NOTICE OF
ADOPTION

AMS 4842D-90
NOTICE 1
9 September 1993

ADOPTION NOTICE

CASTINGS, LEADED BRONZE, SAND AND CENTRIFUGAL 80Cu - 10Sn - 9.5Pb
AS CAST

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The Engineering Society For Advancing Mobility Land Sea Air and Space ®
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AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 4842D

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Superseding AMS 4842C

CASTINGS, LEADED BRONZE, SAND AND CENTRIFUGAL
80Cu - 10Sn - 9.5Pb
As Cast

UNS C93700

1. SCOPE:

1.1 Form: This specification covers a leaded bronze in the form of sand and centrifugal castings.

1.2 Application: Primarily for bearings requiring excellent anti-friction properties and resistance to corrosion. Alloy has good machinability under high speeds and heavy loads.

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 publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

2.1.1 Aerospace Material Specifications:

AMS 2635 - Radiographic Inspection
AMS 2645 - Fluorescent Penetrant Inspection
AMS 2646 - Contrast Dye Penetrant Inspection
AMS 2694 - Repair Welding of Aerospace Castings
AMS 2804 - Identification, Castings

2.2 ASTM Publications: Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187,

ASTM E 18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
ASTM E 54 - Chemical Analysis of Special Brasses and Bronzes

2.3 U.S. Government Publications: Available from Naval Publications and Forms Center, Attn: NPODS, 5801 Tabor Avenue, Philadelphia, PA 19120-5099.

2.3.1 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, 0 determined by wet chemical methods in accordance with ASTM E 54, by spectrochemical methods, or by other analytical methods acceptable to purchaser:

	min	max
Copper (3.1.1, 3.1.2)	78.0	82.0
Tin	9.0	11.0
Lead	8.0	11.0
Nickel (3.1.2)	--	1.0
Zinc	--	0:8
Antimony	--	0:55
Iron	--	0.15
Phosphorus	--	0.15
Sulfur	--	0.08
Aluminum	--	0.005
Silicon	--	0.005
Other Elements, total	--	0.35

3.1.1 May be determined by difference.

3.1.2 In determining copper minimum, copper may be calculated as copper plus nickel.

3.2 Condition: As cast.

3.3 Casting: Castings shall be produced in lots from metal conforming to 3.1. A lot shall be all castings produced from one furnace melt or crucible melt except that, when two or more furnace melts or crucible melts or combination thereof are used to charge a ladle for pouring, the castings therefrom shall constitute a lot. A lot shall be not more than 2000 pounds (907 kg) of castings.

3.4 Chemical Analysis Specimens: Shall be cast from each melt and be of any 0 convenient size, shape, and form.

3.5 Properties: Castings shall conform to the following requirements;

3.5.1 Hardness: Shall be as follows, determined in accordance with ASTM E 18:

3.5.1.1 Sand Castings: Not lower than 65 HRF, or equivalent.

3.5.1.2 Centrifugal Castings: Not lower than 75 HRF, or equivalent.

3.5.2 Structure: Shall show a uniform distribution of lead in the copper-tin
0 matrix. Method of testing and standards for acceptance shall be as agreed upon by purchaser and vendor.

3.6 Quality:

3.6.1 Castings, 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 castings.

3.6.1.1 Castings shall have smooth surfaces and shall be well cleaned.

3.6.2 Castings, when specified, shall be produced under radiographic control. This control shall consist of radiographic examination of castings in accordance with AMS 2635 until proper foundry technique, which will produce castings free from harmful internal imperfections, is established for each part number and of production castings as necessary to ensure maintenance of satisfactory quality.

3.6.3 Castings, when specified, shall be subjected to fluorescent penetrant inspection in accordance with AMS 2645, to contrast dye penetrant inspection in accordance with AMS 2646, or to both.

3.6.4 Radiographic, fluorescent penetrant, contrast dye penetrant, and other quality standards shall be as agreed upon by purchaser and vendor.

3.6.5 Castings shall not be reworked by peening, plugging, welding, or other methods without written permission from purchaser.

3.6.5.1 When permitted in writing by purchaser, imperfections in castings may be
0 reworked by welding in accordance with AMS 2694.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of castings 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 4.5. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the castings conform to the requirements of this specification.

4.2 Classification of Tests: Tests for all technical requirements are acceptance tests and preproduction tests and shall be performed prior to or on the first-article shipment of a casting to a purchaser, on each melt or lot as applicable, when a change in material and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, contracting officer, or request for procurement.

4.3 Sampling and Testing: Shall be in accordance with the following; the number Ø of specimens to be sampled shall be the minimum number of specimens tested:

4.3.1 At least one chemical analysis specimen in accordance with 3.4 from each Ø melt, a casting from each lot, or both.

4.3.2 Two preproduction castings in accordance with 4.4.1 of each part number.

4.4 Approval:

4.4.1 Sample castings from new or reworked patterns or molds and the casting procedure shall be approved by purchaser before castings for production use are supplied, unless such approval be waived by purchaser.

4.4.2 Vendor shall establish, for production of sample castings of each part number, parameters for the process control factors which will produce acceptable castings; these shall constitute the approved casting procedure and shall be used for producing production castings. If necessary to make any change in parameters for the process control factors, vendor shall submit for reapproval a statement of the proposed changes in processing and, when requested, test specimens, sample castings, or both. Production castings incorporating the revised operations shall not be shipped prior to receipt of reapproval.

4.4.2.1 Control factors for producing castings include, but are not limited to, the following:

Type of furnace
Furnace atmosphere
Fluxing or deoxidation procedure
Gating and risering practices
Metal pouring temperature; variation of ±50°F (±28°C) from the established limit is permissible
Mold rotational speed for centrifugal castings
Solidification and cooling procedures
Cleaning operations
Methods of inspection

4.4.2.1.1 Any of the above process control factors for which parameters are considered proprietary by the vendor may be assigned a code designation. Each variation in such parameters shall be assigned a modified code designation.