MILITARY SPECIFICATION

PADLOCK, KEY OPERATED, HIGH SECURITY, SHROUDED SHACKLE

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers one type of key operated, high security, shrouded shackle padlock that employs a dead bolt locking mechanism.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

* 2.1.1 Specifications, standards, and handbooks. Unless otherwise specified, the following specifications, standards, and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation, form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

QQ-C-320 - Chromium Plating (Electrodeposited).
QQ-N-290 - Nickel Plating (Electrodeposited).
RR-C-271 - Chains and Attachments, Welded, Weldless.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer (Code 156), Naval Construction Battalion Center, Port Hueneme, CA 93043, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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PPP-B-566 - Boxes, Folding Paperboard.
PPP-B-601 - Boxes, Wood, Cleated-Plywood.
PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
PPP-B-636 - Boxes, Shipping, Fiberboard.

MILITARY

MIL-P-116 - Preservation, Methods of.
MIL-M-7866 - Molybdenum Disulfide, Technical, Lubrication Grade.
MIL-G-21164 - Grease, Molybdenum Disulfide, for Low and High Temperatures.
MIL-H-29181 - Hasp, High Security, Shrouded, for High and Medium Security Padlock, General Specification for.
MIL-H-43905 - Hasp, High Security Padlocks.

STANDARDS

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129 - Marking for Shipment and Storage.
MIL-STD-889 - Dissimilar Metals.

* 2.1.2 Other Government documents, drawings, and publications. The following other Government documents form a part of this specification to the extent specified herein.

DRAWINGS

NAVAL SEA SYSTEMS COMMAND (NAVSEA)

53711-5532334 - High Security Hasp, MK 2 MOD 9 Hinged or Sliding Horizontal Door, R. H., Style 1.
53711-5532335 - High Security Hasp, MK 2 MOD 9 Hinged or Sliding Horizontal Door, L. H., Style 2.
53711-5532337 - High Security Hasp, Shipboard, 1300 MOD 1.
53711-5532340 - Universal Security System Sliding Door.

NAVAL AMMUNITION PRODUCTION ENGINEERING CENTER (NAPEC)

0955 - High Security Hasp, Hinged R. H., MK 2 MOD 7.
0956 - High Security Hasp, Hinged or Sliding Horizontal Door, R. H., MK 2 MOD 8.
0957 - High Security Hasp, Hinged or Sliding Horizontal Door R. H., MK 2 MOD 8.
0958 - High Security Hasp, Hinged or Sliding Horizontal Door, L. H., MK 2 MOD 8.

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(Copies of military specifications and standards required by contractors in connection with specific acquisition functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following document(s) form a part of this specification to the extent specified herein. The issues of the documents which are indicated as Department of Defense (DoD) adopted shall be the issue listed in the current DODISS and the supplement thereto, if applicable.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

B117 - Salt Spray (Fog) Testing.
E18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

(Nongovernment standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

* 3.1 Description. The shrouded shackle, high security padlock, hereinafter referred to as the "padlock" shall be a single, key operated type (proprietary military keyway), utilizing a special key for disassembly. Padlocks shall be keyed individually. The padlock body or case shall employ an extension shielding the shackle at least 3/8 inch (9.5 millimeter [mm]) above the top and on three sides with a configuration that will allow close mating with the hasps specified herein. The padlock, locked on these special hasps, shall constitute a locking system highly resistant to forced and surreptitious entry as detailed within this specification. A unit, as referred to herein, shall be one completely assembled padlock with keys. See figure 1 for examples of padlocks with shrouded shackle.

3.2 Padlock samples.

* 3.2.1 Bid samples. Unless otherwise specified (see 6.2.1), each bidder shall furnish, with the bid, 17 samples of the padlock with key sets they propose to furnish under the contract for inspection as specified in 4.3.1, and in addition, unless otherwise specified (see 6.2.1), 10 milled, uncut

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key-blanks shall be furnished for testing. One intact unit of the selected product will be retained by the testing agency and one intact unit will be returned to the selected bidder to be used as a guide in manufacturing the first article and production quantity (see 3.2.2).

* 3.2.2 First article. Unless otherwise specified (see 6.2.1), seven padlocks and key sets shall be furnished for first article testing and approval (see 4.4 and 6.3). If the requirement for bid samples is waived, 17 padlocks and key sets shall be furnished for the first article testing and approval. In addition, unless otherwise specified (see 6.2.1), ten milled, uncut key blanks shall be furnished for testing. The first article units shall be selected at random from the first 100 standard production units or from the contractor's current inventory. If approved, one intact unit of the first article submission will be forwarded to the cognizant quality assurance representative and one intact unit shall be returned to the contractor to serve as the manufacturing standard. No deviation from the manufacturing standard shall be acceptable without formal written approval of the contracting officer in advance. Certification of compliance with this paragraph shall be provided to the inspector with each production quantity lot presented for inspection and acceptance.

3.3 Materials. Materials used shall be free from defects which 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 commercial practice. Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this specification are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from scrap material and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products are allowed under this specification unless otherwise specified.

3.3.1 Material deterioration and control. The padlock shall be fabricated from compatible materials, inherently corrosion and deterioration resistant, or treated to provide protection against the various forms of corrosion and deterioration that may be encountered in any of the applicable storage and operating environments to which the padlock may be exposed.

3.3.1.1 Dissimilar metals. Dissimilar metals, as defined in MIL-STD-889, shall be coated, plated, or electrically insulated from one another to minimize or prevent galvanic corrosion.

3.3.1.2 Identification of materials and finishes. The contractor shall identify the specified material, material finish, or treatment used for, on, or between components and sub-components, and shall make information available, upon request, to the contracting officer or designated representative.

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3.3.2 Recycled materials. For the purpose of this requirement, recycled materials are those materials which have been collected from scrap materials and reprocessed to become a source of raw materials, as distinguished from virgin raw materials. The components, pieces, and parts incorporated in the padlock may be newly fabricated from recycled materials, provided the padlock produced meets all other requirements of this specification. Used, rebuilt, or remanufactured components, pieces, and parts shall not be incorporated in the padlock.

