

MIL-T-20168C  
 4 August 1986  
 SUPERSEDING  
 MIL-T-20168B  
 19 August 1962  
 (See 6.4)

## MILITARY SPECIFICATION

### TUBES, BRASS, SEAMLESS

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

#### 1. SCOPE

1.1 Scope. This specification covers seamless red brass (copper alloy UNS No. C23000) tubes with standard size outside diameters suitable for use with brazed fittings.

#### 2. APPLICABLE DOCUMENTS

##### 2.1 Government documents.

2.1.1 Standards. The following 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.

#### STANDARDS

##### FEDERAL

FED-STD-151 - Metals; Test Methods.

FED-STD-184 - Identification Marking of Aluminum, Magnesium, and Titanium.

##### MILITARY

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

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

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 5523, Department of the Navy, Washington, DC 20362-5101 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 4710

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## MIL-T-20168C

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.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

B 43 - Standard Specification for Seamless Red Brass Pipe, Standard Sizes. (DoD adopted)

E 112 - Standard Methods for Determining Average Grain Size of Metals. (DoD adopted)

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

(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 General. Seamless red brass tubes shall be in accordance with ASTM B 43, with additional requirements as specified herein (see 6.2.1).

3.2 Mechanical properties. When specified (see 6.2.1), the tube shall have a minimum strength of 40 kilopounds per square inch (ksi) and a minimum yield strength at 0.5 percent extension under load of 12 ksi.

3.3 Microstructure. Tubes shall be fully recrystallized with an average grain size not in excess of 0.050 millimeters when determined as specified in 4.4.2.

3.4 Dimensions and weights. The size of tube shall be as specified (see 6.2.1), and shall have the standard dimensions as specified in ASTM B 43.

3.5 Tolerances. Unless otherwise specified (see 6.2.1), tolerances shall be as specified in ASTM B 43.

3.5.1 Roundness tolerance. The roundness tolerance for straight length tubes shall be as specified in table I.

3.5.1.1 The measurement for roundness tolerance shall be made from the outside diameter. The deviation from roundness is measured as the difference between major and minor diameters as determined at any one cross section of the tube. The major and minor diameters are the diameters of two concentric circles just enclosing the outside surface of the tube at the cross section.

## MIL-T-20168C

TABLE I. Roundness tolerance.

Wall thickness to outside diameter ratio	Percentages of nominal outside diameter
0.01 to 0.05 inclusion	6
Over 0.05	3

3.6 Identification marking. When specified (see 6.2.1), identification marking shall be in accordance with FED-STD-184.

#### 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.

4.1.2 Certification of quality conformance. A certificate of quality conformance shall be prepared for each lot of material offered for acceptance (see 6.2.2). The certificate shall include actual data of specified chemical and mechanical tests. Qualitative results of nondestructive tests and other inspections or tests shall be recorded on the certificate. The certificate shall also state that each lot has been sampled, tested, and inspected in accordance with the specification and meets all specification requirements. The certificate shall be signed by a responsible representative of the contractor.

#### 4.2 Sampling.

4.2.1 Lot. A lot shall consist of not more than 5,000 pounds up to 1-1/2 inches, inclusive; 10,000 pounds over 1-1/2 to 4 inches, inclusive; and 40,000 pounds over 4 inches.

4.2.2 Sampling for visual and dimensional examination. From each lot, a representative sample of tubes shall be selected for visual and dimensional examination in accordance with MIL-STD-105, inspection level II, acceptance quality level of 1.5.

## MIL-T-20168C

4.3 Examination.

4.3.1 Visual and dimensional. Each sample tube selected in accordance with 4.2 shall be visually examined and measured to verify conformance with ASTM B 43.

4.3.2 Rejection. Any nonconforming tube in each examination sample shall not be offered for delivery, and if the number of nonconforming tubes in the sample exceeds the acceptance number specified in MIL-STD-105 for that sample, this shall be cause for rejection of the entire lot.

4.4 Tests.

4.4.1 Chemical analysis. Chemical analysis shall be made by the wet chemical method in accordance with method 111 of FED-STD-151, or by the spectrochemical method in accordance with method 112 of FED-STD-151. In case of dispute, the chemical analysis by wet chemical method 111 shall be the basis for acceptance.

4.4.2 Grain size. The surface of the test specimen for grain size determination shall approximate a radial longitudinal section and shall be prepared and examined in accordance with ASTM E 112 for conformance to 3.3.

4.5 Inspection of packaging. Sample packages and 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 and the documents specified therein.

## 5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisition.)

5.1 Packaging, packing and marking. Packaging, packing and marking shall be as specified in the supplementary requirements of ASTM B 43 (see 6.2.1).

## 6. NOTES

6.1 Intended use. Red brass tube is intended for use where material with resistance to corrosion by fresh water, salt air or gases is required.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) If drawn temper required (see 3.1).
- (c) When tensile and yield strengths are required (see 3.2).
- (d) Length of tube and whether specific or mill lengths are required (see 3.4).
- (e) Size required (outside diameter and wall thickness) (see 3.4).
- (f) Where tube of dimensions and tolerances other than those specified in ASTM B 43 are required (see 3.5).

## MIL-T-20168C

- (g) If identification marking 5.3 of supplementary requirements, ASTM B 43 is required (see 3.6).
- (h) Levels of packaging and packing required (see 5.1).

6.2.2 Data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DoD FAR Supplement, Part 27, Sub-Part 27.410-6 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification are cited in the following paragraph.

<u>Paragraph no.</u>	<u>Data requirement title</u>	<u>Applicable DID no.</u>	<u>Option</u>
4.1.2	Certification data/report	UDI-A-23264	---

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5010.12-L., Vol. I, AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

6.2.2.1 The data requirements of 6.2.2 and any task in sections 3, 4, or 5 of this specification required to be performed to meet a data requirement may be waived by the contracting/acquisition activity upon certification by the offeror that identical data were submitted by the offeror and accepted by the Government under a previous contract for identical item acquired to this specification. This does not apply to specific data which may be required for each contract regardless of whether an identical item has been supplied previously (for example, test reports).

6.3 Subject term (key word) listing.

Copper alloy  
Red brass  
Seamless  
Tubes

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

Custodians:

Army - ME  
Navy - SH  
Air Force - 20

Preparing activity:

Navy - SH  
(Project 4710-0840)

Review activities:

Army - MR, MI  
Navy - YD  
Air Force - 99  
DLA - CS

User activity:

Army - AT

**INSTRUCTIONS:** In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (*DO NOT STAPLE*), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

**NOTE:** This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

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DEPARTMENT OF THE NAVY

COMMANDER  
NAVAL SEA SYSTEMS COMMAND (SEA 5523)  
DEPARTMENT OF THE NAVY  
WASHINGTON, DC 20362-5101



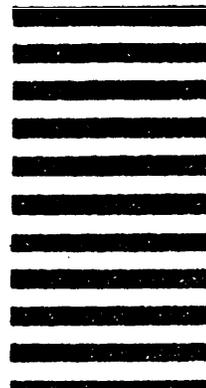
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## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER  
MIL-T-20168C2. DOCUMENT TITLE  
TUBES, BRASS, SEAMLESS

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) - Optional

b. WORK TELEPHONE NUMBER (Include Area Code) - Optional

c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional

8. DATE OF SUBMISSION (YYMMDD)

DD FORM 1476

PREVIOUS EDITION IS OBSOLETE.

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)