[INCH-POUND]
FF-L-2740B
June 15, 2011
SUPERSEDING
FF-L-2740A
January 12, 1997

FEDERAL SPECIFICATION

LOCKS, COMBINATION, ELECTROMECHANICAL

The General Services Administration has authorized the use of this federal specification by all federal agencies.

1. SCOPE

1.1 Scope. The purpose of this document is to describe the U.S. Government's requirements and expectations for a combination lock designed and manufactured specifically to protect unattended national security information (NSI). Combination locks approved under this specification will be used on new and existing General Services Administration (GSA) approved security containers, vault doors and pedestrian door deadbolts. These combination locks should incorporate modern electronic security techniques. The collective power of the Internet has created an increase in the number and sophistication of computer and electronic system hacking techniques. The new generation of electromechanical combination locks uses microprocessors with software codes that can be manipulated during manufacture and transportation. Security features designed to ensure the code has not been altered during manufacture and transportation are required. The vulnerabilities of the new coding techniques mandates the development of new security requirements on the manufacturers to ensure the electronic components and software are adequately protected and are accessed only by personnel subject to U.S. law.

1.1.1 Limited use. Locks tested and qualified under this specification are to be sold only to the Federal Government, Government contractors specifically authorized to purchase these locks, or other organizations or persons specifically authorized or required by the Government to use these locks.

1.2 Styles.

1.2.1 Style 1: Basic self-contained

1.2.1.1 Power source. The power source for a microprocessor based electromechanical lock shall be contained within and integral with the lock body or dial ring assembly. The power source shall be self-generating and must provide power to operate the lock for its intended lifecycle.

1.2.1.2 Peripheral devices. There shall be no external data transfer port or ability to transfer data to or from a secondary device. Keys or special tools required for combination changes shall not be able to communicate with the lock's microprocessor or electronic circuitry. These special keys or tools shall not have any memory-holding capability or signal processing ability.

1.2.2 Style 2: Interoperable / networked

1.2.2.1 Power source. The power source for a microprocessor based electromechanical lock may be contained within and integral with the lock body or dial ring assembly. The power source may be replaceable and available in the open market.

1.2.2.2 Peripheral devices. External data transfers to secondary devices shall meet applicable FIPS Standards. These devices may be used to monitor authorized/unauthorized openings, personnel access, combination verifications, combination changes, etc. These secondary devices shall not be able to open the electromechanical lock.

FSC 5340

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data which may improve this document should be sent to: General Services Administration, Federal Supply Service, National Furniture Center, Engineering Division, Washington, DC 20406.

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.

2. APPLICABLE DOCUMENTS

2.1 Government publications. The following documents, of the issues in effect on the date of invitation for bids or request for proposals, form a part of this specification to the extent specified herein.

Federal Specifications.

AA-F-358 - Filing Cabinet, Steel, Legal and Letter Size, Uninsulated, Security

Federal Standards.

FED-STD-123 - Marking for Domestic Shipment (Civilian Agencies)

FIPS PUB 180 – Secure Hash Standard (SHS)

FIPS PUB 186 – Digital Signature Standard (DSS)

Federal Acquisition Regulation 25.200

(Activities outside the Federal Government may obtain copies of federal specifications, standards, and commercial item descriptions as specified in the General Information section of the Index of Federal Specifications, Standards and Commercial Item Descriptions. The Index is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402.)

(Single copies of this specification, and other federal specifications and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from the General Services Administration, Federal Supply Service Bureau, Specification Section, Suite 8100, 470 L'Enfant Plaza, SW, Washington, DC 20407.)

(Federal Government activities may obtain copies of federal standardization documents and the Index of Federal Specifications, Standards and Commercial Item Descriptions from established distribution points in their agencies or contact the DoD Lock Program at: Comm. 1-800-290-7607, DSN. 551-1212.)

Military Specifications:

MIL-P-116 - Preservation, Methods of

MIL-S-901 – Shock Tests, HI (High Impact) Shipboard Machinery, Equipment and Systems, Requirements for Navy

Military Standards:

MIL-STD-129 - Marking for Shipment and Storage
MIL-STD-810 - Environmental Test Methods and Engineering Guidelines
MIL-STD-889 - Dissimilar Metals

(Copies of military specifications and standards required by contractors in connection with specific procurement functions are obtained from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on the date of invitation for bids or request for proposals shall apply.

American Society for Quality:

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.

ANSI/ASQ Z1.4 - Sampling Procedures and Tables for Inspection by Attributes

(Private sector and civil agencies may purchase copies of this voluntary standard from the American Society for Quality, P.O. Box 3005, Milwaukee, WI 53201-3005.)

National Motor Freight Traffic Association, Inc., Agent:

National Motor Freight Classification

(Private sector and civil agencies may purchase copies of these voluntary standards from the American Trucking Association, Inc., Traffic Department, 2200 Mill Rd., Alexandria, VA 22314.)

Underwriters Laboratories Inc. (UL):

ANSI/UL 768 - Standard for Combination Locks

(Private sector and civil agencies may purchase copies of these voluntary standards from Underwriters Laboratories Inc., 333 Pfingsten Rd., Northbrook, IL 60062-2096.)

Uniform Classification Committee, Agent:

Uniform Freight Classification

(Private sector and civil agencies may purchase copies of these voluntary standards from the National Railroad Freight Committee, Suite 1120, 222 South Riverside Plaza, Chicago, IL 60606.)

(DoD activities may obtain copies of those adopted voluntary standards listed in the DoD Index of Specifications and Standards free of charge from the Standardization Document Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption is obtained.

3. REQUIREMENTS

3.1 Facility clearance. All manufacturers of locks covered under this specification will require access to Top Secret information and will therefore require a facility security clearance at the Top Secret level. Clearances shall be established under the cognizance of the Defense Security Service.

3.2 Qualification. The locks furnished under this specification shall be products which have been tested and have passed the qualification tests and inspections specified in Section 4, and have been listed on or approved for listing on the applicable Qualified Products List (QPL). No changes may be made in the design or construction of listed products without prior written approval from the General Services Administration.

