

FF-P-101F

May 30, 1984

SUPERSEDING

FF-P-101E

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FEDERAL SPECIFICATION

PADLOCKS

This specification was approved by the Assistant Administrator, Office of Personal Property, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers privacy padlocks of key-operated and combination-operated types, as well as one-time-use locks.

1.2 Classification.

1.2.1 Types, styles, and sizes. Padlocks shall be the following types, styles, and sizes (width), without chain unless specified with chain (see 6.2):

Type EC - Combination mechanism (not key-operated).

Style 1 - Single dial.

Size - 1-3/4 inch.

Style 2 - Multiple disc (4).

Size - 1-3/4 inch.

Type EF - Disc or blade tumbler mechanism, 10 or more disc or blade tumblers.

Size - 1-1/2 inch.

Size - 1-3/4 inch.

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Type EPA - Pin tumbler mechanism, 4 or more pins.
Size - 1-1/8 inch.
Size - 1-1/2 inch.
Size - 1-3/4 inch.

Type EPB - Pin tumbler mechanism, 4 or more pins.
Size - 1-3/4 inch.
Size - 2 inch.

Type EPC - Pin tumbler mechanism, 5 or more pins.
Size - 2 inch.

Type ES - Seal, keyless, one-time-use.
Size - 2 inch.

Type EW - Warded mechanism (key-operated).
Size - 1-1/2 inch.

2. APPLICABLE DOCUMENTS

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

Federal Specifications

- QQ-B-626 - Brass, Leaded and Non-Leaded: Rod, Shapes, Forgings, and Flat Products with Finished Edges (Bar and Strip).
- QQ-C-320 - Chromium Plating (Electrodeposited).
- QQ-C-390 - Copper Alloy Castings (Including Cast Bar).
- QQ-N-290 - Nickel Plating (Electrodeposited).
- QQ-P-416 - Plating, Cadmium (Electrodeposited).
- RR-C-271 - Chains and Attachments, Welded and Weldless.
- TT-L-26 - Lacquer, Cellulose Nitrate, Brushing, Gloss.
- TT-T-266 - Thinner: Dope and Lacquer (Cellulose-Nitrate).
- VV-L-800 - Lubricating Oil, General Purpose, Preservative (Water-Displacing, Low Temperature).
- PPP-B-566 - Boxes, Folding, Paperboard.
- PPP-B-601 - Boxes, Wood, Cleated Plywood.
- PPP-B-636 - Boxes, Shipping, Fiberboard.
- PPP-B-676 - Boxes, Set-up.

Federal Standards

- FED-STD-66 - Steel: Chemical Composition and Hardenability.
- FED-STD-123 - Marking for Shipment (Civil Agencies).

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(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial item descriptions, as outlined under General Information in the Index of Federal Specifications, Standards, and Commercial Item Descriptions. The Index, which includes cumulative bimonthly supplements as issued, 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, other Federal specifications, standards and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston, MA; New York, NY; Philadelphia, PA; Washington, DC; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Denver, CO; Houston, TX; San Francisco, CA; Los Angeles, CA; and Seattle, WA.

(Federal Government activities may obtain copies of Federal specifications, standards, commercial item descriptions, and the Index of Federal Specifications, Standards, and Commercial Item Descriptions, from established distribution points in their agencies.)

Military Specifications

- MIL-P-116 - Preservation, Methods of.
- MIL-M-7866 - Molybdenum Disulfide, Technical, Lubrication Grade.
- MIL-C-17112 - Copper-Nickel-Zinc Alloy (Nickel-Silver): Castings.
- MIL-G-20241 - Gasket Material, Wool Felt, Impregnated, Adhesive, Pressure-Sensitive.
- MIL-L-47117 - Lacquer, Acrylic.
- MIL-S-81733 - Sealing and Coating Compound, Corrosion Inhibitive.

Military Standards

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

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

Federal Regulations

- 41 CFR 1-1.25 - Recovered Materials.

(The Code of Federal Regulations (CFR) is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. When indicated, reprints of certain regulations may be obtained from the Federal agency responsible for issuance thereof.)

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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 date of invitation for bids or request for proposal shall apply.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARDS

- ASTM A 47 - Malleable Iron Castings.
- ASTM A 313 - Chromium-Nickel Stainless and Heat-Resisting Steel Spring Wire.
- ASTM A 380 - Cleaning and Descaling Stainless Steel Parts, Equipment and Systems.
- ASTM A 764 - Steel Wire, Carbon, Drawn Galvanized and Galvanized at Size for Mechanical Springs.
- ASTM B 86 - Zinc Alloy Die Casting.
- ASTM B 159 - Phosphor Bronze Wire.
- ASTM B 282 - Sintered Brass Structural Parts.
- ASTM B 633 - Electrodeposited Coatings of Zinc on Iron and Steel.
- ASTM D 3951 - Standard Practice for Commercial Packaging.
- ASTM E 18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Material.

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

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), before production is commenced, a sample specified padlock covered by this specification shall be submitted or made available to the contracting officer or his authorized representative for approval. The approval of the sample authorizes the commencement of production, but does not relieve the contractor of responsibility for compliance with all applicable provisions of this specification. The sample shall be manufactured in the same facilities to be used for the manufacture of the production padlocks.

3.2 Material. Material shall be as specified herein. Materials not specified shall be selected by the contractor and shall be subject to all provisions of this specification.

3.2.1 Regulatory requirements. The offeror/contractor is encouraged to use recovered materials in accordance with Public Law 94-580 (41 CFR 1-1.25) to the maximum extent practical.

3.2.2 Material deterioration and control. The padlocks 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 environment to which the item may be exposed.

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3.2.2.1 Dissimilar metals. Dissimilar metals, as defined in MIL-STD-889, shall be electrically insulated from one another to minimize or prevent galvanic corrosion. Insulation may be provided by an insulating barrier such as a corrosion inhibiting sealant conforming to MIL-S-81733 or chromate tape conforming to MIL-G-20241. Protection against any galvanic corrosion could also be obtained by exclusion of the electrolyte if feasible.

3.2.2.2 Identification of materials and finishes. The contractor shall identify the specific material, material finish or treatment for use with components and sub-components, and shall make information available, upon request, to the contracting officer or designated representative.

3.2.3 Brass or bronze. Padlock components made from brass or bronze shall conform to QQ-B-626, QQ-C-390, or ASTM B 282.

3.2.4 Malleable iron. The malleable iron castings shall conform to ASTM A 47, grade 35018.

3.2.5 Die castings (zinc alloy). The zinc alloy castings shall conform to ASTM B 86, composition optional.

3.2.6 Steel. The steel used in the manufacture of the padlocks and keys shall be the chemical composition and hardness normally used for the types of padlocks specified.

