



AEROSPACE MATERIAL SPECIFICATION

AMS4881™**REV. E**

Issued 1976-07
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Revised 2025-06

Superseding AMS4881D

Nickel-Aluminum-Bronze, Martensitic, Sand, Centrifugal and Continuous Castings,
78Cu - 11Al - 5.1Ni - 4.8Fe,
Quench Hardened and Temper Annealed
(Composition similar to UNS C95520)

RATIONALE

AMS4881E results from a Five-Year Review and update of this specification with changes to clarify that casting approval and reapproval actions are to be carried out by the cognizant engineering organization (see 4.2 and 4.4); update wording to prohibit unauthorized exceptions (see 3.8, 4.5.1, and 8.4); relocate Definitions (see 2.3); update Applicable Documents (see Section 2), Composition (see 3.1), Casting (3.3), Hardness (3.6.2), and Ordering Information (see 8.5); add default requirement for inspection (see 3.7.3); and allow the use of the immediate prior specification revision (see 8.3).

1. SCOPE

1.1 Form

This specification covers a nickel-aluminum-bronze alloy in the form of sand, centrifugal, and continuous castings (see 8.5).

1.2 Application

These castings have been used typically for parts requiring a combination of high strength and hardness with some ductility and toughness, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2175 Castings, Classification and Inspection of

AMS2360 Room Temperature Tensile Properties of Castings

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Documents

Standard, visit Sharing Hub

AMS2630	Inspection, Ultrasonic, Product Over 0.5 Inch (12.7 mm) Thick
AMS2694	In-Process Welding of Castings
AMS2750	Pyrometry
AMS2804	Identification, Castings
AS7766	Terms Used in Aerospace Metals Specifications

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM B208	Preparing Tension Test Specimens for Copper Alloy Sand, Permanent Mold, Centrifugal, and Continuous Castings
ASTM B601	Temper Designations for Copper and Copper Alloys - Wrought and Cast
ASTM E8/E8M	Tension Testing of Metallic Materials
ASTM E18	Rockwell Hardness of Metallic Materials
ASTM E478	Chemical Analysis of Copper Alloys
ASTM E1417/E1417M	Liquid Penetrant Testing
ASTM E1742/E1742M	Radiographic Examination

2.3 Definitions

Terms used in AMS are defined in AS7766.

2.3.1 Copper temper designations are defined in ASTM B601.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined in accordance with ASTM E478 by or by other analytical methods acceptable to the purchaser (see 8.5).

Table 1 - Composition

Element (see 3.1.1)	Min	Max
Copper (see 3.1.2)	74.5	--
Aluminum	10.5	11.5
Nickel	4.2	6.0
Iron	4.0	5.5
Manganese	--	1.5
Zinc	--	0.30
Tin	--	0.25
Cobalt	--	0.20
Silicon	--	0.15
Chromium	--	0.05
Lead	--	0.03
Sum of Named Elements (see 3.1.3)	99.8	--



Documents

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- 3.1.1 These composition limits do not preclude the presence of other elements. Limits may be established and analysis required for unnamed elements by agreement between the manufacturer or supplier and purchaser.
- 3.1.2 Copper may be reported as “remainder” or as the difference between the sum of results for all elements and 100% or as the result of direct analysis.
- 3.1.3 When all named elements in Table 1 are analyzed, the sum shall be 99.8% minimum, but such determination is not required for routine acceptance of each lot.

3.2 Condition

Quench hardened and temper annealed (TQ50) (see 2.3.1).

3.3 Casting

Castings shall be produced in lots from metal conforming to 3.1. Metal remelted from previously analyzed and compliant ingot may be poured directly into castings. Molten metal taken from alloying furnaces, with or without additions of foundry operating scrap (gates, sprues, risers, and rejected castings), shall not be poured into castings unless first converted to ingot, analyzed, and remelted or unless the composition of a sample taken after the last addition to the melt conforms to 3.1.

- 3.3.1 A melt shall be the metal withdrawn from a batch furnace charge of 2000 pounds (907 kg) or less as melted for pouring castings, or when permitted by the purchaser, a melt shall be 4000 pounds (1814 kg) or less of metal withdrawn from one continuous furnace in not more than 8 consecutive hours.
- 3.3.2 A lot shall be all castings poured from a single melt in not more than 8 consecutive hours and quench hardened and temper annealed in the same heat-treatment batch.

3.4 Test Specimens

3.4.1 Chemical Analysis Specimens

Shall be cast from each melt and be of any convenient size, shape, and form.

3.4.2 Tensile Coupons

Shall be cast with each lot of sand cast or centrifugal cast castings and as follows:

3.4.2.1 Sand Cast

Coupons from which specimens are produced shall be standard keel blocks in accordance with ASTM B208 cast in molds made with the regular foundry mix of sand, without using chills, or in baked core sand molds. Metal for the coupons shall be part of the melt that is used for the castings and shall be poured at a temperature not lower than the temperature of the metal during pouring of the castings. If the metal for castings is given any treatment, such as fluxing or cooling and reheating, the metal for the coupons shall be a portion of the metal so treated and during such treatment shall be heated to the same maximum temperature and held for approximately the same length of time as the molten metal for the castings. Coupons shall be heat treated with the castings in accordance with 3.5 and machined to standard tensile specimens conforming to ASTM E8/E8M with 0.500-inch (12.70-mm) diameter at the reduced parallel gauge section.

3.4.2.2 Centrifugally Cast

Coupons from which specimens are produced shall be cylindrical bars of such size to allow machining specimens conforming to ASTM E8/E8M with 0.500-inch (12.70-mm) diameter at the reduced parallel gauge section. Metal for the coupons shall be part of the melt that is used for the castings and shall be poured at a temperature not lower than the temperature of the metal during pouring of the castings. If the metal for castings is given any treatment, such as fluxing or cooling and reheating, the metal for the coupons shall be a portion of the metal so treated and during such treatment shall be heated to the same maximum temperature and held for approximately the same length of time as the molten metal for the castings.