3.2.1 Qualification suspension.

3.2.1.1 Development of entry techniques. The locks qualified under this specification will be continually tested by the Government during the term of qualification to determine whether the entry protection afforded by the locks can be improved. At any time, if entry techniques which affect a lock's integrity are developed, the lock shall be disqualified and removed from the QPL.

3.2.1.2 Change in specification requirements. This specification will be reviewed by the Government to determine whether specification requirements should or can be changed to improve product quality. If, at any time, requirements are changed, and such changes affect the qualification status of a qualified lock, it shall be

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.

removed from the QPL and the manufacturer will be required to modify the product to the extent necessary to comply with specification changes and have the product requalified.

3.3 Description. The lock shall be a dial operated, bolt type, electromechanical combination lock.

3.3.1 Pre submission testing. The lock shall conform to the applicable sections of ANSI/UL 768, as evidenced by a certificate from a recognized testing facility located within the US. After the initial product review by GSA an ANSI/UL 768 conformance list will be provided to the submitting manufacturer for ANSI/UL 768 pre submission testing. The government reserves the right to perform any additional testing or inspections in the ANSI/UL 768 standard. Contact the General Services Administration for a listing of recognized testing facilities.

3.4.1 Materials. Material used shall be free from defects that would adversely affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in the commercial market.

3.4.2 Material deterioration and control. The lock shall be fabricated from compatible materials inherently corrosion- or deterioration-resistant or treated to provide protection against corrosion. Dissimilar metals, as defined in MIL-STD-889, shall be plated or compatible to prevent operationally destructive corrosion.

3.4.3 Electronic components. The manufacturer is responsible for assuring that all electronic components are as approved and may be inspected and verified to ensure continued compliance throughout the product's lifecycle.

3.4.3.1 Electronic component reliability. Electronic components shall be selected with the reliability and shelf life equal to the mechanical components, which is 10 years.

3.4.3.2 Layout. Component layout and circuit design shall incorporate security features to mitigate reverse engineering.

3.4.3.3 Electronic component production point. United States made electronic components shall be used to the maximum extent possible. All foreign procured electronic components shall be declared to GSA prior to submittal for testing.

3.4.3.4 Electronic component security features. Electronic circuit card/board shall incorporate security features such as clear conformal coatings with dyes.

3.4.4 Lock bolt. The lock bolt shall be made of Type 304 stainless steel or equal material that is corrosion resistant, has a minimum tensile strength of 85,000 psi, and a hardness of Rockwell B85.

3.5 Design.

3.5.1 Changing combinations. Changing procedures shall require access to the back of the lock, to have the bolt extended during changing, and shall ensure the operator must know the current combination prior to changing the combination, except in the case of a lost combination. For situations when the combination is lost, a procedure shall be provided to change the lock combination without revealing the lost combination or requiring replacement of components.

3.5.2 Key change combination locks. Key change combination locks shall be designed to be readily combination-changeable by use of a key or special tool. Changing the combination shall not require removal or disassembly of the lock.

3.5.2.1 Style 1 combination change key. Style 1 lock's key or special tool required for combination changes shall not be able to communicate with the lock's microprocessor or electronic circuitry. These keys or special tools shall not have any memory-holding capability or signal processing ability.

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.

3.5.3 Bolt lockout. The lock shall have a mechanical relock mechanism that will prevent retraction of the bolt if the lock cover is moved more than 0.10 inch (2.54 mm) at any point from its normal operating position.

3.5.4 Combinations. The lock combination shall be selected by the use of a dial. The combination for opening the lock shall not exceed four numbers. Each number shall be within the range of 0 to 99, inclusive. The lock shall have as a minimum 1,000,000 operational combinations, as defined in 6.3.4. Both digits in a double digit number shall be entered at one time. Locks with graduated dials shall be designed to initiate retraction of the bolt on a setting of or near 0 when installed in right hand, left hand, vertical up or vertical down positions.

3.5.5 Lock operation. The dial, spindle, bolt and all internal parts shall operate smoothly for the operating life of the lock. Locks shall be tested for compliance with this requirement as specified in 4.6.2.

3.5.6 Lock bolt operation. All energy required to retract or extend the lock bolt shall be derived from mechanical operation of the lock dial by the operator. The torque required to retract and extend the bolt shall not exceed 32 inch-ounces (0.225 N-m). When the bolt is in the open position, application of a torque of 50 inch-ounces (0.353 N-m) to the dial shall not cause damage to the dial, spindle or any other part of the lock that will cause the lock not to function properly.

3.5.7 Combination redial. Once the lock bolt has been extended to the locked position it shall not be possible to reopen the lock without completely redialing the current lock combination. For the purposes of this requirement, the locked position means the bolt has been fully extended.

3.5.8 Case access. When the lock is mounted to the test fixture and locked, the assembled lock case shall not permit internal visual inspection of the lock.

3.5.9 Dial torque. Dial torque for the lock shall be 16 to 20 inch-ounces (0.113 to 0.141 N-m) to facilitate ease of dialing. Torque shall remain within the specified range for the operating life of the lock, when tested in accordance with 4.6.2. Lock design may provide for adjustment of the torque to remain in the specified range. The dial and rotating internal parts shall not be free-wheeling.

3.5.10 Temperature. The lock shall operate in a temperature range of -10°F to 158°F (-23.3°C to 70.0°C). Locks shall be tested for compliance with this requirement in accordance with 4.6.10.

3.5.11 Moisture absorption and humidity. The lock shall be designed to operate in a humidity range of 10 to 98 percent relative humidity for its operating life. Locks shall be tested for compliance with this requirement in accordance with 4.6.6.

3.5.12 Vibration. Locks shall be subjected to environmental vibration tests, as specified in 4.6.9. Operation and security performance and tolerance shall remain within standards.

