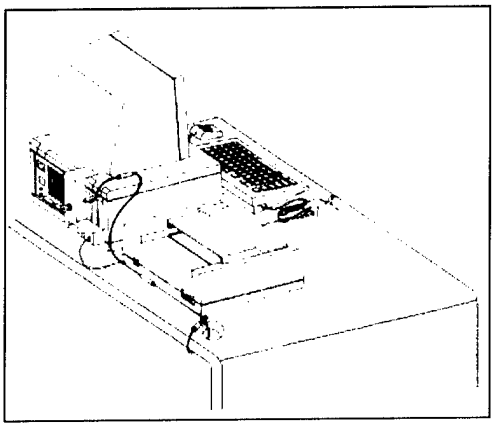


Figure 4-22. Type I equipment lock.

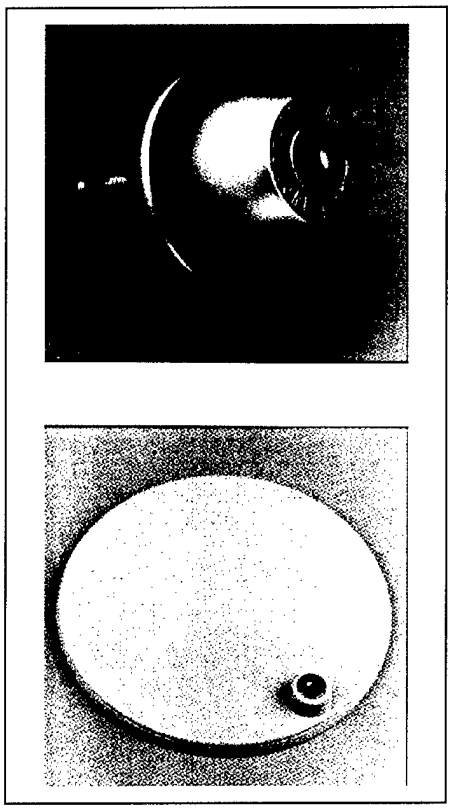


Figure 4-23. Type II equipment lock.

Computer memory chips and processors have become the gold of the 1990s. High-tech theft is increasing. Security equipment designers and manufacturers are making major strides in developing innovative devices to secure equipment. As a consequence, new security technology is reaching the marketplace on a daily basis.

Selection and Ordering Guide

Some factors to consider when selecting an anti-theft device are value and criticality of the equipment, its portability, and the threat against the equipment. Consult manufacturers for specific applications, availability of product, and hardware necessary for installation. A list of office equipment manufacturers of anti-theft devices is in Appendix A. Anti-theft devices are Special Item Number 47-147 in the Federal Supply Schedule 74 I A Class 5340.

Installation and Service

Follow the manufacturer's suggested installation procedures. These anti-theft devices normally require precision installation. Substitutions of inappropriate hardware may degrade protective functions as well as cause operating and maintenance problems. Installation of an anti-theft device should not inhibit any equipment's internal moving or electrical parts. Contact the manufacturer for service and installation information.

Type I through III locks with either locking-type screws/bolts or reinforced with lock washers to prevent loosening through vibration.

ELECTRIC STRIKES

Functional Description

Electric strikes (Figure 4-25) are designed to add security to a traffic control device. However, they may reduce forced entry delay times for doors where they are installed. Electric strike applications range from securing a protected area perimeter to controlling entry to warehouses or computer rooms.

Electric strikes are used with various access control systems. When a person desiring entry to a protected area uses an authorized card, code, or is recognized manually, either the access control device or guard releases the electric strike and the individual is allowed to enter. Electrical actuation or de-actuation within the strike unlocks the strike, releasing the latchbolt so the door can be opened without operating the latch itself (Figure 4-26). The strike may contain internal switches used to monitor the latchbolt of the locking hardware and/or the locking cam of the electric strike. These switches will indicate whether the latch bolt is thrown or retracted, or the strike is locked or unlocked. The switches can be used for remote door monitoring, to control alarms or indicating lights, or for electrical interlocking.

Electric strikes normally have a flat faceplate for mounting in the jamb of either a single door or pair of doors. Strikes can be used in wood, steel, or aluminum jambs. Standard operation strikes are unhanded, which means they can be installed for either right or left hand doors and can be opened inward or outward (Figure 4-27).

Electric strikes can be fail-safe or non-fail-safe. Fail-safe means the strike locks when the solenoid is energized and automatically unlocks in case of power failure. A fail-safe strike is normally unlocked and is locked when powered. Non-fail-safe means the strike unlocks when the solenoid is energized and automatically locks in case of power failure. A non-fail-safe strike is normally locked and is unlocked when powered.

Selection and Ordering Guide

When ordering an electric strike, make sure the strike conforms to any standards that may be required, such as

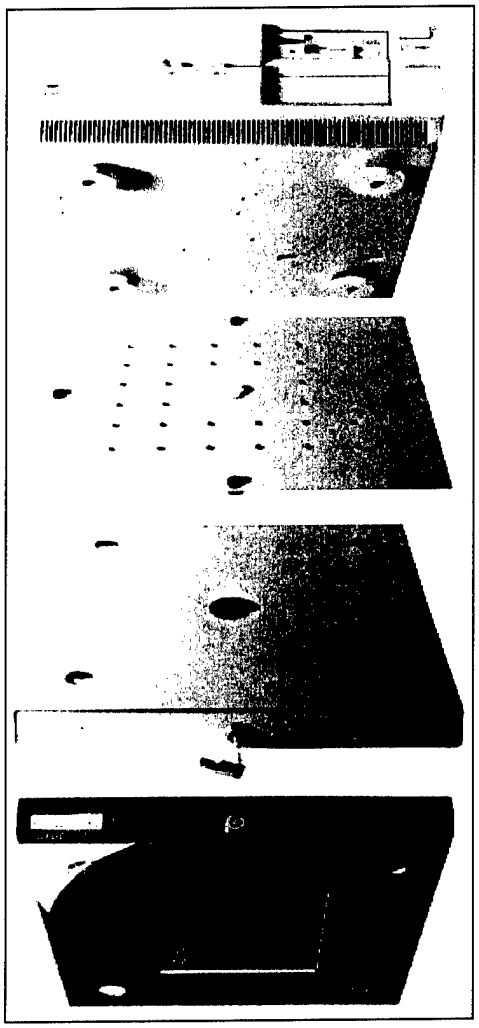


Figure 4-24. Type III and IV equipment lock.

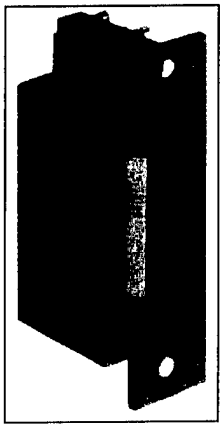


Figure 4-25. Electric strike.

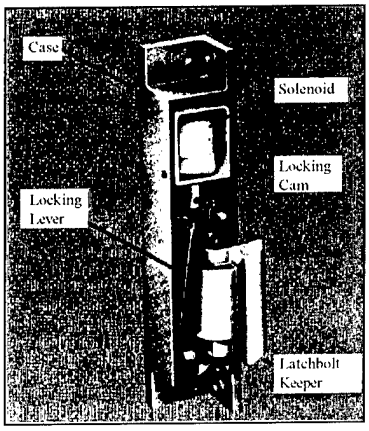


Figure 4-26. Inside of electric strike.

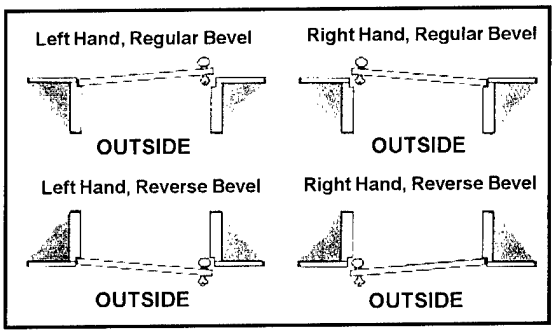


Figure 4-27. Handing method.

UL Standard UL1034 or ANSI/BHMA A156.5 requirements for Grade 1 electric strikes. A list of features for selecting an electric strike is provided.

a. **Corrosion-resistant** - What are the weather conditions where the strike is to be installed?

b. **Reversibility** - Handed or nonhanded.

c. **Remote electric operation** - Will the electric strike be operated by a card access device or by a switch?

d. **Solenoid ambient temperature** - Ranges from -40°C to 150°C (-40°F to 302°F).

e. **Operating action** - Non-fail-safe or fail-safe operation.

f. **Operating Voltage** - Several operating voltages are available:

AC voltages - 12, 24, or 120 VAC/60 Hz. These voltages may cause a slight buzzing sound. To increase the volume on the buzzing sound, the solenoid may be equipped with an "audible feature."

AC-SO voltages - For silent operation, no buzzing, 6, 12, 24, 48, or 120 VAC-SO voltages are available.

DC voltages - 6, 12, 24, 48, or 120 VDC.

g. **Latchbolt keepers** - There are various sizes of latchbolt keepers available ranging from 1/2" to 1."

h. **Indication switches** - Internal switches can be installed in the electric strike, depending on personnel requirements. Each switch is a single pole, double throw (SPDT). They are each rated for 5 amps at 125 or 250 VAC. They are:

• ***DBS*** - This switch indicates whether or not the deadbolt is extended into the electric strike.

• ***LCM*** - This switch indicates whether or not the latchbolt keeper is locked in place.

• ***LBM*** - This switch indicates whether or not the latchbolt is extended into the electric strike.

• ***LCBM*** - This switch indicates that the latchbolt is extended into the electric strike and the latchbolt keeper is locked in place. It monitors both the locking cam and the latchbolt.

• ***LBMLCM*** - These are two switches: one monitors the locking cam and the other monitors the latchbolt. Together they indicate the latchbolt keeper is locked in place and latchbolt is extended into the electric strike.

i. **Faceplates** - Faceplates come in a variety of materials to suit specific needs. The majority are investment cast with either stainless steel or brass. Die-cast brass, brass bar stock, sand-cast aluminum, and aluminum bar stock are also available in some models.

j. **Deadbolt cavity in faceplate** - A maximum 1-inch throw deadbolt may be installed. It is not released by the electric strike and must be retracted manually.

k. **Extended lip on faceplate** - Certain electric strikes may be used on door frames having a deep rabbet. These strikes allow an extension to be added to their faceplate. This extension, or lip, forms a path for the latchbolt. Extended lips are available in increments of 1/4 inch, up to 2 inches long.

l. **Holding Force** - The holding force of electric strikes ranges from 1,000 to 2,000 pounds.

m. **Durability** - The durability of electric strikes ranges from 300,000 to 1,000,000 life cycles. An analysis should be made concerning the number of activation cycles per time period required for the strike.

When selecting an electric strike, consider the type of locking hardware that will be used, the latchbolt throw, deadbolt throw, and type of door opening for your application (Table 4-6).

Installation and Service

Follow the manufacturer's suggested installation procedures. Poor installation or inappropriate hardware often causes operating and maintenance problems. Prior to installation of the electric strike, accurately check the electric circuit. Contact the manufacturer for service and installation information.

Table 4-6. Electric Strike Selection Guide

Locking Hardware	Latchbolt Throw	Deadbolt Throw	Door Opening
Mortise locks, mortise exit devices and bored locks	1/2" or 5/8"	N/A	Single doors or pair of doors
	3/4"	1"	Single doors or pair of doors
Preassembled locks	3/4"	N/A	Single doors
Rim exit devices	3/4"	N/A	Single doors or pair of doors
Concealed, vertical-rod exit devices	1/2" or 5/8"	N/A	Pair of doors
Auxiliary rim locks	1/2" or 5/8"	N/A	Single doors
Surface, vertical-rod exit devices	3/4"	N/A	Pair of doors

CHAPTER 5

KEY CONTROL

INDEXED KEY CONTROL CABINETS

Functional Description

Key control cabinets are described by Commercial Item Description (CID) A-A-2547. The lockable, wall-mounted key cabinets, as shown in Figure 5-1, with key hooks, key tags, and a single identification system are typical of these cabinets.

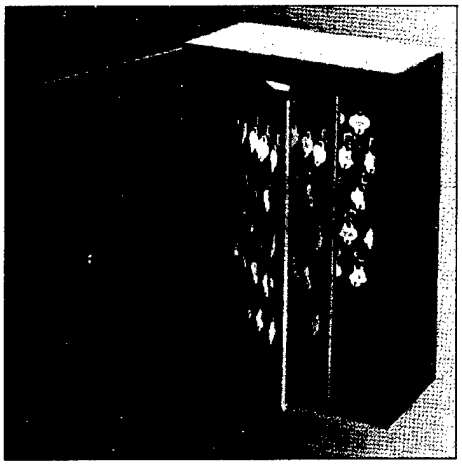
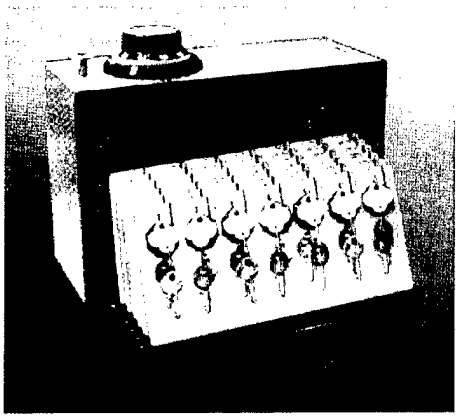
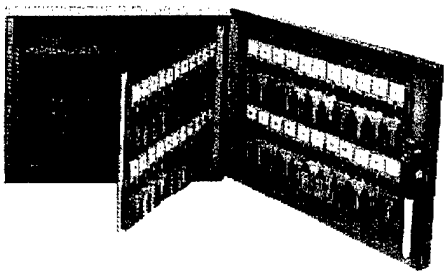


Figure 5-1. Wall-mounted key cabinet.

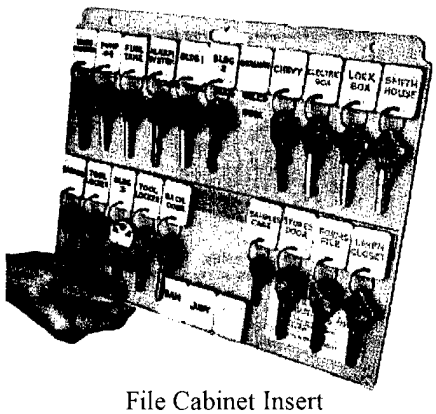
Other types of key cabinets and trays not described in CID A-A-2547 are shown in Figure 5-2. Indexed key control cabinets provide storage for any number of keys. Properly administered key control is essential for maintaining the integrity of an activity's security system. Procedures used for a key control system depend on the complexity of the system and the activity using it. As a minimum, key control systems require a key inventory, issue record, and key return receipt. Recommended procedures and additional information are found in the Navy "User's Guide on Controlling Locks, Keys and Access Control Cards (UG-2040-SHR)," which is available from the DoD Lock Program Technical Office, DSN: 551-1212, (805) 982-1212; Fax: DSN: 551-1253 or (805) 982-1253.



Utility Key Locker



Portable Key Tray



File Cabinet Insert

Figure 5-2. Assorted key cabinets and trays.

Selection and Ordering Guide

Selecting the proper key control cabinet depends on its intended use. Several types of key cabinets are available including wall-mounted (flush or recessed), table-mounted, multiple-drawer, and portable. The capacity of these cabinets ranges from 28 keys, for the smallest wall-mounted cabinet, to over 3,300 keys for an 8-drawer cabinet.

Most standard key cabinets have the same type of lock as an office desk and provide the same minimal protection. Although dual-lock combination locks, cabinet handles, and padlock-locking systems are available for key cabinets, they do not increase the overall security protection provided by the cabinet. Do not use key cabinets to store keys to containers that store sensitive or classified materials. Store such keys in security containers as required by applicable security regulations. Where to place key cabinets within the facility is important. The cabinet should be located within a room or building that is either locked or attended at all times. Keys to the cabinets should also be controlled. Store key and cylinder information separately.

Key control cabinets may be purchased with several options. Complete key control systems include all the components such as:

- Key-gathering envelopes
- Hook labels
- Temporary key tags
- Receipt holders
- Receipt forms
- Index
- Instructional manual

A single identification system provides only:

- Lock labels
- Temporary key tags
- Permanent key tags

A dual identification system is a complete cross-index system of records for recording alphabetical, hook numerical, core numerical, core, and masterkeying information. The cabinets may be purchased separately, in which case only the cabinet and hook labels are furnished.

Accessories such as tags and additional panels for expanding the capacity may be purchased with or for the above systems.

Key control units were previously covered in the Fed Spec AA-C-30, which was cancelled on January 20, 1988. Types I, III, and IV have no superseding documents to cover them. Type II is superseded by Commercial Item Description (CID) A-A-2547. Table 5-1 lists key control cabinets that are covered under CID A-A-2547. Table 5-2 lists other key control units not covered by a Federal Specification or commercial item description, but which are still being manufactured and may be purchased. The key cabinets, key boxes, and key racks covered in Table 5-2 are classified as follows:

a. Type I - Multiple-drawer key cabinet

   Class A - With key-holding hooks on panels

b. Type II - Wall-mounted key cabinets

   Class A - With key-holding hooks on panels
   Class B - With multiple-bend key-holding wires on panels

c. Type III - Portable key box (tray) for mounting in letter and legal-size filing cabinets

   Class A - With key-holding hooks on panels
   Class B - With multiple-bend key-holding wires on panels

d. Type IV - Key racks and/or panel(s) for mounting in letter and legal-size filing cabinets

   Class A - With key-holding hooks on panels
   Class B - With multiple-bend key-holding wires on panels

Systems using devices for identification and/or cross-indexing keys can be furnished with key control units. These systems can be furnished with or without cabinets, boxes, or trays. Unless otherwise specified, the systems are configured as follows:

- System 1 - Single identification system
- System 2 - Multiple identification system

System 1. Single Identification System is used when a simple record of key identification symbols corresponding to those assigned to lock location, and a record of key issues, is required. The key and lock location symbols may or may not be identical. Identification aids furnished are not less than one ledger, record book, card index, or other recording device. When specified, one

Table 5-1. Key Control Cabinets (Reference: CID A-A-2547)

Key Capacity	NSN	Classification	
		Class	System
25	2090-00-958-0236	A	---
50	2090-00-958-0237	A	---
75	7125-00-132-8973	A	1
95	7125-00-285-3049	A	1
190	7125-00-285-3048	A	1
1,000	7125-00-132-8981	A	1

key tag will be furnished for each key hook. Tags shall be either plain or numbered, as specified.

