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400 Commonwealth Dr., Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 4558E

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Superseding AMS 4558D

BRASS TUBING, SEAMLESS
66.5Cu - 31.5Zn - 1.6Pb
Drawn Temper (H58)

UNS C33200

1. SCOPE:

1.1 Form: This specification covers one type of brass in the form of seamless tubing.

1.2 Application: Primarily for screw machine parts.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2223 - Tolerances, Copper and Copper Alloy Seamless Tubing
MAM 2223 - Tolerances, Metric, Copper and Copper Alloy Seamless Tubing
AMS 2350 - Standards and Test Methods

2.2 ASTM Publications: Available from ASTM, 1916 Race Street, Philadelphia, PA 19103.

ASTM B154 - Mercurous Nitrate Test for Copper and Copper Alloys
ASTM B251 - General Requirements for Wrought Seamless Copper and Copper-Alloy Tube
ASTM B251M - General Requirements for Wrought Seamless Copper and Copper-Alloy Tube (Metric)
ASTM E8 - Tension Testing of Metallic Materials
ASTM E8M - Tension Testing of Metallic Materials (Metric)
ASTM E18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
ASTM E478 - Chemical Analysis of Copper Alloys

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Specifications:

MIL-C-3993 - Copper and Copper-Base Alloy Mill Products, Packaging of

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, Ø determined by wet chemical methods in accordance with ASTM E478, by spectrochemical methods, or by other analytical methods acceptable to purchaser:

	min	max
Copper	65.0	68.0
Lead	1.50	2.50
Iron	--	0.07
Zinc + Sum of Named Elements (3.1.2)	99.6	--
Zinc (3.1.1)	remainder	

3.1.1 Applicable when zinc is not determined by analysis. The reported Ø (certified) value is the difference between the sum of all other specified elements and 100% and will, therefore, include unnamed elements. Limits for unnamed elements may be established by agreement between purchaser and manufacturer.

3.1.2 Applicable only when zinc is determined by direct analysis.

3.2 Condition: Drawn temper, general purpose (H58) (See 8.2). Ø

3.3 Fabrication: Tubing shall be produced by a seamless process. The external and internal surface finishes may be produced by any method which will provide the required surface condition and which will not affect limits of wall thickness or corrosion resistance.

3.4 Properties: Tubing shall conform to the following requirements:

3.4.1 Tensile Strength: Shall be not lower than 54,000 psi (372 MPa), determined in accordance with ASTM E8 or ASTM E8M:

3.4.2 Hardness: Should be as follows, or equivalent, determined in accordance with ASTM E18, but tubing shall not be rejected on the basis of hardness if the tensile strength requirement is met:

Nominal Wall Thickness		Hardness
Inch	Millimetres	min
0.012 to 0.020, incl	0.30 to 0.51, incl	78 HR15T
Over 0.020 to 0.045, incl	Over 0.51 to 1.14, incl	53 HR30T
Over 0.045	Over 1.14	55 HRB

3.4.3 Embrittlement: Specimens of tubing, approximately 6 inches (152 mm) in length, shall withstand, without cracking, immersion in mercurous nitrate solution in accordance with ASTM B154, Procedure A.

3.5 Quality: The tubing, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the tubing.

3.6 Tolerances: Shall conform to AMS 2223 or MAM 2223 as applicable to nonrefractory alloys.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the tubing shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the tubing conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for composition (3.1), tensile strength (3.4.1), hardness (3.4.2), and tolerances (3.6) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Tests to determine conformnce to requirements for embrittlement (3.4.3) are classified as periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling: Shall be in accordance with ASTM B251 or ASTM B251M.

4.4 Reports: The vendor of tubing shall furnish with each shipment a report showing the results of tests for chemical composition, tensile properties, and hardness of each lot and stating that the tubing conforms to the other technical requirements of this specification. This report shall include the purchase order number, lot number, AMS 4558E, size and quantity.

4.5 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the product may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the product represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Identification: Individual tubes or bundles shall have attached a durable tag marked with not less than the purchase order number, AMS 4558E, and nominal size or shall be boxed and the box marked with the same information.

5.2 Packaging:

5.2.1 Tubing shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the product to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.

5.2.2 For direct U.S. Military procurement, packaging shall be in accordance with MIL-C-3993, Level A or Level C, as specified in the request for procurement. Commercial packaging as in 5.2.1 will be acceptable if it meets the requirements of Level C.

6. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS: Tubing not conforming to this specification, or to modifications authorized by purchaser, will be subject to rejection.

8. NOTES:

8.1 Marginal Indicia: The phi (Ø) symbol is used to indicate technical changes from the previous issue of this specification.

8.2 Copper temper designations are defined in ASTM B601.

8.3 Dimensions and properties in inch/pound units are primary; dimensions and properties in SI units are shown as the approximate equivalents of the primary units and are presented only for information.

8.4 For direct U.S. Military procurement, purchase documents should specify not less than the following:

Title, number, and date of this specification
Size of tubing desired
Quantity of tubing desired
Applicable level of packaging (See 5.2.2).