3.5.13 Shock. Locks shall be subjected to shock tests in accordance with 4.6.7.

3.5.14 Electromagnetic pulse. Locks shall be subjected to electromagnetic pulse tests as specified in 4.6.11. The lock shall operate normally after exposure.

3.5.15 Electrostatic discharge. Locks shall resist damage due to electrostatic discharge. Locks shall be tested to 250,000 volts, as specified in 4.6.12. The lock shall operate normally after exposure.

3.5.16 Operating system access.

3.5.16.1 Style 1 locks. Style 1 locks shall have no external data transfer ports or the ability to transfer data to or from a secondary device. Keys or special tools required for combination changes shall not be able to communicate with the lock's operating system, microprocessor or electronic circuitry. Any data contained in the audit function (opening/closing history) may only be accessed from the lock's display.

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.

3.5.16.2 Style 2 locks. Style 2 lock's external data transfers from the operating system, microprocessor or electronic circuitry to a secondary device shall meet applicable FIPS Standards. These devices may be used to monitor authorized/unauthorized openings, personnel access, combination verifications, combination changes, etc. These secondary communication devices shall not be able to open the electromechanical lock.

3.6 Construction.

3.6.1 General. Locks supplied under this specification shall be interchangeable with existing GSA approved combination locks in accordance with this specification (see figure 1).

3.6.2 Dial and dial ring. Lock dials shall be top reading design and shall be provided with suitable dial rings. Locks shall have a dial and dial ring not less than 3 inches (76 mm) nor more than 3 7/8 inches (98.4 mm) in diameter. Dial plus dial ring shall not extend more than 2 1/8 inches beyond the dial ring mounting surface. The dial and dial ring design shall prevent casual observation of the combination during dialing. Logos or non-essential markings or features which may be related to the numeric setting shall not appear on the dial or other exposed movable surfaces. Dial ring mounting screws shall be provided of sufficient length to extend 1/8 inch beyond the exterior of the dial ring to ensure proper engagement. Once properly installed and in a secured condition, the dial, dial ring, and any other exterior component assembly, or parts thereof, shall not be removable without causing observable physical damage

3.6.2.1 Graduated dials. When a graduated dial is provided, the dial shall be numbered with distinct divisions to facilitate reading. The dial shall be not less than 3 inches (76 mm) diameter. When installed, the dial of a graduated dial must withstand a turning torque of 50 inch pounds. A dust cover shall be supplied to cover the dial and dial ring. The cover shall not interfere with normal dialing operation. When installed, only the knob of the dial shall be available to grasp for rotation purposes. All other movable surfaces shall be shielded from touch.

3.6.2.2 Dust cover. A dust cover shall be required when there is a physical relationship between the dial position and the related number selected.

3.6.3 Spindle. The lock shall be furnished with a spindle that can be cut to length to suit doors or drawers of varying thickness between 1/2 and 3 1/2 inches (12.7 and 89 mm) in combined thickness. The spindle diameter, including tubes, cables and other components between the dial and lock case, shall not exceed 3/8 inch (9.5 mm).

3.6.4 Case and cover. The case and cover dimensions shall be as shown in Figure 1. The cover shall be removable and held in place by not more than two screws, each fitted with a lock washer or other means of securing the screws. The lock shall allow attachment to the door or drawer by means of four, ¼- 20 UNC-2a machine screws each fitted with a lock washer or other means of securing the screws, located as shown in Figure 1. Case mounting screws shall be provided of sufficient length to extend 1/4 inch (6 mm) beyond the exterior of the lock case to ensure proper engagement with the mounting surface. The lock case mounting and spindle hole locations shall be as shown in Figure 1. Case and cover shall be designed to protect the electronic components of the lock from electrostatic discharge (ESD) and other security requirements as noted in 3.6.

3.6.5 Lock bolt. The lock bolt as specified in 3.3.4 shall have a cross-section measuring 0.310 ±0.005-inch by 0.995 +0.005,-0.003-inch (7.87 mm ± 0.13 mm by 25.27 mm +0.13 mm,-0.08 mm). The bolt throw shall be not less than 5/16 inch (7.92 mm). The lock bolt shall have two threaded holes in the end of the bolt. The holes shall be #10-32 UNF with a center to center distance of 0.563 ± 0.005 inch. The holes shall be tapped to a minimum depth of 3/8 inch (see figure 4).

3.6.6 Finish. All surfaces shall have a uniform finish of sufficient smoothness to accept markings required.

3.6.7 Workmanship. The lock shall be free of sharp edges, burrs, slivers, or other defects affecting appearance, operation, or serviceability.

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.

3.7 Security.

3.7.1 Government testing. The Government reserves the right of testing the combination lock in accordance with standards that are privileged to the Government.

3.7.2 Surreptitious entry. The lock shall be tested for resistance to surreptitious entry as specified in 4.6.8.3.

3.7.2.1 Manipulation. The lock shall resist opening through manipulation for a period of 20 man-hours.

3.7.2.2 Radiological analysis. The lock shall resist opening through radiological analysis for a period of 20 man-hours.

3.7.2.3 Emanations analysis. The lock shall not emit sounds, latent display images or other signals which may be used to surreptitiously open the lock within a period of 20 man-hours.

3.7.3 Covert entry. The lock shall resist covert entry for a period of 30 man-minutes, when tested as specified in 4.6.8.4.

3.7.4 Case and bolt strength. The lock case and bolt shall withstand the test specified in 4.6.8.5 without any fracture or bending of the bolt or case.

3.7.5 Software security.

3.7.5.1 Physical control. Software will not be classified but controlled in a manner to protect the software from disclosure to unauthorized personnel as designated by GSA. A software security plan shall be submitted to GSA for approval prior to product submission against the specification.

3.7.5.2 Software/Firmware verification. Software codes, security features, encryption etc. will be provided to GSA for evaluation. A software verification tool will be provided to GSA in order to verify proper loading of the software and identify any manipulation of the loaded software.