3.4 Design. The major components of the padlock shall be a body, a shackle, and a locking mechanism. The term shackle as used herein also includes a sliding pin or bar if so designed. The pin or bar is the part that passes through the locking hole of the mating halves of hasps such as the shackle does. The shape of the padlock shall be at the option of the contractor, provided the assembled padlock conforms to all requirements specified herein. The shackle shrouding created by body extensions shall have a closely-fitted top opening for shackle clearance when the padlock is in the unlocked fully open position. The shackle shrouding shall have a side opening that will admit the mating members of hasps conforming to MIL-H-43905, MIL-H-29181, NAVSEA Drawings 53711-5532337 53711-5532340, 53711-5532334, 53711-5532335, and NAPEC Drawings 0955, 0956, 0957, and 0958. The locking of the padlock onto the above described hasps shall be accomplished by either turning the key or pushing the body onto the shackle and turning the key without the assistance of blocking or spacers between the shackle and the hasp guard. The padlock shall lock the mating members of the hasps specified herein when the hasps are mounted as specified in the installation instructions of the specific hasps. The assembled padlock, excluding the chain, clevis, and plate shall have a volume that is not more than 20 cubic inches (328 cubic centimeters), and a weight that is not more than 6 pounds (lbs) (3.0 kilograms [kg]).

* 3.4.1 Key and keyways. The key and keyways design shall be configured exclusively for military use, and shall not be available commercially. The key and keyways design, and the reverse image of the design, shall be set aside for DoD use only. There shall be not less than 100,000 different key changes for padlocks supplied under any one contract.

* 3.4.2 Chain, clevis, and plate. A chain, attachment plate, and clevis shall be furnished with each padlock. The chain shall be securely attached to the padlock case by means of a clevis and rivet or other secure fastening device, in such a manner that it will not interfere with the operation of the locking mechanism. The chain length shall be 9 inches (229 mm) plus or minus one link. Chain, clevis, fastener, screws, and plate shall be fabricated from corrosion resisting material. The chain shall be attached to the lock in such a manner that the key opening and drain holes shall perform their proper function. The chain shall conform to RR-C-271, Type I, Grade C, Class 5, Style 1.

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3.5 General requirement. The padlock shall meet general requirements as specified in 3.5.1 through 3.5.3.

3.5.1 Surreptitious neutralization resistance. The padlock shall resist surreptitious neutralization for not less than 15 minutes before and after the wear resistance cycling (see 3.5.2.1 and 4.6.3.1).

* 3.5.2 Effectiveness of design and materials durability. The design features and the materials used shall be such that the padlock shall perform as specified in 3.5.2.1 through 3.5.2.9.

3.5.2.1 Wear resistance. The padlock shall withstand 10,000 complete locking and unlocking cycles, without failure to fully lock and fully unlock during any cycle, and without loss of resistance to surreptitious neutralization (see 4.6.3.2).

3.5.2.2 Drop resistance, ambient temperature. The locked padlock shall withstand not less than 10 consecutive drops on different sides, from a height of not less than 6 feet (1.8 meters [m]), onto a hard, unyeilding surface without exhibiting evidence of fracture of any component or malfunction (see 4.6.3.3).

* 3.5.2.3 Drop resistance, high temperature. The locked padlock shall not be affected from being dropped from a height of not less than 3 feet (0.9 m) onto a hard, unyeilding surface. The padlock shall not open by means other than with the proper key. The padlock is to be dropped while it is still hot from having been heated to a temperature of not less that 1200 degrees Fahrenheit (°F) (649° Centigrade (C)) (see 4.6.3.4 and 4.6.3.7).

* 3.5.2.4 Shackle pull-out resistance. The padlock shall resist a tensile pull of not less than 12,000 pounds force (lbf) (5340 kilonewtons [kN]) on the shackle without pulling the shackle out of the padlock (seee 4.6.3.5).

* 3.5.2.5 Shock resistance, low temperature. The padlock shall resist opening by means other than by the proper key after being cold soaked at -100°F (-73°C) and being struck with a 3 lb (1.36 kg) double faced engineers hammer. This performance is required while the padlock is secured in the locked mode on a MIL-H-43905 hasp in a vertical wall mount position (see 4.6.3.6).

* 3.5.2.6 Forced entry resistance. The padlock shall withstand a concentrated forced entry attack using the tooling constraints listed in 4.6.3.7 and an accumulated work time of five minutes maximum.

* 3.5.2.7 Heat resistance. The padlock shall withstand a direct pull of not less than 50 lbf (222 Newtons [N]) on the shackle, after exposure to a temperature between 1875°F (1023°C) and 1925°F (1051°C), without opening or separation of the shackle (see 4.6.3.8).

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* 3.5.2.8 Low temperature operation. The padlock shall operate at temperatures to -60°F (-51°C) when the appropriate operating key is inserted and turned in the padlock. The cylinder shall turn without sticking or excessive force or pressure and release the shackle both when initially tested and after 10,000 cycles. The control key shall also perform its design function without sticking or excessive pressure or force before and after the 10,000 cycle test (see 4.6.3.9).

* 3.5.2.9 Salt spray (fog) resistance. The padlock and its keys shall withstand exposure to salt spray (fog) for not less than 96 hours without exhibiting evidence of deterioration of any component, except for minor corrosion that does not adversely affect the performance of the padlock and keys (see 4.6.3.11).

* 3.5.3 Key integrity. The keys furnished with any padlock shall be not capable of locking, unlocking, or removing the cylinder, of any other padlock (see 4.6.3.10).

3.6 Detailed requirements. The padlock, components, and keys shall be as specified in 3.6.1 through 3.6.4.1.

3.6.1 Body. The complete assembled body of the padlock shall have no openings other than shackle opening and keyway, except that drainage holes and plugged holes are permissible. Drainage holes, if incorporated, shall be not larger than .093 inches (2.40 mm) diameter. The body shall incorporate a means to prevent access to the locking mechanism, except by use of a control key or by disassembly of the padlock.

3.6.2 Shackle. The shackle shall be 0.50, + .002, - .010 inch (12.7, + 0.05, - 0.254 mm) diameter. The shackle shall remain securely attached when the padlock is in the unlocked, fully opened position and shall be capable of being separated from the padlock only when the padlock is disassembled.