System 2. Multiple Identification System is used when specific control of keys is desired to hide the identity of lock applications and/or lock. Setting up and indexing instructions are furnished with each multiple identification system.

Manufacturers of indexed key control cabinets are listed in Appendix A and should be contacted for availability of finish, type, and design.

Installation and Service

Follow the manufacturer's installation procedures for table-mounted and wall-mounted key cabinets. Installation instructions are normally furnished with the cabinet.

KEY-CONTROL SOFTWARE

Functional Description

Any business in which personnel have access to keys will inevitably have an accountability problem. Many times keys are not returned or returned to the wrong place. This problem can result in the cost to replace keys, wasted employee time, even theft. Key control software combines the technologies of scanners, computers, and electronics. It allows management to always know who has possession of a key and how long they have had it. It also provides management with a way to control which employee has access to a key. A system run by key control software is shown in Figure 5-3.

The software is first installed on an IBM compatible computer. The computer is connected with the key drawers. The computer interface circuit card (PCIF) is the interface between the computer and the drawers. It also decodes the data from the card reader. Each key in each drawer is attached to a tag that is barcoded and is positioned inside a slot on the bottom of the drawer. System access is obtained by the user signing on to the system software with a magnetic card and/or keyboard password entry, and then requesting access to specific keys.

If the software determines that the request should be granted, it will display a graphical picture on the computer screen indicating where the key is located in the drawer. The software then unlocks the drawer where the key is located and the user is prompted to open the drawer and remove the key from its slot. After the drawer is closed the computer scans the drawers and marks any changes that have occurred since the last scan.

Any keys missing are marked as "logged-out" to the current user, showing the time and date they were taken. The computer can also instantly report on which keys have been taken, at what time of the day, by whom, and for what reason, each time the drawer is closed. This procedure accounts for all keys in real time and provides an audit trail. An alarm sounds if an employee attempts to remove a key that he is not authorized to remove.

Selection and Ordering Guide

The computer is the heart and controller of a key control software system. To ensure operation of the system, a computer system must meet the following criteria:

- 100 percent IBM-AT compatible
- One megabyte or more RAM
- 150-watt or larger power supply
- 20-megabyte or larger IDE hard drive
- One high-density 3-1/2"floppy drive
- Two serial/RS-232C ports
- One centronic compatible parallel port
- One expansion card slot for the PCIF card
- Color graphics video - "CGA" or higher

Another consideration when ordering a key control software unit is the amount of keys that will be stored. Most units can be purchased to handle anywhere from 100 to 3,500 keys. If the system is to be used with access control cards, a standard magnetic card reader must also be bought.

Installation and Service

Follow the manufacturers' introduction procedures for the key control software, which are normally furnished for both the software and the unit.

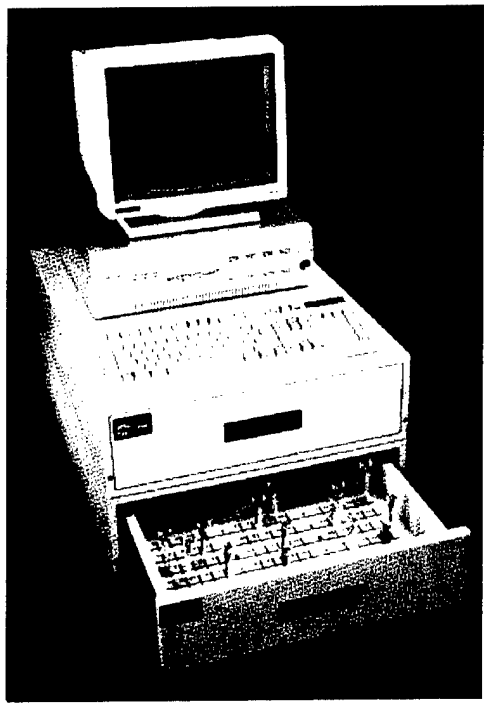


Figure 5-3. Key control software unit.

Table 5-2. Key Capacities

Cabinets, Boxes, and Racks	Type	Class[1]	System	Key Capacity Selection (minimum)
Floor Cabinets, Drawer Type, with Panels and Hooks				
4-drawer without system	I	A	---	391, 782, 1173, 1564
4-drawer with system	I	A	1 & 2	
5-drawer without system	I	A	---	391, 782, 1173, 1564,
5-drawer with system	I	A	1 & 2	1955
6-drawer without system	I	A	---	600, 800, 1000, 1200,
6-drawer with system	I	A	1 & 2	1400, 1600
8-drawer without system	I	A	---	1800, 2000, 2200
8-drawer with system	I	A	1 & 2	
Wall-Mounted Cabinets, with Key-Hold Hooks				
Cabinet only	II	A	1	25, 50, 75, 95, 190, 285, 380,
Cabinet with single system	II	A	1	475, 570, 600, 800, 1000, 1200
Cabinet with multiple system	II	A	2	25, 50, 75, 95, 150, 190, 250, 285, 350, 380, 450, 475, 550, 570, 600, 800, 1000, 1200
With Multiple-Bend Key-Holding Wires				
Cabinets only	II	B	---	60, 100, 200, 300, 400,
Cabinets with single system	II	B	1	600, 800
Portable Key Boxes				
Portable key box (tray)	III	A	---	21, 35, 42, 49
Boxes with system	III	A	1 & 2	
Portable key box (tray)	III	B	---	40, 80, 120
Boxes with single system	III	B	1	
Key Racks				
Key rack (panel)	IV	A	---	10, 20, 28
Key rack (panel)	IV	B	---	10, 20, 40

[1]Class A minimum capacity selections are listed by the number of hooks for holding at least two keys of at least 0.080-inch thickness. Class B minimum capacity selections are listed by the number of key retaining bends on a wire from which at least three keys of at least 0.080-inch thickness can be suspended by means of a slot or other means of hanging the key and holder on the wire.

CHAPTER 6

SECURITY SEALS AND TAMPER-INDICATING DEVICES

MECHANICAL AND ELECTROMECHANICAL SECURITY SEALS

Functional Description

Security seals are passive, one time locking devices used to detect tampering or entry, afford limited resistance to entry, or provide a combination of both. Seals provide tamper resistance through their design and unique identification capabilities. Except for electromechanical seals designed to be reusable, once a seal has been used, its design will prevent its removal without being deformed or destroyed. Substitution with a similar seal is difficult because of each seal's unique numbering and marking.

For years DoD agencies have used lead-wire seals (Figure 6-1) to seal weapons containers, calibrated test equipment, chemical storage drum rims, etc.

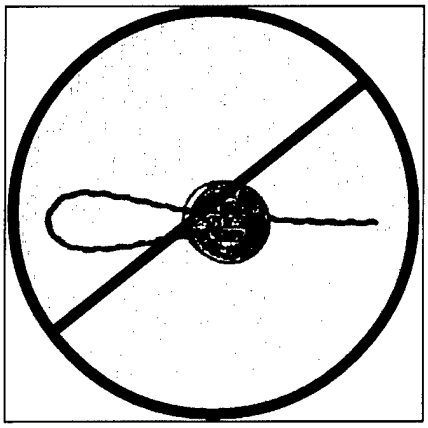


Figure 6-1. Lead-wire seal.

Environmental issues concerning disposal of lead seals in the field have surfaced. DoD and the Environmental Protection Agency (EPA) have discussed methods to eliminate the use of lead seals. Manufacturers are recommending plastic and aluminum seals to their customers. While lead seals are available commercially, due to their toxicity they should be avoided and seals made of other materials substituted.

Applications for security seals continue to increase. Below is a partial listing of applications for mechanical security seals and tamper-indicating devices (TIDs).

- Container, semi-trailer, railcar, and rolling boxcar door security
- Rail tanker and hopper car hatches
- Medical material and pharmaceutical control
- Material, packaging, inventory control and accountability
- Fixed long-term storage
- Chemical storage containers, tanks, and vessels
- Dry chemical drum liners
- Weapons and ammunition storage/accountability
- Liquid valves, tank latches
- Storage drum rings and lids
- Fuel truck valves
- Semi-trailer king pins
- Fire and emergency exits
- Tote bins
- Checked baggage, luggage, and zipper bags checked on airlines
- Storage sheds
- Low security
- Tool boxes, bins, and cages
- Medical spark kits
- Inactive personnel fence gates and other replacements for padlocks
- Mail, courier, money, and canvas bags with latching belts
- Arms control and verification
- Sealed classified shipments
- Engine governors
- Hospital crash carts
- Fire extinguisher and fire doors
- Wire and communications cable runs and J-boxes
- Securing food boxes from theft and contamination
- Connect wires in aircraft
- Locking fuel injection systems, scales, meters, and calibration equipment
- Taxi and utilities meters
- Airliner liquor carts

To meet this expanding demand, an extremely wide selection of mechanical security seals and TIDs are now commercially available.

Mechanical seals range from large metal locking pins, "C" clamps, and aircraft cable devices that require special tools or bolt cutters to remove, to thin plastic strips, tiny molded plastic padlocks, and plastic-wire seals that are easily removed with household scissors or a pocket knife.

Mechanical seals can be categorized into 5 groups by style. Plastic or metal flat strap seals (Figure 6-2) are approximately 3/8-inch wide and 8 inches long. When fabricated with a metal ball locking mechanism they are often called "ball-seals."

Plastic and wire padlock seals (Figure 6-3) have the appearance of a non-keyed padlock. They have plastic bodies with either a wire or plastic shackle, which must be cut off. Wire shackles are easy to remove by twisting the seal at the score marks. Shackle diameters (openings) vary starting at approximately 1/2-inch.

Wire and metal crimp seals (Figure 6-4 - top) and wire with plastic body and locking plug (Figure 6-4 - bottom) are used as alternatives to lead wire seals. Wire length is approximately 8 inches, but any length can be obtained. These seals can be aluminum, steel, or brass. A special crimping tool is required for the metal crimp seals. For plastic body seals, needle-nose pliers can be used to snap the plastic plug into place thereby securing the wire.

Pull-tight (cinch) seals (Figure 6-5) are used to seal both plastic and canvas bags. Some require a special tensioning tool to tighten the strap around the neck of the bag. These seals come with a smooth strap for plastic bags and either gripping teeth on the strap, or seal locking device, for canvas bags. Various strap lengths are available.

Cup seals to secure bolt or screw heads (Figure 6-6) are used on meters, containers, valves, etc., to prevent unauthorized removal. They are often used in conjunction with a wire-type seal. Cup seals generally range from 3/8 to 1 inch in diameter.

Bolt seals (Figure 6-7) are often used in lieu of a padlock due to lesser cost. Not only do they provide the same security as a low-security padlock, but they also provide an audit trail due to their recordable number or code. They are used on railroad cars, interstate trucks, and container doors as cargo seals. Bolts are generally 5/16-inch hardened steel, 3 to 5 inches long.

Crimp cable loop seals (Figure 6-8) are made with a steel one-way lock body and aircraft cable ranging in diameter from 3/32 to 1/4 inches. Cable length is normally 12 inches, but any length can be specified.

Railroad car door "C" clamp rail seals (Figure 6-9) are specifically designed to be used next to the opening mechanism on the top door rail of railroad cars. (Note: Installation of these seals requires the use of a 10- or 12-foot extension ladder). Their height of installation and specialized set screw design

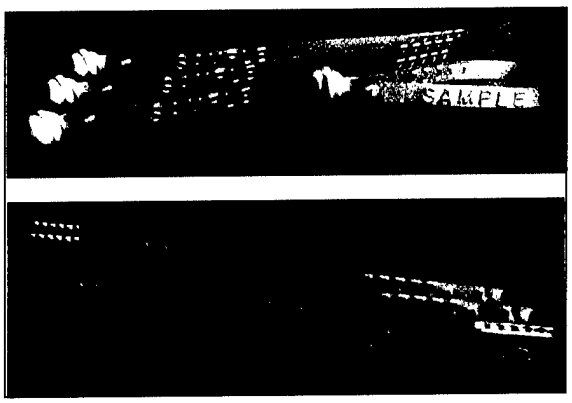


Figure 6-2. Flat and ball strap seals.

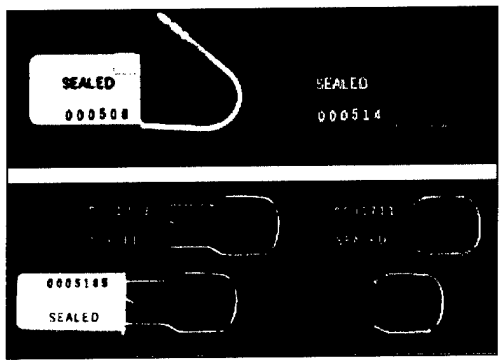


Figure 6-3. Steel and plastic shackle padlock seals.

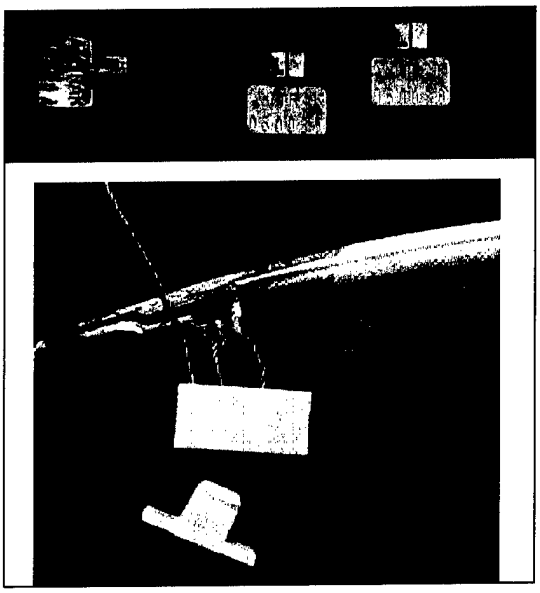


Figure 6-4. Wire and metal crimp seals.

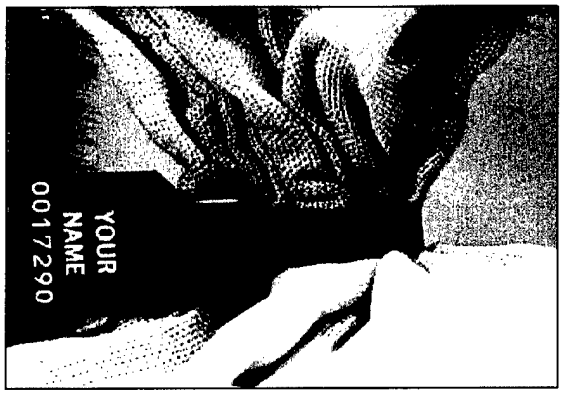


Figure 6-5. Bag strap seals.

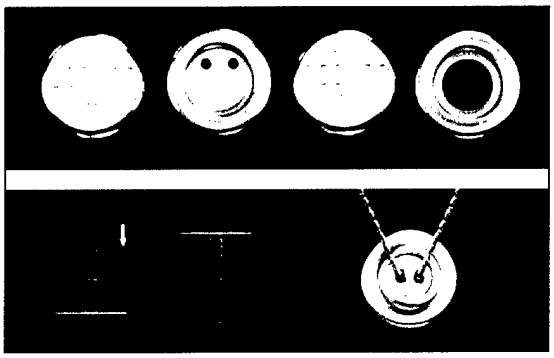


Figure 6-6. Cup seals.

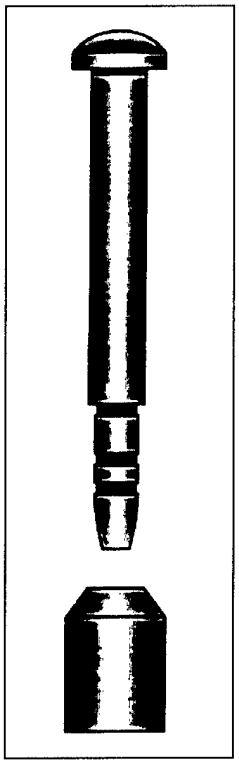


Figure 6-7. Bolt seal.

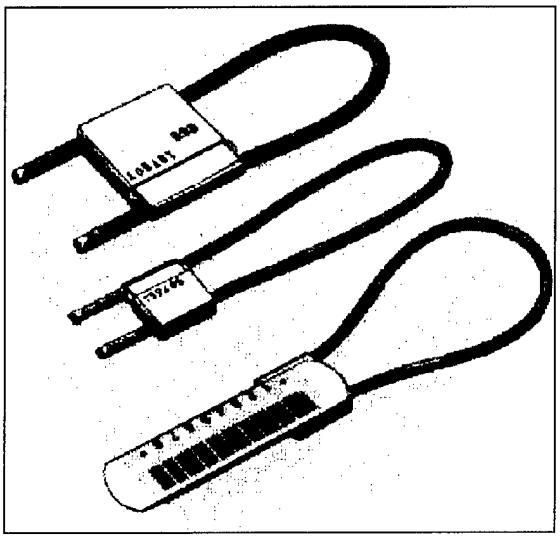


Figure 6-8. Crimp cable loop seals.

