

INCH-POUND

OO-K-220C  
 24 November 2015  
 SUPERSEDING  
 OO-K-220B  
 21 April 1989

## FEDERAL SPECIFICATION

## KEY, MACHINE

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

## 1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers the requirements for machine keys, except woodruff keys (see 6.1).

1.2 Classification. Machine keys covered by this specification shall be classified by either of the following (see 6.2).

1.2.1 Classification I. Machine keys covered by this specification shall be of the following types, styles and grades as specified (see 6.2).

Type I – Gib Head (figure 1).

Type II – Square in cross-section (figure 1).

style 1 – Both ends square

style 2 – Both ends round

style 3 – One end square, other end round

Type III – Rectangular in cross-section, both ends square (figure 1).

## Grades

A – Corrosion – Resistant steel

B – Alloy steel

C – Carbon steel

1.2.2 Classification II. MS part number shall be in accordance with associated MS sheet or NASM standard (see 3.4).

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 and 4 of this specification, whether or not they are listed.

Comments, suggestions, or questions on this document should be addressed to DLA Troop Support - Industrial Hardware Division (ATTN: Code FHTE), 700 Robbins Avenue, Philadelphia, PA 19111-5096 or email [trpsptspecspa@dla.mil](mailto:trpsptspecspa@dla.mil). Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil>.

## OO-K-220C

## 2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

## DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-130	Identification Marking of U.S. Military Property
MS51935	Key Machine, Gib Head

(Copies of these documents are available online at <http://quicksearch.dla.mil/> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

## AMERICAN SOCIETY FOR QUALITY (ASQ)

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

(Copies of this document are available from [www.asq.org](http://www.asq.org) American Society for Quality Control, 600 North Plankinton Avenue, Milwaukee, WI 53203.)

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A108	Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
ASTM A322	Standard Specification for Steel Bars, Alloy, Standard Grades
ASTM A493	Standard Specification for Stainless Steel Wire and Wire Rods for Cold Heading and Cold Forging
ASTM A582/A582M	Standard Test Specification for Bars, Free-Machining, Stainless Steel

(Copies of these documents are available from [www.astm.org](http://www.astm.org) or the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

## NATIONAL AEROSPACE STANDARD (NAS)

NASM1312-6	Fastener Test Methods, Method 6, Hardness
NASM20065	Key, Machine-Rectangular In Cross Section, Both Ends Square
NASM20066	Key, Machine-Square In Cross Section, Both Ends Square
NASM20067	Key, Machine-Square In Cross Section, One End Square, Other End Round
NASM20068	Key, Machine-Square In Cross Section, Both Ends Round

(Copies of this document are available from [www.aia-aerospace.org](http://www.aia-aerospace.org) or the Aerospace Industries Association, 1250 Eye Street, N. W., Suite 1200, Washington DC, 20005-3924.)

OO-K-220C

## SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE AMS2700

Passivation of Corrosion Resistant Steels

(Copies of these documents are available from [www.sae.org](http://www.sae.org) or the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096-0001.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 Materials. Materials for machine keys under this specification shall meet the requirements of 3.1.1 through 3.1.3.

3.1.1 Corrosion-resistant steel. Corrosion-resistant steel machine keys shall be manufactured in accordance with ASTM A493 Type 410 (UNS S41000) or ASTM A582/A582M Type 416 (UNS S41600). The material shall have a minimum shear strength of 75,000 psi (see 3.3).

3.1.2 Alloy steel. Alloy steel machine keys shall be manufactured in accordance with ASTM A322 Grades 1335 (UNS G13350), 4130 (UNS G41300), 5130 (UNS G51300) or 8630 (UNS G86300). The material shall have a minimum shear strength of 90,000 psi (see 3.2).

3.1.3 Carbon Steel. Carbon steel machine keys shall be manufactured in accordance with ASTM A108 Grades 1018 to 1035 (UNS G10180 to G10350) inclusive. The material shall have a minimum shear strength of 60,000 psi.

3.1.4 Recycled, recovered, environmentally preferable, or biobased materials. Recycled, recovered, environmentally preferable, or biobased materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.2 Hardness. Alloy steel machine keys shall have a hardness range of 40-50 HRC.

3.3 Passivation. Corrosion-resistant steel machine keys shall be passivated in accordance with SAE AMS2700.

3.4 Dimensions. Dimensions and tolerances of machine keys shall conform to Table I. Length of machine keys shall be as specified (see 6.2) or as specified on MS51935, NASM20065, NASM20066, NASM20067 and NASM20068.

3.5 Identification Marking. When required (see 6.2) each key shall be marked for identification with the manufacturer's part number and in accordance with MIL-STD-130.