3.8 Marking. Each lock shall be marked with the month and year of manufacture on the dial, dial ring and lock case. Marking shall be embossed, impressed or engraved. Marking on the lock case shall be visible on removal of the lock cover.

3.9 Regulatory requirements. The manufacturer is encouraged to use recovered materials in accordance with Public Law 94-580, as amended, to the maximum extent practicable.

3.9.1 Foreign parts restriction. The Buy America Act, sections of the Federal Acquisition Regulation 25.200 applies to the combination locks manufactured under this federal specification. For national security reasons, the government reserves the right to restrict or direct the procurement process of critical lock components from foreign entities.

3.10 Instructions. Manufacturer's instructions, normally furnished in commercial practice, describing how to mount and operate the lock shall be furnished with each lock. For locks shipped in bulk to container or vault door manufacturers, instructions shall be provided for inclusion with the container or door.

3.11 Assembly drawing and parts list. A parts list of all lock parts which may be subject to subsequent replacement because of wear or damage shall be furnished with each lock delivered under contract. The parts list shall clearly identify the parts by description, location and part number. When necessary, assembly drawings shall be provided to show the location of the parts. The parts list shall be printed on heavy paper or other suitable material.

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.

4. QUALITY ASSURANCE PROVISIONS

4.1 Manufacturer. The supplier is responsible for the performance of all inspection requirements as specified herein. The supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. Inspection records of the examination and tests with itemized results shall be kept complete at the manufacturer's facility, available to the Government throughout the duration of the contract, or a minimum of two years, whichever is longer. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of Sections 3 and 5. The inspections set forth in this specification shall become a part of the supplier's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the specification. Sampling in quality conformance does not authorize the submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Component and material inspection. In accordance with 4.1, the supplier is responsible for insuring that components and materials are manufactured, tested and inspected in accordance with the requirements of referenced specifications and standards to the extent specified or, if none, in accordance with this specification.

4.2 Qualification testing and inspection. Qualification testing and inspection shall consist of the-tests and inspections shown in Table 1. Two groups of locks shall be tested in the sequences shown. Each group will consist of a minimum of four locks. Failure of any lock to meet any one or more of these requirements shall provide reason to consider the product as having failed to meet the requirement for qualification.

Table 1. Qualification Testing Sequence and Inspection Matrix

Qualification Test		Test Sequence	
		Group I	Group II
4.7	Inspections	1	1
4.6.9	Vibration	2	8
4.6.10.2	High temperature	3	9
4.6.6	Moisture	4	10
4.6.4	Salt spray	5	11
4.6.12	Electrostatic discharge	6	13
4.6.2	Operational test	7	6
4.6.3	Wear test	8	7
4.6.7	Shock	9	2
4.6.10.1	Low temperature	10	3
4.6.5	Aging-stress	11	4
4.6.8	Security	12	12
4.6.11	Electromagnetic pulse	13	5

4.3 Inspection for acceptance. The Government reserves the right to inspect and test each lock, including all component parts thereof, delivered for acceptance under this specification. Locks delivered for acceptance shall be inspected as specified in 4.4. Any nonconformance shall provide reason to reject the product. Rejected locks may be reworked to correct nonconformance and they may be resubmitted for acceptance. Reworked locks shall be so indicated.

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.

4.3.2 Quality assurance testing. Periodically, during the term of the contract, the Government inspector, at a time convenient to the Government, will select samples of the manufacturer's regular production and subject them to the tests in 4.6. This quality assurance testing shall be performed by a Government agency specifically designated by the General Services Administration. Failure of the lock to meet any one or more of these tests shall provide reason to suspend acceptance of the manufacturer's product until the Government is satisfied that all defects have been corrected.

4.4 Quality conformance inspection. The quality conformance inspection shall include the examinations specified in 4.4.1, and preparation for delivery inspections specified in 4.4.2.

4.4.1 End item inspection. The locks shall be examined for nonconformance in accordance with Table 2. Sampling and inspection procedures shall be in accordance with ANSI/ASQ Z1.4. The unit of product shall be a complete lock. All combination locks offered for delivery at one time shall be considered a lot for the purpose of inspection. The inspection level shall be level II with an Acceptable Quality Level (AQL) of 2.5 percent nonconforming.

Table 2. Examination for Nonconformance

Material is not resistant to corrosion and deterioration, nor treated to be resistant to corrosion and deterioration for the applicable storage and operating conditions.
Dissimilar metals as defined in MIL-STD-889 are not treated or plated to prevent corrosion.
Supplier does not have documentation available for identification of material, material finishes or treatment.
Used, rebuilt or remanufactured component, pieces or parts incorporated in the locks.
Design not as specified.
Security of lock not as specified.
Dimensions not as specified.
Lock subassembly not as specified.
Bolt lockout device not as specified.
Lock torque not as specified.
Dial ring not as specified.
Dial not as specified.
Spindle not as specified.
Dust cover not as specified.
Markings incorrect, missing or illegible.
Finish not as specified.
Instruction not furnished, or not as specified.
Workmanship not as specified.

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.

4.4.2 Inspection of preparation for delivery. An inspection shall be made to determine that packaging, packing and marking comply with those specified in Section 5 of this specification. For examination of interior packaging, the sample unit shall be one shipping container fully prepared for delivery, selected at random just prior to the closing operations. Sampling shall be in accordance with ANSI/ASQ Z1.4. Nonconformity of closure listed shall be examined on shipping containers fully prepared for delivery. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 with an AQL of 4.0 nonconformities per hundred units.

TABLE 3. Classification of Preparation for Delivery Defects

Packaging	Instruction sheet not in unit container with lock. Change key not in unit container with lock. Unit container not sealed with reinforced tape. Improper quantity of locks placed in intermediate container.
Packing	Shipping container not as specified. Shipping container weights exceed specified limitations.
Marking	Marking not in accordance with FED-STD-123 or MIL-STD-129, as specified. Marking not in accordance with the contract or order. Item description marked on unit container. Unit containers not marked or labeled with special instructions as specified.