* 3.6.3 Locking mechanism. The shackle shall be held in the locked position by a dead-bolt type lock mechanism. The padlock shall open when the key is turned in the clockwise direction and lock when the key is turned in the counterclockwise direction. The operating key shall be retained in the keyway of the cylinder and shall not be removable when the padlock is in the open position.

3.6.3.1 Cylinder assembly. The cylinder assembly of the locking mechanism shall have a plug with only three distinct easily recognizable positions. Two positions of the plug shall be operating positions of locked and unlocked. The third position shall be the control position which allows disassembly of the lock.

* 3.6.3.1.1 Cylinder assembly removal. The cylinder assembly shall be securely retained within the padlock body when the cylinder plug is in either the locked or unlocked position. The cylinder assembly shall be removable

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from the padlock body only after the cylinder plug is rotated to the control position by use of a control key. When removed from the padlock body, the cylinder assembly shall remain as one assembly (see 4.6.3.15).

* 3.6.3.1.2 Cylinder assembly interchangeability. A cylinder assembly from any one padlock delivered under a contract shall be interchangeable with a cylinder assembly from any other padlock delivered under the same contract (see 4.6.3.16).

* 3.6.3.2 Keys. The padlock shall be furnished with 3 keys, consisting of 2 operating keys and 1 control key. Terms for parts of keys and padlocks used herein are as follows and on figures 1 and 2.

Bow	- Part grabbed by your hand to turn the key.
Bit	- Part that is inserted into the keyway and depresses the tumbler pins in the plug.
Milled Ward-Cuts	- Grooves in the flat side of the bit parallel to the bit axis.
Bit Cuts	- Cutouts made on the edge of the blade (at an angle to the long axis of the blade) to activate the tumblers.
Blade	- Part that enters the keyway in the plug.

* 3.6.3.2.1 Key material hardness. The key material shall have a hardness that is not less than 75 HRB in accordance with ASTM E18 (see 4.6.3.12).

* 3.6.3.2.2 Key deformation resistance. The key shall resist a torque of 8 lbf·in (0.9 N·m) without permanent set deformation of more than 0.125 inch (3.2 mm), when measured at the end of an 8 inches (203 mm) lever. The lever to be attached to the bow of the key blank at an angle prependicular to the long axis of the blade of the key blank. The maximum cross section of the material being torqued shall be no greater than the cross section at the deepest bit cut employed (see 4.6.3.13).

3.6.3.2.3 Key shapes. The bows of the operating keys shall be identical. The bows of control keys shall be of significantly different shapes than the bows of the operating keys.

3.6.3.2.4 Key bit cut limits. The cut depth of all keys shall be no more than 55 percent of the full depth, or cross section, of the key bit. The depth of the last two cuts (nearest the bow) on any key shall be no more than 40 percent of the key bit depth.

3.6.3.2.5 Key marking. In addition to the individual key markings specified in 3.6.3.2.7.1, all keys shall be stamped with: "US MILITARY PROPERTY - DO NOT DUP."

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* 3.6.3.2.6 Operating keys. The operating keys shall lock and unlock the padlock. The operating keys shall not be capable of rotating the cylinder plug to the control position. When the cylinder plug is in the unlocked position, the operating key shall be prevented from being removed from the cylinder plug (see 4.6.3.14).

* 3.6.3.2.7 Control key. The control key shall lock and unlock the padlock, and also rotate the cylinder plug to the control position to enable removal of the cylinder as specified in 3.6.3.1.1 (see 4.6.3.15).

3.6.3.2.7.1 Control key marking. The control key shall be embossed with the legend "CONTROL KEY."

3.6.4 Appurtenances, slides, or covers. Appurtenances, slides, or covers that may be incorporated in the padlock shall be secure when the locking mechanism is in the locked or unlocked positions. The removal of any appurtenance, slide, or cover shall not be possible, except with the control key in the control position or by disassembly of the padlock (see 4.6.3.1).

* 3.6.4.1 Keyway cover. Any keyway cover or plate shall remain aligned with the keyway. There shall be no keyway cover or obstruction which requires any special action or separate maneuver by the padlock user before a key can be inserted in the keyway (see 4.6.3.14).

3.7 Lubrication. The padlock shall be lubricated with molybdenum disulfide powder conforming to MIL-M-7866 applied sparingly to the internal parts of the cylinder. Other moving parts may be lubricated by applying a thin film of lubricant conforming to MIL-G-21164.

3.8 Color and finish. The color of the padlock shall be the natural color of the finish. All surfaces shall have a uniform finish of sufficient smoothness to accept the required marking. When corrosion protection is required for the padlock body or shackle, the finish shall be limited to chromium plating in accordance with QQ-C-320, class 1, type II, or nickel plating in accordance with QQ-N-290, class 2 except that the finish shall be dull or satin.

* 3.9 Identification marking. The body of the padlock shall be marked with the letters "US", the manufacturer's name or trademark, some traceable model identification, and the year of manufacture. The markings may be stamped, rolled, cast, or applied in any other manner that will assure legibility after the padlock has been exposed to the testing specified herein.

3.9.1 Prohibited marking. There shall be no markings on the padlock exterior which would aid in the unauthorized opening of the padlock.

* 3.10 Instructions. Operating and maintenance instructions shall be furnished with each padlock.

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3.11 Workmanship. The padlock and keys shall be free from sharp edges, burrs, and slivers that affect serviceability or appearance.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. 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 Component and material inspection. Components and materials shall be inspected in accordance with all the requirements specified herein and in applicable referenced documents.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. Bid sample innspection (see 4.3).
b. First article inspection (see 4.4).
c. Quality conformance inspection (see 4.5).
d. Inspection of packaging (see 4.7).

4.3 Bid sample inspection. Bid sample inspections shall be conducted by agencies as specified in the contract. Samples selection at the manufacturer's option (see 3.2.1).

* 4.3.1 Bid sample examination. Bid sample padlocks shall be examined for defects listed in table I. The presence of any visual defect, any dimensions not within specified requirements, or failure to pass any test shall be cause for rejection of the bid. Bid sample padlocks, after inspection, shall be handled as specified in 3.2.1 unless otherwise specified in the contract. Bid samples shall be preproduction or standard production units from the contractor's current inventory.