3.6 Edges and corners. All edges and corners shall be rounded to not less than 0.010 nor more than 0.020 inch.

3.7 Workmanship. Machine keys shall be free from surface contamination, tool marks and other imperfections which may adversely affect usability.

TABLE I. Tolerance requirements machine keys in inches.

Type I															
Nominal Size	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1
D-Width:															
Maximum	0.126	0.1885	0.251	0.3135	0.376	0.4385	0.501	0.5635	0.626	0.6885	0.751	0.8135	0.876	0.9385	1.001
Minimum	.125	.1875	.250	.3125	.375	.4375	.500	.5625	.625	.6875	.750	.8125	.875	.9375	1.000
L-Shank Height:															
Maximum	.127	.1895	.252	.3145	.377	.4395	.5025	.565	.6275	.690	.7525	.815	.878	.9405	1.003
Minimum	.125	.1875	.250	.3125	.375	.4375	.500	.5625	.625	.6875	.750	.8125	.875	.9375	1.000
C-Head Height $\pm .0312$	.250	.3125	.4375	.5625	.6875	.7812	.875	1.000	1.0625	1.125	1.250	1.375	1.500	1.625	1.750
E-Edge $\pm .0312$	.1562	.2187	.3437	.4062	.4687	.5312	.625	.6875	.750	.8125	.875	.9375	1.000	1.250	1.1875
G-Length: $\pm 0.010$ key to be tapered .125 inch per foot G angle $+5^\circ$															

Type II, Styles 1, 2 and 3														
Nominal Size	1/16	3/32	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
C														
Maximum	0.0635	0.0948	0.126	0.1885	0.251	0.3135	0.376	0.4385	0.501	0.5635	0.626	0.751	0.876	1.001
Minimum	.0625	.0937	.125	.1875	.250	.3125	.375	.4375	.500	.5625	.625	.750	.875	1.000
A-Length: Style 1 $\pm 0.010$ ; Styles 2 and 3 $+ 0.000 - 0.010$														

Type III			
Nominal Size	7/16 by 5/16	1/2 by 5/16	9/16 by 3/8
C-Height:			
Maximum	0.3135	0.3135	0.3760
Minimum	.3120	.3120	.3745
D-Width:			
Maximum	.4385	.5010	.5635
Minimum	.4370	.4995	.5620
A-Length: $\pm 0.010$			

## OO-K-220C

## 4. VERIFICATION

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

- a. Material inspections (see 4.2)
- b. Conformance inspections (see 4.3)

4.2 Material inspections. Material inspection shall consist of certification supported verifying test data that the materials used in fabrication of machine keys are in accordance with the applicable paragraphs 3.1.1 through 3.1.3.

4.3 Conformance inspection. Conformance inspection shall be as specified in Table II.

TABLE II. Conformance Inspections.

Inspection	Requirement Paragraph	Test Method Paragraph
Dimensions	3.4	4.4.1
Hardness	3.2	4.5.2

4.3.1 Inspection lot. An inspection lot shall consist of completed machine keys covered by this specification, produced under essentially the same conditions and offered for acceptance at one time.

4.3.2 Sampling for visual and dimensional examination. Sampling shall be in accordance with ASQ Z1.4, Inspection Level II.

4.3.3 Sampling for protective finish. Sampling for passivation shall be in accordance with the applicable specification referenced in 3.3.

4.3.4 Inspection of packaging. The sampling and inspection of the preservation, packing and container marking shall be in accordance with the requirements of 5.1.

4.4 Methods of inspection.

4.4.1 Visual and dimensional examination. Samples taken as specified in 4.4.3 shall be thoroughly examined to determine conformance with this specification. Examination shall be conducted in accordance with Table III.

4.5 Test methods.

4.5.1 Protective finish. Corrosion-resistant steel machine keys shall conform to the finish test of SAE AMS2700 as specified in 3.3.

4.5.2 Hardness. Machine keys shall be tested for surface hardness in accordance with NAS1312-6.

## OO-K-220C

TABLE III. Classification of Defects.

Categories	Defects	Inspection Method
Critical	None defined	
Major		
101	Key height	CIE <u>1/</u>
102	Key width	CIE <u>1/</u>
103	Key taper	CIE <u>1/</u>
104	Radius (type II, styles 2 and 3)	CIE <u>1/</u>
Minor		
201	Head height (type I)	CIE <u>1/</u>
202	Head angle (type I)	CIE <u>1/</u>
203	Key length (see 3.4)	CIE <u>1/</u>
204	Marking of keys (see 3.5) when specified	Visual
205	Edges and corners (see 3.6)	CIE <u>1/</u>
206	Workmanship (3.7)	Visual

