

OO-K-220B  
21 April 1989  
~~TO SUPERSEDE~~  
OO-K-220A  
September 8, 1988

## FEDERAL SPECIFICATION

### KEY, MACHINE

#### 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 (fig. 1).

Type II - Square in cross-section (fig. 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 (fig. 1).

#### Grades

A - Corrosion - Resistant steel

B - Alloy steel

C - Carbon steel

1.2.2 Classification II. (For Military Procurement (see 6.2). Military part number shall be in accordance with associated Military Standards (Ms's) (see 6.3).

AMSC N/A

FSC 5315

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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## 2. APPLICABLE DOCUMENTS

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

### FEDERAL SPECIFICATION

QQ-P-35 - Passivation treatments for corrosion-resisting steel  
PPP-H-1581-Hardware (fasteners and related items), packing of

### FEDERAL STANDARDS

FED-STD-123 - Marking for shipment (Civil Agencies)

(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 and other Federal specifications 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; Houston, TX; Denver, CO; San Fransico, CA; Los Angeles, CA; and Seattle, WA.)

(Federal Government activities may obtain copies of Federal standardization documents and the Index of Federal Specifications, Standards and Commercial Item Descriptions from established distribution points in their agencies)

### MILITARY STANDARDS

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes  
MIL-STD-129 - Marking for Shipment and Storage  
MIL-STD-130 - Identification Marking of U.S. Military Property  
MIL-STD-1312 - Fastener Test Methods

(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.)

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.

#### ASTM

- ASTM A108 - Steel Bar, Carbon, Cold Finished, Standard Quality
- ASTM A322 - Steel Bars, Alloy, Standard Grades
- ASTM A493 - Stainless and Heat-Resisting Steel for Cold Heading and Cold Forging-Bar and Wire
- ASTM A582 - Free-Machining Stainless and Heat-Resisting Steel Bars, Hot-Rolled or Cold Finished

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

### 3. REQUIREMENTS

3.1 Material. Materials for machine keys under this specification shall meet the requirements of 3.1.1 thru 3.1.3. The offeror/contractor is encouraged to use recovered materials in accordance with PUBLIC LAW 94 - 580 to the maximum extent practicable.

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 Type 416 (UNS S41600). The material shall have a minimum shear strength of 75,000 p.s.i. (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 minimum shear strength of 90,000 p.s.i. (see 3.2).

3.1.3 Carbon steel. Carbon steel machine key shall be manufactured in accordance with ASTM A108 grades 1018 to 1035 (UNS G10180 to UNS G10350) inclusive. The material shall have a minimum shear strength of 60,000 p.s.i.

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 QQ-P-35.

