



## MILITARY SPECIFICATION

PIN, STRAIGHT, HEADED (CLEVIS PIN)  
GENERAL SPECIFICATION FOR, METRIC

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

## 1. SCOPE

1.1 Scope. This specification covers solid, metal, cylindrical, headed straight pins, which are commonly referred to as clevis pins.

## 2. APPLICABLE DOCUMENTS

2.1 Issues of documents. 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.

## SPECIFICATIONS

## FEDERAL

- QQ-P-416 - Plating, Cadmium (Electrodeposited).
- QQ-Z-325 - Zinc Coating, Electrodeposited, Requirements for.
- PPP-H-1581 - Hardware (Fasteners and Related Items), Packaging and Packing for Shipment and Storage of.

## MILITARY

DOD-P-63479/1 - Pin, Straight, Headed (Clevis Pin), Metric.

## STANDARDS

## FEDERAL

FED-STD-66 - Steel: Chemical Composition and Hardenability.

## MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.

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 and Development Command, ATTN: DRDAR-TST-S, Dover, NJ 07801 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

DOD-P-63479

(Copies of specifications, standards, drawings and publications 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 otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)/AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ANSI/ASTM-E18-79 - Standard Test Method for 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.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

### 3. REQUIREMENTS

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

3.2 Materials. Recycled and reclaimed materials (see 3.1) shall be used to the maximum extent practicable.

3.2.1 Carbon steel. Carbon steel clevis pins shall conform to the requirements of steel composition of 1010 or 1111 as specified in FED-STD-66. These steels shall have a minimum ultimate shear strength of 283 MPa.

3.3 Dimensions. Dimensions and tolerances for all types of clevis pins shall conform to the dimensional requirements of the applicable specification sheet and shall apply after protective finishes.

3.4 Performance characteristics. The clevis pins shall meet the following performance requirements when subjected to the applicable test specified in 4.8.

3.4.1 Double shear strength. Carbon steel clevis pins shall be capable of withstanding the minimum double shear strengths specified in table I (see 4.8.2).

Table I. Double shear strength.

Nominal pin dia. (mm)	kN (min)
5	11
6	16
8	28
10	44
12	64
14	87
16	114
20	178

3.5 Finish. The protective finish of the clevis pins when specified in the applicable specification sheet shall be as follows (see 4.8.3).

3.5.1 Cadmium plate. Carbon steel clevis pins shall be cadmium plated in accordance with QQ-P-416, Type II, class 2. Plating thickness shall be 7.6  $\mu\text{m}$  (micrometers).

3.5.2 Zinc coating. Carbon steel clevis pins shall be zinc coated in accordance with QQ-Z-325, Type II, class 3. Coating thickness shall be 5.1  $\mu\text{m}$  (micrometers).

3.6 Hardness.

3.6.1 Carbon steel clevis pins. Carbon steel clevis pins shall be cyanide hardened to 70HR30N minimum to a depth of 0.125 mm (millimeters) minimum (see 4.8.4).

3.7 Workmanship. The workmanship shall be uniform in quality and free of irregularities or detrimental defects. The surfaces shall not contain any foreign matter.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, 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.

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

- a. Material inspection (see 4.4)
- b. Quality conformance inspection (see 4.5)

DOD-P-63479

4.3 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified in 4.8.1 thru 4.8.4.

4.4 Materials inspection. Materials inspection shall consist of certification supported by verifying data that the materials used in fabricating the clevis pins are in accordance with the applicable paragraphs listed in 3.2.

4.5 Quality conformance inspection. Quality conformance inspection shall be as specified in table II. Each clevis pin which does not pass any of the tests specified shall be defective.

4.6 Quality conformance inspection sampling.

4.6.1 Inspection lot. An inspection lot shall consist of all clevis pins covered by a single specification sheet produced under essentially the same conditions, and offered for inspection at any one time.

TABLE II. Quality conformance inspections.

<u>Inspection</u>	<u>Requirement paragraph</u>	<u>Test method paragraph</u>
Dimensions	3.3	4.8.1
Double Shear Strength	3.4.1	4.8.2
Finish	3.5.1, 3.5.2	4.8.3
Hardness	3.6	4.8.4

4.6.2 Sampling for visual and dimensions examination. A random sample of clevis pins shall be taken from each lot in accordance with MIL-STD-105 inspection level II. The acceptable quality level (AQL) shall be as indicated in table III. The AQL shall apply to each individual defect, not to a group of defects.