3.2.7 Wire for padlock springs and retaining rings.

3.2.7.1 Types EPA, EPB, and EPC. Padlock springs shall be phosphor bronze wire conforming to ASTM B 159, copper alloy UNS No. C51000, temper H08 or stainless steel wire conforming to ASTM A 313, UNS 530200, class 1 or UNS 530400.

3.2.7.2 Types EC, EF, and EW. Padlock springs shall be phosphor bronze wire conforming to ASTM B 159, copper alloy No. UNS C 51000, temper H08; stainless steel wire conforming to ASTM A 313, UNS 530200, class 1 or UNS 53400; or zinc, coated carbon steel wire conforming to ASTM A 764, type 2 coating.

3.2.7.3 Type ES. Padlock retaining rings shall be carbon steel conforming to the chemical composition of FED-STD-66, UNS G10600 through G10900 inclusive.

3.2.8 Chain. The chain shall conform to RR-C-271, type II, class 1, class 2, or class 3, except the links of the chain may be welded at the contractor's option.

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3.2.9 Keys.

3.2.9.1 Nickel-silver. Nickel-silver for keys shall conform to MIL-C-17112.

3.2.9.2 Aluminum. Aluminum keys shall be acceptable at the option of the contractor in lieu of nickel-silver for types EPA and EPB pin tumbler padlocks providing the material has a hardness not less than Rockwell B-80.

3.2.10 Lubricant. The working parts of all padlocks, with the exception of type EC and type EF, shall be lubricated with molybdenum disulfide conforming to MIL-M-7866. Type EC and type EF shall be lubricated with molybdenum disulfide conforming to MIL-M-7866 or oil lubricant conforming to VV-L-800.

3.2.11 Lacquer. Brushing lacquer shall conform to TT-L-26 with thinner TT-T-266 or spraying lacquer conforming to MIL-L-47117. All metal surfaces to be painted that are not matte finish shall be brought to this condition prior to application of the lacquer.

3.2.12 Aluminum. Aluminum may be substituted for type EC, style 1, padlock dial assembly and shall be the composition and hardness normally used for commercial padlocks.

3.3 Detail of components.

3.3.1 Keying (see 6.4).

3.3.1.1 Keys. The keys for types EPA, EPB, and EPC padlocks shall be milled and fabricated from material conforming to 3.2.3 or 3.2.9. Unless otherwise specified (see 6.2), the key for all padlocks shall be removable in the unlocked position. Each key operated padlock shall be furnished with two keys. When more than one padlock is specified to be keyed alike, only one key shall be furnished for each such padlock unless otherwise specified (see 6.2). The keys shall be secured to the shackle with a steel wire ring not less than 3/8-inch in diameter. The wire shall be not less than 0.032 inch diameter.

3.3.1.2 Key changes. Each pin-tumbler and disc tumbler padlock in any one contract shall be operated by its own individual key and by no other key fitting the keyway, up to the limit of number of key changes specified herein for its type and size. Padlocks shall be keyed alike, or master-keyed, only when specified (see 6.2).

3.3.1.2.1 Master keying. The master key shall open all padlocks in the master keyed group, but it shall not open any of the padlocks of another master-keyed group. Three master keys shall be furnished with each group of master-keyed locks unless otherwise specified (see 6.2).

3.3.2 Cases.

3.3.2.1 Solid cases. Solid cases shall consist of one piece substantially the full size and shape of the finished case, with openings for inserting the mechanism. Plugs used to close openings in the lock case shall be secured in such a manner as to prevent easy removal.

3.3.2.2 Laminated cases. Laminated cases shall have plates riveted, welded, or brazed so as to be substantially solid.

3.3.2.3 Pressed steel cases. Pressed steel cases shall be two parts and permanently fastened together.

3.3.2.4 Die-cast zinc-alloy cases. Die-cast zinc-alloy cases shall be either solid or two closely-fitting pieces.

3.3.2.5 Reinforced drawn cases. Reinforced cases shall consist of several plates the cross sectional shape of the padlock, housed in the drawn case with a telescoping bottom pressed and clinched together.

3.3.3 Shackles. Unless otherwise specified (see 6.2), shackles shall be the following types: spring extension, pressed firmly, pulled firmly, or retaining ring. All units shall be self-locking and shall lock at both heel and toe.

3.3.3.1 Steel shackles. The shackles shall be fabricated from steel specified in 3.2.6 and unless otherwise specified (see 6.2), shall be case hardened to a depth of not less than 0.005 inch and have a Rockwell hardness of not less than 85 on the Rockwell 15N scale. The design of the shackle and the hardening thereof shall be such as to prevent fracturing when tested as specified in 4.3.1.

3.3.3.2 Brass or bronze shackles. When specified (see 6.2), brass or bronze shackles shall be fabricated from material specified in 3.2.3.

3.3.3.3 Extended shackles. When extended shackles are required for 1-1/2, 1-3/4 and 2 inch padlocks, the inside dimension of the shackle shall be 1-1/2, 2, 2-1/4 or 3-3/4 inch, plus or minus, 1/8 inch as specified (see 6.2).

3.3.4 Lock mechanism. The lock mechanism shall be constructed in such a manner as to withstand the impact test specified in 4.3.1 without showing signs of splitting, fracturing or in any manner affecting the operating of the lock mechanism.

3.3.4.1 Pin tumbler mechanism. Types EPA, EPB and EPC pin-tumbler padlocks shall have brass pin-tumbler mechanisms with pins and rotating plugs in a brass shell inserted in the case. When the case is solid brass the shell is not

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required. Pins and plugs shall be closely fitted to provide not less than the number of key changes specified (see 3.4) for each type and shall be safe from key-interchange and shall be constructed so that it will be impractical to release the locking latch when tested in accordance with 4.3.3.

3.3.4.2 Brass pin-tumbler and brass locking bolt mechanism. Types EPA, EPB, and EPC pin-tumbler padlocks shall have brass pin-tumbler mechanisms and brass locking bolts, with pins and rotating plugs in a brass shell inserted in the case. When the case is solid brass, an inserted shell is not required. Pins and plugs shall be closely fitted to provide not less than the number of key changes specified (see 3.4), for each type and be safe from key-interchanging.

3.3.4.2.1 Key mechanism. Paracentric key and keyway mechanisms shall have longitudinal grooves in the key, mating with ribs in the keyway and not less than one rib on each side of the keyway shall project to or beyond the center line of the keyway. Flat keys shall be milled for plain keyways.

3.3.4.2.2 Locking bolts. Type EPA, EPB, and EPC padlocks shall have brass locking bolts. All other types of padlocks shall have either brass or steel locking bolts.

3.3.4.3 Six pin-tumbler mechanism. When specified (see 6.2), six pin tumblers shall be furnished for type EPB and EPC padlocks.