4.3.2 Bid sample tests. Bid sample padlocks shall be tested in accordance with 4.6.2.2, table II.

4.4 First article inspection.

* 4.4.1 Sampling for first article. When a first article is required (see 3.2.2 and 6.2.1), 7 sample units shall be provided for inspection. When the requirement for bid samples is waived, 17 units shall be provided for inspection, plus 10 milled, uncut key-blanks. The first article unit(s) shall be the first 100 standard production units or from the contractor's current

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inventory or shall be exactly the same as accepted bid samples set aside for production samples (see 6.3). First article units, after inspection, shall be handled as specified in 3.2.2 unless otherwise specified in the contract.

4.4.2 First article examination. The first article shall be examined as specified in 4.6.1. Presence of one or more defects shall be cause for rejection (see 3.2.2).

4.4.3 First article tests. The first article shall be subjected to the tests as specified in 4.6.2.2, table II. Failure of any test shall be cause for rejection (see 3.2.2).

4.5 Quality conformance inspection

4.5.1 Sampling.

4.5.1.1 For examination. Sampling for examination shall be in accordance with MIL-STD-105, inspection level S-3. Acceptable Quality Level (AQL) shall be 2.5 percent defective for major defects and 4.0 percent for minor defects. The lot shall be units produced at the same plant, by the same process, with same materials, and of the same design, all offered for delivery at one time, not to exceed 5,000 units per lot.

4.5.1.2 For tests. Padlocks shall be randomly selected from the lot submitted for acceptance in accordance with MIL-STD-105, inspection level S-3. Failure of any test shall be cause for rejection.

4.5.2 Examination. Samples selected in accordance with 4.5.1.1 shall be examined for defects as specified in 4.6.1. Presence of any critical defect shall be cause for rejection.

4.5.3 Tests. The padlocks selected in accordance with 4.5.1.2 shall be subjected to the tests specified in column 3 of table II. Tests shall be performed in the order shown.

4.6 Inspection procedure. Prior to examination and tests, padlocks shall be lubricated and, unless otherwise specified herein, all tests shall be conducted at the ambient air temperature at the test site.

4.6.1 Classification of defects. The padlocks with keys, selected as specified, shall be examined for the following defects:

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TABLE I. Classification of defects.

Classification	Defects	Requirement paragraph
Critical		
01	Design of padlock does not permit mating to specified hasps, or exceeds volume or weight limits specified.	3.4
02	Key and keyway design not set aside for DoD use only, or does not have at least 100,000 different key changes.	3.4.1
03	Any prohibited marking on padlock exterior.	3.9.1
Major:		
101	Material not as specified.	3.3
102	Material deterioration control not as specified.	3.3.1
103	Dissimilar metals not plated or insulated to minimize or prevent galvanic corrosion.	3.3.1.1
104	Information to identify material and finish or treatment not available.	3.3.1.2
105	Used, rebuilt, or remanufactured components, pieces, or parts incorporated in padlock.	3.3.2
106	Chain, clevis, rivet, and plate not attached securely, malformed, bent, any part missing.	3.4.2
107	Body of padlock has openings other than as specified.	3.6.1
108	Shackle not of size specified or is capable of being separated from padlock by means other than as specified.	3.6.2
109	Locking mechanism not as specified.	3.6.3
110	Cylinder assembly and removal not as specified.	3.6.3.1 & 3.6.3.1.1
111	Keys not furnished or not furnished as type in quantities specified.	3.6.3.2
112	Key bow shapes not different for operating and control keys.	3.6.3.2.3

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TABLE I. Classification of defects. cont'd

Classification	Defects	Requirement paragraph
113	Key cut depths exceed depths specified.	3.6.3.2.4
114	Keys not stamped with legend against duplication.	3.6.3.2.5
115	Padlock not lubricated as specified.	3.7
116	Color and finish of padlock not as specified.	3.8
117	Workmanship not as specified.	3.11
Minor:		
201	Control key not embossed and stamped as specified.	3.6.3.2.7.1
202	Identification markings omitted from body of padlock.	3.9
203	Instruction not furnished with padlock.	3.10

4.6.2 Tests.

4.6.2.1 Test conditions. Except as otherwise specified herein, tests shall be conducted at prevailing ambient temperatures and humidity in the test facility.

NOTICE

The United States Government neither assumes nor accepts responsibility for any injury or damage to nongovernment personnel or property that may occur during or as a result of any test required by this specification.

* 4.6.2.2 Test schedule. The test schedule shall be as shown in table II, in the order shown.

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Table II. Test schedule.

Bid Samples	First Article	Quality Conformance	Test	Test Paragraph	Requirement Paragraph
1	2	3	4	5	6
			Functional test		
X	X	X	Operating key function.	4.6.3.14	3.6.3.2.6 & 3.6.4.1
X	X	X	Control key function.	4.6.3.15	3.6.3.2.7 & 3.6.3.1.1
X	X	X	Cylinder interchangeability.	4.6.3.16	3.6.3.1.2
			Key tests		
X	X		Key hardness.	4.6.3.12	3.6.3.2.1
X	X		Key deformation resistance.	4.6.3.13	3.6.3.2.2
			Environmental tests		
X	X		Salt spray (fog) resistance.	4.6.3.11	3.5.2.9
			Performance tests		
X	X		Surreptitious neutralization resistance.	4.6.3.1	3.5.1 & 3.6.4
X	X		Wear resistance.	4.6.3.2	3.5.2.1
X	X		Drop resistance, ambient temperature.	4.6.3.3	3.5.2.2
X	X		Drop resistance, after heating.	4.6.3.4 4.6.3.7	3.5.2.3
X	X		Shackle pullout	4.6.3.5	3.5.2.4
X	X		Low temperature shock resistance	4.6.3.6	3.5.2.5
X	X		Forced entry.	4.6.3.7	3.5.2.6
X	X		Heat resistance.	4.6.3.8	3.5.2.7
X	X		Low temperature operation.	4.6.3.9	3.5.2.8
X	X	X	Key integrity.	4.6.3.10	3.5.3

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4.6.3 Test procedures.

4.6.3.1 Surreptitious neutralization test. Subject the locked padlock to surreptitious attempts to open the padlock, without the furnished keys, by the use of devices, equipment and methods such as picking, shimming, bypassing, impressioning, and other methods used by locksmiths to open padlocks without harm to the padlock or clearly visible evidence of attempts to open, for not less than 15 minutes. If the padlock is opened by any of the surreptitious techniques in less than 15 minutes, it shall constitute failure of this test. In addition, if any appurtenance, slide, or cover is rendered insecure, or is removed by surreptitious neutralization, it shall constitute failure of this test (see 3.5.1 and 3.6.4).