4.5 Qualification testing.

4.5.1 Testing agency. Qualification tests on products submitted for inclusion on the applicable Qualified Products List (QPL) under this specification and any retesting that may be required shall be performed by a testing agency specifically designated by the General Services Administration.

4.5.2 Testing costs. All testing costs entailed in determining the qualification of the supplier's product, including costs of retesting a qualified product if subsequently disqualified under 3.1.1.1 or 3.1.1.2, shall be borne by the supplier, and shall be payable to GSA as directed.

4.5.3 Test procedures. The following procedures shall govern the testing of all products submitted for qualification under this specification.

4.5.3.1 Sample submission. Samples shall be submitted for qualification only after the supplier has obtained written authorization from GSA.

4.5.3.2 Qualification test discontinuation. A qualification test may be discontinued at the Government's testing facility at any time the product fails to meet any one of the requirements set forth in this specification. The manufacturer may be permitted to make modifications on the sample during the testing phase where such modifications, in the judgment of the General Services Administration, are clearly in the interest of the Government.

4.5.3.3 Sample retest. In case of failure of the sample, consideration will be given to the request of the manufacturer for submission for retest only after it has been clearly shown that changes have been made in the product which the Government considers sufficient to warrant retest.

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.

4.5.3.4 Manufacturer test observation. The manufacturer or his representative will not be permitted to observe the tests conducted on his/her product at the testing facility. However, when samples tested fail to comply with the requirements of this specification, the sample may be examined by the manufacturer or his/her representative and full details of the failure may be made known to them in a manner which, for reasons of security, will be in the best interest of the Government. Appropriate security clearances or access approvals may be required prior to release of information relating to test procedures or results.

4.5.4 Test samples. Forty test samples shall be submitted to a laboratory specified by the General Services Administration. In the event the samples are destroyed or damaged to such an extent during testing that testing cannot be completed, the Government reserves the right to require the manufacturer to furnish additional samples necessary to complete the testing.

4.5.5 Drawings and list of materials. The manufacturer shall furnish five complete sets of construction and assembly drawings and lists of materials with samples submitted for qualification. The manufacturer shall provide schematics of all electronic circuitry, a complete set of photolithographic photo mask(s) or photoreticle(s) and provide documented source code listings of all software/firmware used in the lock. The government shall have the right to request additional information as required. When the samples are tested and are approved for inclusion on the applicable QPL, three sets of the drawings and lists of materials shall be marked by the General Services Administration with the Government's approval. One set of drawings shall be returned to the manufacturer. Drawings will be used in inspections of products offered to the Government. All material so furnished by the manufacturer will be held in proprietary confidence.

4.5.5.1 Changes in construction or drawings. Once a product has been tested and approved for QPL, no subsequent change of any kind shall be made in its construction or in the construction drawings unless prior written authorization to make a change is obtained by the manufacturer from General Services Administration. Failure to comply will result in removal from the QPL.

4.6 Tests. All tests shall be performed in accordance with the Qualification Test and Inspection Matrix (table 1)

4.6.1 Break-in period. All tests shall be conducted before and after completion of the operation test in 4.6.2 and the wear test in 4.6.3. Failure of the lock in either phase shall be cause for rejection.

4.6.2 Operation test. The lock shall be subjected to 10,000 uninterrupted cycles of operation without addition of lubricants and without replacement of any component. One cycle shall consist of dialing the combination at a speed not exceeding 48 revolutions per minute, retracting the bolt, throwing the bolt and scrambling the combination. Following the cycling, the lock shall be subjected to 50 combination changes including 3 open-and-close operational verifications after each change. When a graduated dial is used, the lock shall then be checked to verify that the dialing tolerance is still within the acceptable range specified by UL 768. After completion of the cycling and combination changes, the lock shall operate smoothly and the dial torque shall be in the range specified in 3.5.6. Any failure of the lock's normal operation during testing shall be cause for rejection.

4.6.3 Wear test. While in the locked condition, the lock shall have the dial turned at 600 rpm for a period of not less than 8 hours, 4 hours in a clockwise direction and 4 hours in a counterclockwise direction. At the end of 8 hours, it shall not be possible to open the lock through surreptitious or covert techniques as specified in 4.6.8.3 and 4.6.8.4.

4.6.4 Salt spray corrosion test. Locks shall be tested in accordance with UL 768 Salt Spray Corrosion Test. Locks shall be operated five times after each 24-hour period. Any failure of the lock to open and/or failure of any portion of the combination display device of the lock shall result in failure of the test.

4.6.5 Aging-stress distortion. Locks shall be tested in accordance with UL 768 Aging-Stress Distortion test.

4.6.6 Moisture absorption. Locks shall be tested in accordance with MIL-STD-810, Method 507.3, Procedure III - Aggravated. Locks shall be tested in the operational mode with a test duration of 10 cycles.

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.

4.6.7 Shock test. Locks shall be tested in accordance with MIL-S-901 – Test Category: Lightweight, Shock Grade: A, Equipment Class: I, Shock Test Type: C, Mounting Location: Deck mounted.

4.6.8 Security tests.

4.6.8.1 Test fixture. Security tests shall be conducted with the lock mounted in each of the four mounting configurations, i.e., vertical up, vertical down, horizontal right, horizontal left. The security tests shall be conducted with the lock mounted to a test fixture. The fixture shall consist of a steel plate, 9.5 to 12.7mm (3/8" to 1/2") thick, mounted in an upright position. The plate shall be approximately 480 mm (19") wide by 279 mm (11") high. A plate of equal thickness and dimensions shall be used for the base. The test fixture shall be representative of an approved safe or vault door lock box and shall be drilled and tapped to allow mounting in all four positions using the screws specified in paragraph 3.5.4. When a 9.5 mm (3/8") plate is used, the thickness shall be increased to 12.7 mm (1/2") at the lock mounting location. Security testing will not be limited to this test fixture.