3.3.4.4 Disc or blade tumbler mechanism. Disc or blade mechanisms shall be as specified in 3.4.2.

3.3.4.5 Interchangeable core mechanism. Padlocks with or without an interchangeable core may be furnished at the contractor's option. The core shall contain the keyway, rotating plug and pin tumbler and may be removable by special masterkeys or by mechanical means through the shackle toe hole when shackle is unlocked.

3.3.4.6 Circular keyway mechanism. When circular keyway is specified (see 6.2) for brass padlocks, either a circular or paracentric keyway may be furnished at the contractor's option. The circular pin-tumbler mechanism shall be in a plug securely fastened in the bottom of the case. Keys shall be steel, nickel plated.

3.3.4.7 Retaining ring locking mechanism. When retaining ring, positive locking, for one-time-use-only is specified (see 6.2), the padlock shall lock and seal when the shackle is firmly pressed or struck with hammer to close.

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3.3.5 Attachments.

3.3.5.1 Chain. The chain, when required (see 6.2), shall be wire link or stamped link in accordance with 3.2.8 and shall conform to requirements of table I. Unless otherwise specified (see 6.2), the chain shall have a minimum length of 9 inches plus one link.

Table I. Chain requirements.

Actual lock size (width of case)	Wire chain, weldless ^{1/} or welded Minimum diameter of wire <u>Inch</u>	Sash chain	
		Minimum thickness of metal <u>Inch</u>	Minimum width of chain <u>Inch</u>
1-1/4 inch and smaller	0.054 (No. 6)	0.021 ^{2/}	3/16 ^{2/}
Over 1-1/4 inch and under 2 inches	0.072 (No. 4)	0.028	1/4
2 inches and larger	0.072 (No. 4)	0.035	5/16

^{1/} Weldless wire chain shall have wire ends secured to side of link.

^{2/} Either sash chain or safety chain (plumber's type) may be furnished on sizes 1-1/4 inch and smaller.

3.3.5.2 Clevis. The chain shall be secured to the padlock with a clevis attached so as not to interfere with operation of lock. The clevis shall be fabricated from material specified in 3.2.4 or 3.2.6 and shall be attached to either case or shackle. When clevis on each end of chain is specified (see 6.2), the free end of chain shall be provided with a stamped metal clevis or round-eye link having two round holes for fastening by screws or rivets. Clevises shall pass through the end of links of the chain.

3.4 Construction. A tolerance not more than 5 percent under the dimension or weight specified herein shall be permitted. (No limitations are specified for oversize and overweight).

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3.4.1 Type EC padlock. Type EC padlocks shall be either single-dial, style 1, or multiple-disc (4), style 2. The padlock shall have a keyless mechanism operated by rotating dial or discs. The padlock case, dial assembly and discs shall be fabricated from material specified in 3.2.3 (brass or bronze), 3.2.5 (die cast zinc alloy), or 3.2.6 (steel), except that aluminum may be substituted in the dial assembly for style 1 (see 3.2.12). The case shall be not less than 0.049 inch thick, except that cold rolled carbon steel cases shall be not less than 0.037 inch thick, and shall be assembled without rivets. The shackle shall conform to 3.3.3 and 3.3.3.1 except that the spring extension feature shall not apply and the lock mechanism shall not permit the shackle to be locked out in the open position. When specified (see 6.2), extended shackles conforming to 3.3.3.3 shall be furnished for style 2. No setting points shall be revealed in operation by tension on shackle or otherwise. Clearance between outer edge of dial and case shall be not more than 0.010 inch. The dial or disc shall be easily turnable. Instructions shall be included which explain the operation of the padlock and shall be marked to indicate the right or left hand direction of turn.

3.4.1.1 Single-dial, style 1. The single-dial, style 1 padlock (see figure 1 and 6.5), shall have a 3-point combination mechanism with not less than 30 nor more than 60 setting points indicated by either colored depressed figures on contrasting dial, or by baked lacquer or enamel figures on smooth dial. Every fifth point shall be identified by a numeral, remaining points may be identified by marks. The lock shall not operate when any individual combination number is varied two full points or more. Dial knobs shall be knurled or have longitudinal serrations. Shackles upon closing, shall throw off combinations, either with or without moving the dial, so as to require complete resetting of combination to reopen. The dimensions shall be as shown on figure 1.

3.4.1.2 Multiple-disc, style 2. The multiple disc, style 2 padlock (see figure 2 and 6.5), shall have a 4-point combination mechanism with four numbered discs operating through bottom of case. The lock shall not operate when any individual combination is varied two full points or more. The lock shall either throw off the combination upon closing or shall not close until the combination setting is thrown off. The padlock shall contain a changeable combination. The dimensions shall be as shown in figure 2.

3.4.2 Type EF, disc or blade tumbler padlock. Types EF padlocks (see figure 3 and 6.5), shall have a solid or laminated unground case without outside pins or rivets and shall be fabricated from material specified in 3.2.3, 3.2.4, 3.2.5, or 3.2.6. The lock mechanism shall be fabricated from material specified in 3.2.3, or 3.2.5, and shall have ten or more disc or blade tumblers giving not less than 1200 key changes. Grooved single or double-bitted keys fabricated from material specified in 3.2.3 shall be furnished. The shackle shall conform to 3.3.3 and 3.3.3.1. Shackles shall lock at both toe and heel by means of a cam and two steel balls or an equivalent means without springs, preventing any effective movement of parts holding the shackle when locked. Weight and minimum dimensions are shown in table II and figure 3 for pin disc or blade tumbler padlocks.

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3.4.3 Type EPA, pin-tumbler padlock. Type EPA padlocks (see figure 3 and 6.5), shall have a solid or laminated case fabricated from material specified in 3.2.6 or a solid case fabricated from material specified in 3.2.4 or 3.2.5. The shackle shall conform to 3.3.3 and 3.3.3.1. When specified (see 6.2), extended shackles conforming to 3.3.3.3 shall be furnished. The lock mechanism shall conform to 3.3.4.1 and 3.3.4.2. The lock shall have a paracentric key and keyway conforming to 3.3.4.2.1. The mechanism shall contain four or more pins giving not less than 1800 key changes for 1-1/2 inch and 1-3/4 inch padlocks, and not less than 750 key changes for 1-1/8 inch padlocks. Weight and minimum dimensions are as shown in table II and figure 3.

3.4.4 Type EPB, pin-tumbler padlock. Type EPB padlocks (see figure 3 and 6.5), shall have a solid or laminated case fabricated from material specified in 3.2.3. The shackle shall conform to 3.3.3.2 and 3.3.3.1. When specified (see 6.2), brass shackles conforming to 3.3.3.2 shall be furnished. When specified (see 6.2), extended shackles conforming to 3.3.3.3 shall be furnished. The lock mechanism shall conform to requirements in 3.3.4.1 and 3.3.4.2. The lock shall have a paracentric or flat key and keyway (see 3.3.4.2.1) or when specified (see 6.2), a circular keyway shall be furnished (see 3.3.4.6). The mechanism shall contain four or more pins unless otherwise specified (see 3.3.4.3 and 6.2), giving not less than 3200 key changes. Weight and minimum dimensions are as shown in table II and figure 3.