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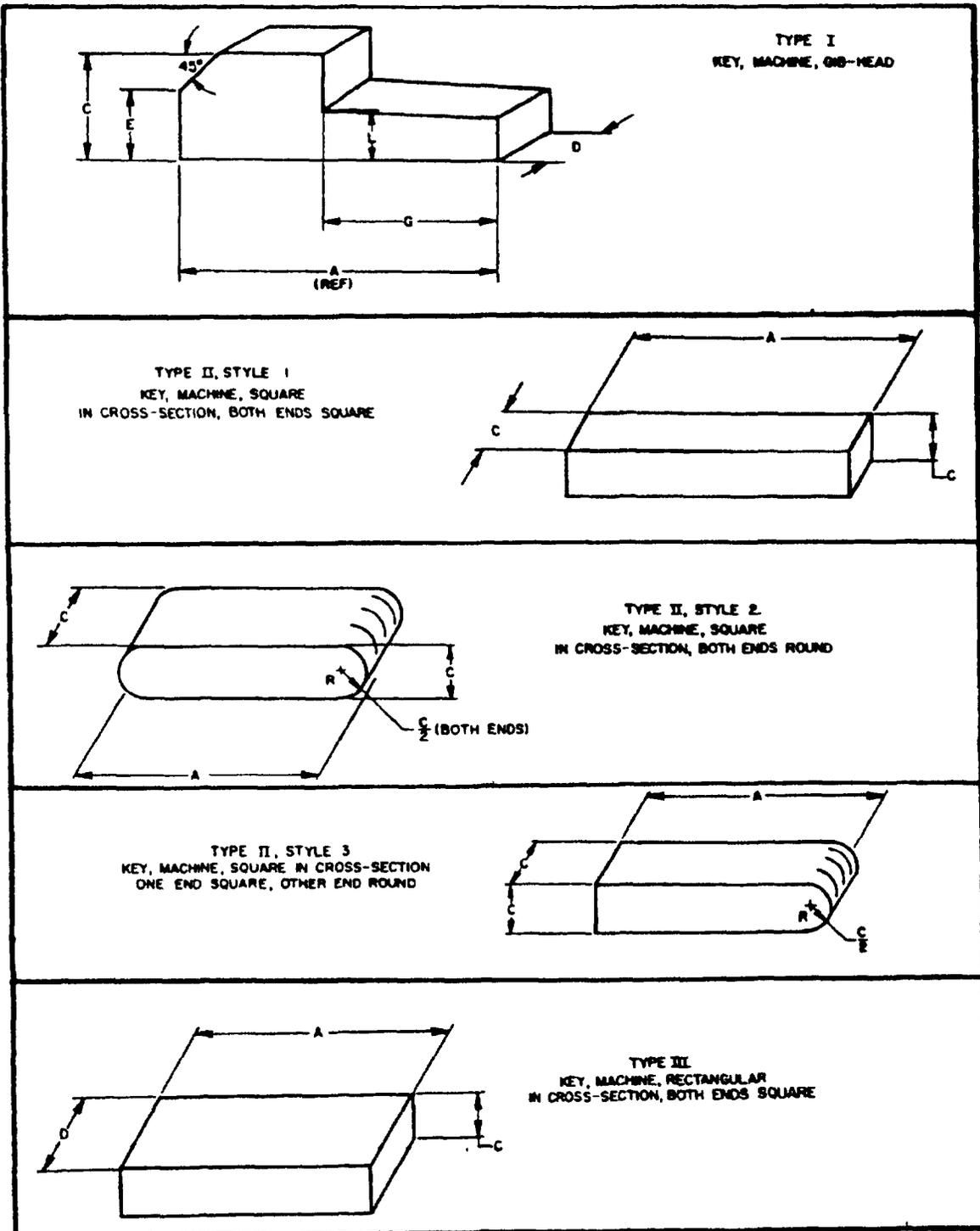


TABLE I. Tolerance requirements for machine keys in inches

Nominal size	Type I														
	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 Minimum	0.126 .125	0.1885 .1875	0.251 .250	0.3135 .3125	0.376 .375	0.4385 .4375	0.501 .500	0.5635 .5625	0.626 .625	0.6885 .6875	0.751 .750	0.8135 .8125	0.876 .875	0.9385 .9375	1.001 1.000
L-Shank height: Maximum Minimum	.127 .125	.1895 .1875	.252 .250	.3145 .3125	.377 .375	.4395 .4375	.5025 .500	.565 .5625	.6275 .625	.690 .6875	.7525 .750	.815 .8125	.878 .875	.9405 .9375	1.003 1.000
C-Head Height $\pm 1/32$	1/4	5/16	7/16	9/16	11/16	25/32	7/8	1	1-1/16	1-1/8	1-1/4	1-3/8	1-1/2	1-5/8	1-3/4
E-Edge $\pm 1/32$	5/32	7/32	11/32	13/32	15/32	17/32	5/8	11/16	3/4	13/16	7/8	15/16	1	1-1/4	1-3/16

G-Length:  $\pm 0.010$  key to be tapered 1/8 inch per foot G angle  $\pm 5^\circ$

Type II, styles 1, 2, and 3

Nominal size	Type II, styles 1, 2, and 3													
	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  $\pm 0.000 - 0.010$

Type III

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

A-Length:  $\pm 0.010$

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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 MS documents.

3.4 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.