4.6.3.2 Wear resistance test. Use the control key to remove and replace the cylinder assembly in the padlock. Place the cylinder plug in the locked position (shackle, bar, or pin in closed position) and withdraw the control key. Use an operating key to subject the padlock to 10,000 complete, consecutive cycles of unlocking and locking. A single cycle shall include the following steps:

a. Insert operating key into keyway and use it to rotate cylinder plug to unlocked position. The bar or pin of the sliding bar or pin type shall move to the open position by the rotation of the cylinder plug to the unlocked position.

b. Pull shackle fully open and reclose shackle.

(1) This step does not apply to the sliding bar or pin type.

c. Rotate cylinder plug with operating key to locked position and pull on shackle to assure it is locked.

(1) For the sliding bar or pin type, the bar or pin shall have been pushed by a cam on the cylinder plug to the locked position by rotation of the cylinder plug to the locked position.

d. Remove the operating key from the keyway.

After the 10,000 cycles are completed, conduct the surreptitious neutralization test specified in 4.6.3.1 on the same padlock used in the wear test. Then, use the control key to remove and replace the cylinder assembly again. If the padlock malfunctions during the 10,000 cycles, fails the surreptitious neutralization test after the 10,000 cycles, or does not permit removal and replacement of the cylinder by use of the control key, any one of these shall constitute failure of this test (see 3.5.2.1).

* 4.6.3.3 Drop test, ambient temperature. The surface on which the padlock shall be dropped, shall be 0.5-inch (12.7 mm) thick steel plate fastened to a portland cement concrete base. The padlock shall be locked. Drop the padlock not less than 10 times from a height of 6 feet (1.8 meter) onto the steel plate. The drops shall be free drops, but manipulated so that the padlock

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strikes the steel surface at least once on each of its six major surfaces (i.e., top, bottom, front, back, and both sides). After the 10 drops, unlock the padlock with the control key and then remove the cylinder. Examine the padlock. Fracture of any component or malfunction of the padlock shall constitute failure of this test (see 3.5.2.2).

* 4.6.3.4 Drop test, high temperature. Support the locked padlock in a hanging position where it can be easily removed without opening the shackle. Insert an iron-constant (Type-J) or a chromel-alumel (Type-K) thermocouple into the keyway. Heat the body of the padlock to a temperature of 1200°F (649°C) with a suitable heating torch. Do not concentrate the heating flame on one location, but use a brushing motion of the flame. When the thermocouple temperature of 1200°F (649°C) is indicated, maintain the temperature for not less than 3 minutes. Then remove the flame and lift the padlock from its support with tongs, within 2 seconds of removing the flame, drop the padlock onto a steel plate, as specified in 4.6.3.3, from a height of 3 feet (0.9 m). Immediately pick the padlock up with the tongs and drop it four more times from the same height onto the same surface. If the padlock shackle opens after any drop, or opens by means other than by using the proper key, this constitutes failure of the test. Perform tests of 4.6.3.7 to determine malfunction or damage from dropping (see 3.5.2.3).

* 4.6.3.5 Shackle pull-out test. Clamp the locked padlock in a device that will bear against the shroud of the body, but not interfere with the shackle. Apply a tension load of 12,000 lbf (5442 kN) at a gradually increasing load (no sudden impact) on the vertical center line of the padlock so that a direct and equal tension is applied to each leg of the shackle. If the shackle pulls out of the padlock, it shall constitute failure of this test (see 3.5.2.4).

* 4.6.3.6 Low temperature shock test. Install and lock the padlock on a MIL-H-43905 hasp or fixture of suitable low temperature resistant metal that simulates the support and access of this hasp. Cold soak the padlock until the temperature is stabilized at not higher than -100°F (-73°C) and attempt to break the padlock by striking the padlock at least six times with a 3 lb (1.36 kg) double faced engineers hammer. Swinging of the hammer shall be performed while grasping the end of the handle with both hands. Striking of the padlock shall be done while the padlock is within 5°F (2.8°C) of -100°F (-73°C). If the padlock opens, shatters, or fails the tests of 4.6.3.1 and 4.6.3.5 after being subjected to striking for 5 minutes or less lapsed time at the low temperature, the padlock has failed the test. The test of 4.6.3.1 and 4.6.3.5 shall be conducted with the padlock at room temperature (approximately 70°F (39°C)) (see 3.5.2.5).

* 4.6.3.7 Forced entry test. A suitable hasp selected from MIL-H-43905 shall be secured to a solid upright post or wall supported heavy plate in a manner capable of surviving the forces of this test. The padlock to be tested shall be locked onto the hasp. Any combination of tools similar, but not limited to the following types, shall be used in an attempt to defeat the padlock. Total weight shall not exceed 20 lbs (9.07 kg).

a. Saws and drills - manual or battery powered.
b. Heating equipment - limited to single tank type - not to exceed 1200°F (649°C).

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c. Hammer: - not to exceed 3 lbs (1.36 kg) weight with 18 inches (0.46 m) long handle.
d. Chisels, punches, jimmys, wrecking bars, and torque levers - limited to 18 inches (.45 m) in collapsed length.
e. Common hand tools.
f. Chemicals - capable of softening or dissolving critical components, explosives excluded.

Defeat of the padlock in less than five minutes accumulated work time (excluding preparation, rest, and safety precaution periods) shall constitute failure of this test (see 3.5.2.3 and 3.5.2.6).

WARNING

These tests may be hazardous due to the characteristics of the tools involved. Proper personnel protection (clothing, eye protection, gloves, etc.) and equipment are necessary.

* 4.6.3.8 Heat resistance test. Suspend a locked padlock by the shackle in an unheated oven. Turn the oven on and bring the oven temperature up to not less than 1875°F (1023°C), but not more than 1925°F (1051°C) and hold the oven at that temperature for not less than 30 minutes. Turn the oven off and allow the padlock to cool to room temperature. After the cooling, restrain the shackle and apply a pull of not less than 50 lbs (23 kg) to the padlock body. If the shackle opens or separates from the padlock, it shall constitute failure of this test (see 3.5.2.7).