4.6.8.2 Tools. Tools used for a single test shall be limited to a maximum weight of 70 kg (154 lbs).

4.6.8.3 Surreptitious entry. Attempts shall be made to unlock the lock through manipulation, operating system access, radiological analysis and emanations analysis. Manipulation may include the use of automatic dialing devices. Manipulation, operating system access and analysis may include the use of computer enhancement techniques for signals or emanations. The lock shall resist opening for the times specified in 3.6.2.

4.6.8.4 Covert entry. For the purpose of the covert entry test, access to the lock shall be limited to the dial and spindle. The lock shall resist covert opening for the period specified in 3.6.3.

4.6.8.5 Case and bolt strength. Mount the lock on a test stand so that the bolt extends at least 2.5 mm (.010") beyond the edge of the stand, as shown in Figure 2. Apply a force of 2669 N to the bolt as shown in the figure. Examine the case and bolt for damage. Apply a force of 2669 N (600 lbs) to the bolt as shown in Figure 3. Any fracture or bending of the bolt or case or movement of the bolt more than 2.5 mm (.010") shall be a failure.

4.6.9 Vibration. The lock shall be tested to the vibration spectrum as derived from MIL-STD-810G, Section 514, Annex A and Annex C. The parameters for the vibration test shall be as stated in Table 4 and 5. The lock shall be tested in each axis (vertical, front-back, side-side) for a duration of 4 hours across the frequency spectrum. At the end of each 4 hour cycle the lock shall be checked for conformance to the operation, security and tolerance requirements. There shall be no movement or damage which affects the locks normal operation or security.

Table 4

Broadband Random Envelope			
Frequency (Hz)	Acceleration Spectral Density g^2/Hz	Frequency (Hz)	Acceleration Spectral Density g^2/Hz
5	0.2308	142.8	0.02
8	0.7041	193.8	0.013
12	0.0527	193.8	0.034
15	0.04	214.2	0.034
64.6	0.04	224	0.015
64.6	0.30	230	0.01
71.4	0.30	258.4	0.01
71.4	0.04	258.4	0.019
83.8	0.04	285.6	0.019
129.2	0.022	285.6	0.01
129.2	0.075	2000	0.01
142.8	0.075		

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.

Table 5
SHOCK TEST VIBRATION SPECTRUM

Helo-sine Composite			
Frequency (Hz)	Peak Acceleration (g-peak)	Frequency (Hz)	Peak Acceleration (g-peak)
17.4	1.74	53.0	1.5
27.3	2.5	81.9	1.5
34.9	2.5		

4.6.10 Temperature test.

4.6.10.1 Low temperature test. The lock shall be placed in a chamber maintained at a temperature of -10°F (-23°C) for a period of three hours or until the lock temperature has stabilized. At the end of that period, without removing the lock from the chamber, ten attempts shall be made to open the lock, using normal dialing procedures. The lock shall open at least six out of ten times. Slower than normal operation of the lock is not considered failure. After ten attempts, the lock shall be removed from the chamber and allowed to return to room temperature. Ten more opening attempts shall be made. The lock shall open all ten times. The lock shall be examined for any damage or defects due to the low temperature exposure. There shall be no defects affecting the operation or life of the lock.

4.6.10.2 High temperature test. The lock shall be placed in a chamber maintained at a temperature of 155 degrees Fahrenheit for a period of three hours. At the end of that period, the lock shall be removed from the chamber and immediately opened five times using normal dialing procedures. Failure of the lock to operate shall constitute failure. The lock shall then be subjected to extreme heat and an attempt shall be made to retract the locking bolt without using the proper combination. Retraction of the lock bolt without entering the proper combination shall constitute a failure."

4.6.11 Electromagnetic pulse. The lock shall be installed in a Class 6 security file cabinet as described in federal specification AA-F-358. The installed lock shall be tested in 4 orientations at each field level: front-on, drawer closed; front-on, drawer open; side-on, drawer closed; side-on, drawer open. The lock shall withstand 10 pulses in each orientation. The lock shall be subjected to transient pulse illumination with electric field peaks within the range of 28 to 37 kV/m with a 1.5 to 3.0 ns risetime. After exposure at each field level, the lock shall operate normally.

4.6.12 Electrostatic discharge. The lock shall be mounted on the test stand described in 4.6.8.1. The lock dial shall be subjected to 5 electrostatic discharges of 250 kV. After exposure, the lock shall operate normally.

4.7 Inspections. A visual inspection shall be made to determine compliance with the requirements specified in the following paragraphs:

3.3.1 Materials
3.4.3 Key change locks
3.4.4 Bolt lockout
3.4.5 Combinations
3.4.6 Lock operation
3.4.7 Lock bolt operation
3.4.8 Combination redial
3.4.9 Case access
3.4.10 Dial torque
3.5.2 Dial and dial rings
3.5.3 Spindle

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.

3.5.4 Case and cover
3.5.5 Lock bolt
3.5.6 Finish
3.5.7 Workmanship
3.7 Marking
3.9 Instructions

5. PREPARATION FOR DELIVERY

5.1 Packaging. Installation and combination changing instructions and the combination change key (when applicable) shall be placed in an envelope. Each lock and envelope shall be packaged in a close-fitting fiberboard box. The box shall be sealed with reinforced tape. Ten locks shall be placed in a close-fitting fiberboard box.

5.2 Packing. Locks, packaged as specified in 5.1, shall be packed to ensure carrier acceptance in accordance with the National Motor Freight Classification and Uniform Freight Classification.

5.3 Marking. Marking shall be in accordance with FED-STD-123 or MIL-STD-129, as specified.

5.3.1 Additional marking. Each unit container specified in 5.1 shall be marked with the following special instructions:

IMPORTANT

TO BE OPENED BY DESIGNATED

USER SECURITY PERSONNEL ONLY

The letters shall be ¼-inch high minimum. Color to be red or black and shall be applied by marking the reinforced sealing tape (see 5.1) or by application of preprinted labels.

6. NOTES

6.1 Intended use. Combination locks covered by this specification are intended for use on safes, safe lockers, security containers, vault doors and similar items (see 1.1).