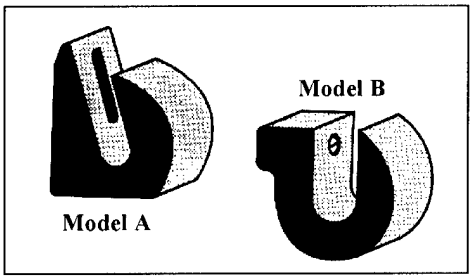


Figure 6-9. Railroad car door seal.

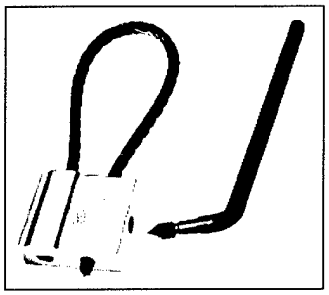


Figure 6-10. Cable loop seal with snap-off twist bolt.

makes them difficult to remove and thus unattractive to thieves. As an exception, railroad car door seals are reusable.

Cable loop seals with a snap-off twist bolt (Figure 6-10) have a 9-inch cable with one end molded into a steel or aluminum body. The other end is threaded through the hasp loop(s) and pushed completely through a hole in the seal body. A snap-off screw is then tightened until it shears off, thereby securing the cable. The screw handle is disposable. These seals come in different seal body styles and with various sizes of steel cable ranging from 1/32 to 1/4 inch.

Pull-tight sliding loop seals (Figure 6-11) are similar to the snap-off lock cable loop seals discussed above except they use an one-way sliding automatic lock design, rather that the twist-off bolt, to secure the steel cable. Again, seal bodies vary. Cables are approximately 12 inches in length and 1/8 to 1/4 inch in diameter. Other cable lengths can be special ordered.

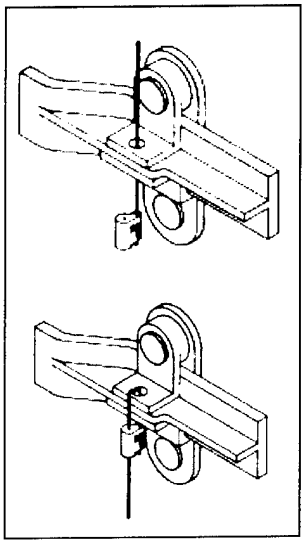


Figure 6-11. Pull-tight sliding loop seal.

Zipper-lock transport envelopes (Figure 6-12) can be used for a myriad of purposes, such as, transportation of valuables, evidence chain-of-custody, cash deposits, magnetic tapes, sensitive documents, etc. Envelopes are made of plastic, vinyl-coated fabric, or canvas and sealed with a special zipper seal. These en-velopes are available in many different sizes. Envelopes can also be made to meet special requirements.

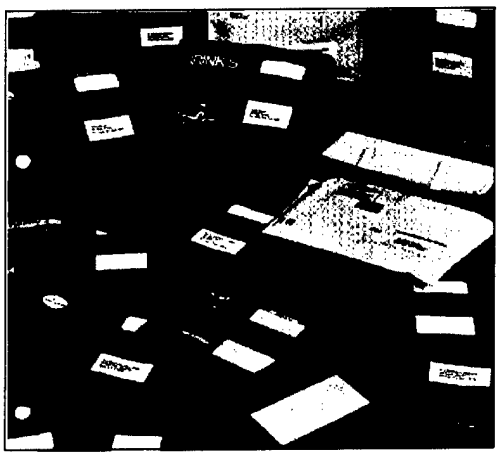


Figure 6-12. Zipper-lock transport envelopes.

Flag and cone cable seals (Figure 6-13) are used as a combination lock and seal. The cable is 3/16 inch in diameter with a standard length of about 7 inches. Both the flag and cone are serialized. The cable with the flag is slipped through the cargo or railcar door hasp and the cone slides up the cable snug to the hasp. When the cable is cut, some designs allow the cone to be slipped off the cable remnant for reuse.

New technology is having a significant impact on the development of more effective security seals. Fiber optics and electronic chips are rapidly entering the security seals and TID field. A few security seals using fiber optic cable technology are now on the market and reportedly, many more are in research and development. At least one manufacturer has developed and is marketing a reusable security seal (Figure 6-14) that resets automatically with a random number each time the system is activated. While the initial cost of security seals that use new technology will be greater than that of the disposable seals, they should be cost-effective over time.

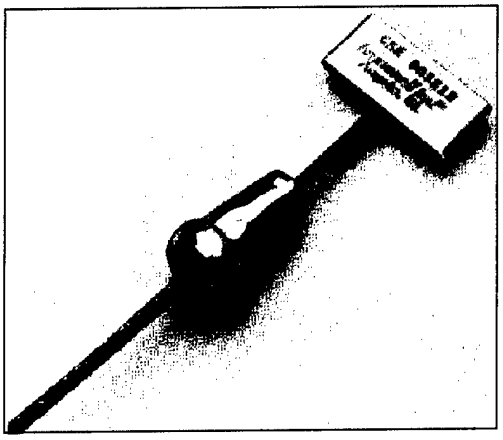


Figure 6-13. Flag and cone cable seal.

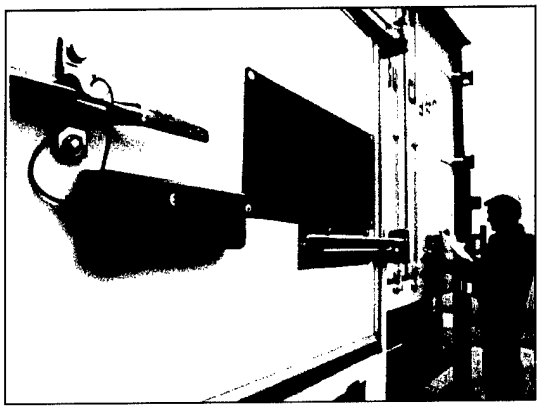


Figure 6-14. Reusable electromechanical seal.

Security seals and TIDs can be used where accountability of an asset is the primary purpose of the seal. Seals are often used to verify inventories when custody of sensitive assets is rotated, e.g., ammunition, narcotics, evidence containers, etc. Since such assets are otherwise protected against physical loss, using seals expedites the turnover of the assets and/or provides a "chain-of-custody" trail by validating the security seal rather than resorting to a full inventory of every item in the container or storage area.

Seals can also be used in conjunction with keyed or combination padlocks where accountability, as well as the physical security of assets, is important.

Keys to padlocks that secure inactive fence and building entrances and exits are often misplaced or lost. As a consequence, when access is required, bolt cutters are often used to remove these locks. Bolt and heavy steel cable seals can be an alternative to low-security padlocks. Bolt and cable seals are as robust as low-security padlocks, cost less per item, yet their serial number or bar code provides evidence that the entrance/exit was/was not opened.

Security seals can also be used to both seal and lock cargo trucks and shipping containers for long distance transit. By knowing the serial number of the seal used by the shipper, the recipient can assure that the shipment was not opened or pilfered during transit.

Many security seals and TIDs are available in a variety of colors that allow the user to establish color-coded systems. Determine any special markings, barcoding, or numbering desired before ordering. When so specified by the user, colorings and markings will be placed on security seals by the manufacturer. Correct seal selection, along with complete and accurate ordering specifications, will eliminate costly production and usage errors.

Federal Specification FF-S-2738, "Seals, Anti-Pilferage," covers six styles of seals. Table 6-1 summarizes these styles, types, description, materials, and markings.

Selection and Ordering Guide

The responsibility for ordering and receiving security seals and TIDs should rest with only one designated person, the Seal Administrator (SA). Seal manufacturers should be instructed to ship orders, by name, directly to the SA. When orders are received, the SA should open and inspect the shipment, then secure the seals in a controlled environment.

When selecting a security seal or TID, consider application, removal, and any special tools needed as well as the level of physical security desired.

Generally, mechanical security seals listed in manufacturer's catalogs are standard commercial-off-the-shelf and are ordered without modification. However, where special requirements exist, manufacturers can "customize" their seals for a particular application. When ordering seals from a manufacturer, consider the following:

- Manufacturer's stock number
- Printing desired (e.g., name, code)
- Special subordinate unit codes
- Consecutive numbering sequence
- Barcoding, if desired
- Color
- Standard or special lengths (cable seals)
- Special packaging requirements
- Special shipping requirements

A partial list of mechanical seal manufacturers and dealers is provided in Appendix A.

Installation and Service

Security seals should only be installed or removed by a properly trained individual.

An accurate record must be made concerning each seal when it is installed and removed. As a minimum, the following information should be recorded:

- Type of seal installed
- Serial number/bar code of seal
- Special coding or markings on seal
- Time and date seal installed
- Where seal was installed (e.g., door, valve, etc.)

Security seals and TIDs should be inspected on a regular basis for evidence of tampering and unauthorized removal. Security seals and TIDs should be stored in a secure and controlled area to prevent unauthorized personnel from having access to the seals. The storage area must be clean and free of corrosive elements and protected against unauthorized entry.

ADHESIVE SECURITY SEALS AND TIDS

Functional Description

Adhesive security seals and TIDs are passive, one time tamper-indicating materials used to detect unauthorized entry, pilferage, and tampering. They afford limited resistance to entry, but show evidence of tampering by their design and unique identification capabilities. Adhesive seals are applied with heat-transfer or pressure-sensitive adhesives.

Once applied, it is difficult to remove without deforming or destroying the seal. Due to their unique characteristics and specialized adhesive properties, substituting a similar seal is extremely difficult to do without detection.

Applications for adhesive seals increase daily. Below is a partial listing of applications for adhesive security seals and TIDs. To meet this expanding demand for tamper indication, a wide variety of adhesive seals has become commercially available.

- Verifying and validating equipment manufactured by legitimate original equipment manufacturers (OEM's)
- Security seals for cargo vessels, aircraft, and ground transportation

- Communications panels and computer control consoles
- Seals for valuable documents (anti-counterfeiting, document alteration)
- Authenticating device for equipment and containers
- Tamper-indicating device for doors, drawers, envelopes, packaging, or metal and plastic boxes
- Household goods shipments
- Drug test samples and test report envelopes
- Parking stickers and DMV vehicle inspection stickers
- Circuit board verification
- Instrument calibration verification
- Tamper indicators for HAZMAT materials
- Seals for radioactive materials and waste

Adhesive security seals can be grouped into three functions:

Package, document, and envelope seals are available in many forms. They use tamper-indicating adhesives to indicate that the envelope or parcel has been opened. When applied, the seal has a solid color background with customer ordered imprinting. When the seal is lifted or removed, the adhesive in the area of separation leaves special marks or repetitive words such as "void" or "opened" (Figure 6-15).

Identification and anti-alteration overlay seals (for passports, drivers licenses, identification cards, product identification, etc.) are primarily used to overlay critical printed data, graphical information, or signatures to protect such items from tampering (Figure 6-16). They also can be used to cover and protect calibration date stamps, installation passes, etc. Most of the seals in this category are applied through a heat and pressurized process.

Anti-counterfeiting, tamper-resistant and tamper-indicating, self-destruct, equipment access panel, and aircraft-component validation seals (Figure 6-17) are used as an authentication device for equipment and containers. They can be used on metal and plastic storage containers, HAZMAT material control, communications panels and computer control consoles and to validate critical equipment components.

Selection and Ordering Guide

As with mechanical seals, ordering and receiving security seals and TIDs should be the responsibility of only one person, the SA. Seal manufacturers should be instructed to ship orders directly to the SA.

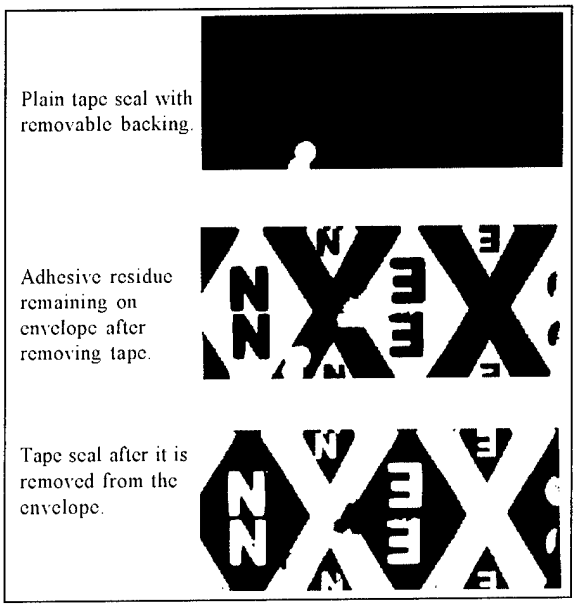


Figure 6-15. Document and package seals.

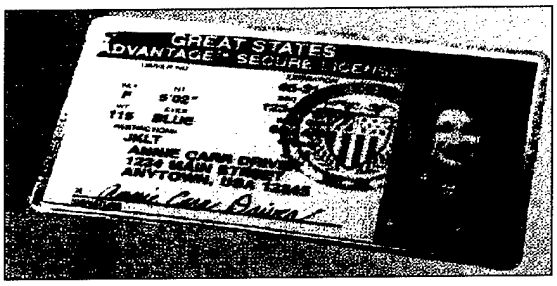


Figure 6-16. Identification and anti-alteration overlay seals.

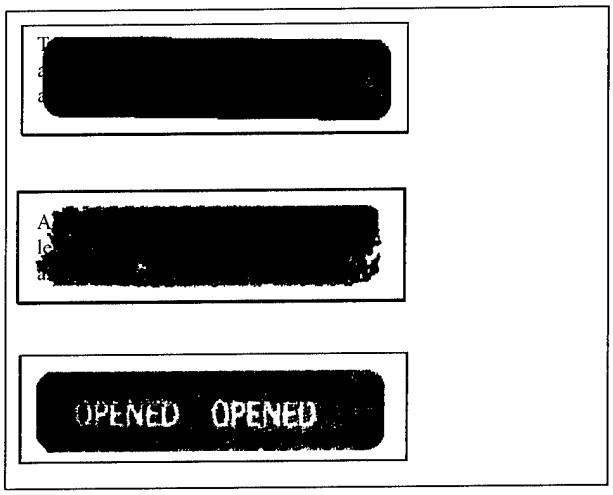


Figure 6-17. Tamper resistant/indicating seal.

For best results with adhesive security seals, a technical analysis of the surfaces where the seals will be used must be made. Even similar metals, paints, and plastics have widely varying adhesion qualities. The technical selection and/or development of an adhesive material is important when selecting adhesive seals. The adhesives selected must be compatible with proposed seal application surfaces.

Most adhesive seals leave a residue on the surfaces where they are applied. Often seal adhesives are designed to leave adhesive residue repeated throughout the application area that states "void," "opened," or has a special logo or marking. In many cases, these seals will be one-time usage seals and residue removal can be ignored. However, in some cases, i.e., equipment access doors, calibration seals, reusable shipping or storage containers, etc., it would be appropriate to remove seal residues in preparation for the next use. Personnel responsible for the ordering of adhesive seals must consider residue removal in such cases as a part of the ordering process.

Most manufacturers are equipped to provide an analysis of the application surfaces involved and then recommend or develop an appropriate adhesive for that specific application. Several adhesive seal manufacturers should be contacted to obtain their recommendations for adhesive seals. These can then be compared technically and the best alternative selected.

When so specified by the user, colorings and markings are placed on security seals by the manufacturer. Correct seal selection, along with complete and accurate ordering specifications, will eliminate costly production and usage errors. Adhesive seals can be multicolored, have logos, and generally allow for any special markings, barcoding, or numbering desired.

There is no Government specification for adhesive seals. A listing of commercial manufacturers and dealers is provided in Appendix A.

Installation

Once seals are distributed for use, they must be applied as soon as possible. When applying a seal, record the seal data and include:

- Type of seal
- Serial number
- Material identification
- Location and identification of container
- Identification of person applying seal
- Identification of person witnessing application where a two party program is in place
- Date
- Verification of correct and complete information by seal custodian

Establish a detailed procedure for applying seals for each type of seal and container. A suggested application procedure should be similar to the example in Chapter 5.

Unused seals must be returned to the seal administrator for accountability and control.

For more detailed information about seals and TIDs, call for a copy of The United States Department of Defense guide, "Antipilferage Seal User's Guide," dated October 1997.

