

MIL-T-5685C

6 April 1971

SUPERSEDING

MIL-T-5685B

30 January 1959

MILITARY SPECIFICATION

TURNBUCKLES, BARRELS, FORKS, AND EYES

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

1. SCOPE

- * 1.1 This specification covers turnbuckle component parts.

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

Federal

QQ-B-637	Brass, Naval: Rod, Wire, Shapes, Forgings, And Flat Products With Finished Edges Base, Flat Wire, And Strips
QQ-P-416	Plating, Cadmium (Electrodeposited)

Military

MIL-H-3982	Hardware (Fasteners And Related Items), Packaging And Packing For Shipment And Storage Of
MIL-H-6875	Heat Treatment Of Steels (Aircraft Practice), Process For
MIL-T-6945	Tubing, Brass Seamless

STANDARDS

Federal

FED-STD-151	Metals; Test Methods
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Military

MIL-STD-105	Sampling Procedures And Tables For Inspection By Attributes
MIL-STD-130	Identification Marking Of US Military Property

FSC 5340

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Air Force-Navy Aeronautical

AN155	Barrel, Turnbuckle
AN161	Fork-Turnbuckle
AN162	Fork-Turnbuckle, For Bearing
AN165	Eye-Aircraft Turnbuckle, For Pin
AN170	Eye-Aircraft Turnbuckle, For Cable

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

3. REQUIREMENTS

- * 3.1 First article. Unless otherwise specified (see 6.2), before production is commenced, eight complete turnbuckles shall be submitted or made available to the contracting officer or his authorized representative for approval in accordance with 4.2. The approval of the preproduction sample authorizes the commencement of production but does not relieve the supplier of the responsibility for compliance with all applicable provisions of this specification. The preproduction samples shall be manufactured in the same facilities to be used for the manufacture of the production items.
- 3.2 Material. The material used in the manufacture of turnbuckle parts shall be as specified herein.
 - * 3.2.1 Fork and eye turnbuckle ends. Fork and eye turnbuckle ends shall be forked or machined from cold rolled or cold-drawn carbon or alloy steel, of which the sulfur content does not exceed 0.050 percent and the phosphorus content does not exceed 0.040 percent, provided the finished parts conform to applicable requirements of this specification. Ends not fabricated from heat-treated material shall be heat treated in accordance with MIL-H-6875 to conform to this specification and the applicable AN standard.
 - * 3.2.2 Turnbuckle barrel. Turnbuckle barrels shall be made from hard temper brass bar conforming to composition 2 to QQ-B-637 or seamless brass tubing conforming to MIL-T-6945.
 - * 3.2.2.1 Internal strain. Finished brass turnbuckle barrels fabricated by the swaging process shall withstand the test specified in Section 4 without showing surface cracks.
- * 3.3 Construction. Construction of turnbuckles and component parts shall be as specified on AN155, AN161, AN162, AN165, and AN170.
- 3.4 Breaking strength. Breaking strength of turnbuckle assemblies and component parts after plating shall be not less than the values specified on the applicable AN standards.
- * 3.5 Bending. Turnbuckle ends shall not fail or crack during the bend tests specified in 4.3.3.
- * 3.6 Tensile fatigue. Turnbuckle bodies and ends shall be capable of withstanding a load equal to 60 percent of the minimum breaking strength specified on the applicable AN standard, applied repeatedly in tension for 300 applications without failure, deformation, or permanent increase in overall length in excess of 0.001 inch per inch in the direction of the application of load.

- * 3.7 Distortion. The permanent increase in overall length shall not exceed 0.001 inch per inch in the direction of application of load when tested in accordance with 4.3.4.
- * 3.8 Protective treatment. Carbon and alloy steel turnbuckle parts shall be cadmium plated in accordance with type II, class 2 of QQ-P-416.
- * 3.8.1 Stress embrittlement relief. Plated steel parts of Rockwell C-40 hardness and higher shall be baked in accordance with the requirements of QQ-P-416 to eliminate hydrogen embrittlement.
- * 3.9 Dimensions. The turnbuckle parts shall meet such dimensions and tolerances as shown on the applicable AN standard.
- * 3.10 Marking. All turnbuckle parts shall be permanently and legibly marked in accordance with MIL-STD-130 with the manufacturer's name and trademark and the part number as noted on the applicable AN standard.
- * 3.11 Workmanship. All turnbuckle parts shall be uniform in quality and shall be free from pits, scales, burrs, cracks, and other injurious defects which would affect performance. The finished surfaces shall be smooth and free from pronounced tool marks.