1/ Commercial Inspection Equipment

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in- house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Machine keys are used to restrict the movement of certain machine members and to retain their position as assembled. The principal application is to secure a rotating member to its shaft.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number and date of this specification.
- b. Type, grades (see 1.2.1).
- c. Protective finish (see 3.3).
- d. Dimensions (Table I).
- e. Applicable MS part number (see 1.2.2).
- f. Packaging requirements (see 5.1).
- g. Identification marking of machine keys when required (see 3.5)

6.3 Subject term (key word) listing.

Gib head  
Rectangular  
Square

OO-K-220C

6.4 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

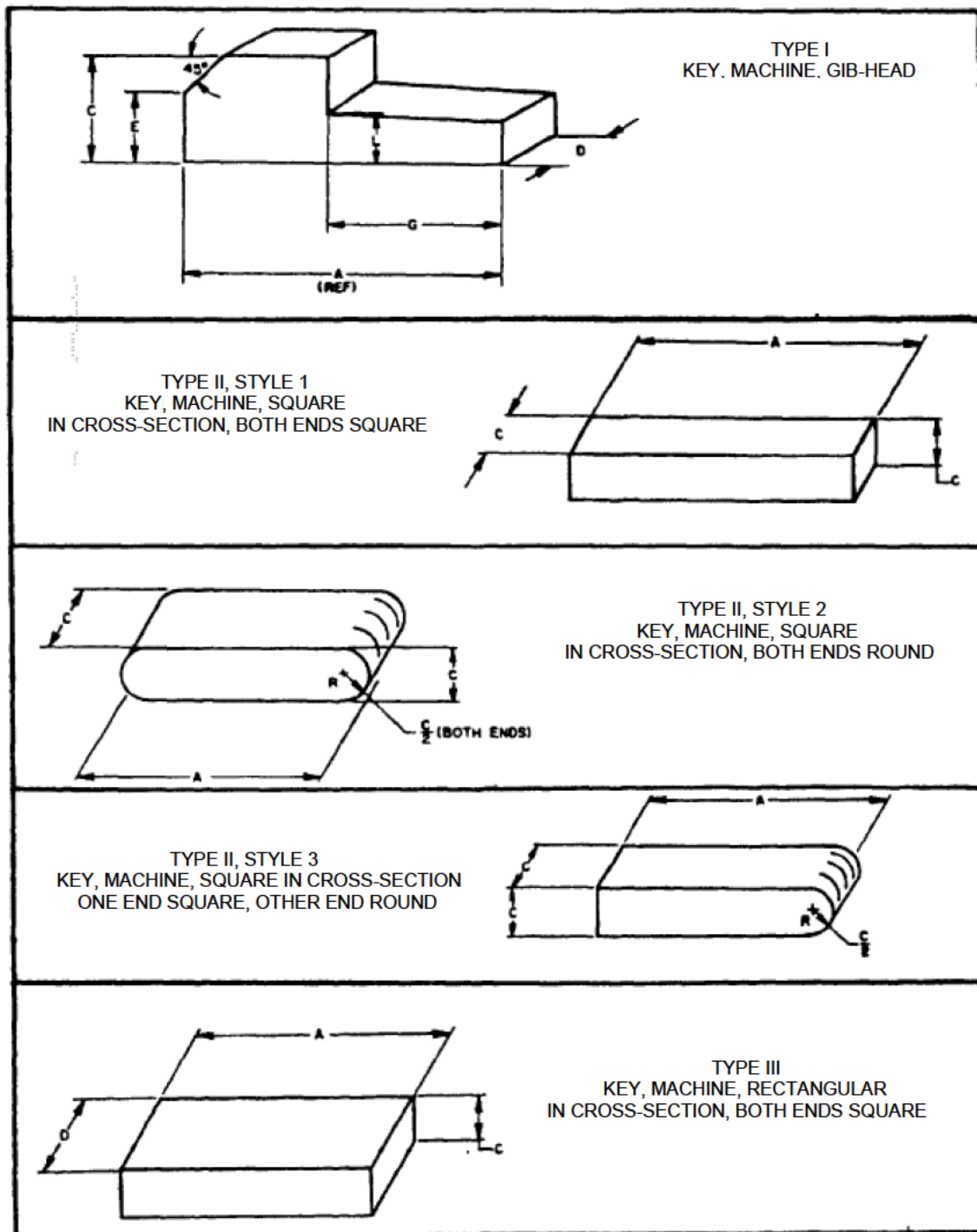


FIGURE 1. Type I – Slotted and Type II – Hexagon, Plain.

OO-K-220C

Custodian:

Army - AR  
Navy - AS  
Air Force - 99  
DLA - IS

Preparing Activity:

DLA - IS

(Project 5315-2015-001)

Review Activity:

Army - AT, AV, CR4, GL  
Navy - MC, SA

NOTE: The activities listed above were interested in this document as of the date of document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.