Table 6-1. Anti-Pilferage Seals
(Federal Specification FF-S-2738A)

Style/Type	Description	Seal Material	Resistance to Tampering	Marking	NSN	Figure
Style A-Wire Type 1 Crimp	Small disk of metal with holes for the sealing wire. After the wire is through the secured item and disk, the disk is crimped with special embossed pliers.	Aluminum, or sheet steel. Wire is spiral wound single strand 2 or 3 ply galvanized or stainless steel	30 sec	Identity mark or special logo embossed onto disk with special pliers.	Lead seals are not recommended for use.	6-1
Style A-Wire Type 2 Folding	Spiral wound wire is passed through the secured item. A sheet metal box is folded around both ends of the wire and locked onto the wire serrations.	2- or 3-ply spiral wound galvanized stainless steel wire and sheet metal box coated for thermal discoloration	30 sec	Numbered sequentially, logos, or specialized markings.	None	Not shown
Style A-Wire Type 3 Cup	Stainless steel is passed through secured item then into the seals crimp point and knotted. The crimped knotted wire ends are then enclosed in a two-piece, self-locking sheet metal cup, therein, providing a second seal.	15-strand stainless wire with interlocking stamped sheet metal cups	30 sec	Numbered sequentially or unique markings inside or outside.	None	Not shown
Style B-Padlock Type 4 Wire Shackle	Padlock style with spring wire shackle. The wire shackle is passed through secured item and inserted into a metal or plastic block where it locks. The wire shackle must be cut or the lock body destroyed to remove the seal.	Galvanized or stainless steel spring wire (.041, .047, or .055" diameter) shackle with a metal or plastic body	15 sec	Numbered sequentially, logos, or specialized markings.	None	6-3
Style B-Padlock Type 5 Plastic Shackle	One-piece seal molded in the shape of a padlock. When the shackle is closed into the body, it automatically locks. The shackle must be cut to remove the seal.	Molded plastic	15 sec	Numbered sequentially, logos, or specialized markings.	None	6-3
Style B-Padlock Type 6 Steel Shackle	A keyless padlock that has a hardened steel shackle and metal body. Both pieces are marked and/or numbered. One time locking mechanism is in the body.	Steel body with hardened steel shackle	15 sec	Numbered sequentially, logos, or specialized markings.	None	Not shown
Style C-Strap Type 7 Car/Box End	Flat metal strap for container, truck cargo, and railroad car doors & hasps. Straps are approx 6" long and not less than 0.3" wide. One end is folded & crimped to form a box with a capture mechanism. The other end, when inserted into box, is captured forming a seal.	Stainless or galvanized steel	30 sec	Numbered sequentially and/or specialized markings.	5340-00-662-9817	6-2

(Continued)

Table 6-1. Anti-Pilferage Seals (continued)
(Federal Specification FF-S-2738A)

Style/Type	Description	Seal Material	Resistance to Tampering	Marking	NSN	Figure
Style C-Strap Type 8 Car/Plastic	Thermosetting plastic version of Type 7. One end locks into a plastic capture device molded on the opposite end of the strap.	Plastic, various colors	15 sec	Numbered sequentially, logos, or specialized markings.	None	Not shown
Style C-Strap Type 9 Car/Ball End	Steel or aluminum strap similar to Type 7, except strap has a ball latching mechanism on one end.	Steel or aluminum	30 sec	Numbered sequentially, logos, or special-ized markings.	5340-00-081-3381	6-2
Style D-Cable Type 10 Crimp, Special Markings	Standard steel strapping closures with a controlled lithographic design with special markings.	Steel to QQ-S-781	5 min	Logos and special markings.	None	Not shown
Style D-Cable Type 11 One-Piece	High-strength 3/16- or 1/4-in. diam. steel aircraft cable, 8 in. in length, with swagged captive device(s) at one or both ends. When only on one end, the device captures the inserted cable, which is cinched up on itself. When on both ends, one end has a male fitting that locks in the other end's female fitting.	Aircraft steel cable	30 sec	Numbered sequentially, logos, or special-ized markings.	None	6-11
Style D-Cable Type 12 Two-Piece	High-strength 3/16- or 1/4-in. diam. steel aircraft cable, 8 in. in length, with separate locking mechanism. Locking mechanism can be attached to the cable or locking point on the cable.	Aircraft steel cable with steel locking device.	30 sec	Both pieces numbered sequentially, logos, or special-lized markings.	None	6-8
Style E-Bolt Type 13 Unthreaded	Notched unthreaded pin and locking cylinder. When the pin is inserted in the cylinder, a notch on the pin is captured by a locking ring, securing the seal.	Steel pin and steel locking device.	30 sec	Numbered sequentially, logos, or special-ized markings.	None	6-7
Style F-Plastic Type 14 Pull-Tight	One-piece serrated plastic string or slender strap with capture device at one end. The free string end is threaded through	Plastic, various colors	10 sec	Numbered sequentially, logos, or special-specialized	None	Not shown

CHAPTER 7

SECURITY HARDWARE

HINGE-SIDE DOOR PROTECTION

Functional Description

Hinge-side protection offers resistance against forced entry attack and removal of the door from the hinged side. Exposed hinges on out-swinging doors are vulnerable to forced entry by simply driving out the hinge pins or cutting off the hinge knuckles and pulling the door free of the locking mechanism.

There are a number of concepts for hinge-side protection on outswing doors. These involve positive interlocking hardware that couple the hinge side of the door to the door frame. One concept is a continuous hinge shown in Figure 7-1.

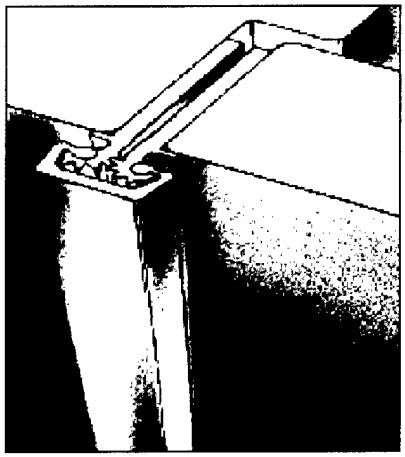


Figure 7-1. Continuous hinge.

Continuous hinges run the full length of the door for continuous connection of the door to the door frame. Moving parts are not exposed as on typical hinges. Continuous hinges are made from a high-strength aluminum alloy extrusion.

Another concept is the pin-and-socket system shown in Figure 7-2. Pins in the door engage mating sockets in the jam when the door is closed. A pin may either be a round bolt, a metal lug, a rectangular bar, or a piece of flat stock steel. Pins should project a minimum of 1/2 inch into the mating socket and be installed on or near each hinge. Round pins are at least 1/2 inch in diameter. A close fit between the pin and socket increases the door's resistance to removal on the hinge side.

Selection and Ordering Guide

Continuous hinges are commercially available and may be purchased from the manufacturer. While there are several commercially available pin-and-socket systems, most will need to be designed and constructed in-house. MIL-HDBK-1013/1B suggests several pin-and-socket systems. Both methods provide acceptable levels of hinge-side protection. See Appendix A for a list of manufacturers.

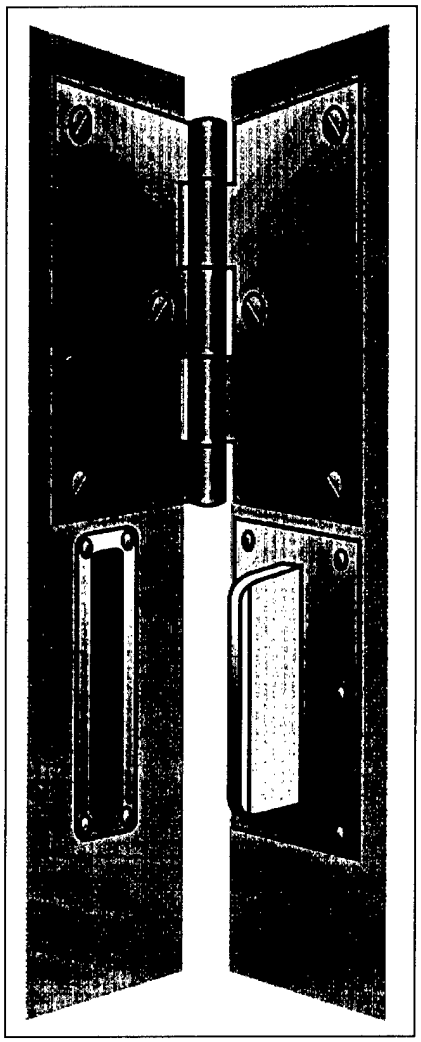


Figure 7-2. Pin-and-socket hinge.

Installation and Service

Continuous hinge installation instructions are provided with the product. Installation requires standard tools and hardware. Use caution when aligning a door during installation to avoid hinge-to-hinge or door-to-jamb binding.

Fabrication of a pin-and-socket system requires common fasteners and no special tools.

Other methods of hinge-side protection such as hinge pin peening, tack-welding, or use of set screws installed in the hinge knuckle to lock the hinge pin in place are not recommended methods because they do not provide protection against cutting off the hinge.

For information on in-house hinge-side protection designs, contact the *DoD Lock Program, Technical Office Hotline, DSN 551-1212, (805) 982-1212, or 1-800-290-7607.*

EXIT DEVICES AND EMERGENCY EXIT HARDWARE

Functional Description

Emergency exit devices allow safe, instant exit through locked doors without the use of keys, tools, or special knowledge. They operate by depressing an inside bar that retracts the latch bolt and opens the door. Some actuating bars can be secured open by a "dogging" device operated by a tool or key, causing the bolt to remain retracted. The door then operates in a "push-pull" manner without restriction. Emergency exit devices may or may not have a key-operated cylinder that allows key operation from the outside.

Fire exit devices look the same as emergency exit devices. The basic reason for their use is the same — to allow quick, easy, and safe exit in case of an emergency. In addition to performing this function, they also hold the fire door closed and prevent fire from spreading throughout the building. The most important difference between emergency exit devices and fire exit devices is that "dogging" mechanisms are not allowed on fire exit doors. Fire exit devices should be installed only on labeled fire exit doors. All emergency exit devices and fire exit hardware must be listed by UL as meeting requirements for life safety and fire resistance. Field modifications may result in negation of the UL label. Emergency exit devices and fire exit devices are available in four basic types:

1. Rim - Surface applied with latch bolt in lock stile case (Figure 7-3).

2. Mortise - Latch bolt in lock mortised into the lock stile of the door (Figure 7-4).

3. Surface Vertical Rod - Surface applied with latch bolts in the top and bottom cases (Figure 7-5).

4. Concealed Vertical Rod - Vertical rods, top and bottom cases, and bolts concealed in the door (Figure 7-6).

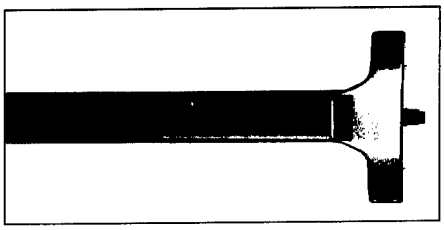


Figure 7-3. Rim exit device.

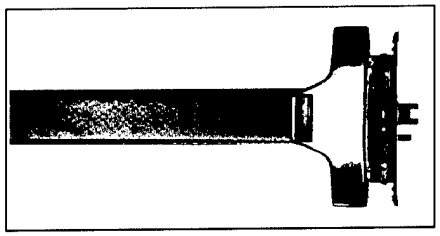


Figure 7-4. Mortise exit device.

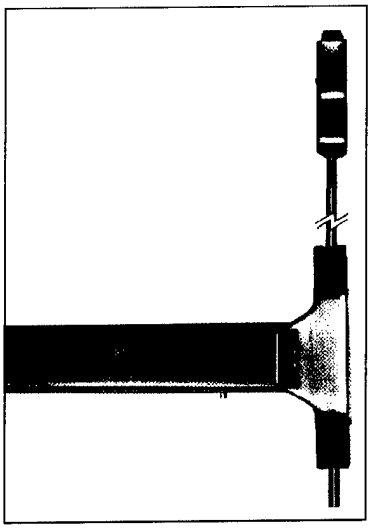


Figure 7-5. Surface vertical rod exit device.

These types are further broken down for flush doors, wide stile doors, and narrow stile doors. These are fabricated from aluminum, hollow metal (steel), and wood. Tables 7-1 and 7-2 list the available types and functions of exit devices.

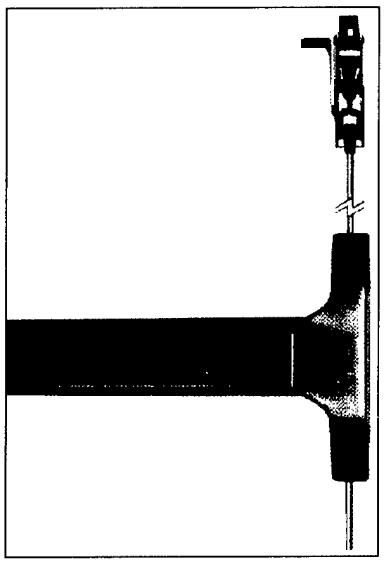


Figure 7-6. Concealed vertical rod exit device.

In addition to mechanical applications, various electromechanical functions are available. Automatic locking and unlocking of all, or specific, entrance doors may be accomplished by a remote-controlled, electrically activated exit device. Local and remote electrically monitored alarms can indicate if doors are in an opened or closed position or if exit devices are locked/unlocked or dogged/undogged. National Fire Protection Association (NFPA) Standard No. 101, "Life Safety Code," or other competent authorities requiring exit devices, prohibit the use of any type of auxiliary locking hardware if it prevents or is intended to prevent free use of the exit door.

Emergency and fire exit devices do not provide protection against forced, covert, or surreptitious entry attacks. Exit devices should only be installed on personnel egress doors where required by NFPA Standard No. 101 or the local fire protection authority. Since emergency and fire exit devices degrade the penetration resistance of security doors, it's not cost effective to install high- or medium-security doors in spaces requiring these devices. Whenever possible, secure areas should be constructed in locations that minimize exit device requirements.

Exterior doors equipped with exit devices can also be alarmed by either an intrusion detection system or a safety alarm lock (Figure 7-7) to provide added security protection.

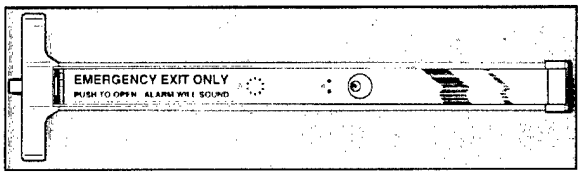


Figure 7-7. Exit device with a safety alarm.

Emergency and fire exit device requirements for security door applications can be obtained from the local fire marshal and security officer.

Table 7-1. Exit Devices for Single Doors
(Reference: American National Standards Institute/ Builders Hardware Manufacturers Association (ANSI/BHMA) A156.3, Standard for Exit Devices)[1]

Exit Device Type	Door
Rim Mortise Surface Vertical Rod Concealed Vertical Rod	Aluminum/Thin Stile (less than 1-3/4 in.)
Rim Mortise Surface Vertical Rod Concealed Vertical Rod	Aluminum/Narrow Stile (about 2 in.)
Rim Mortise Surface Vertical Rod Concealed Vertical Rod	Aluminum/Medium Stile (over 3-1/2 in.)
Rim Mortise Surface Vertical Rod Concealed Vertical Rod	Aluminum/Wide Stile (over 4 in.)
Rim Mortise Surface Vertical Rod Concealed Vertical Rod	Hollow Metal
Rim Mortise Surface Vertical Rod Concealed Vertical Rod	Flush Wood
Rim Mortise Surface Vertical Rod Concealed Vertical Rod	Wood with Panels/ Wood with Glass Panels

[1] Adopted by DoD

Note: All types of exit devices and doors are available with the following functions: NL = night latch action (key retracts latch bolt); TO = thumbpiece (key locks or unlocks thumbpiece); EO = exit only (no operation from outside).

Table 7-2. Exit Devices

Type	Door Type	Additional Required Equipment
Rim	Single	Door Closer
Mortise	Single	Door Closer
Rim (2 sets)	Pair	Door Closer for Each Door, Mullion
Combination Rim and Surface Vertical Rod	Pair	Door Closer for Each Door, Door Coordinator, Astragal
Combination Mortise and Surface Vertical Rod	Pair	Door Closer for Each Door, Door Coordinator, Astragal
Surface Vertical Rod (2 sets)	Pair	Door Closer for Each Door, Interlocking Threshold
Concealed Vertical Rod	Pair	Door Closer for Each Door, Interlocking Threshold

Note: Exit devices applied on flush, 5-inch minimum stile, aluminum, hollow metal, or wood doors. This table is not all inclusive. Only the most commonly used types of exit devices are listed. Other types or combination of types may be installed. Additional optional hardware includes astragals, interlocking thresholds, door pulls, locking cylinders, cylinder guards, and kick plates.

Selection and Ordering Guide

There are three common functions for exit devices:

1. Exit only (no operation from outside).

2. Entrance from outside by a key (key is removable only when hardware locks).

3. Entrance by outside thumbpiece (key unlocks thumbpiece).

ANSI/BHMA A156.3 may be referred to for help in selecting an exit device. Exit devices may be ordered in either standard or custom configurations. The standard configuration may require modifications to fit the door panel. For example, exit devices for a 36-inch wide door (most popular size) may be modified to fit doors down to 30 inches by cutting the actuating bar to the proper length. Vertical rod devices may be modified by cutting them to fit doors shorter than the standard devices. Standard devices are usually supplied for doors 1-3/4 inches thick. Rim devices without exterior hardware will usually fit doors up to 2-1/4 inches thick. Most standard rim devices are universal (not "handed:" they fit right-hand reverse beveled or left-hand reverse beveled doors) or are field reversible. Devices using mortise locks are not universal and "handing" must be specified when ordering (see Figure 4-27).

Devices designed for narrow stile installation can be used on wide stile doors but ***not vice versa***. It is important to specify the width of stiles when ordering exit devices and also the minimum width of stiles necessary for application of the devices. The manufacturer's catalog provides the minimum width of stile and backset dimensions.

When ordering, specify standard devices, the grade, type, function, design, and handing. Also specify height if using vertical rod exit devices and any special fasteners that may be required. There are three grades of exit devices:

1. Grade 1 - Heavy-duty

2. Grade 1A - For key-operated exit devices having high-security lock cylinders

3. Grade 2 - Standard duty

All grades may not be available in all types, functions, and finishes. Exit devices come in a number of natural, plated, or painted finishes and designs. The finish and design should be specified if devices are to match existing hardware. If the application is not standard, check with the manufacturer for any additional required ordering information.

Exit devices are available commercially but not all firms manufacturer all types and grades. Manufacturers generally do not market their products directly to the user, but sell them through vendors. To obtain the names of local distributors or vendors of these devices, contact the manufacturers listed in Appendix A.

Installation and Maintenance

Properly selected door exit devices enhance fire safety. When properly installed, exit devices should not require extensive maintenance. Routine adjustments and minor repairs are considered normal. If incorrectly installed or improperly selected, hardware can jeopardize both safety and security. Scheduled maintenance, in accordance with manufacturers' directions, increases life and proper operation of hardware. Refer to these schedules for proper servicing information.

SECURITY CHAINS

Functional Description

There are a variety of chains available for use in conjunction with security equipment. Type I is a steel chain intended for general services. Type I, Class 1 is a special alloy steel recommended for hazardous overhead lifting and wherever long life and extremely high tensile strengths are required.

Although there are several chains that meet Federal Specification RR-C-271D only two are classified as security chains: Type I - Class 1 and Type I - Class 4.