6.2 Ordering data. Purchasers shall specify the following:

a. Title numbers and date of this specification
b. Level of packaging and packing required.

6.3 Definitions.

6.3.1 Covert entry. For the purpose of this specification, covert entry is defined as a method of entry which causes physical damage to the container or lock such that the damage can be repaired to the point where it would not be detectable by a user during normal use. However, the damage would be detectable during inspection by a qualified person. If replacement parts, including replacement lock parts, or paint, are necessary to conceal the damage caused by the entry attempt so it cannot be detected during normal use, the entry method shall be considered covert.

6.3.2 Entry. For the purpose of this specification, entry means retracting the bolt.

6.3.3 Normal use. For the purpose of this specification, normal use means dialing the combination, retracting the bolt, and extending the bolt.

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.

6.3.4 Operational combinations. Operational combinations are combinations which may be set on the lock after excluding those settings which are prohibited by the manufacturer due to the lock design. Operational combinations include those settings which are not recommended for use, but which exist, such as 20-40-60.

6.3.5 Surreptitious entry. For the purpose of this specification, surreptitious entry means a method of entry, such as manipulation or radiological attack, which would not be detectable during normal use or during inspection by a qualified person.

6.3.6 Self-generating power. For the purpose of this specification, self generating power is defined as using mechanical or photovoltaic means to generate the electrical power used to operate the lock. This may include rotational kinetic energy, solar energy, and kinetic energy. The mechanism to create power can require the user to generate the power each time they approach the container or can store the energy within the lock. Battery power is considered chemical power and is not considered self generating power.

6.3.7 Interoperable. For the purpose of this specification, interoperable is defined as a lock that has features which allow any outside device to communicate with the lock microprocessor in any way. Interoperable also refers to locks that allow the lock to communicate with devices outside the lock. In addition, any lock that uses means other than self generating power falls under the Style II interoperable lock.

6.3.8 Communicating. For the purpose of this specification, communicating is defined as sending or receiving a command or information from a separate device.

6.4 Samples. All samples required for test purposes shall be furnished at no expense to the Government and the manufacturer shall pay all transportation to and from the point where the tests are performed. All tested samples shall become property of the Government but may be released to the manufacturer at the option of the Government. Upon request, the manufacturer shall furnish to the Government testing facility, a lock equal in respect to that of the qualified sample for use in inspection and test during the term of qualification. The lock shall be returned to the manufacturer upon removal of the product from the Qualified Products List.

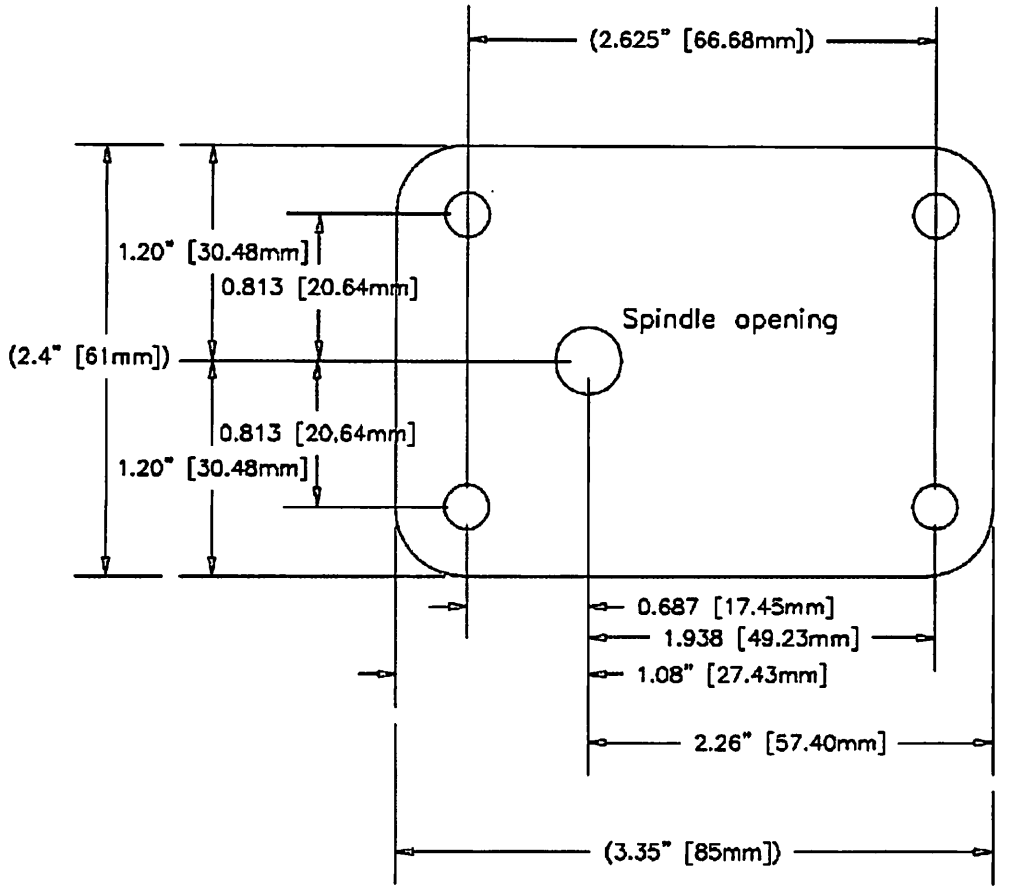
MILITARY INTERESTS:

REVIEW ACTIVITIES:
Army
Navy
Air Force

CIVIL AGENCY COORDINATING ACTIVITIES:
State Department
CIA
NSA
Department of Justice
Department of Transportation
Department of Commerce
Department of Treasury

PREPARING ACTIVITY
GSA-FAS

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.



Tolerances:
XX.XX ±0.01 [±0.25 mm]
XX.XXX ±0.005 [±0.13 mm]

Maximum thickness of lock case plus cover: 1-13/32 inches

FIGURE 1
Schematic arrangement of lock case holes.

