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400 COMMONWEALTH DRIVE WARRENDALE PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 4508E
Superseding AMS 4508D

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BRASS SHEET, LAMINATED
70Cu - 30Zn
Surface Bonded

1. SCOPE:

1.1 Form: This specification covers one type of brass in the form of laminated sheet.

1.2 Application: Primarily for shims in which thickness is to be adjusted by removal of laminations as required.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) 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 2350 - Standards and Test Methods

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM B248 - General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip, and Rolled Bar
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 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

2.3.2 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, determined by wet chemical methods in accordance with ASTM E478, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other analytical methods approved by purchaser:

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	min	max
Copper	68.50	71.50
Lead	--	0.07
Iron	--	0.05
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Zinc	remainder	

3.2 Condition: Laminated shim stock shall be fabricated from brass laminations in the quarter-hard or harder temper.

3.3 Properties: Sheet shall conform to the following requirements:

3.3.1 Fabrication:

3.3.1.1 Stock shall consist of laminations, each 0.002 in. ± 0.0002 (0.05 mm ± 0.005) thick or 0.003 in. ± 0.0003 (0.08 mm ± 0.008) thick, or partly of such laminations combined with a single thicker lamination, as ordered, bonded together in such manner that individual laminations may be peeled for adjustment of shim thickness.

3.3.1.2 Sheet shall consist of the following thickness and combinations of laminations and solid base, unless otherwise specified:

Nominal Thickness of Shim Inch	Stock (mm)	All Laminated, Laminations Each 0.002 in. (0.05 mm)	All Laminated, Laminations Each 0.003 in. (0.08 mm)	Half Solid, Half Laminated, Laminations Each 0.002 in. (0.05 mm)	Half Solid, Half Laminated, Laminations Each 0.003 in. (0.08 mm)	Three Quarters Solid, One Quarter Laminated, Laminations Each 0.002 in (0.05 mm)	Three Quarters Solid, One Quarter Laminated, Laminations Each 0.003 in. (0.08 mm)
0.006	(0.15)	X					
0.008	(0.20)	X					
0.010	(0.25)	X					
0.016	(0.40)	X	X				
0.020	(0.50)	X	X				
0.032	(0.80)	X	X				
0.047	(1.18)	X	X				
0.062	(1.55)	X	X	X	X		
0.094	(2.35)	X	X	X	X		
0.125	(3.12)	X	X	X	X	X	X

3.4 Quality:

3.4.1 Sheet, as received by purchaser, shall be uniform in quality and condition, sound, and free from internal and external imperfections detrimental to usage of the sheet.

3.4.2 Laminations shall be bonded together in such a manner that any shape can be cut out of the shim stock without causing the laminations in the shape to separate. Normal handling shall not cause separation of laminations.

3.5 Tolerances: Unless otherwise specified, tolerances shall be as specified in Table I.

TABLE I

Nominal Total Thickness Inch	Tolerance, Inch plus	minus
Up to 0.008, incl	0.001	0.0005
Over 0.008 to 0.010, incl	0.0015	0.0005
Over 0.010 to 0.016, incl	0.0015	0.001
Over 0.016 to 0.021, incl	0.002	0.001
Over 0.021 to 0.033, incl	0.003	0.002
Over 0.033 to 0.048, incl	0.005	0.002
Over 0.048 to 0.063, incl	0.006	0.002
Over 0.063 to 0.080, incl	0.007	0.002
Over 0.080 to 0.094, incl	0.009	0.003
Over 0.094 to 0.109, incl	0.010	0.003
Over 0.109 to 0.125, incl	0.012	0.003

TABLE I (SI)

Nominal Total Thickness Millimetres	Tolerance, Millimetres plus	minus
Up to 0.20, incl	0.02	0.012
Over 0.20 to 0.25, incl	0.038	0.012
Over 0.25 to 0.40, incl	0.038	0.02
Over 0.40 to 0.52, incl	0.05	0.02
Over 0.52 to 0.82, incl	0.08	0.05
Over 0.82 to 1.20, incl	0.12	0.05
Over 1.20 to 1.60, incl	0.15	0.05
Over 1.60 to 2.00, incl	0.18	0.05
Over 2.00 to 2.35, incl	0.22	0.08
Over 2.35 to 2.75, incl	0.25	0.08
Over 2.75 to 3.12, incl	0.30	0.08

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of sheet 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 sheet conforms to the requirements of this specification.

4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests and shall be performed on each lot.

4.3 Sampling: Shall be in accordance with ASTM B248.