Type I - Class 1 chains are used to secure perimeter gates and must be welded, 1/2-inch steel alloy chains hardened to Brinell hardness 280-310 to be effective.

Type I - Class 4 are chains used to secure weapons racks and must be heavy-duty, hardened straight-link steel, welded, galvanized, and at least 5/16-inch thickness.

Figure 7-8. Type I, Class 1 chain.

Selection and Ordering Guide

When ordering security chains, pay attention to the dimensions and the physical requirements. Type I - Class 1 are similar to Figure 7-8 and shall conform to the dimensions and physical requirements listed in Table 7-3. The NSN for security chain is:

- 4010-00-323-4460 - 1/12-inch

Type I - Class 4 proof coil chain shall conform to the dimensions and physical requirements shown in Table 7-4. The NSNs for this chain are:

- 4010-00-149-5583 - 5/16-inch
- 4010-00-184-3476 - 3/8-inch

When specified, the following finishes for chain and attachments are available:

- Self-colored (uncoated)
- Bright finish (uncoated)
- Blacked finish
- Zinc-coated

For further information, contact the ***DoD Lock Program Technical Information Hotline, DSN 551-1212, (805) 982-1212, or 1-800-290-7607.***

Installation and Maintenance

Follow the manufacturer's suggested installation procedures and maintenance guidelines.

Table 7-3. Type I - Class 1 Welded Steel, Alloy Chain
(Ref: Fed Spec RR-C-271D)

Nominal (Trade) Size of Chain (in.)	Maximum Inside Length of Links (in.)	Maximum Inside Width of Links (in.)	Minimum Height per 100 feet (lb)	Safe Working Load (lb)	Proof Load (lb)	Breaking Breaking Load (lb)
1/4	0.975	0.455	72	3,600	7,200	14,400
5/16	1.100	0.500	92	4,450	8,900	17,800
3/8	1.333	0.650	127	6,400	12,800	25,600
1/2	1.560	0.845	226	11,400	22,800	45,600
5/8	1.820	0.975	365	17,800	35,600	71,200
3/4	2.080	1.170	520	25,650	51,300	102,600
7/8	2.340	1.300	720	34,900	69,800	139,600
1	2.800	1.430	925	45,600	91,200	182,400
1-1/4	3.705	2.048	1,465	71,250	142,500	285,000

Table 7-4. Type I - Class 4 Welded Steel, Proof Coil Chain
(Ref: Fed Spec RR-C-271D)

Nominal (Trade) Size of Chain (in.)	Actual Size of Material (in.)	Nominal Inside Link Dimensions		Length, 100 Links (max) (in.)	Weight 100 Feet (max) (lb)	Safe Working Load (lb)	Proof Load (min) (lb)	Breaking Load (min) (lb)
		Length (in.)	Width (in.)					
3/16	7/32	0.95	0.40	99	42	750	1,500	3,000
1/4	9/32	1.00	0.50	104	76	1,250	2,500	5,000
5/16	11/32	1.10	0.50	114	115	1,900	3,800	7,600
3/8	13/32	1.23	0.62	128	166	2,650	5,300	10,600
1/2	17/32	1.50	0.81	156	289	4,500	9,000	18,000
5/8	21/32	1.87	1.00	194	425	6,900	13,800	27,600
3/4	25/32	2.12	1.12	220	612	9,750	19,500	39,000
7/8	29/32	2.50	1.37	260	811	11,375	22,750	45,500
1	1-1/32	2.75	1.50	286	1045	13,950	27,900	55,800

WEAPONS RACKS

Functional Description

A low-security multi-purpose small arms storage rack, or "Multi-Rack" (Figure 7-9), may be used to provide a secondary locking system for Risk Category II, III, and IV arms. This 10-weapon rack is designed with interchangeable butt cups and barrel clips that allow a wide variety of weapons to be stored in one rack. Some of the weapons that can be stored in this rack are:

- M-16 rifle
- M-14 rifle
- 12-gauge shotgun
- M-60 machine gun
- M-79 grenade launcher
- MK 19 MOD 3 grenade launcher
- 0.50-caliber machine gun (barrel removed)
- Squad assault weapon (SAW)

In small armories or reaction force facilities with limited space, this versatile rack may be used in place of several weapons racks, which store only one type of weapon. The multi-rack further eliminates the need to procure new racks to accommodate any change in requirements. The rack is largely made from 6061 aluminum. A low-security padlock is used to lock the doors and bolt holes are provided as a means for anchoring the rack.

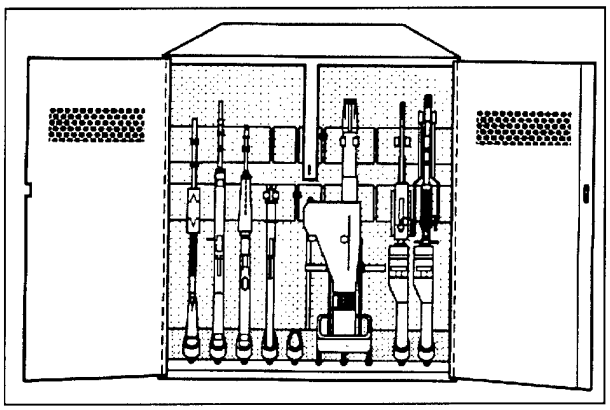


Figure 7-9. Small arms storage rack.

Selection and Ordering Guide

At the present time only a user construction specification packet is available for the multi-purpose small arms storage rack. For information, a specification packet on the multi-purpose small arms storage rack, or to order a reaction force locker contact:

Commander
Crane Division
Naval Surface Warfare Center
Code 3046
Crane, IN 47522
DSN: 482-1354 or (812) 854-1354

Installation and Maintenance

Follow manufacturer's suggested installation procedures for installing weapon racks. If not correctly installed or selected, the hardware can jeopardize both safety and security.

SECURITY HASPS

Functional Description

High-security hasps are designed to be used with the high-security padlock as discussed in Chapter 4. The high security hasp has evolved. The high security hasp currently available is the NAPEC Mark 2 Mod 9, Style 1 or 2, two-piece hasp as shown in Figure 7-10.

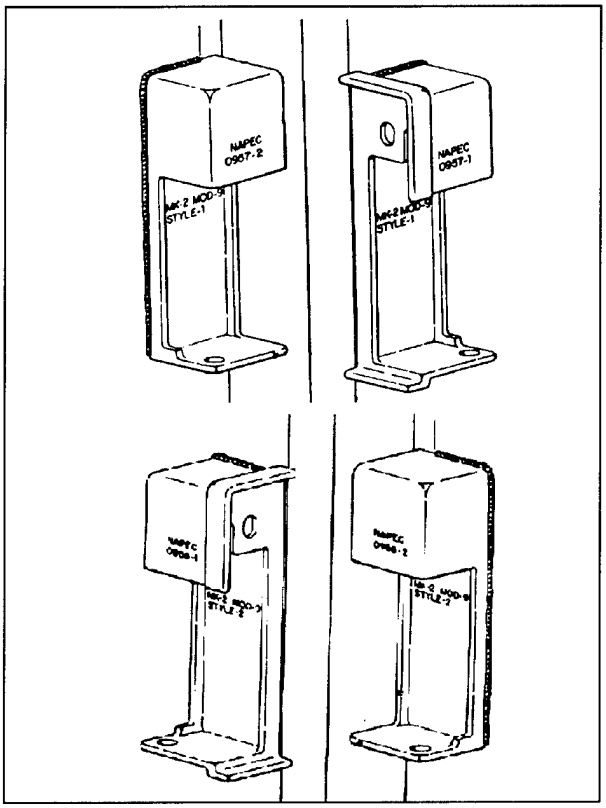


Figure 7-10. MARK 2 MOD 9 hasp.

The Sargent and Greenleaf (S&G) 833C high-security padlock is designed to be used with this hasp. When used together, they form a system that is highly resistant to attack. The two-piece MARK 2 MOD 9 hasp is made with 304 stainless steel and can be used on hinged and sliding doors. The baffle angle plate directly below where the lock hangs enhances the attack resistance of the system by preventing free access to the bottom of the padlock and its keyway.

In cases where adjoining door and wall surfaces are not flush, use a wall mounting box. Implanting the wall mounting box into the edge of the wall allows the wall half of the hasp to be attached to the recessed surface of the mounting box, flush with the door (Figure 7-11).

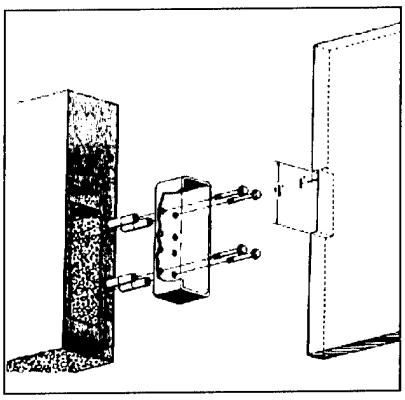


Figure 7-11. Wall mounting box.

The MARK 2 MOD 9 hasp is approved for use to protect arms, ammunition, and explosives (AA&E) and special weapons, as directed by DoD. Previous variations of the MARK 2 hasp, such as the MOD 8 four-piece hasp, may continue to be used as long as they remain serviceable. The "NATICK" hasp is no longer authorized for use to protect AA&E or special weapon assets. Existing NATICK hasps must be replaced with the MARK 2 MOD 9 hasp.

Selection and Ordering Guide

An approved high-security locking system is mandatory on new construction and upgrades of existing facilities where AA&E or special weapons are stored. The MARK 2 MOD 9, Style 1 and 2 high-security hasps are available through the Federal Supply Schedule. Table 7-5 provides the use (left- or right-handing) of Style 1 and 2 hasps, the associated MILSPEC, and NSN for ordering these hasps. The wall mounting box shown in Figure 7-11 may be obtained from:

Commander
Code 3046
Naval Surface Warfare Center Division
300 Highway 361
Crane, Indiana 47522-5001

For additional assistance contact Code 208 representatives at DSN: 482-5860/5840 or (812) 854-5860/5840.

Installation and Maintenance

Proper installation of high-security hasps is mandatory to provide the maximum level of designed security. High-security shrouded hasps must be carefully aligned during installation to maintain proper tolerances. Installation and maintenance instructions are provided with each hasp.

Table 7-5. High-Security Hasps

Hasp Style	Use	Specification	NSN
MARK 2 MOD 9 Style 1 (NAPEC 957) (2-piece hasp)	RIGHT-hand active door: Single, double, or sliding	MIL-H-29181A	5340-01-196-2547
MARK 2 MOD 9 Style 2 (NAPEC 958) (2-piece hasp)	LEFT-hand active door: Single, double, or sliding	MIL-H-29181A	5340-01-235-6907

CHAPTER 8

MISCELLANEOUS SECURITY EQUIPMENT

ROUTINE AND EMERGENCY DESTRUCTION EQUIPMENT

Functional Description

Routine and emergency destruction equipment is designed to destroy (render reconstruction impossible) sensitive or classified documents and equipment that are obsolete, have outlived their usefulness, or have been designated for destruction by the proper authority. It has also become commonplace to destroy less sensitive Privacy Act information when such information could be potentially valuable to international industrial spies.

Devices used for routine and emergency destruction include, but are not limited to, the following:

- Incinerators
- Shredders
- Pulverizers
- Disintegrators
- Wet process pulpers
- Software and degaussers

Incinerators are used to destroy (burn) most types of sensitive or classified material. Incinerating has been the traditional method for destroying sensitive or classified material, since destruction is complete and disposition of the remaining ash is relatively simple. The remaining ash need only be stirred to ensure reconstruction is impossible. However, precautions must be taken to prevent the material, or burning portions of ash, from being carried away by the wind or a draft. The Clean Air Act (42 USC 1857), as amended, places restrictions on burning. In some areas, burning may also be prohibited by state or municipal legislation. Since pollution control criteria may vary between Federal, state, and municipal jurisdictions, local officials should always be consulted before purchasing incendiary equipment or devices.

Shredders (Figure 8-1) are relatively quiet and require little skill to operate. The degree of effectiveness varies widely between shredders and depends on both their design and mechanical condition. There are two forms of shredding -- strip and crosscut:

Strip shredding machines cut the material in long strips. For proper shredding, the strips of material can be no wider than 1/32-inch. While strip shredders purchased before 1988 may continue to be used, crosscut shredders must be purchased.

Crosscut shredding machines being purchased must reduce the material to clippings no greater than 3/64-inch wide by 1/2-inch long.

Pulverizers and disintegrators (Figure 8-2) are other methods used to destroy sensitive or classified information. Pulverizers and disintegrators are usually too noisy and dusty for office use unless they are installed in a noise and dust proof enclosure. Some pulverizers and disintegrators are appropriate for the destruction of photographs, film, typewriter ribbons, glass slides, offset printing plates, floppy disks, CD-ROMs, and hard drives. Others should only be used to destroy paper products.

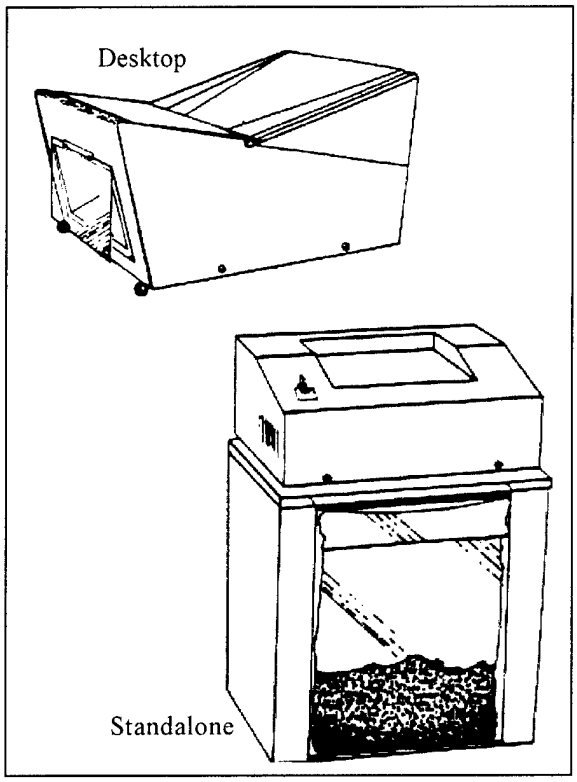


Figure 8-1. Shredding machines.

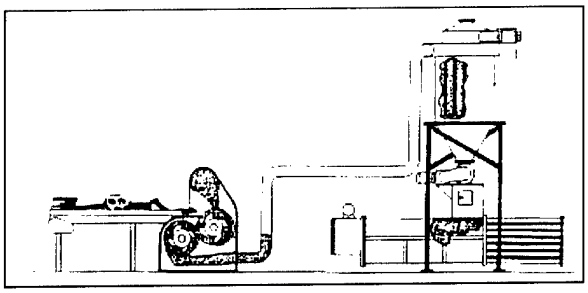


Figure 8-2. Pulverizer and disintegrator.

Pulverizers and disintegrators used for destroying sensitive or classified material must have a 3/32-inch or smaller security screen. However, the security screen size may vary depending on the media being destroyed.

Wet process pulpers with a 1/4-inch or smaller security screen may be used to destroy water-soluble sensitive or classified material (Figure 8-3). Since pulpers only destroy paper products, staples, paper clips and other fasteners must be removed to prevent clogging the security screen.

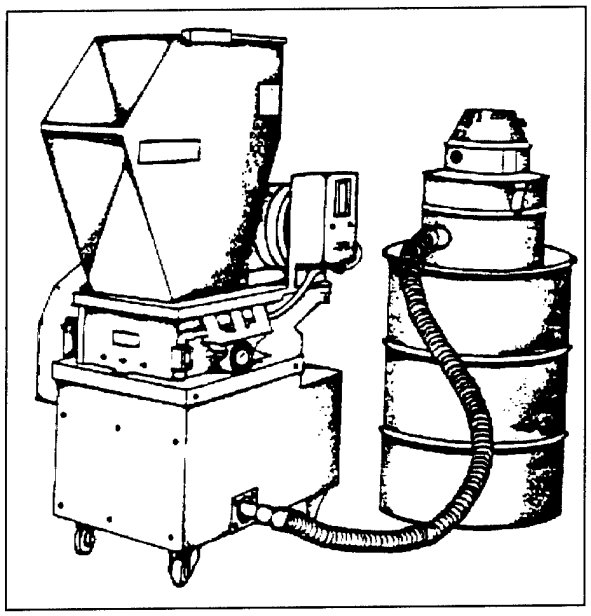


Figure 8-3. Volume shredder.

Software and degaussing equipment, in addition to destruction equipment, approved by the National Security Agency and/or the specific DoD component, is necessary to clear, purge and/or destroy the sensitive or classified information on magnetic media. Each method of disposal selected (clear, purge, or destroy) requires that a specific and approved procedure is followed. Approved software and/or degaussing equipment should be used to clear or purge magnetic media. Clearing procedures should be followed when the magnetic media is operable and will be treated at the same level of classification as the data being cleared. Purging procedures should be followed when the media will be declassified and/or then destroyed. Inoperative disks, disk packs, screens and other rigid magnetic media that cannot be cleared or purged should first be exposed to the prescribed minimum magnetic field strengths and then destroyed using an approved destruction device.

Commands outside the United States and its territories, and all deployable commands, are required to have an anti-compromise emergency destruction (ACED) capability. Such units should have the necessary equipment to destroy all Priority One (Top Secret) material, without exception, within 60 minutes at ground-based stations, 30 minutes in ships, and 3 minutes in aircraft. Incendiary devices, such as a thermite block or grenade, which reach temperatures of 4,000°F and will soften steel, are often used for emergency destruction of classified material. Before incendiary devices are selected, the effects of an incendiary fire on the surroundings must be carefully considered.