3.4.5 Type EPC, pin-tumbler padlock. Type EPC padlocks (see figure 3 and 6.5) shall have a solid or laminated case fabricated from material specified in 3.2.3. The shackle shall conform to 3.3.3 and 3.3.3.1. When specified (see 6.2), brass shackles conforming to 3.3.3.2 shall be furnished. When specified (see 6.2), extended shackles conforming to 3.3.3.3 shall be furnished. The lock mechanism shall conform to 3.3.4.1 and 3.3.4.2. The lock shall have a paracentric key and keyway (see 3.3.4.2.1) or when specified (see 6.2), a circular keyway shall be furnished (see 3.3.4.6). The mechanism shall contain five or more pins unless otherwise specified (see 3.3.4.3 and 6.2), giving not less than 6000 key changes. Weight and minimum dimensions are as shown in table II and figure 3.

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TABLE II. Disc, blade or pin tumbler padlock.

Size W (inches)	Dimensions (inches)					Weight with 2 keys (ounces)
	C	H	R	S	T	
1-1/2 1-3/4		2-3/8 2-1/2	TYPE EF 3/4 3/4	7/32 1/4		5 7-3/4
1-1/8 1-1/2 1-3/4	1-1/16 1-1/8 1-3/8	1-7/8 2-1/8 2-1/2	TYPE EPA 5/8 11/16 13/16	3/16 1/4 5/16	5/8 21/32 13/16	3.3 5 9
1-3/4 2	1-7/16 1-5/8	2-9/16 2-7/8	TYPE EPB 13/16 19/32	5/16 11/32	3/4 3/4	9 10
2	1-5/8	2-7/8	TYPE EPC 29/32	11/32	3/4	11

3.4.6 Type ES, seal, lock, one-time-use (keyless). Type ES padlocks (see figure 4 and 6.5), shall be heavy duty, solid case fabricated from material specified in 3.2.6. The shackle shall conform to 3.3.3.1. The retaining rings shall conform to 3.2.7.3. The plugs shall be securely fastened in the bottom of the case. Weight and minimum dimensions are shown in table III and figure 4. Padlocks shall be opened only with a 3-foot bolt cutter. When specified, (see 6.2), a 7-digit serial number shall be stamped permanently for record purposes.

TABLE III. Type ES padlock.

Size W (inches)	Dimensions (inches)				Weight (ounces)
	C	R	S	T	
2	1-1/4	1-5/16	5/16	1/2	7.3
2	1-1/4	3-3/4	5/16	1/2	8.2

3.4.7 Type EW padlock, warded mechanism. Type EW padlocks (see figure 5 and 6.5), shall be heavy case construction. The padlock shall have a solid or laminated unground case fabricated from material specified in 3.2.6 or a

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solid unground case fabricated from material specified in 3.2.4 or 3.2.5. The shackle shall conform to 3.3.3 and 3.3.3.1. Keys fabricated from material specified in 3.2.6 shall be furnished. In lieu of warded mechanism, the padlocks may be furnished with disc tumbler mechanism having brass discs, die-cast plug, and brass keys conforming to 3.2.3 and 3.2.5. Weight and minimum dimensions, and number of key changes are as shown in table IV and figure 5.

TABLE IV. Type EW padlock.

Size (inches)	Minimum safe key changes	Dimensions (Inches)					Weight without Keys (ounces)
		N	C	H	R	S	
1-1/2	15	1-1/2	1	2	9/16	1/4	5

3.4.8 Operation of key-operated padlock. There shall be no wedging of the key in the keyway or need for excessive pressure to turn the plug and unlock the shackle when tested as specified in 4.3.4.

3.4.9 Resistance to jarring. The padlock shall not be jarred open when jarred forcible against a wood upright as specified in 4.3.5.

3.4.10 Resistance to tension pull. The padlock shall not be pulled open or fracture when subjected to a tension load of 500 pounds. Fracture shall be defined as a crack larger than 0.015 inch long.

3.5 Finish.

3.5.1 Iron and steel. Iron and steel padlock components and attachments excluding keys (see 3.5.3), shall have all surfaces, both interior and exterior, thoroughly and evenly coated with zinc or cadmium. The zinc coat shall conform to ASTM B 633, Fe/Zn 13, type II finish. The cadmium plating shall conform to QQ-P-416, class 1, type II. Corrosion-resisting steel need not have a protective coat but shall be cleaned and descaled in accordance with ASTM A 380. Cadmium or zinc plated steel components that have been heat treated with a hardness of Rockwell C-40 and higher shall be baked within four hours after plating for three hours or more at 375° F, plus or minus 25° F, to remove hydrogen embrittlement. When specified (see 6.2), the chain, shackle, and exterior of the padlock shall have a baked pigment lacquer or japed finish over a phosphate coating. A corrosion resistant, baked enamel finish offered on type EF padlocks as a standard finish is allowable. Protective finish for type ES padlocks shall adhere so that it can be removed by solvent only.

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3.5.2 Brass and zinc alloy die-casting. The exterior of brass and zinc alloy diecasting shall be coated with a clear or colored lacquer conforming to 3.2.11.

3.5.3 Keys. When plated keys are required (see 6.2), they shall be thoroughly cleaned prior to plating and shall be plated after the key has been cut. The plating shall be either nickel, in accordance with QQ-N-290, class 1, grade C, zinc as per ASTM B 633, Fe/Zn 13, type II finish, or chromium plated in accordance with QQ-C-320, class 1 (with an underplate thickness as per QQ-N-290, class 1, grade B) or as specified (see 6.2).

3.6 Marking. Padlocks shall be marked in accordance with the manufacturer's standard commercial practice.

3.6.1 Change numbers. All padlocks with pin-tumbler or disc tumbler mechanisms shall have the change number legibly stamped into the metal of the lock and key, and padlocks with combination mechanisms shall be similarly marked on the case or dial. The change number shall conform to a distinctive noncommercial blind code, unless it is specified that a commercial code will be acceptable (see 6.2). The blind code shall bear no relation to the bitting of the key or setting of the combination, and shall indicate to the contractor that it is a Government padlock. The code number shall provide sufficient information for replacement of the key by the contractor.

3.7 Workmanship. The workmanship of the finished padlocks shall conform to the quality and grade of product established by this specification. There shall be no defects 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 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 Material inspection. The contractor is responsible for insuring that materials used are manufactured, examined, and tested in accordance with referenced specifications and standards, as applicable.

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

- a. First article inspection (see 4.2.1).
- b. Quality conformance inspection (see 4.2.2).
- c. Examination of preparation for delivery (see 4.4).