4.6.3 Sampling for shear test. Sampling of shear test of clevis pins shall be in accordance with level S-1 of MIL-STD-105. The AQL shall be 0.65 percent defective.

4.6.4 Sampling for finish test. Samplings for protective finish test of clevis pins shall be in accordance with the applicable specification referenced in 3.5.1 and 3.5.2.

4.6.5 Sampling for hardness test. Sampling for hardness test of clevis pins shall be in accordance with level S-1 of MIL-STD-105. The AQL shall be 0.65 percent defective.

TABLE III. Classification of defects.

Category	Defect	Inspection method
Major	AQL = 0.65 percent defects	
101	Clevis pin diameter	SIE <u>1/</u>
102	Under head to centerline of drilled hole (length)	SIE
Minor	AQL = 6.5	
201	Head diameter	SIE
202	Head height	SIE
203	Under head to end shank	SIE
204	Overall length	SIE
205	Shank chamfer diameter	SIE
206	Head chamfer length	SIE
207	Hole size	Gage
208	Protective finish missing or incomplete	Visual

1/ SIE - Standard inspection equipment.

4.7 Packaging inspection. The sampling and inspection of the preservation, packaging, packing and container marking shall be in accordance with the requirements of PPP-H-1581.

#### 4.8 Methods of inspection.

4.8.1 Visual and dimensions examination. Each clevis pin taken as specified in 4.6.2 shall be examined to verify conformance with this specification. Examination shall be conducted in accordance with table III.

4.8.2 Double shear strength test. Each clevis pin taken as specified in 4.6.3 shall be tested for double shear strength in accordance with 4.8.2.2.

4.8.2.1 Shear test fixture. The shear test shall be made by means of a suitable fixture which meets the following requirements. The clevis pin shall be placed in a hole that passes through a shear block and a plunger within the block. The maximum clearance between the shearing planes of the block and the plunger shall be 0.125 mm (millimeters). The block and the plunger shall be constructed so that the shear planes are normal to the longitudinal axis of the clevis pin being tested. The block and plunger shall be made of hardened steel or shall have steel inserts with a minimum shearing-surface hardness of Rockwell C65. The clearance or interference between the clevis pin and clevis pin hole of the block and plunger shall be within the following limits:

DOD-P-63479

Clevis pin dia. (nom.) (mm)	Clearance (max.) (mm)	Interference (max.) (mm)
1.5 to 5	.0075	.0050
6 to 10	.0100	.0075
12 to 16	.0125	.0075
20 to 25	.0150	.0100

The clevis pin to be tested shall be assembled to the block and plunger with the two ends of the clevis pin at least one clevis pin diameter away from the shear plane. A load equal to the minimum double shear value specified in table I for the clevis pin size being tested, shall be applied to the plunger. If fracture occurs in the clevis pin under the applied shear load the clevis pin shall be considered defective. Clevis pins too short to be tested in double shear shall be tested by applying the test to two clevis pins simultaneously in single shear.

4.8.2.2 Double shear test method. The clevis pins shall be tested by the double shear method and shall be subjected to the minimum shear force as shown in table I.

4.8.3 Finish test. The carbon steel clevis pins shall conform to the finish test of QQ-P-416 and QQ-Z-325 as specified in 3.5.

4.8.4 Hardness. The clevis pins taken as specified in 4.6.5 shall be subjected to a hardness test to determine conformance to 3.6. The test shall be conducted in accordance with ASTM E-18-79.

## 5. PACKAGING

5.1 Packaging requirements. The requirements for packaging, packing and container marking shall be in accordance with PPP-H-1581 (see 6.2).

## 6. NOTES

6.1 Intended use. Clevis pins are intended for use in equipment for fastening clevises and eyes.

6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number and date of this specification and applicable specification sheet.
- b. Applicable specification sheet part number(s).
- c. Applicable levels of packaging protection (see 5.1).

## 6.3 Definitions.

6.3.1 Metric terms and definitions. Metric terms used in this specification are defined in ASTM E 380, Standard for Metric Practice.

Custodians:

Army - AR  
Air Force - 99

Review activities:

Army - AT, AV  
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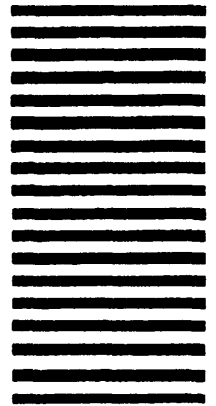
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