Table 8-1 describes routine and emergency destruction equipment presently available and in use. Figures 8-4 through 8-6 show other types of routine and emergency information destruction equipment.

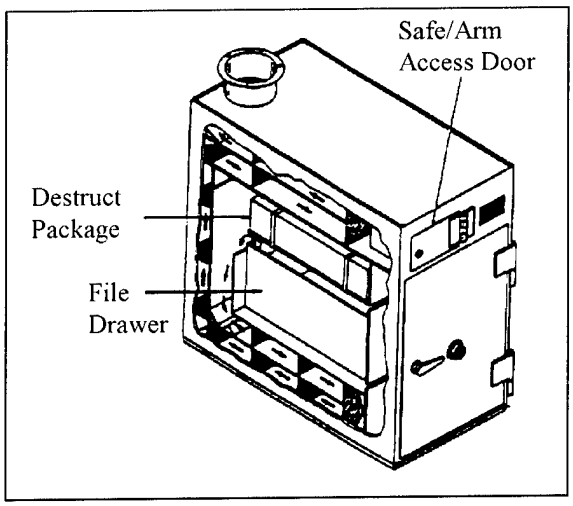


Figure 8-4. Material destruction container.

Selection and Ordering Guide

When selecting routine and emergency destruction equipment, the following factors should be considered.

a. **Security.** Does the destruction equipment, its location, and its operating procedures minimize the possibility that classified information can be compromised? Consider wind loss, residue, clearing of jams, and physical security.

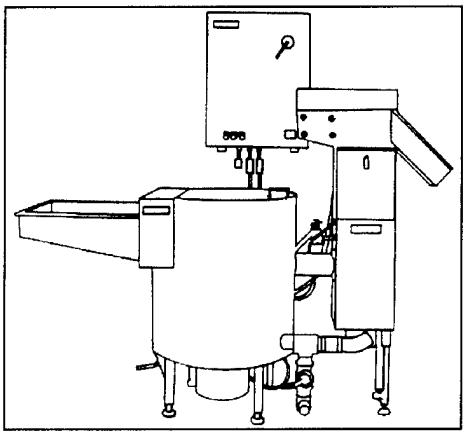


Figure 8-5. Wet-process pulper.

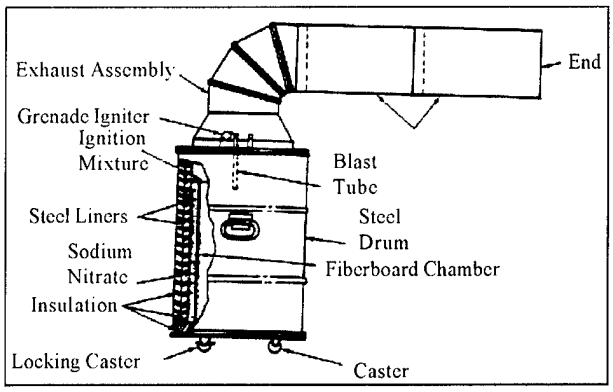


Figure 8-6. Portable document destruction device.

b. **Safety.** Can operators be burned or injured by metal or glass fragments? Are fire and explosive hazards minimized?

c. **Environment.** To what extent, if any, can the equipment's operation contribute to pollution of the air, water, or land? Will vented gases and disposable solids meet local environmental standards?

d. **Reliability.** What and how many problems could disable the system or degrade performance? What are their probabilities of occurring? How long will it take to correct the problems? Consider loss of required utilities.

e. **Equipment Capacity.** What is the throughput rate requirement for routine and emergency destruction? Will this meet ACED requirements? Can the largest and the smallest anticipated requirements be met economically?

f. **Local Disturbance.** Will noise distract operations or other workers? Is equipment operation, including residue or disposal, either dusty or messy?

g. **Flexibility.** Can the equipment handle several types of media? Will the equipment handle near and/or long term, anticipated requirements?

h. **Simplicity.** Is the equipment easy to operate and maintain?

i. **Utility Requirements.** What utility and venting capabilities are required for the routine and emergency destruction equipment? Will available utility capacity suffice?

Whenever possible, obtain routine and emergency destruction equipment through the National Supply System. Shredders, disintegrators, pulverizers and wet-process pulpers are available through the Federal Supply Schedule for "Pulverizing, Pulping, and Shredding Machines," FSC Group 36, Part 11, FSC Class 3615 under special item numbers (SIN) 51-125, 51-125-1, and 51-126. Special degaussing equipment for declassifying magnetic media is available through FSC Group 7D, Part I, Section, B. Manufacturers of routine and emergency destruction equipment are listed in Appendix A.

Installation and Service

Since each item of equipment in this section is unique, the user should refer to specific manufacturer instructions for installation and service requirements.

SECURITY COMMAND AND CONTROL CONSOLES

Functional Description

As demonstrated by the development of urban 911 emergency service centers in our Nation's cities, control and dispatching of fire, police, and emergency medical services is most effectively done through centralized security command and control consoles. By necessity, these activities require timely data inputs in order to be fully responsive and effective. To increase efficiency, many DoD complexes have now combined their police, physical security, and fire safety activities into one console. Consoles have become the way to consolidate data inputs and alert operators to critical events. When properly designed, consoles can greatly increase operator efficiency and thus, reduce reaction times for emergency services.

Consoles can be either designed by the user and their support activity and built to a set specification or they can be tailored from "commercial-off-the-shelf" (COTS) modular components. Any effort to design and develop

fabrication specifications for a console should be a joint effort between the command's emergency services managers and their designer. Generally, consoles specifically designed and fabricated in this manner by the command will cost more than prefabricated COTS modular units.

COTS modular security consoles are designed and specifically adapted to accept various commercial equipment components used for monitoring incoming data and performing command and control activities. Using modular components, an ergonomic, cost-effective, and expandable system can be tailored to meet each command's specific requirements. As a command's requirements change over time, modular COTS components can easily be expanded or reconfigured to meet more sophisticated and/or changing requirements. Consoles can range in size from the most basic single- or double-bay console (Figure 8-7) to highly sophisticated console systems that monitor security, safety, medical emergency, and disaster control activities (Figure 8-8). COTS modular security consoles can be selected to integrate and accommodate equipment designed for the monitoring and control of activities as:

- Access control systems
- Fire safety alarms
- Intrusion detection system annunciators
- CCTV monitors
- Communications
- Disaster control and emergency relief
- 911 emergency activities

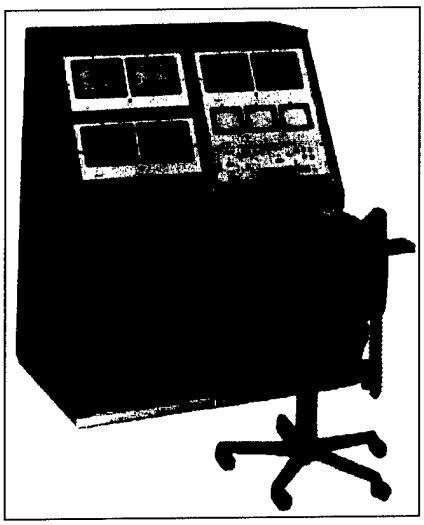


Figure 8-7. Double-bay console.

Selection and Ordering Guide

COTS modular consoles are fabricated using industry standard dimensions that will accept most "rack-mounted" electronics and computer equipment. Manufacturers also provide many accessories such as corner and 45-degree corner cabinets, working surfaces, top module wedges, and blank cabinets. Base cabinets are approximately 19 inches deep by 20 inches wide. Consoles are stackable but usually not stacked above 66 inches. Manufacturers of modular consoles are listed in Appendix A.

Installation and Service

Since fabrication of modular equipment in this chapter is unique to each manufacturer, the user should refer to the specific manufacturer's instructions for installation. Generally there are no service requirements for modular consoles.

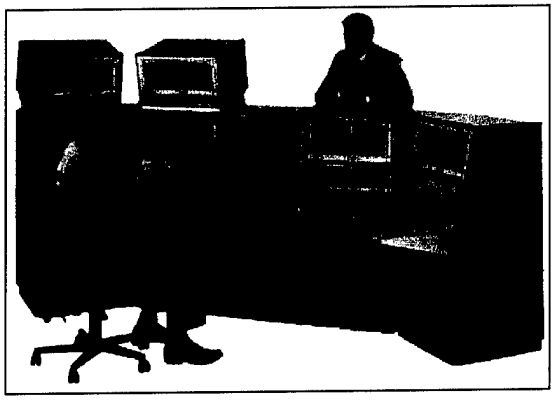


Figure 8-8. Expanded capabilities console.

Table 8-1. Routine and Emergency Destruction Equipment

Method	Description
Incinerator	Limited use, due to Clean Air Act, for destruction of classified and sensitive material, although some areas are still able to use this equipment. Special equipment may be required, such as a fly ash precipitator, to meet local and state laws. The incinerator handles a large volume of material and burns at approximately 1,600°F. This destruction method can destroy paper products, film, negatives, communication circuit boards.
Shredders	Strip shredders must cut the material to be destroyed into shreds no greater than 1/32-inch wide. Crosscut shredders must reduce the residue to particles no greater than 3/64-inch wide by 1/2-inch long. There are two types of shredders: • ***Personal Shredders***. Desktop or stand-alone units handle a small volume of paper. They are quiet and do not create dust. Some models can cut staples and paperclips. • ***Volume Shredders***. These machines handle a higher capacity and are noisier than personnel shredders. Units reduce paper to strips or particles. There are mobile and stationary models, and some can cut heavy staples, microfiche, and plastic.
Pulverizers and Disintegrators	These stationary models are designed for continuous high output. They reduce material to confetti, but they are noisy and create dust. Some models can handle only paper while others can disintegrate microfiche, offset plates, communications circuit boards, and steel tape reels. Conveyer belts and balers can also be ordered. Federal specification requires the residue to pass through a security screen with aperture size no larger than 3/32-inch on classified material pulverizing equipment.
Wet-Process Pulper	This process mixes paper with water, grinds them, and then extracts excess water and automatically discharges a semi-dry pulp into a haul-away container. Federal specification requires the residue to pass through a security screen with aperture size no larger than 1/4-inch for classified material pulverizing equipment.
Anti-Compromise Emergency Destruction Devices	There are a number of devices available for the emergency destruction of classified material: • ***Incinerator***. These are small incinerators capable of burning approximately 100 pounds of classified material per hour. One major problem with this equipment is that classified material must be carried to the incinerator for destruction, which may be impossible to do during an emergency situation. • ***Thermite Block***. During an emergency, a thermite block on top of the file is ignited and burns through the container, destroying classified material in the process. A major problem with this device is that it can also cause peripheral damage to the working area. • ***Material Destruction Container***. This is a one-drawer, 50-lb capacity model. The cabinet is a Mosler Class 5 general purpose security container with a destruction package inside the safe. No external power supply is required for beginning the destruction process, which is self-contained, self-sustaining, irreversible, and complete within 30 minutes. The outside of the safe reaches an operational temperature of 800°F maximum while the inside reaches 1,700°F. An exhaust duct is required to vent gases generated during destruction. • ***Portable Document Destruct Device*** **(PDDD)**. A barrel-shaped unit, mounted on four casters, designed to be moved by two people. The barrel is about the size of a 30-gallon drum and can be stored and used in an office environment. The interior barrel wall is lined with sodium nitrate, an oxidizing agent that assists in the combustion process. The drum can hold and totally destroy 40 pounds of paper in less than 60 minutes.

CHAPTER 9

REFERENCES

CHAPTER 2 - ACCESS CONTROL SYSTEMS

FSS "Alarm and Systems; Miscellaneous Alarms and Signals." (FSS Group 63, Part I, FSS Class 6350) (pg. 2-6).

FSS "Photographic Supplies and Equipment (FSS Group 67, Parts II and III, Section B (FSS Class 6720) (pg. 2-6).

Electric Strikes - UL Standard UL1034, ANSI/BHMA A 156.5 (pg. 2-7).

Metal Detectors and X-Ray Equipment, FSS Group 84, Part VI, Section A, under Special Item 426-4K (pg. 2-10).

Explosives Detector, FSS Group 84, Part VI, Section A, under Special Item 426-4K (pg. 2-10).

CHAPTER 3 - SECURITY CONTAINERS/SAFES

DoD Regulation 5200.1R (14 Jan 97) (pgs. 3-1, 3-5).

Federal Specification AA-F-358G, Mar 89 (Revised) (pg. 3-1, Table 3-4).

Federal Specification AA-F-358H, May 00.

Federal Specification AA-F-2815 (16 Nov 92) (pgs. 3-1, 3-2).

Federal Specification FF-L-2740A, Surface Mounted Combination Locks for Vaults, Safes, and Security Containers, 12 Jan 1997 (pgs. 3-2, 3-4, 3-5, 3-17).

Federal Specification AA-F-363B (1A3) (pg. 3-4).

Federal Specification AA-C-2859 (pg. 3-4).

Military Specification MIL-L-15596 (pg. 3-5).

UL Standard 687, "Standard for Burglary-Resistant Safes." (pg. 3-14).

UL Standard 768, "Combination Locks." (pg. 3-14).

DoD 5200.8R, "Physical Security Program." (pg. 3-14).

Federal Specification AA-S-1518 (1 Jun 70) (pg. 3-14).

Federal Supply Schedule 71 III E, Special Item #489-166 (pg. 3-14).

Vault Doors

Federal Specification AA-D-600D GSA Specification for Class 5 & 6 Vault Doors (Fixed Location Vaults) 15 May 2000.

Federal Specification FF-L-2740A, Surface Mounted Combination Locks for Vaults, Safes, and Security Containers, 12 Jan 97.

Federal Specification AA-V-2737, GSA Specification for Modular Vault Systems.

UL Standard 608, "Burglary-Resistant Modular Vault Doors and Panels."

Modular Vault Systems

UL Standard 887 (pg. 3-19).

Qualified Products List, QPL-AA-V-2737A.

Personal Safes

Federal Specification, "Law Enforcement And Security Equipment." (FSC Group 84, Part 1B, Section A) under Special Item 426-G

CHAPTER 4 - LOCKS AND LOCKSETS

Combination Locks

Federal Specification FF-L-2740A, Surface Mounted Combination Locks for Vaults, Safes, and Security Containers, 12 Jan 97 (pg. 4-1).

Federal Specification FF-L-2890 (pgs. 4-3, 4-4).

UL Standard 768, "Combination Locks." (pg. 4-4).

Cylindrical, Deadbolt, Mortise, Drop-Bolt, Rim, and Unit Locks

ANSI/BHMA-A156.2, Series 4000 (pg. 4-5, Table 4-3). No. F-82, No. F-86, No. F-84.

Padlocks

Military Specification MIL-P-43607H (pg. 4-7).

Federal Specification FF-P-2827(2) (pg. 4-7).

Federal Specification FF-L-2890 (pg. 4-4).

CID-A-A-1927D (pg. 4-8).

Office Equipment Locks and Cam/Cabinet Locks

CID-A-A-1013 (pg. 4-13).

FSS 74I, A Class 5340, Special Item 47-147 (pg. 4-14).

CHAPTER 5 - KEY CONTROL

CID-A-A-2547 (pgs. 5-1, 5-2).

Federal Specification AA-C-30 Cancelled 1/20/88 (pg. 5-2).

UG-2040-SHR, User's Guide on Controlling Locks, Keys, and Access Control Cards.

CHAPTER 6 - SECURITY SEALS AND TIDS

Federal Specification FF-P-2738 (30 March 99).

Department of Defense Antipilferage Seal User's Guide (Oct 97).

CHAPTER 7 - SECURITY HARDWARE

MIL-HDBK-1013/1B (pg. 7-1).

NFPA Standard No. 101 (pg. 7-3).

ANSI/BHMA A156.3 (pg. 7-3).

ANSI/BHMA A156.3-1194 (pg. 7-4).

Federal Specification RR-C-271D (pg. 7-5).

Military Specification MIL-H-29181A (pg. 7-8, Table 7-5).

CHAPTER 8 - MISCELLANEOUS SECURITY EQUIPMENT

Federal Supply Schedule (pg. 8-3).

GLOSSARY

AA&E - Arms, Ammunition, and Explosives

Access Control - A method of providing security by restricting the movement of persons into or within a protected area.

Access Control Reader Card, Active Electronic Coding - A card reader that supplies power to the electronically coded card via magnetic induction.

Access Control Reader Card, Magnetic Coding - Spots are encoded on a permanent magnetic material on the card and are read by magnetic sensors.

Access Control Reader Card, Magnetic Stripping - Bits of information, encoded on the card's magnetic strip, are read as the card moves past a magnetic head.

Access Control Reader Card, Optical Coding - A geometric array of spots printed and laminated into the card. Photo detectors read the spots to decipher the card's code. Most optical systems use infrared lights to read the code so the spots are not visible under normal lighting.

Access Control Reader Card, Passive Electronic Coding - This type of card contains a flat, electronically-tuned circuit. The card reader generates a radio frequency (RF) field.

Access Mode - An alarm system operation that prevents the alarm signal from sounding when the protected area is entered, but allows a signal to sound if the sensor, annunciator, or control unit is tampered with or opened.

Alarm Condition - A threatening condition, such as an intrusion, fire, or holdup, sensed by a detector.

Alarm State - A detector condition that causes a control unit in the secure mode to transmit an alarm signal.

Annunicator - A visual or audible signaling device that indicates conditions of associated circuits by activating a signal lamp and audible sound.

ANSI - American National Standards Institute - The coordinator of America's voluntary standards system. The system meets national standards needs by marshaling the competence and cooperation of commerce and industry, standards developing organizations, and public and consumer interests. ANSI specifications listed in this manual have been adopted by DoD.

Area Protection - Protection of the inner space or volume of a secured area by means of a volumetric sensor.

Astragal - A member fixed to, or a projection over, an edge of a door or window to cover the joint between the meeting of stiles; usually fixed to one of a pair of swinging doors to provide a seal against the passage of weather, light, noise, or smoke.