4.2.1 First article inspection. When a preproduction sample is required, it shall be examined for the defects in table V and the specified dimensions, and shall be tested in accordance with 4.3 as applicable. The presence of any visual defect, any dimension not within specified requirements, or failure to pass any test shall be cause for rejection of the preproduction sample. Preproduction samples, after testing, shall not be returned to the contractor.

4.2.2 Quality conformance inspection. Sampling for inspection shall be in accordance with MIL-STD-105, except where otherwise indicated hereinafter.

4.2.2.1 End item inspection. A lot shall be all of the padlocks of one type, style, and size offered for inspection at one time.

4.2.2.2 Visual inspection. Examination shall be made of the padlocks for the defects listed in table V. The inspection level shall be level II with an Acceptable Quality Level (AQL) of 2.5 percent defective for major defects and 4.0 percent for minor defects.

TABLE V. Classification of defects.

Number	Defect	Requirement paragraph
	<u>MAJOR</u>	
101.	Materials not as specified.	3.2
102.	Materials are not resistant to corrosion and deterioration or treated to be resistant to corrosion and deterioration for the applicable storage and operating environments.	3.2.2
103.	Dissimilar metals as defined in MIL-STD-889 are not effectively insulated from each other.	3.2.2.1
104.	Contractor does not have documentation available for identification of material, material finishes or treatment.	3.2.2.2

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TABLE V. Classification of defects. - Continued

Number	Defect	Requirement paragraph
<u>MAJOR</u>		
105.	Material made from brass or bronze do not conform to QQ-B-626, QQ-C-390, or ASTM B 282.	3.2.3
106.	Malleable iron castings do not conform to ASTM A 47, grade 35018.	3.2.4
107.	Zinc alloy castings do not conform to ASTM B 86.	3.2.5
108.	Steel not the chemical composition and hardness normally used for padlocks.	3.2.6
109.	Wire for the different types of padlocks not as specified.	3.2.7.1, 3.2.7.2, 3.2.7.3
110.	Chain not as specified.	3.2.8
111.	Nickel-silver keys not as specified.	3.2.9.1
112.	Aluminum keys not as specified	3.2.9.2
113.	Lubricant not as specified.	3.2.10
114.	Lacquer not as specified.	3.2.11
115.	Aluminum for padlock dial not as specified.	3.2.12
116.	The different types of keys for each type of lock not as specified.	3.3.1.1, 3.3.1.2, 3.3.1.2.1
117.	The different types of cases for each type of lock not as specified.	3.3.2.1, 3.3.2.2, 3.3.2.3, 3.3.2.4, 3.3.2.5
118.	Type of shackles not of the type specified.	3.3.3
119.	Shackles fabricated from steel not as specified.	3.3.3.1
120.	Shackles fabricated from brass or bronze not as specified.	3.3.3.2
121.	Extended shackles not as specified.	3.3.3.3
122.	Types EDA, EPB and EPC pin-tumbler padlocks do not have brass pin-tumbler mechanisms with pins and rotating plus as specified.	3.3.4.1
123.	Brass pin-tumbler and brass locking bolt mechanism not as specified.	3.3.4.2
124.	Key mechanism not as specified.	3.3.4.2.1

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TABLE V. Classification of defects. - Continued

Number	Defect	Requirement paragraph
<u>MAJOR</u>		
125.	Locking bolts not as specified.	3.3.4.2.2
126.	Six pin-tumbler mechanism, when specified for the type EPB and EPC padlocks, not as specified.	3.3.4.3
127.	Disc or blade tumbler mechanism not as specified.	3.3.4.4
128.	Interchangeable core mechanism missing.	3.3.4.5
129.	Circular keyway mechanism (when specified) missing. Keys not made as specified.	3.3.4.6
130.	Retaining ring locking mechanism (when specified) missing.	3.3.4.7
131.	The chain, when required, not as specified.	3.3.5.1
132.	The clevis not as specified.	3.3.5.2
133.	Plated keys not plated as specified.	3.5.3
<u>MINOR</u>		
201.	All types of markings for the padlocks, not as specified.	3.6, 3.6.1
202.	Workmanship not as specified.	3.7

4.2.2.3 Testing for shackle case hardness depth. When applicable, the depth of hardness shall be determined by a microscopic examination and measurement of a cross-section of the case hardened shackle. A lot shall be all shackles case hardened as a batch. The inspection level shall be S-1 with an AQL of 2.5 percent defective for all defects (see 3.3.3.1). When specified, (see 6.2), a contractor's certificate of compliance may be accepted in lieu of test reports.

4.2.2.4 Dimensional examination. Examination shall be made of the end item for compliance with dimensions specified. Any deviation from specified requirements shall constitute a defect. The inspection level shall be S-2 with an AQL of 2.5 percent defective for all defects.

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4.2.2.5 End item testing. Testing of the completely finished padlock shall be in accordance with 4.3. The inspection level shall be S-2 with an AQL of 2.5 percent defective for all defects. Separate samples shall be taken for 4.3.1 impact test.

4.3 Tests.

4.3.1 Impact. The padlocks shall be dropped from a height of not less than 6 ft. onto a concrete floor. Eight drops shall be conducted on each sample, four with the shackle in the locked position and four with the shackle in the open position. Two drops in the open position and two in the locked position shall be so conducted that the initial impact is directly on the shackle. The remaining drops shall be conducted in proper attitudes to allow various portions of the case to strike the floor first. Nonconformance to 3.3.3.1 and 3.3.4 shall constitute failure of this test.

4.3.2 Hardness. Tests for hardness of the shackles shall be performed in accordance with ASTM E 18 to determine compliance with 3.3.3.1. Three readings on each item shall be taken. Any reading not within limits specified shall constitute failure of this test.

4.3.3 Picking (not applicable to types ES or EW). The inspector shall try to release the locking latch by means such as a screwdriver, fingernail file, ordinary wire, picks, shims and other tools used to open locks, inserted either through the keyway or along the side of the shackle. The padlock shackle shall withstand this test for not less than 40 seconds. Opening any padlock in less than 40 seconds shall constitute failure of this test.

4.3.4 Operational (key operated padlocks). Key operated padlocks shall be tested as follows:

- a. Prior to conducting the test, insert the key into the padlock cylinder 25 times and manually rotate both clockwise and counterclockwise (if possible, otherwise in the direction of opening) after each insertion.
- b. In a test fixture which will horizontally hold the padlock and mechanically operate the key, activate through a cycle consisting of the following:
 1. Fully inserting the key into the keyway.
 2. Rotating the key and cylinder plug the necessary number of degrees to open the padlock either clockwise or counterclockwise.
 3. Returning the key and cylinder plug to the home position.
 4. Retracting the key from the cylinder plug until the key tip no longer touches the front tumbler.
 5. Reengaging the shackle to the locked position.