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.

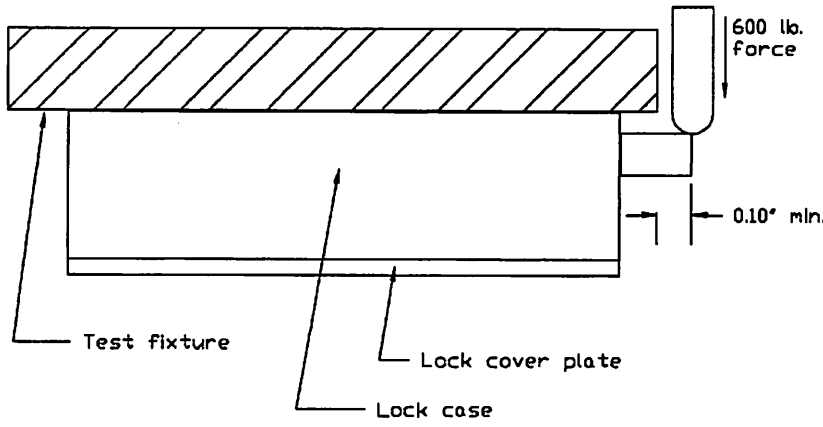


FIGURE 2
Case and bolt strength test

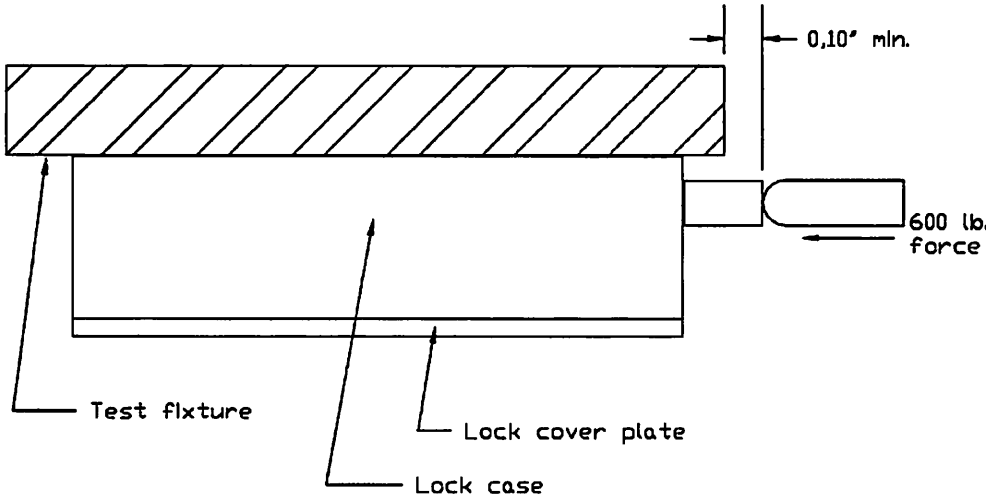


FIGURE 3
Bolt end pressure test

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.

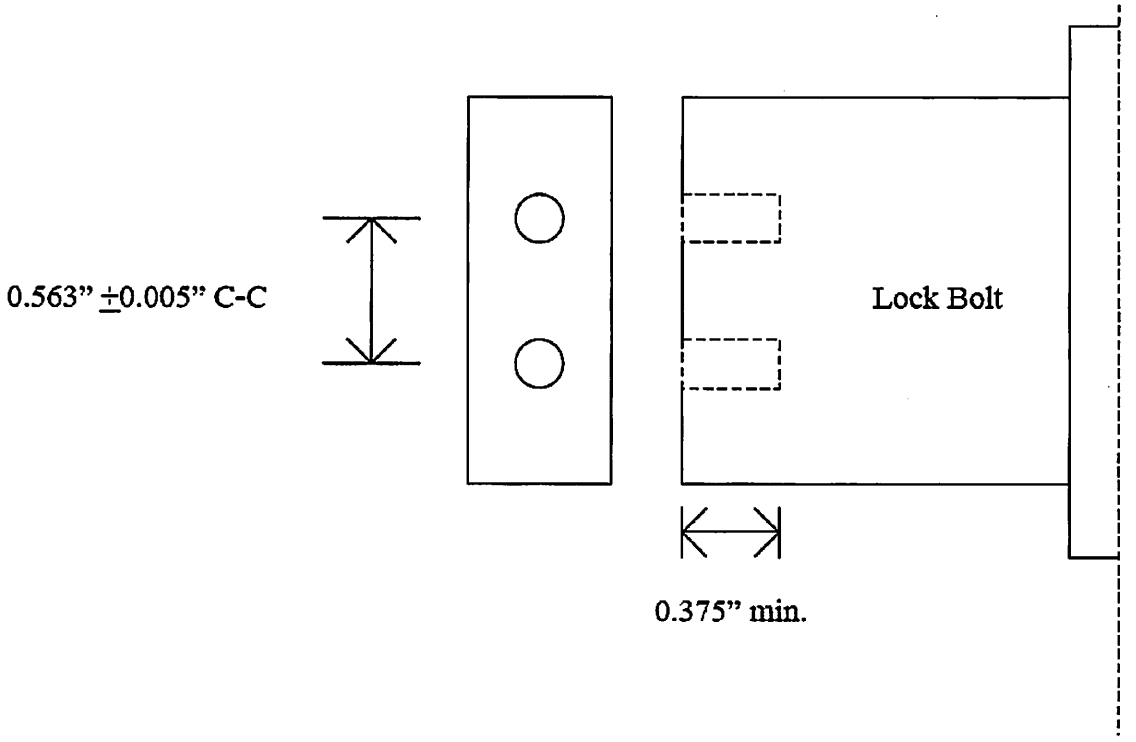


FIGURE 4. Lock bolt threaded holes

Source: https://assist.dla.mil -- Downloaded: 2016-12-10T22:19Z
Check the source to verify that this is the current version before use.