4.6.3.9 Low temperature operation test. Cold-soak the padlock at a temperature not higher (warmer) than -60°F (-51°C). While at the temperature, subject the padlock to the operational test specified in 4.6.3.14 (see 3.5.2.8).

4.6.3.10 Key integrity test. The test padlock shall be a locked padlock. The keys from 10 other padlocks selected at random from all the padlocks in the sample shall be used to attempt to unlock the test padlock. A key from each of the 10 padlocks shall be fully inserted into the keyway. The key shall then be slowly withdrawn while applying a jiggling-twisting force in the direction that the lock normally opens. The padlock shall resist the withdrawing and jiggling-twisting force for 1 minute without opening. If the test padlock opens, it shall constitute failure of this test (see 3.5.3).

4.6.3.11 Salt spray (fog) resistance test. The padlock and keys, with keys not inserted in the cylinder plug, shall be subjected to 96 hours of salt spray (fog) in accordance with ASTM B117. After 96 hours, rinse the padlock and keys in the water, and examine for evidence of deterioration of any component. Any evidence of deterioration, except for minor corrosion spots that obviously do not affect the performance of the padlock, shall constitute failure of this test (see 3.5.2.9).

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* 4.6.3.12 Key hardness test. The key blank, made from the same material as operating and control keys, shall be tested for hardness in accordance with ASTM E18. Key material does not have hardness equal to 75 HRB, or better, shall constitute failure of this test (see 3.6.3.2.1).

* 4.6.3.13 Key deformation resistance test. Cut a key blank in the first position next to the key bow to the maximum depth of the deepest bit cut employed in the bitting design. Clamp the key in a vise and attach an 8-inch (203 mm) lever to the key blank bow in such a manner that it will not separate from the bow under the torque load to be applied in this test procedure. Mark the position of the end of the lever opposite the bow on a fixed, immoveable surface. Apply a torque force of not less than 8 lbf·in (0.9 N·m) to key-blank bow for not less than 1 minute. Release the torque load and mark the position of the end of the lever opposite the bow. A mark in the second position, after torque unloading of the key blank bow, that is more than .125 inches (3.18 mm) from the original mark, shall constitute failure of this test (see 3.6.3.2.2).

* 4.6.3.14 Operating key function test. Operate a padlock with its operating key through 10 cycles of the steps specified in 4.6.3.2. The cyclic procedure shall be modified so that each time the padlock is unlocked, an attempt to withdraw the key from the padlock and to rotate the cylinder plug to the control position, shall be effected. Failure of the padlock to unlock, release of the operating key when the padlock is open, rotation of the cylinder plug to the control position, or failure of the padlock to lock shall constitute failure of this test. If the keyway cover or plate does not remain aligned with the keyway or obstructs the insertion of the operating key into the keyway, it shall also constitute failure of this test. This test shall be performed before and after 4.6.3.9 (see 3.4, 3.6.3.2.6, and 3.6.4.1).

* 4.6.3.15 Control key function test. Use the control key to turn the cylinder plug to the unlocked position and then to the control position. If the control key does not turn the the cylinder plug to both unlock and control positions, or cannot be used to remove and reinsert the cylinder assembly, it shall constitute failure of this test (see 3.6.3.1.1 and 3.6.3.2.7).

* 4.6.3.16 Cylinder interchangeability test. Remove the cylinder assembly from one padlock. Use the control keys of other padlocks from the same lot sample to remove their cylinder assemblies and to insert them into the padlock from which the cylinder has been removed. Then operate the padlock through not less than 5 cycles of the steps specified in 4.6.3.2, using the operating key which matches that of the cylinder. If the padlock fails to lock and unlock, using each of the replacement cylinder assemblies and their associated control keys, it shall constitute failure of this test (see 3.6.3.1.2).

4.7 Inspection of packaging.

4.7.1 Quality conformance inspection of pack.

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4.7.1.1 Unit of product. For the purpose of inspection, a completed pack prepared for shipment shall be considered a unit product.

4.7.1.2 Sampling. Sampling for examination of the pack shall be in accordance with MIL-STD-105, level S-3.

* 4.7.1.3 Examination. Samples selected in accordance with 4.7.1.2 shall be examined for defects in accordance with table III. AQL shall be 2.5 percent defective except as noted (see 1/ of table III).

TABLE III. Defects in packaging.

No.	Defect	A	C
119	Advertising and registration forms included in the package.	5.1.1	5.1.1
120	Envelope/bag for keys not printed as specified.	5.1.2.1	5.1.2.1
121	Matching keys and instruction sheets not in unit container with padlock as specified.	5.1.2.1	5.1.3.1
122	Unit container not sealed with reinforced tape as specified.	5.1.2.1	5.1.3.1
123	Sealed bag enclosing the unit container for level A preservation not style 2 (transparent) as specified.	5.1.2.1	
124	Improper quantity of padlocks placed in intermediate container.	5.1.2.2	5.1.3.2
125	Intermediate container not as specified.	5.1.2.2	5.1.3.2
126	Closure of intermediate container not as specified.	5.1.2.2	5.1.3.2
127	Shipping container not as specified.	5.2.1	5.2.2
128	Shipping weights exceed specified limitations.	5.2.1	5.2.2
129	Marking not in accordance with MIL-STD-129.	5.3	5.3
130	Marking not in accordance with the contract or order.	5.3	5.3
131 1/	Item description (name/nomenclature), marked on unit container.	5.3	5.3
132 1/	Unit containers not marked or labeled with special instructions as specified.	5.3.1	5.3.1
133 1/	Unit containers not sealed as specified. They can be opened and resealed without evidence of tampering.	5.1.1	5.1.1

1/ The finding of one or more of defects 131, 132, or 133 shall be cause for rejecting the entire lot

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5. PACKAGING

5.1 Preservation. Preservation shall be level A or C as specified (see 6.2.1).

5.1.1 General. Each padlock, including the specified keys and operating instructions, shall be preserved in an individual container that is sealed in such a manner that it cannot be opened and resealed without obvious indication of tampering. The keys required for one padlock shall be sealed in a paper, plastic envelope, or bag.