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- c. Operate for 1,000 cycles at a rate not to exceed 10 cycles per minute to determine conformance to 3.4.8. Failure of any key to open the padlock or failure of the padlock to operate at the conclusion of or during any part of this test shall constitute failure.

4.3.5 Jar test without tension. The shackle, in a locked position, shall be fastened to a solid hard wood upright by means of a staple. The body shall be held loosely with one hand and the padlock shall be struck a substantial blow with a mallet. The mallet shall be hardwood, weigh one pound, and shall be swung from a starting point not less than 18 inches from the padlock. The padlock shall be released immediately before the blow so as to jar the lock forcible against the wood upright. This procedure shall be repeated six times, striking the padlock from six different directions to determine compliance with 3.4.9. Failure of the padlock to remain in a locked position or to be operable after jar test shall constitute failure of this test.

4.3.6 Tension. The body of the padlock shall be held in a U-shaped metal strap bearing against the outer surface of the case with a slot permitting the shackle to pass through and engage in a suitable hook or eye. The slot width shall be approximately equal to the shackle diameter. The required 500 pounds tension shall be applied slowly along the vertical centerline of the padlock so as to put a direct and equal tension in each shank of the shackle to determine compliance with 3.4.10. Failure of the padlock to remain in a locked position shall constitute failure of this test.

4.3.7 Operational (combination locks). The combination locks shall be tested as follows (see 3.4.1.1 and 3.4.1.2):

- a. Using the contractor's instructions for opening the padlock, dial the correct combination.
- b. With the lock closed, move the dial or disc off the opening combination by two digits. Insert the open end of the shackle into the case and attempt to relock. Without additional movement of dial or discs, grasp the case and attempt to pull the shackle open by hand. For style 2, multiple disc padlocks (see 3.4.1.2) four tests shall be run, one on each disc.
- c. (Style 2, multiple disc padlocks only) Repeat procedure a., and then follow the contractor's instructions to change the combination after which repeat b.

Nonconformance to 3.4.1 and 3.4.1.1 or 3.4.1.2 shall constitute failure of this test.

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4.3.8 Cycle (combination locks). Cycle padlocks (for style 2, each disc) in alternate directions for 1,000 cycles at a rate not to exceed 10 cycles per minute, with no more than a 2 second dwell. At the conclusion of the test, the lock must open when the correct combination is dialed. Lubrication shall not be added during this test. Failure of the padlock to operate at the conclusion of or during any part of this test shall constitute failure.

4.4 Inspection of preparation for delivery.

4.4.1 Quality conformance inspection of pack.

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

4.4.1.2 Examination. Each shipping container shall be examined as specified in 4.4.1.3. Sampling shall be in accordance with MIL-STD-105, inspection level S-2. AQL shall be 2.5 percent defective for major defects and 6.5 percent defective for minor defects.

4.4.1.3 Inspection. The shipping container shall be examined for the major and minor defects listed in table VI.

TABLE VI. Classification of packaging defects.

Number	Defect	Requirement paragraph
	<u>MAJOR</u>	
134.	Preservation and packaging for level A or commercial (see 6.2) not as specified.	5.1
135.	Unit packaging for level A not as specified.	5.1.1.1
136.	Intermediate packaging for level A not as specified.	5.1.1.2
137.	Preservation for commercial not as specified.	5.1.2
138.	Packing not level A, level B or commercial as specified (see 6.2).	5.2
139.	Padlocks not packed for level A as specified.	5.2.1
140.	Padlocks not packed for level B as specified.	5.2.2
141.	Padlocks not packed for commercial as specified.	5.2.3

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TABLE VI. Classification of packaging defects. - Continued

Number	Defect	Requirement paragraph
<u>MINOR</u>		
203	Marking for level A or level B not in accordance with MIL-STD-129.	5.3.1
204.	Marking for commercial not in accordance with ASTM D 3951.	5.3.1
205.	Interior packages and shipping container not marked in accordance with Fed Std No. 123.	5.3.2

5 PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall be level A or commercial as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Unit of package. Each padlock, with matching keys or printed sheet containing the combination, and chain if applicable, shall be preserved in accordance with MIL-P-116, method IC-2. The container shall be the supplier's standard commercial box or a close-fitting box conforming to PPP-B-566 or PPP-B-676; variety, type, style and class optional.

5.1.1.2 Intermediate packaging. Padlocks of like description, unit packaged as specified in 5.1.1.1, shall be intermediate packaged together in quantities as specified (see 6.2), in a close-fitting box conforming to PPP-B-636, W6c, style optional.

5.1.2 Commercial. Each padlock, with matching keys or printed sheet containing the combination, and chain if applicable, shall be preserved in accordance with ASTM D 3951.

5.2 Packing. Packing shall be level A, level B or commercial as specified (see 6.2).

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5.2.1 Level A. Padlocks preserved and packaged as specified in 5.1, shall be packed together in quantities as specified (see 6.2), in a close-fitting box conforming to PPP-B-601, overseas type, style optional. Box closure and strapping shall be in accordance with the appendix to the box specification.

5.2.2 Level B. Padlocks, preserved and packaged as specified in 5.1, shall be packed together in quantities as specified (see 6.2), in a close-fitting box conforming to PPP-B-636, V3c, style optional. Box closure and sealing shall be as specified for method V in the appendix to the box specification.

5.2.3 Commercial. Padlocks, preserved and packaged as specified in 5.1, shall be packed in accordance with ASTM D 3951.

5.3 Marking.

5.3.1 Military activities. Marking for level A or level B shall be in accordance with MIL-STD-129. Marking for commercial shall be in accordance with ASTM D 3951; in addition, weight and cube of the pack shall be marked on the shipping container.

5.3.2 Civil agencies. Interior packages and shipping containers shall be marked in accordance with FED-STD-123.

6. NOTES

6.1 Intended use. This specification covers padlocks for general use and where high security is not required.

6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

- a. Title, number, and date of this specification.
- b. Type, style, and size of padlock required (see 1.2.1).
- c. When a first article sample is required (see 3.1).
- d. When keys are not required to be removable in the unlocked position (see 3.3.1.1).
- e. Number of keys required for padlocks keyed alike if other than specified (see 3.3.1.1).
- f. When padlocks shall be keyed alike or master-keyed (see 3.3.1.2).
- g. When number of master keys required is other than specified (see 3.3.1.2.1).
- h. When shackle type shall be other than specified (see 3.3.3).
- i. When steel shackles shall not be case hardened (see 3.3.3.1).
- j. When brass or bronze shackles are required (see 3.3.3.2, 3.4.4, and 3.4.5).