4. QUALITY ASSURANCE PROVISIONS

- * 4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier 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 inspection. The inspection requirements specified herein are classified as follows:
 - a. First article inspection (see 4.3).
 - b. Quality conformance inspection (see 4.4).
- * 4.3 First article inspection. First article inspection shall be performed on turnbuckle assemblies representative of the production lot.
- * 4.3.1 First article inspection samples. The contractor shall subject eight turnbuckle assemblies containing the component parts of the type and size to all the applicable tests described under 4.6.
- * 4.4 Quality conformance inspection. The quality conformance inspection shall consist of examinations and tests as specified under 4.5 and 4.6, respectively.
- * 4.4.1 Inspection lot. An inspection lot shall consist of turnbuckle component parts of the same type, size, and material produced under essentially the same manufacturing conditions. The unit of inspection shall be one turnbuckle component part.

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- * 4.4.2 Sampling.
- * 4.4.2.1 Sampling for examination. A random sample shall be chosen from each inspection lot in accordance with MIL-STD-105, inspection level II, acceptable quality level (AQL) of 1.0 percent defective.
- * 4.4.2.2 Sampling for tests. A random sample shall be selected from each inspection lot in accordance with MIL-STD-105, inspection level S-3, acceptable quality level of 1.5 percent defective. Turnbuckle components subject to destruction tests shall not be shipped as part of the order.
- * 4.4.3 Resubmitted inspection lots. MIL-STD-105 shall apply, except that resubmitted lots shall be inspected using tightened inspection. Where the original acceptance number was zero, a sample size represented by the next higher sample size code letter shall be chosen. Before an inspection lot is resubmitted, full particulars concerning the cause of previous rejection and action taken to correct the defect found, shall be furnished by the contractor to the procuring activity.
- * 4.5 Examination of product. Each sample part shall be examined for conformance to the material, design, dimensional, protective treatment, marking, and workmanship as specified and the applicable AN standards.
- 4.6 Test methods.
- * 4.6.1 Internal strain. A finished brass turnbuckle barrel of each size shall be tested in accordance with Method 831 of FFD-STD-151. Turnbuckle barrels subjected to the internal strain test shall be discarded.
- * 4.6.2 Breaking strength. Samples shall be tested for maximum tensile strength in accordance with Method 211 of FED-STD-151 and as otherwise specified herein. Provided the specimens do not fail under the specified maximum load, they shall not be further loaded to destruction.
- 4.6.3 Bending. Each turnbuckle end which meets the breaking strength requirements shall be held in a square-nosed vise and bent through an angle of 90 degrees.
- * 4.6.4 Distortion. A proof load of 60 percent of the minimum allowable breaking strength specified on the applicable drawing, shall be applied to turnbuckle parts for a period of 5 seconds. The load shall then be released and the part checked for distortion.
- * 4.6.5 Stress embrittlement relief. Plated steel parts, which have been baked to relieve hydrogen embrittlement, shall be tested by applying a tensile load, equal to 50 percent of the minimum allowable breaking strength specified on the applicable drawing, to a turnbuckle, in which the part has been assembled, for a period of 24 hours. Parts shall not fracture or develop cracks as a result of this test.
- * 4.7 Inspection of the preservation, packaging, packing and marking for shipment and storage. Sample items or packs and the inspection of the preservation, packaging, packing and marking for shipment and storage shall be in accordance with the requirements of Section 5, or the documents specified therein.

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5. PREPARATION FOR DELIVERY

- * 5.1 Turnbuckles and component parts shall be preserved, packaged, packed and marked in accordance with the requirements of MIL-H-3982, as specified (see 6.2).

6. NOTES

- * 6.1 Intended use. Turnbuckles and component parts are intended for use in cable actuated control systems.
- * 6.2 Ordering data. Procurement documents should specify the following:
 - a. Title, number and date of this specification.
 - b. Name of part.
 - c. Part number.
 - d. First article when required (see 3.1).
 - e. Selection of applicable levels of preservation, packaging and packing required (see 5.1).
- * 6.3 The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:

Army - AV
 Navy - AS
 Air Force - 82

Preparing Activity:
 Air Force - 82

Review Activities:

Army - AV
 Navy - AS
 Air Force - 82

Project No. 5340-0840

SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 22-R255
<p>INSTRUCTIONS: This sheet is to be filled out by personnel, either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments and suggestions submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or serve to amend contractual requirements.</p>		
SPECIFICATION		
ORGANIZATION		
CITY AND STATE	CONTRACT NUMBER	
<p>MATERIAL PROCURED UNDER A</p> <p><input type="checkbox"/> DIRECT GOVERNMENT CONTRACT <input type="checkbox"/> SUBCONTRACT</p>		
<p>1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?</p> <p>A. GIVE PARAGRAPH NUMBER AND WORDING.</p>		
<p>B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES</p>		
2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID		
<p>3. IS THE SPECIFICATION RESTRICTIVE?</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NO (If "yes", in what way?)</p>		
<p>4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)</p>		
SUBMITTED BY (Printed or typed name and activity - Optional)		DATE

DD FORM 1426
1 JAN 65

REPLACES EDITION OF 1 OCT 64 WHICH MAY BE USED.