SPECIAL NOTE: No advertising or key registration forms shall be included in any bag, envelope, carton, or box.

5.1.2 Level A.

5.1.2.1 Unit container. Each padlock with matching keys (see 3.6.3.2) and operating instruction sheet (see 3.10), shall be preserved in accordance with submethod 1C 2 of MIL-P-116. The snug-fitting carton or box shall comply with PPP-B-566 or shall be the contractor's standard commercial snug fitting carton or box. Closure of the carton or box shall be with reinforced tape. The sealed bag enclosing the carton or box shall be as specified for the submethod, except that the bag shall be style 2.

5.1.2.2 Intermediate container. Ten padlocks, each preserved in the unit container specified in 5.1.2.1, shall be placed in a close-fitting fiberboard box conforming to PPP-B-636, class weather-resistance. Box closure shall be in accordance with method V of the appendix thereto.

5.1.3 Level C.

5.1.3.1 Unit container. Each padlock, with matching keys (see 3.6.3.2) and operating instruction sheet (see 3.10), shall be preserved in a close-fitting fiberboard folding or set-up carton or box, sealed with reinforced tape.

5.1.3.2 Intermediate container. Ten padlocks, each preserved in the unit container specified in 5.1.3.1, shall be placed in a close-fitting fiberboard box conforming to PPP-B-636, class domestic. Box closure shall be in accordance with method I of appendix thereto.

5.2 Packing. Packing shall be level A or level C as specified (see 6.2.1).

5.2.1 Level A. Padlocks, preserved as specified in 5.1, shall be packed in a close-fitting box, conforming to PPP-B-601, overseas type, style optional, or PPP-B-621, class 2, style optional. The gross weight of the box shall not exceed 200 lbs. Box closure and strapping shall be as specified in the applicable box specification or the appendix thereto, except that the strapping shall be flat and its finish shall be A.

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5.2.2 Level C. Padlocks, preserved as specified in 5.1, shall be packed in a close-fitting box conforming to PPP-B-636, class domestic, either single wall or double wall. The quantity per box shall not exceed the applicable weight limitations specified therein and the box closure shall be method I of the appendix thereto.

5.3 Marking. Marking shall be as specified in the contract or order and in accordance with MIL-STD-129 except that the item description (name/nomenclature) shall be omitted from the unit containers.

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 1/4-inch high minimum, color to be red or black, and shall be applied by marking the reinforced sealing tape (see 5.1.2.1 and 5.1.3.1) or by the application of pre-printed labels.

6. NOTES

6.1 Intended use. This specification covers padlocks for general military use with hasps conforming to MIL-H-43905, MIL-H-29181, and drawings listed in 3.4 herein, where a high degree of physical security is required. The degree of security is reduced when the padlock is used without a high security hasp.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Bid samples required and instructions for disposition, if different (see 3.2.1).
c. Key requirements, if different (see 3.2.1 and 3.2.2).
d. When a first article is required for inspection and approval, and the number of units required and instructions for disposition, if different (see 3.2.2 and 4.4.1).
e. Preservation level required (see 5.1).
f. Packing level required (see 5.2).

* 6.2.2 Commercial data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the Contract Data Requirements List (CDRL), incorporated into the contract. When the provisiosn of DOD FAR Supplement, Part 27, Sub-Part 27.410-6 (DD Form 1423) are invoked

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and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification are cited in the following paragraphs:

Paragraph No.	Data requirement title	Applicable DID No.	Option
(a) None	Engineering drawings	DI-E-5325	Maintenance drawings not required.

6.3 First article. When first article testing and approval is required, the first article units shall be selected and tested as specified in 3.2.2 and 4.4. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examination, tests, availability of drawings of hasps required for tests, source(s) to purchase hasps for tests, disposition of bid sample and first article units tested, and approval of the first article.

* 6.4 Subject term (Keyword) listing.

Control Key
Cylinder assembly
Cylinder plug
High security padlock
Key, control
Key, operating
Keyway
Keyway military
Operating key
Padlock
Padlock, high security
Padlock, key operated
Physical security
Physical security devices
Physical security hardware
Shackle shroud
Shackle, shrouded
Shrouded shackle

* 6.5 Changes from previous issue. The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to

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evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:

Army - AR
Navy - YD
Air Force - 99

Review Activities:

Army - GL
DLA - IS

User Activities:

Army - CE
Navy - OS, SH, MC, CG

Preparing Activity:

Navy - YD

(Project 5340-1710)