Attack Resistance - Relative level of protection provided by a system; usually measured in man minutes.

Audible Alarm - An electronic screamer or bell for outdoor or indoor use in a protected area.

Auxiliary Lock - A lock installed on a door or window to supplement a previously installed primary lock. Also called a secondary lock. It can be a mortised, bored, or rim lock.

Backset (Lock) - The horizontal distance from the open edge (opposite the hinges) of a door to the center of the keyway, spindle, or cylinder hole.

Balance Magnetic Switch - A magnetically operated switch designed to detect the opening of a secured door, window, or other closure.

Ballistic Resistant - Bullet does not penetrate or cause spalling.

Ballistic-Resistant Level I - Medium-power small arms (MPSA) (Super .38).

Ballistic-Resistant Level II - High-power small arms (HPSA) (.357 Magnum).

Ballistic-Resistant Level III - Super-power small arms (SPSA) (.44 Magnum).

Ballistic-Resistant Level VI - High-power rifle (HPR) (30-06 rifle).

Ballistic-Resistant Level V - Super-rifle (7.62 NATO Ball Ammunition).

Bevel (of a door) - The angle of the lock edge of the door in relation to its face. Bevel (of a latch bolt) is a term used to indicate the direction in which a latch bolt is inclined: regular bevel for doors opening in, reverse bevel for doors opening out.

BHMA - Builders Hardware Manufacturers Association - manufactures builders' hardware and publishes BHMA standards.

Bolt - The part of a lock which, when actuated, is projected (or thrown) from the lock into a retaining member, such as a strike plate, to prevent a door or window from moving or opening.

Burglar-Resistant Glazing - Any glazing that is more difficult to break through than the common window or plate glass, and is designed to resist burglary attacks of the hit-and-run type.

Cam - The part of a lock or cylinder that rotates to actuate the bolt or latch as the key is turned. The cam may also act as the bolt.

Capacitance Proximity Sensor - Records change in capacitance or electrostatic fields to detect attempted penetration through windows, ventilators, and other openings. Also used to detect attempted penetration into safes or storage cabinets.

Case - The housing in which a lock mechanism is mounted and enclosed.

CCTV - Closed-circuit television

CFR - Code of Federal Regulations

Change Key - A key that will operate only one lock or a group of keyed-alike locks, as distinguished from a master key.

Combination Lock - Any lock that requires one or more movable numbered dials to align the locking components to open the lock.

Padlock - Combination padlocks that can be removed from the container or equipment to which they are attached.

Mounted - Mounted combination locks that are attached to the container or equipment.

Continuous Hinge - A hinge designed to be the same length as the edge of the moving part to which it is applied.

Control Unit - A terminal box that receives alarm and tamper signals, and transmits these signals to the local audible alarm and/or monitor unit. It provides the primary and backup power for all sensors and activates and deactivates the alarm system.

Coordinator - A mechanism that controls the order of closing of a pair of swing doors, used with overlapping astragals and certain exit device hardware, which require that one door closes before the other.

Covert Entry - A method of entry that would leave evidence, but would not be detectable by a user during normal use, but would be detectable during inspection by a qualified person.

Cylinder - The cylindrical subassembly of a lock, including the cylinder housing,cylinder plug, tumbler mechanism, and keyway.

Cylinder Lock -

1. A lock in which the locking mechanism is controlled by a cylinder. A double-cylinder lock has a cylinder on both the interior and the exterior of the door.

2. A lock cylinder that has a threaded housing that screws directly into the lock case with a cam or other mechanism engaging the locking mechanism (mortise cylinder).

Data Transmission System - Component consisting of a data transmitter in the control unit and a data receiver in the monitor unit. It provides the communication link to transmit alarm and equipment status signals from the control unit to the monitor unit over a wire transmission line or by radio frequency.

Deadbolt Lock - Any lock designed in such a manner that when the bolt is extended, it cannot be pushed back or opened with pressure against the end of the bolt.

Defeat - The frustration, counteraction, or thwarting of an alarm device so that it fails to signal an alarm when a protected area is entered. Defeat includes both circumvention and spoofing.

DoD - Department of Defense

Dogging Device - A mechanism that fastens the cross bar of a panic exit device in the fully depressed position, and retains the latch bolt or bolts in the retracted position to permit free operation of the door from either side.

Doppler - The compression effect of expanding sound or radio frequencies reflected from or originated from a moving object.

Double Door - A pair of doors mounted together in a single opening.

Double Glazing - Two thickness of glass, separated by an air space and framed in an opening, designed to reduce heat transfer or sound transmission. In factory-made double glazing units, known as insulating glass, the air space between the glass sheets is desiccated and sealed airtight.

Dummy Trim - External hardware, without lock; usually used on the inactive leaf of a double-door assembly.

Duress Alarm Device - A device that produces a silent alarm under personnel stress conditions, such as holdup, fire, or other emergency. The device is manually operated and may be fixed or portable.

Electric Strike - An electrically operated device that replaces a conventional strike plate.

Entrance Delay - The elapsed time between an actuating sensor on an entrance door or gate and the sounding of a local alarm or the transmitting of an alarm signal by the control unit. This delay permits the person with the control key to enter the protected area and deactivate the authorized access switch. The delay is provided by a timer within the control unit.

Exit Delay - The elapsed time between activating the control unit and the sounding of a local alarm or the transmitting of an alarm signal when the sensor is activated on the exit door. This delay permits the person with the control key to exit the protected area without causing an alarm. The delay is provided by a timer within the control unit.

Exit Devices - Door-locking mechanism that can be opened from inside the building by pressure on a crash bar or lever.

False Alarm - Activation of sensor(s) for which no cause can be determined.

Fed Spec - Federal Specification

Fire Integrity (windows) - Ability to remain intact in the frame during a fire, thereby allowing no additional oxygen to enter to aid combustion. Pane may crack or fracture, but will still maintain its integrity.

FSS - Federal Supply Schedule

Forced Entry - Entry through a locked device or security container that leaves evidence of the act during normal operation. Forced entry is considered an attack in which the attacker has no concern over leaving evidence that the unit has been opened.

Glazing - Any transparent or translucent material used in windows or doors to admit light.

Grandmaster Key - A key designed to operate all locks under several master keys in a system.

Grid Wire Sensor - Detects forced entry through walls, floors, ceilings, doors, and other barriers by the break-wire method.

GSA - General Services Administration

Hand (of a door) - The opening direction of the door. A right-hand (RH) door is hinged on the right and swings inward when viewed from the outside. A left-hand (LH) door is hinged on the left and swings inward when viewed from the outside. If either of these doors swings outward, it is referred to as a right-hand reverse (RHR) door or a left-hand reverse (LHR) door, respectively.

Hasp - A device that consists of either a hinged plate with a slot in it that fits over a staple, or two pieces designed for the shackle of a padlock to pass through to secure the pieces to each other.

High-Security - Locks, hasps, and alarms - security devices which, through testing, provide the highest level of protection available.

Hinge - A device generally consisting of two metal plates having loops formed along one edge of each to engage and rotate about a common pivot rod or "pin;" used to suspend a swinging door or window in its frame.

Hollow Core Door - A door constructed so that the space (core) between the two facing sheets is not completely filled. Various spacing and reinforcing materials are used to separate the facing sheets; some interior hollow core doors have nothing except perimeter stiles and rails separating the facing sheets.

Infrared Motion Detector - Detects changes in the infrared light radiation in the protected area. The presence of an intruder in the area changes the infrared light intensity coming from the intruder's direction.

Intrusion Detection Systems - Devices that initiate alarm signals by sensing a stimulus, change, or specific condition.

Keyway - The opening in a plug, cylinder, or lock case configured to accept only the key designed for that particular lock.

Key-in-Knob Lock - A cylindrical lockset having the cylinder in the knob. These are the most common types of locksets.

Knob - An ornamental or functional round handle on a door; may be designed to actuate, lock, or latch.

Latch - Any spring or mechanical device used to secure doors and other openings. Latches can be key- or lever-operated, and provide a low level of security.

Latch (or latch bolt) - A beveled, spring-actuated bolt that may or may not include a deadlocking feature.

Lite - Material in each opening of a window or door. Sometimes called "pane."

Lock Manipulation - The opening of the combination lock without alteration of the physical structure, or disarranging of parts. Ordinarily, manipulation would be done by moving the lock dial.

Locked Out - When a security container can not be opened by properly manipulating the combination lock and locking bolt assembly.

Master Key - A key that will operate two or more locks that can also be operated with their own change keys.

Master Key System - A method of keying locks that allows a single key to operate multiple locks, each of which will also operate with an individual change key. Several levels of master keying are possible:

- A single master key is one that will operate all locks of a group of locks with individual change keys.

- A grandmaster key will operate all locks of two or more master key systems.

- A great grandmaster key will operate all locks of two or more grandmaster key systems.

Master key systems are used primarily with pin tumbler locks.

Microwave Sensor - A radio/radar frequency (RF) transceiver having a frequency range of GHz (billion cycles per second) that detects motion through the doppler shift effect.

Mil Spec - Military Specification.

Monitor - A device that senses and reports on the condition of a system, commonly used interchangeably with the terms "monitor unit," "monitor panel(s)," "status indicator module,"and "annunciator."

Mortise Lock - A lock in which the case is recessed into the edge of a door in a recess specifically cut out to receive it.

Motion Sensor - Detects movement inside the protected area.

Mullion -

1. A movable or fixed center post used on double-door openings, usually for locking purposes.

2. A vertical or horizontal bar or divider in a frame between windows, doors, or other openings.

NCEL - Naval Civil Engineering Laboratory (now NFESC).

NFESC - Naval Facilities Engineering Service Center.

NFPA - National Fire Protection Association - NFPA 101, referenced in this manual, has been adopted by the Navy.

NSN - National Stock Number.

Nuisance Alarm - A sensor activation caused by accident, neglect, malfunction, or natural causes, such as wind, lightning, or thunder. Often improperly called false alarm.

NWSC - Naval Weapons Support Center.

Padlock - A detachable and portable lock.

Passive Ultrasonic Sensor - Detects the sounds of forced entry through walls, ceilings, and doors.

Penetration Resistance - Ability to withstand attack by a sophisticated burglar or terrorist or other person(s) using proper tools to achieve rapid penetration, and the ability to withstand attack from a vandal, looter, or other person(s) without knowledge of the tools described above.

Penetration Sensor - Detects entry through doors, windows, walls, or other openings into the protected area.

Point Sensor - Detects removal or attempted removal of an object from its storage container.

PVB - Polyvinyl butyral

Restricted Keyway - A special keyway for high-security locks, with a configuration that is not freely available and must be specifically requested from the manufacturer.

Safe - A container, usually equipped with a mounted combination lock, specifically designed for the protection of money and other highly negotiable materials or assets.

Security System - A term applied when all facets of a facility's security are being considered (i.e., locks, safes, security containers, guards, alarms, etc.).

Service Life - Relative amount of time the product meets or exceeds the performance criteria, including aesthetics, for which it was designed.

Shackle - The movable part of a padlock that does the fastening.

Shutter - A movable grid or cover used to protect an opening, especially a window.

SIN - Special Item Number

Single Door - A door mounted to swing to only one side of the plane of its frame.

Slide Bolt - A simple lock that is operated directly by hand without using a key, a turnpiece, or other actuating mechanism. Slide bolts can normally only be operated from the inside.

Solid Core Door - A door constructed so that the space (core) between the two facing sheets is completely filled with wood blocks or other rigid material.

Spalling (glass or other glazing material) - Small fragments breaking off the back side of the glazing.

Stile - One of the vertical edge members of a door or window sash.

Strike - A metal plate designed to be secured to the door frame and accept the lock, bolt, or latch when the door is closed.

Supervised Line - A conductor that if cut, broken, shorted, or otherwise tampered with, will cause a change in status indicated at a monitoring unit.

Surreptitious Entry - Gaining entry through a locked device or security container in such a manner that evidence of the act will not be readily discernible during normal operation of the locking unit or during inspection by a qualified person.

Tailgating - One or more persons following an authorized person through a control point into a secured area.

Threshold - A wood or metal plate forming the bottom of a doorway.

Thumbpiece - The small pivoted part above the grip of a door handle that is pressed by the thumb to operate a latch bolt.

Thumbturn - A unit that is gripped between the thumb and forefinger, and turned to project or retract a bolt.

Transponder - A radio or radar transceiver that automatically transmits electrical signals when actuated by a specific signal from an interrogator.

Trim - Hardware items mounted on doors such as knobs, latches, weatherguards, etc.

UL - Underwriters Laboratories, Inc. - A nonprofit national testing laboratory that tests and lists/labels various categories of equipment for safety and reliability. It also publishes standards for a wide range of products, including security products.

Ultrasonic Motion Sensor - Detects the motion of an intruder inside the protected area by frequency shift (doppler effect).

Wired Glass - Glass manufactured with a layer of wire mesh running approximately midway in the thickness of the sheet.

Zones - A security method of dividing large areas into small subdivisions (zones) to permit selective access to certain zones while other zones remain secure. Also used to pinpoint specific locations of alarm signal transmission.

Appendix A

MANUFACTURER LISTING

Manufacturer/Address	Phone Number	FAX Number	Products
		Access Control Systems	
Alpha Protection Systems, Inc. 1500 South Barton, Suite 601 Arlington, VA 22204	(703) 920-7832	(703) 920-7832	Access Control Systems
American Science & Engineer Engr. Fort Washington 40 Erie Street Cambridge, MA 02139-4286	(617) 868-1600	(617) 354-1054	X-Ray Metal Detectors
Amtech Systems Corp. 17304 Preston Road, E-100 Dallas, TX 75252	(800) 923-4824 (214) 733-6600	(214) 733-6699	Vehicle Access Control Systems
Cadix International Corp. 1200 Ashwood Parkway, Suite 135 Atlanta, GA 30338	(404) 804-9951	(404) 804-9949	Signature Systems
Continental Instruments Corp. 70 Hopper Street Westbury, NY 11590	(516) 334-0900 (800) 242-1961	(516) 334-0235	Card Reader Systems, Computer Access Control
Controlled Access Security Equip. 18503 Candace Lane Watsonville, CA 95076-9176	(408) 726-7114	(408) 726-1150	Access Control Systems
Controlled Access, Inc. 1256 North 3rd Street, Suite D Moorestown, NJ 08057	(609) 866-5525 (800) 377-5050	(609) 866-0004	Computer-Based Access Control Systems
Cypress Computer Systems, Inc. 3546 South Lapeer Road Metamoram, MI 48455	(810) 678-3777 (800) 807-2977	(810) 678-3788	Access Control System
Essex-Tec Corporation 1130 Mark Ave. Carpenteria, CA 93013	(800) 628-9673 (805) 684-7601	(805) 684-0332	Keyless Entry System
EyeDentify, Inc. 10473 Old Hammond Highway Baton Rouge, LA 70816	(504) 752-5780 (800) 593-5353	(504) 752-5748	Integrated Security Systems, Retinal Scan

Manufacturer/Address	Phone Number	FAX Number	Products
	Access Control Systems (continued)		
Inforite Corporation 1670 S. Amphlett Boulevard Suite 100 San Mateo, CA 94402	(415) 571-8766 (800) 366-4635	(415) 571-7547	Signature Access Systems
Identicard 630 East Oregon Road Lancaster, PA 17606	(717) 569-5797 (800) 233-0298	(717) 569-2390	Access Control Systems
Identicator 5822 Hubbard Drive Rockville, MD 20852	(301) 468-2444	(301) 468-6455	Fingerprint access control
Kastle Systems, Inc. 1501 Wilson Boulevard Arlington, VA 22209	(703) 528-8800	(703) 528-2103	Computer Controlled Security Access
Kidde Automated Systems 835 Sharon Drive Westlake, OH 44145	(216) 871-9900	(216) 871-9934	Card Reader Systems
MRL, Inc. 7640 Fullerton Road Springfield, VA 22175	(703) 569-0195 (800) 989-9891	(703) 569-0196	Card Reader Systems
Northern Computers, Inc. 5007 South Howell Avenue Milwaukee, WI 53207	(800) 323-4576	(414) 769-5989	Access Control Systems and Video Badging
NUS Corporation 910 Clopper Road Gaithersburg, MD 20878	(301) 258-8547 (800) 368-2755	(301) 258-8617	Access Control Systems
Omega Optical Turnstiles 488 North Wiget Lane Walnut Creek, WI 53207	(510) 256-3700	(510) 256-3737	Optical Turnstiles
Parking & Access Computer Systems 2517 Wyandotte Road Willow Grove, PA 19090	(215) 657-7500	(215) 657-4321	Access Control Systems
Polaroid Corporation 575 Technology Square Cambridge, MA 02139	(800) 225-1618	(800) 832-9004	Instant Photo ID Systems
Sargent & Greenleaf One Security Drive Nicholsville, KY 40356	(606) 885-9411	(606) 887-2057	Electronic Combination Locks

Manufacturer/Address	Phone Number	FAX Number	Products
	Access Control Systems (continued)		
Schiff & Associates, Inc. 1017 Main Street Hamden, CT 06517	(512) 321-4421	(203) 777-7443	Automated Access Control Barriers
Sensor Engineering Co. 2155 State Street Hamden, CT 06517	(203) 777-7443 (800) 243-2563	(203) 624-2895	Access Control Card Readers
Simplex Access Controls 2941 Indiana Avenue Winston Salem, NC 27105	(910) 725-1331	(919) 725-3269	Mechanical Push-Button Access Controls
SMF Systems Inc. 2551 San Ramon Valley Boulevard Suite 231 San Ramon, CA 94583	(510) 855-1426	(510) 855-1427	Long Range Smoke Detectors
TDSi USA 1530 Fairview St. Louis, MO 63132	(800) 793-3070	-----	Microlock Card Readers
Trigon Electronics 1220 N. Battavia Orange, CA 92667	(800) 842-7444 (714) 633-7442	(714) 633-7567	Telephone Entry Systems Card Reader Systems
Vindicator 3001 Bee Caves Road Austin, TX 78746-5561	(512) 314-1200	(512) 314-1270	Electronic Security Systems
Visual Methods Inc. 35 Charles Street Westwood, NJ 07675	(201) 666-3950	(201) 666-7931	Closed Circuit TV Equipment
	Continuous Hinges		
Roton 1115 N. Ellsworth Villa Park, IL 60181	(800) 447-6866	(800) 752-1391	Hinges
Hager Hinge Company 139 Victor St. Louis, MO 63104	(800) 325-9995	(800) 782-0149	Hinges