#### 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 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.

4.2 Classification of examinations and tests. The inspections specified herein are classified as follow:

- a. Material inspections (see 4.3)
- b. Quality conformance inspections (see 4.4)

4.3 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.

4.4 Quality conformance inspection. Quality conformance inspection shall be as specified in Table II.

TABLE II. Quality Conformance Inspections

Inspection	Requirement Paragraph	Test Method Paragraph
Dimensions	3.4	4.5.1
Hardness	3.2	4.6.2

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

4.4.2 Rejected lots. If an inspection lot is rejected, the contractor may rework it to correct the defeats, or screen out the defective units, and resubmit for reinspection. Resubmitted lots shall be inspected using tightened inspection. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

4.4.3 Sampling for visual and dimensional examination. Sampling shall be in accordance with Inspection Level II or MIL-STD-105 with an Acceptance Quality Level (AQL) of 2.5 percent defective for major defects. Minor defects shall be in accordance with Inspection Level II of MIL-STD-105 with an AQL of 6.5 percent defective.

4.4.4 Sampling for protective finish. Sampling for passivation shall be in accordance with the applicable specifications referenced in 3.3.

4.4.5 Inspection of packaging. The sampling and inspection of the preservation - packaging, packing and container marking shall be accordance with PPP-H-1581

#### 4.5 Methods of inspection.

4.5.1 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 II.

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TABLE II. Classification of Defects

CATEGORY	DEFECT	INSPECTION METHOD
CRITICAL	NONE DEFINED	
MAJOR	AQL = 2.5 Percent	
101	Key height	CIE 1/
102	Key width	CIE 1/
103	Key taper	CIE 1/
104	Radius (type II, styles 2 and 3)	CIE 1/
MINOR	AQL = 6.5 Percent	
201	Head height (type I)	CIE 1/
202	Head angle (type I)	CIE 1/
203	Key length (see 3.4)	CIE 1/
204	Marking of keys (see 3.5) when specified	Visual
205	Edges and corners (see 3.6)	CIE 1/
206	Workmanship (see 3.7)	Visual

1/ COMMERCIAL INSPECTION EQUIPMENT.

#### 4.6 Test methods.

4.6.1 Protective finish. Corrosion-resistant steel machine keys shall conform to the finish test of QQ-P-35 as specified in 3.3.

4.6.2 Hardness. Machine keys shall be tested for surface hardness in accordance with MIL-STD-1312, test method 6.

#### 5. PACKAGING.

5.1 Packaging requirements. Packaging requirements shall be in accordance with PPP-H-1581.

5.2 Marking. In addition to any special marking required by the contract or purchase order, interior packages and shipping containers shall be marked in accordance with FED-STD-No 123 or MIL-STD-129 as applicable.

#### 6. NOTES

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 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, grades (1.2.1)
- (c) Protective finish (3.3)
- (d) Dimensions (table I)
- (e) Applicable MS part number (1.2.2)
- (f) Applicable levels of packaging (5.1)
- (g) Identification marking of machine keys when required (3.4).

6.3 Military procurement. Items procured under this specification for military use are to be limited to the variety shown on the applicable military standard as specified below:

#### MILITARY STANDARDS

- MS20065 - Key, Machine-Rectangular in cross section, both ends square
- MS20066 - Key, Machine-Square in cross section, both ends square
- MS20067 - Key, Machine-Square in cross section, one end square, other end round
- MS20068 - Key, Machine-Square in cross section, both ends round
- MS51935 - Key, Machine-Gib head

6.4 Subject term (key word) listing. Key, Machine, Square, Rectangular, Gibhead.

#### MILITARY INTERESTS:

##### Custodians:

Army - AR  
Navy - AS  
Air Force - 99

Civil Agency Coordinating Activity  
GSA - FSS

Preparing Activity:  
Army - AR

##### Review Activities:

Army - ME  
Navy - SA  
NSA - NS  
DLA - IS

Agent:  
DLA - IS

DoD Project 5315-0436

##### User Activities:

Army - AT, AV, GL  
Navy - MC



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