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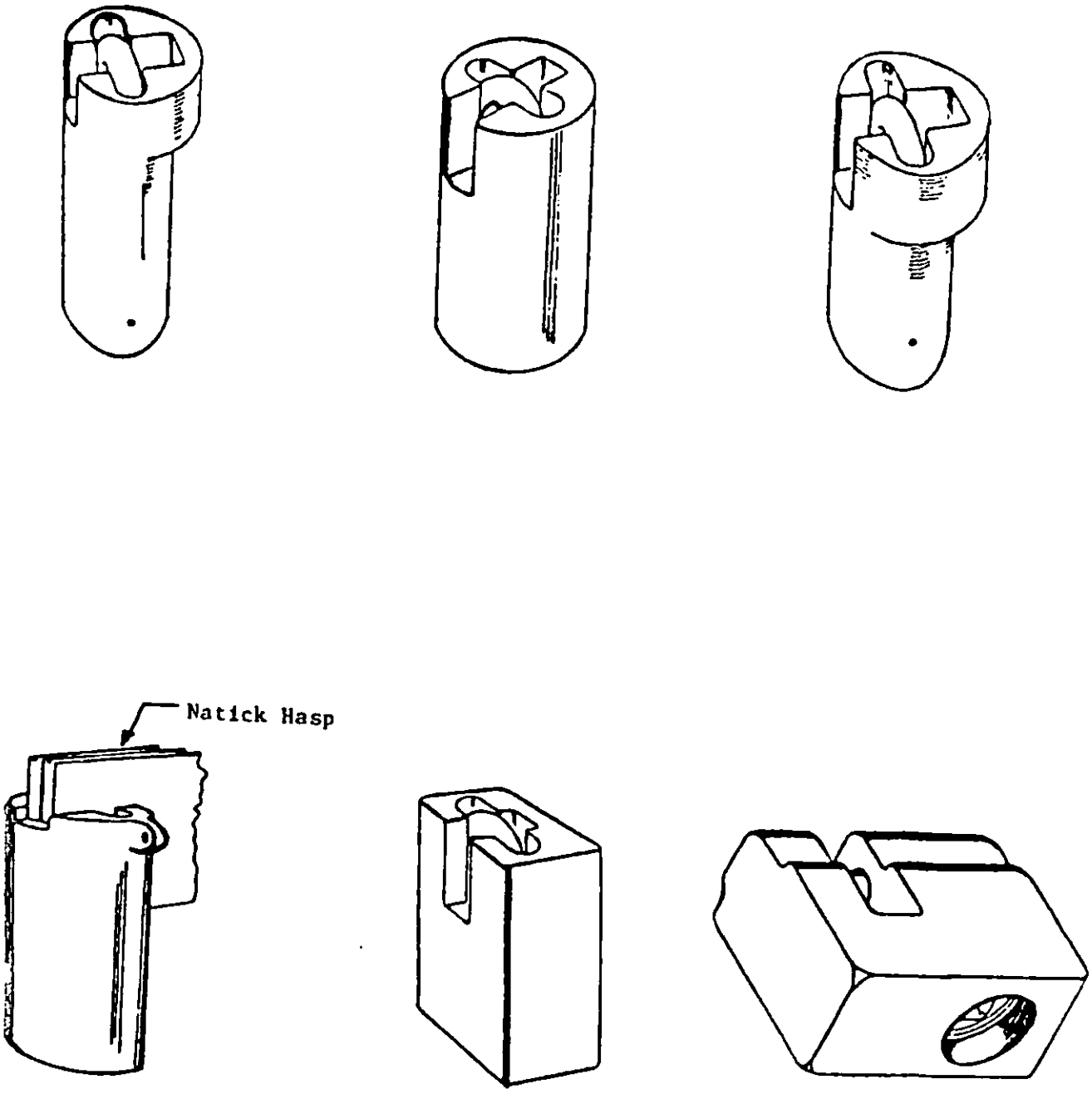

FIGURE 1. Example of padlocks with schrouded shackles.

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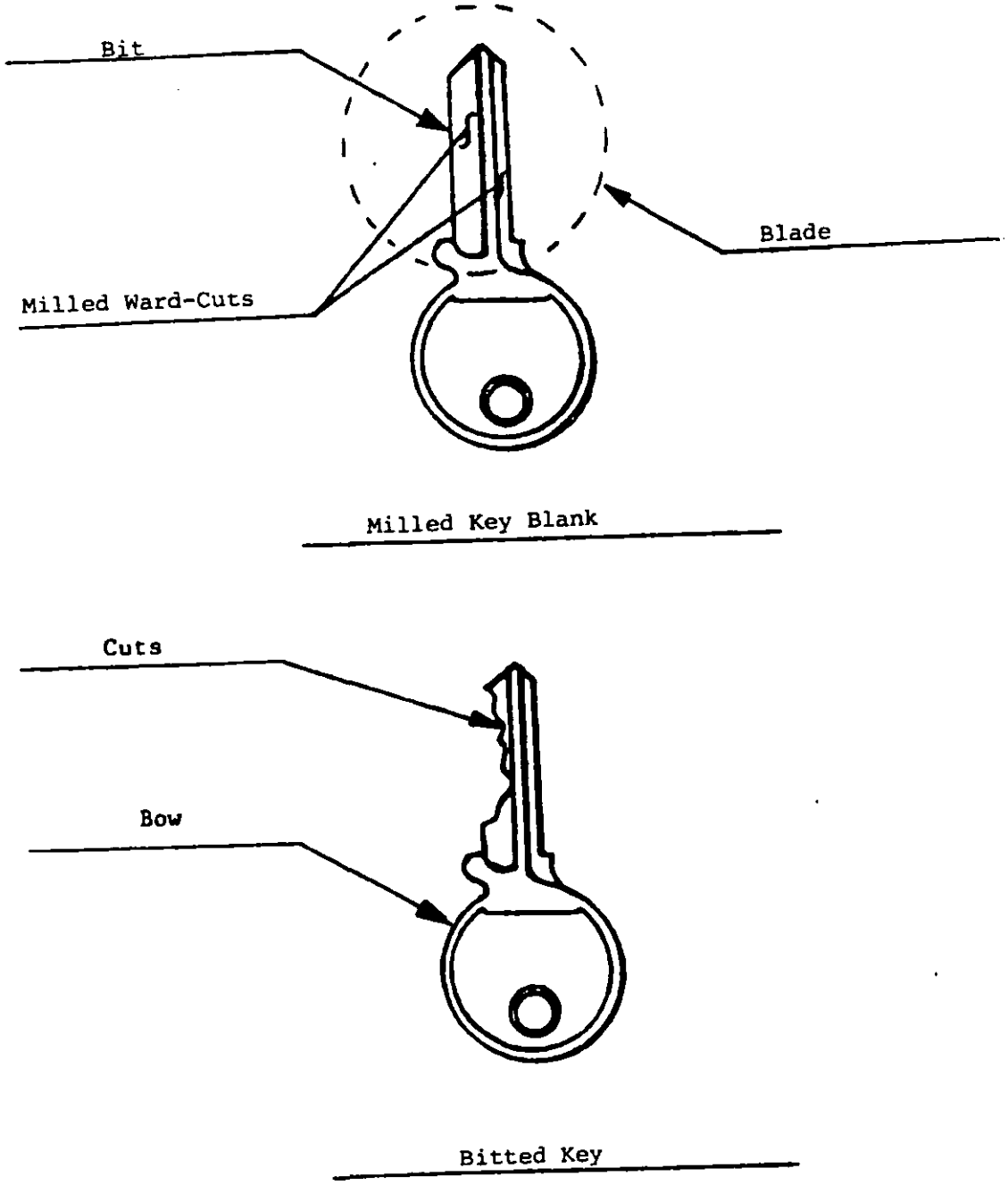

FIGURE 2. Key nomenclature.

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-P-43607G	PADLOCK, KEY OPERATED, HIGH SECURITY, SHROUDED SHACKLE

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)*:

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

DD FORM 1426, 83 MAR PREVIOUS EDITION IS OBSOLETE.

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)

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