Manufacturer/Address	Phone Number	FAX Number	Products
	Door Hardware, Locks, and Padlocks		
Assa High Security Locks, Inc. 103-00 Foster Avenue Brooklyn, NY 11236	(718) 927-2772	(718) 257-2772	Key Control Locks
Best Lock Corporation 6161 E. 75th Street P. O. Box 50444 Indianapolis, IN 46250	(317) 849-2250	(317) 845-7651	Interchangeable Core Locks, Padlocks and Door Hardware
Best Locking Systems 25007 Anza Drive Santa Clarita, CA 91355	(805) 295-0190	(805) 295-0197	Interchangeable Core Locks, Padlocks and Door Hardware
Insta Key Lock Corporation 3021 S. Tejon Street Englewood, CO 80110	(303) 761-9999	(303) 761-6359	Lock Cylinders and Rekeying
Lockmasters, Inc. 5085 Danville Road Nicholasville, KY 40356	(606) 885-6041 (800) 654-0637	(606) 885-7093	Combination Locks
Marks USA 5300 New Horizons Boulevard Amityville, NY 11701	(800) 526-0233	(516) 225-6136	Custom Locksets, Door Hardware and Cylinders
Mas-Hamilton Group 2009 North 14th Street, Suite 201 Arlington, VA 22201	(800) 876-6066 (703) 527-8484	(703) 527-8487	Electromechanical Combination Locks
Safemasters 5655 General Washington Drive, Building A, Unit E Alexandria, VA 22312	(800) 633-9977 (703) 256-6402	(703) 750-1814	Industrial Safes
Sargent & Greenleaf One Security Drive Nicholasville, KY 40356-0569	(606) 885-9411	(606) 887-2057	Mechanical Combination Locks
Schlage Corporation P. O. Box 193324 San Francisco, CA 94119	(415) 467-1100	(415) 330-5620	Door Hardware, Locksets, and Interchangeable Core Cylinders
Securitron Magnalock Corp. 550 Vista Boulevard Sparks, NV 89434-6632	(800) 624-5625 (702) 355-5625	(702) 355-5636	Magnetic Locks

Manufacturer/Address	Phone Number	FAX Number	Products
Door Hardware, Locks, and Padlocks (continued)			
Security Door Controls P. O. Box 6219 Westlake Village, CA 91360	(818) 889-1622	(818) 889-0281	Magnetic and Electric Locks
Vindicator 3001 Bee Caves Rd. Austin, TX 78746-5561	(512) 314-1200	(512) 314-1270	Electronic Security Systems
Electric Strikes			
Adams Rite P. O. Box 1301 City of Industry, CA 91749	(310) 699-0511	(310) 699-5094	Electric Strikes
Folger Adam Company 16300 West 103rd Street Lemont, IL 60439-9653	(708) 739-3900	(708) 739-6138	Electric Strikes
Rofu International Corp. 3725 Old Conejo Rd. Newbury Park, CA 91320	(805) 499-0316	(805) 499-3154	Electric Strikes
Trine Products Company 1430 Ferris Place Bronx, NY 10461	(718) 829-4796	(718) 792-9127	Electric Strikes
Exit Hardware			
American Device Manufacturers P.O. Box 8 Steeleville, IL 62288	(800)624-5625	(702) 355-5636	Gun Locker/Evidence Cabinets
Door Alarm Devices Corp. 20 Lucan Dr. Deer Park, NY 11729	(516) 586-2400	(516) 242-0611	Alarm Locks
Monarch/Newman-Tonks, Inc. P. O. Box 1147 Sheperdsville, KY 40165	(502) 543-2281	(502) 543-2281	Exit Hardware
P & F Corbin Div. Emhart Hardware Group 225 Episcopal Road Berlin, CT 06036	(203) 225-7411	(203) 828-7266	Exit Hardware, Alarm Locks
Sargent & Company Subsidiary of Kidde, Inc. P. O. Box 9725 New Haven, CT 06536	(203) 562-2151 (800) 906-6606	(203) 776-5992	Exit Hardware, Alarm Locks

Manufacturer/Address	Phone Number	FAX Number	Products
	Exit Hardware (cont'd)		
Securitron Magnalock Corp. 550 Vista Boulevard Sparks, NV 89434-6632	(702) 355-5625	(800) 553-2362	Exit Hardware, Magnetic Locks
	Information and Emergency Destruction Equipment		
Allegheny Business Systems P. O. Box 80 Delmont, PA 15626	(800) 245-2497	(412) 468-5919	Paper-Shredding machines
Ameri-Shred Corporation P. O. Box 46130 Monroeville, PA 15146	(800) 634-8981	(412) 798-7329	Paper-Shredding machines
Automated Systems Inc. 7534 Fullerton Court Springfield, VA 22153	(703) 644-5160	(703) 644-2945	Paper-Shredding machines
Munson Machinery Co. P. O. Box 438 Utica, NY 13503	(315) 797-0900	(315) 797-5582	Security Destruction Products
Parkin Security Consultants 1072 S. Saratoga/Sunnyvale Road Suite 396 San Jose, CA 95129	(408) 255-4564	(408) 255-8222	Shredding Machines
Shredding Systems, Inc. 9760 Southwest Freeman Drive Wilsonville, OR 97070	(503) 682-3633	(503) 682-1704	Industrial Shredders and Material Handling Equipment
Stromberg Products Division Division of MITE Corp. 10816 Lower Azusa Road El Monte, CA 91731	(213) 686-1352	(818) 575-1222	Shredding Machines
Whitaker Brothers Business Machines, Inc. 12410 Washington Avenue Silverspring, MD 20906	(202) 726-3450	(301) 770-9217	Paper-Shredding machines
	Key Control Cabinets		
Key Control Systems, Inc. Box 96A, 76 Weil Road Bechtelsville, PA 19505	(215) 845-7585	(610) 845-4363	Various Types

Manufacturer/Address	Phone Number	FAX Number	Products
	Key Control Cabinets (continued)		
Key-Trak, Inc. 1750 W. Broadway Suite 220 Oviedo, FL 32765	(800) 541-5033	(407) 366-5700	Automated Trail for Key Usage
Key Systems Inc. 948 Culver Road Rochester, NY 14609	(716) 654-9388	(716) 654-7916	Security Key Monitors
Locksoft P. O. Box 3168 Bristol, TN 37625-3168	(423) 652-2454	-----	Lock Software
Mosler 8133 Leesburg Pike Suite 410 Vienna, VA 22182	(800) 568-7233	(703) 761-4669	Key Safes and Containers
Morse Watchmans, Inc. 2 Morse Road Oxford, CT 06478	(203) 264-8367	(203) 264-8367	Guard Tour and Key Management System
	Manual and Electric Turnstiles		
Burle-Philips, CSS 7041 Orchard Dearborn, MI 48126-1781	(313)846-2623 (800) 338-3692	(313) 846-3569	Security Turnstyles
Controlled Access Security Equip. 18503 Candace Lane Watsonville, CA 95076	(408) 726-7144	(408) 726-1150	Security Turnstyles
Don LaForce Associates, Inc. 25510 Frampton Avenue Harbor City, CA 90710	(310) 326-0710	(301) 326-3058	Security Turnstyles
Horton Automatics 4242 Baldwin Blvd Corpus Cristi, TX 78405	(800) 531-3111	(800) 531-3108	Security Turnstyles
Perey Turnstyles 45 Church Street Stamford, CT 06906	(203) 961-8444	(203) 961-8855	Security Turnstyles
	Metal and Explosives Detectors		
Barringer Instrument Inc. 30 Technology Drive Warren, NJ 07059	(908) 222-9100	(908) 222-1557	Explosive Detectors
Control Screening Federal Labs 35 W. Pittsburgh Street, No. 203 Greensburg, PA 15601	(412) 837-5411	(412) 837-5425	X-Ray Security Systems

Manufacturer/Address	Phone Number	FAX Number	Products
Metal and Explosives Detectors (continued)			
Del Norte Technology, Inc. 1100 Pamela Drive Euless, TX 76040	(817) 267-3541	(817) 354-5762	Metal Detectors
Federal Laboratories, Inc. 160 Benmont Avenue Bennington, VT 05201	(412) 639-3511	(802) 442-3823	Metal Detectors
Garrett Metal Detectors 1881 West State Street Garland, TX 75042	(214) 494-6151	(214) 494-1881	Multi-Dimensional Scanning
Heimann Systems Systems 186 Wood Avenue South Iselin, NJ 08830	(908) 603-5914	(908) 603-5995	Hi-Scan X-ray Inspection
Infinetics, Inc. 201 Vandever AVenue P. O. Box 2330 Wilmington, DE 17899	(302) 658-2471	(302) 658-2475	Metal Detectors
Phillips Electronic Instruments 85 McKee Drive Mahwah, NJ 07430	(201) 529-3800	(209) 529-0896	Explosives Detectors
Security Defense Systems Corp. System P. O. Box 243 Nutley, NJ 07110	(201) 235-0606	(201) 235-0132	Metal/Weapons Detection
World-Wide Security Service P. O. Box 1561 Largo, FL 34649	(813) 535-2824	(813) 535-2824	X-Ray Inspection Equipment
Xon Tech Inc. 6862 Hayvenhurst Avenue Van Nuys, CA 91406	(818) 787-7380	(818) 786-4275	Metal Detectors
Modular Vaults			
Mosler 8133 Leesburg Pike, Suite 410 Vienna, VA 22182	(800) 568-7233	(703) 761-4669	Lightweight, Bolted, Modular Vault System
Modular Vault Systems, Inc. 8390 Washington Boulevard Jessup, MD 20794	(401) 636-0280	(410) 636-4722	Container Vaults

Manufacturer/Address	Phone Number	FAX Number	Products
Office Equipment Locks			
Anchor Pad International 35 Hammond Street Irvine, CA 92718	(800) 626-2467	(800) 580-2561	Computer Notebook and Docking Stations Security
Brady 11056 South Bell Avenue Chicago, IL 60643	(312) 779-8349	(312) 779-9712	Tray Locks
Compu Guard 36 Maple Avenue Seekonk, MA 02771	(800) 333-6810	(508) 679-1114	Office Machine Anti-Theft Devices
NTI Inc. 2075 NE Division Street Gresham, OR 97030	(503) 666-6599	(503) 674-9145	Micro ID
Secure-It Inc. 18 Maple Court East Longmeadow, MA 01028	(413) 525-7039 (800) 451-7592	(413) 525-8807	Computer Disk Drive Locks
Security Safes and Containers			
Adesco Safe Company 16720 S. Garfield Avenue Paramount, CA 90720	(213) 774-0081 (800) 821-6803	(714) 761-2846	Burglary Resistant Safes
American Device Manufacturing P. O. Box 8 Steeleville, IL 62288	(800) 553-2362	(618) 965-9022	Security Containers
Bonafide Factory Products P. O. Box 473 Huntingdon Valley, PA 19006	(215) 364-0330	(215) 938-4310	Personal Safes
Cincy Safe Company 4385 Creek Road Cincinnati, OH 45241	(513) 793-5635	(513) 793-5227	Burglary Resistant Safes
Collier Safe Company P. O. Box 955 Odessa, FL 33556	(813) 920-6671	(813) 920-5091	Personal Safes and Vault Panels
Detroit Mini-Safe Company 9950 Freeland Ave. Detriot, MI 48227	(313) 931-7720	(313) 931-7758	Personal Safes

Manufacturer/Address	Phone Number	FAX Number	Products
Security Safes and Containers (continued)			
Diebold, Inc. 818 Mulberry Road, SE Canton, OH 44707	(216) 489-4000	(216) 490-3794	Financial Security Systems and Cash Containers
Fire King International 101 Security Parkway New Albany, IN 47150	(800) 948-8400	(812) 948-0437	Fire Proof Cabinets
Gardall Safe Corporation 219 Lamson Street P. O. Box 30 Eastwood Station Syracuse, NY 13206	(315) 432-9115 (800) 722-7233	(315) 434-9422	Burglary Resistant Safes
Hamilton Products Group 2009 North 14th Street, Suite 201 Arlington, VA 22201	(703) 527-8484 (800) 876-6066	(703) 527-8487	Security Containers and Burglary Resistant Safes
Hamilton Safe 3143 Production Drive Fairfield, OH 45014	(513) 874-3733	(513) 874-3967	Security Containers and Vault Panels
LeFebure Corporation 308 29th NE Cedar Rapids, IA 524102	(319) 366-2771	(319) 366-7608	Vault Alarms and Surveillance Systems
Meilink Safe Company 111 Security Parkway New Albany, IN 47150	(812) 941-1655	(812) 948-0437	Fire Proof and Theft Resistant Safes
Mosler Safe Company 8133 Leesburg Pike, Suite 410 Vienna, VA 22182	(800) 568-7233	(703) 761-4669	Burglary Resistant Safes
Perma Vault P. O. Box 473 Huntingdon Valley, PA 19006	(215) 354-0330	(215) 364-8306	Fireproof and Burglary Resistant Safes
Safemasters 5655 General Washington Drive Alexandria, VA 22312	(800) 633-9977	(703) 750-1814	Burglary Resistant Safes
Sargent & Greenleaf One Security Drive Nicholasville, KY 40356	(606) 885-9411	(606) 887-2057	Electronic Combination Locks

Manufacturer/Address	Phone Number	FAX Number	Products
Security Safes and Containers (continued)			
Schwab Corporation P. O. Box 5088 Lafayette, IN 47803	(800) 447-7233	(317) 447-8278	Fireguard Insulated Safes
Security Lock and Safe Co. 5 North, Suite 908 Chicago, IL 60018	(312) 781-0045	(312) 781-1913	Fireproof and Theft Resistant Safes and Vault Panels
Wal Tech Security Systems P. O. Box 6088 Hoboken, NJ 07030	(201) 653-7300	(201) 653-0910	Small Wall Safes and Vaults
Security Seals and Tamper-Indicating Devices			
AC Gibson Company, Inc. 875 Englewood Avenue Buffalo, NY 14223	(716) 838-5960	(800) 875-1563	Metal Seal Presses and Wire
Advantage Technology, Inc. 1809 Olde Homestead Lane Lancaster, PA 17605	(717) 293-4110	(717) 293-4117	Security Seals
American Casting & Manufacturing 51 Commercial Street Plainview, NY 11803	(800) 342-0333	(516) 349-8389	Security Seals
Aquila 8401 Washington Place, NE Albuquerque, NM 87113	(505) 828-9100	(505) 828-9115	Fiber-Optic Seals
Brammall CSE P. O. Box 208 Angola, ID 46703	(800) 348-4777	(219) 665-8309	Security Seals
Consolidated Graphic Materials 400-J Apgar Drive Somerset, NJ 08873	(908) 356-6700	(908) 356-7632	Security Seals
Designer Decal, Inc. East 1120 1st Avenue Spokane, WA 99202	(800) 622-6333	(509) 535-1476	Security Seals
Dickey Manufacturing Co. 1315 East Main Street Saint Charles, IL 60174	(708) 584-2918	(708) 584-0261	Security Seals

Manufacturer/Address	Phone Number	FAX Number	Products
Security Seals and Tamper-Indicating Devices (continued)			
ELC Security Products 530 11th Avenue San Diego, CA 92101	(619) 234-9203	(619) 234-0523	Security Seals
E. J. Brooks Company 164 N. 13th Street Newark, NJ 07107	(201) 483-0335	(201) 483-0647	Security Seals
Encrypta Electronics, Ltd. 5 Gold Tops, Newport, Gwent NP9 4PG, United Kingdom	0633-265551 (805) 649-4100	0633-265667 (805) 649-1932	Active and Reusable Security Seals
Meyercord 365 East North Avenue Carol Stream, IL 60188	(708) 682-6200	(708) 682-6345	Tamper Indicating Devices
Peter Mangone, Inc 12687 West Cedar Drive, Suite 100 Lakewood, CO 80228	(800) 338-2448	(303) 989-1807	Security Seals
Product Consultants International P.O. Box 448 Magnolia, TX 77355	(800) 326-6609	(713) 259-0616	Security Seals
Security Seals Company 32 Intersection Street Hemstead, Long Island NY 11551	(516) 485-6100	(516) 485-6117	Security Seals
Stoffer Seals Corporation 400 High Avenue Nyack, NY 10960	(914) 353-3800	(914) 353-3876	Security Seals
The Tyden Seal Company 210 N. Industrial Park Road Hastings, MI 49058	(616) 945-9501	(616) 945-9599	Security Seals
The United Seal Company 17807 S. Hobart Boulevard Gardena, CA 90247	(213) 321-4390	(310) 327-7611	Security Seals
Vault Doors			
Mosler 8133 Leesburg Pike, Suite 410 Vienna, VA 22182	(800) 568-7233	(703) 761-4669	Vault Doors

Manufacturer/Address	Phone Number	FAX Number	Products
	Vault Doors (continued)		
Overly Manufacturing Company P. O. Box 70 Greensburg, PA 15601-0070	(412) 834-7300	(412) 830-2871	Vault Doors
Hamilton Products Group 2009 North 14th Street, Suite 201 Arlington, VA 22201	(703) 527-8484 (800) 876-6066	(703) 527-8487	Security Containers and Burglary Resistant Safes