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- k. When extended shackles are required and whether inside dimensions shall be 1-1/2, 2, 2-1/2 or 3-3/4 inches (see 3.3.3.3, 3.4.1, 3.4.3, 3.4.4, and 3.4.5).
- l. When six pin tumblers are required for type EPB and EPC padlocks (see 3.3.4.3, 3.4.4, and 3.4.5).
- m. When circular keyway is required (see 3.3.4.6, 3.4.4, or 3.4.5).
- n. When retaining ring locking mechanism is required (see 3.3.4.7).
- o. When a chain is required (see 3.3.5.1).
- p. When required chain length is other than 9 inches (see 3.3.5.1).
- q. When a clevis on each end of chain is required (see 3.3.5.2).
- r. When a 7-digit serial number is required for type ES (3.4.6).
- s. When baked lacquer or japaned finish is required (see 3.5.1).
- t. When plated keys are required (see 3.5.3).
- u. Type of plating for keys (see 3.5.3).
- v. When change numbers are required on lock or blind code is required (see 3.6.1).
- w. When a certificate of compliance for case hardness depth may be acceptable (see 4.2.2.3).
- x. Degree of preservation and packaging and degree of packing required (see 5.1 and 5.2).
- y. Quantity of padlocks to be intermediate packaged together (see 5.1.1.2).
- z. Quantity of padlocks to be packed together (see 5.2.1 and 5.2.2).

6.3 First article. When a first article is required, it should be a pre-production padlock. First article test approval received on padlocks within one type, style, and size may be offered to the contracting officer as the basic for requesting waiver of first article testing of any padlock by type, style, and size. The contracting officer should include specific instructions in all procurement instruments regarding arrangements for inspection and approval of first article.

6.4 Keying. Padlocks are regularly keyed all different, within the limit of practicable key changes and are regularly furnished with two keys per lock. When so specified, pin tumbler padlocks are keyed alike or master-keyed. Disc tumbler padlocks are keyed all alike when so specified, and to a limited extent may be master-keyed when the construction permits, but ordinarily master keying is not recommended for these locks. Warded locks are keyed all alike when so specified but are not effectively master-keyed since the number of practicable key changes is limited.

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6.5 Information figures. Figures 1 through 5 show types of padlocks which have been found acceptable; however, the figures are included for illustration only and are not intended to preclude the furnishing of other padlocks which conform to this specification.

MILITARY INTERESTS:

Custodians

Army - ME
Air Force - 99

Review activities

Army - AR
Air Force - 82
DLA - IS

User activity

Navy - MC

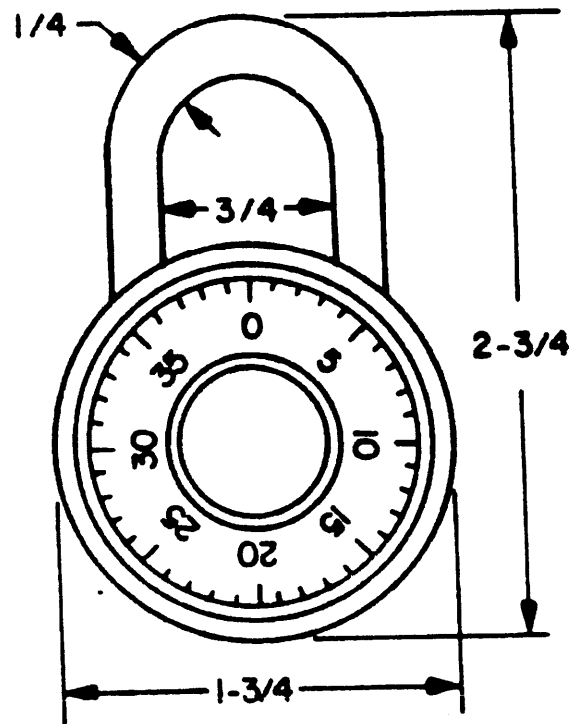
CIVIL AGENCY COORDINATING ACTIVITIES:

DOD - NHT
GSA - FSS, PCD
HEW - FEC

PREPARING ACTIVITY

Army - ME
Project 5340-1438

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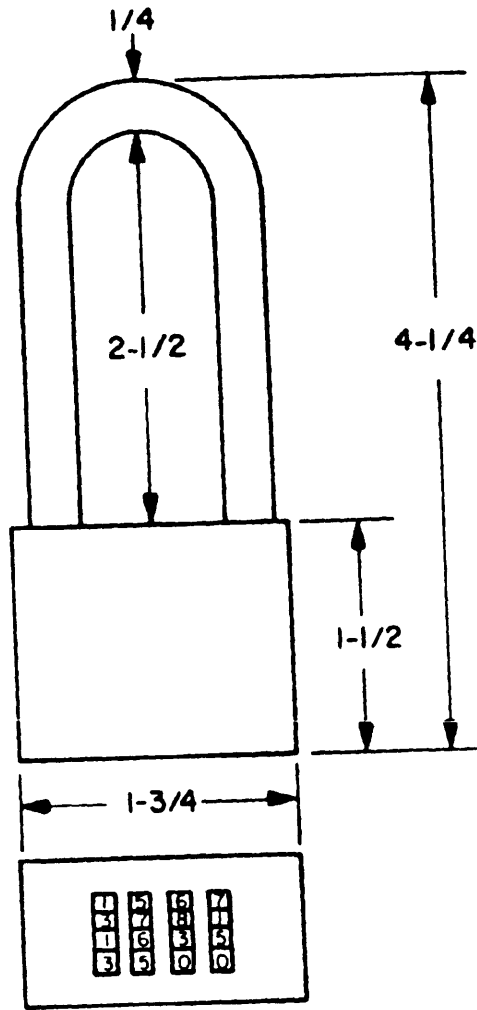


NOTE: ALL DIMENSIONS ARE IN INCHES.

FIGURE 1. Padlock, type EC, style I, minimum dimensions.

X-3792

32-8-10.3



NOTE :
ALL DIMENSIONS ARE IN INCHES.

FIGURE 2. Padlock, type EC, style 2, minimum dimensions.

