

INCH-POUND

MIL-K-27545B

23 JUNE 1989

SUPERSEDING

MIL-K-27545A

23 MAY 1966

## MILITARY SPECIFICATION

## KEY, WOODRUFF, ALLOY STEEL

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

## 1. SCOPE.

1.1. Scope. This specification covers requirements for alloy steel woodruff keys.

1.2. Classification. The keys shall be of the following types:

- Type I - Full length key
- Type II - Flat end key

## 2. APPLICABLE DOCUMENTS

2.1. Government documents.

2.1.1. Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

## SPECIFICATIONS

## FEDERAL

PPP-R-1581 - Hardware (Fasteners and Related Items), Packaging of

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to Commander, US Army Armament Research, Development and Engineering Center, ATTN: SMCAR-BAC-S, Picatinny Arsenal, NJ 07806-5000 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 5315

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

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MILITARY

MIL-H-6875 - Heat Treatment of Steels (Aircraft Practice) Process for

STANDARDS

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
- MIL-STD-1312 - Fasteners, Test Methods
- MS35756 - Keys, Woodruff - Steel, Alloy with Keyway and Key Slot dimensions.

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

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

ASTM

ASTM A29 - Steel Bars, Carbon and Alloy, Hot Wrought and Cold Finished, General Requirements for.

(Application for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103.)

Society of Automotive Engineers (SAE)

- SAE J502 - Woodruff Keys
- SAE J503 - Woodruff Key Slots and Keyways

(Application for copies should be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.)

(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. Specification sheets/Military standards. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet or Military standard. In the event of any conflict between the requirements of this specification and the specification sheet or Military standard, the latter shall govern.

3.2. Material. Keys shall be manufactured from Alloy steel, Grades 4130 (UNS G41300), or 8630 (UNS G86300) as specified in ASTM A29.

3.3. Dimensions. Dimensions and tolerances for keys shall be in accordance with the specification sheet, Military standard (see 3.1) or SAE J502, SAE J503 as applicable.

3.4. Hardness. Keys shall have a hardness of 40-50HRC (see 4.3.2).

3.5. Workmanship. The workmanship shall be uniform in quality and free of irregularities or detrimental defects. The surfaces shall not contain any foreign matter. Edges and corners, as applicable shall be broken or rounded.

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

4.2. Quality conformance inspection. Quality conformance inspection shall be as specified in Table I. Each key that does not pass any of the tests specified shall be defective.

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TABLE I. QUALITY CONFORMANCE INSPECTION.

INSPECTION	REQUIREMENT PARAGRAPH	TEST METHOD PARAGRAPH
GROUP A DIMENSIONS	3.3	4.3.1
GROUP C HARDNESS	3.4	4.3.2

4.2.1. Inspection lot. An inspection lot shall consist of all keys covered by a single specification sheet or military standard, produced under essentially the same conditions, and offered for inspection at one time.

4.2.2. Sampling for Group A inspection. Sampling for Group A inspection shall be as specified in 4.2.2.1.

4.2.2.1 Sampling for dimensions. Sampling shall be in accordance with MIL-STD-105 Inspection Level II. The Acceptable Quality Level (AQL) shall be as indicated in Table II. The AQL shall apply to each individual defect, not to a group of defects.

TABLE II. CLASSIFICATION OF DEFECTS.

CATEGORY	DEFECT	INSPECTION METHOD
CRITICAL	NONE DEFINED	
Major 101	AQL = 1.5 percent defective dimensions (see 3.3)	CIE <u>1/</u>
Minor 201	AQL = 6.5 percent defective workmanship (see 3.5)	VISUAL

1/ Commercial Inspection Equipment

4.2.3. Sampling for Group C inspection. Sampling shall be in accordance with Level S-2 of MIL-STD-105. The AQL shall be 1.5 percent defective. Group C inspection shall be performed on sample units which have passed Group A inspection.

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4.2.4. Noncompliance. If a sample fails to pass Group C inspection, the manufacturer shall notify the qualifying activity and the cognizant inspection activity of such failure and take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured with essentially the same materials and processes, and which are considered subject to the same failure. Acceptance and shipment of the product shall be discontinued until corrective action, acceptable to the qualifying activity has been taken. After the corrective action has been taken, Group C inspection shall be repeated on additional sample units (all tests and examinations, or the test which the original sample failed, at the option of the qualifying activity). Group A inspection may be reinstated; however, final acceptance and shipment shall be withheld until the Group C inspection has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure shall be furnished to the cognizant inspection activity and the qualifying activity.

4.3. Methods of inspection.

4.3.1. Visual and dimensional examination. Each key taken as specified in 4.2.2.1 shall be examined to verify conformance with this specification. Examination shall be conducted in accordance with Table II.

4.3.2. Hardness. Each sample key taken in accordance with 4.2.3, shall be tested for hardness requirements of 3.4. The test procedure shall be in accordance with MIL-STD-1312, Test No. 6.

4.3.3. Material inspection. Material inspection shall consist of certification supported by verifying data that the materials used in fabricating the keys are in accordance with requirements of 3.2 prior to such fabrication.

5. PACKAGING

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

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## 6. NOTES

6.1. Intended use. Keys are used to restrict the movement of certain machine members and retain their position as assembled. The principal application is to secure a rotating member to its shaft, which should have a greater ultimate shear strength than the key.

6.2. Ordering data.

6.2.1. Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification and applicable specification sheet or applicable Military Standard
- b. Applicable part number(s) as shown on specification sheet or Military standard. (See 3.1).
- c. Level (degree) of protection in accordance with PPP-H-1581 (see 5.1)

6.3. Subject term (key word) listing.

Key  
Key, Woodruff  
Woodruff Key

6.4. Changes from previous issue. Asterisks (or vertical lines) are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

## Custodians:

Army-AR  
Navy-OS  
Air Force-99

## Review Activities:

Army-AV  
DLA-IS

## Preparing Activity:

Army-AR

## Agent:

DLA-IS

(Project 5315-0431)

# STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

*(See Instructions – Reverse Side)*

1. DOCUMENT NUMBER

2. DOCUMENT TITLE

3a. NAME OF SUBMITTING ORGANIZATION

4. TYPE OF ORGANIZATION *(Mark one)* VENDOR USER MANUFACTURER OTHER *(Specify):* \_\_\_\_\_b. ADDRESS *(Street, City, State, ZIP Code)*

## 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)* – Optionalb. WORK TELEPHONE NUMBER *(Include Area Code)* – Optionalc. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional8. DATE OF SUBMISSION *(YYMMDD)*