X-3793

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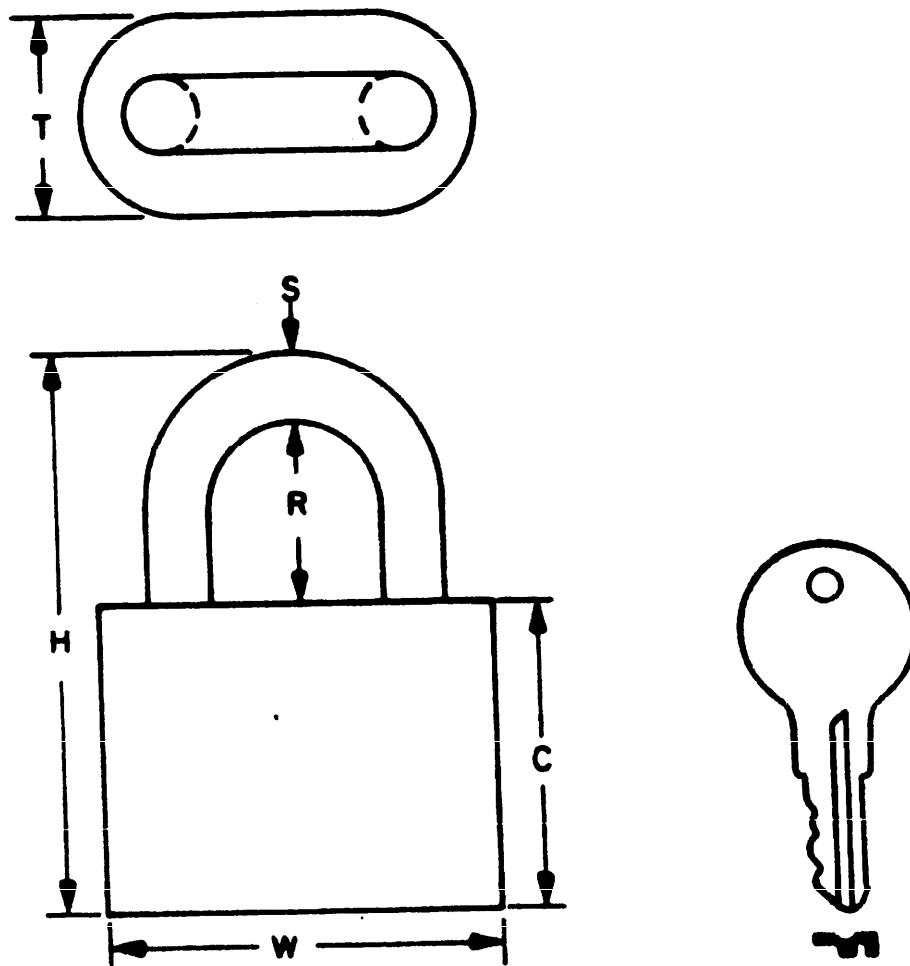


FIGURE 3. Padlock, type EF, EPA, EPB, and EPC pin, disc, or blade tumbler.

X-3794

28-P-10.2

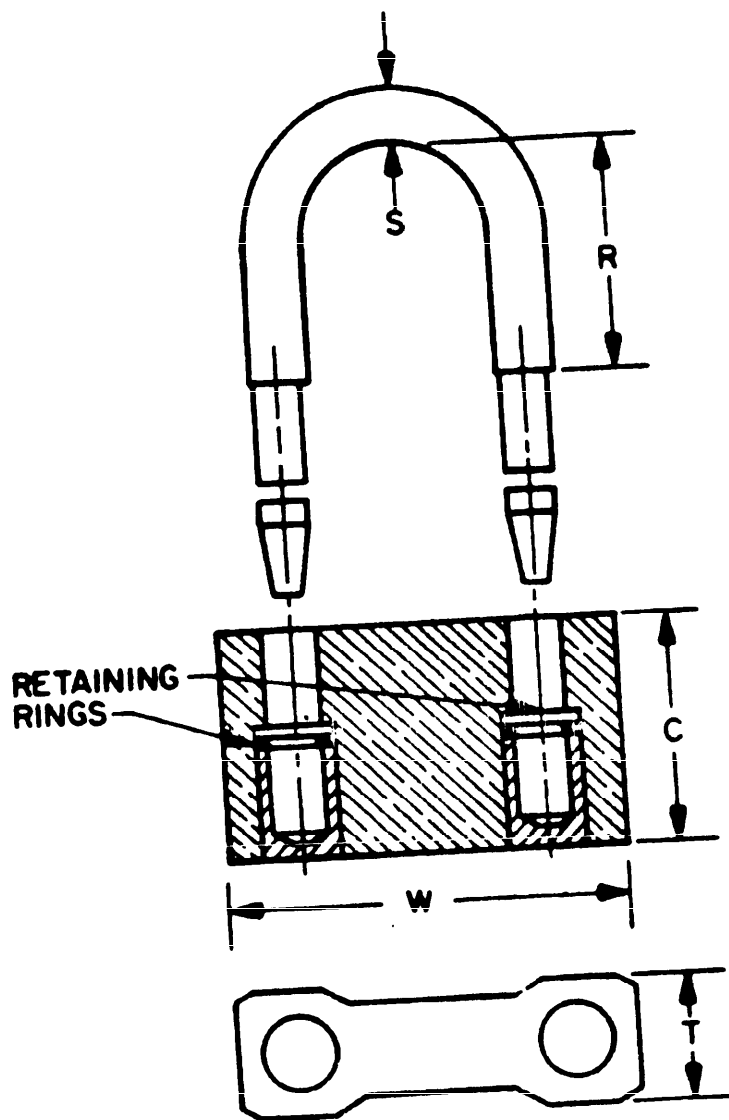


FIGURE 4. Padlock, type ES, seal-lock one time use keyless.

X-3795

FF-P-1017

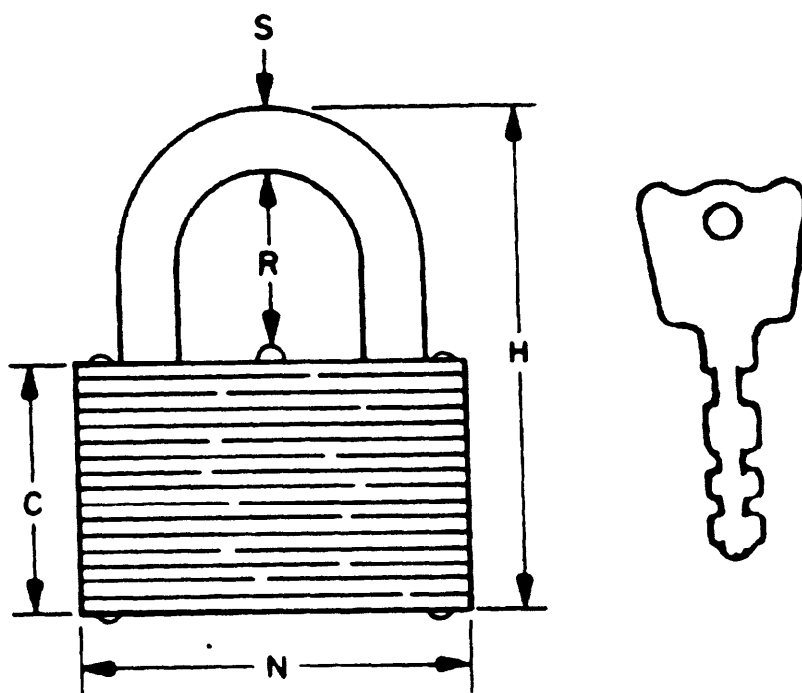


FIGURE 5. Padlock, type EW (laminated case shown).

X-3796