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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4764D

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Superseding AMS 4764C

Submitted for recognition as an American National Standard

COPPER ALLOY BRAZING FILLER METAL
52.5Cu - 38Mn - 9.5Ni
1615 to 1700 °F (879 to 927 °C) Solidus-Liquidus Range
UNS C69950

1. SCOPE:

1.1 Form:

This specification covers a copper alloy in the form of wire, rod, sheet, strip, foil, and powder and a viscous mixture (paste) of powder in a suitable binder.

1.2 Application:

Primarily for joining corrosion and heat resistant alloys where high strength, good ductility, and short-time oxidation resistance above 1000 °F (538 °C) are required. Provides a very good color match for corrosion-resistant steels.

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.

AMS 2222 Tolerances, Copper and Copper Alloy Sheet, Strip, and Plate
MAM 2222 Tolerances, Metric, Copper and Copper Alloy Sheet, Strip, and Plate
AMS 2224 Tolerances, Copper and Copper Alloy Wire
MAM 2224 Tolerances, Metric, Copper and Copper Alloy Wire

2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM B 214 Sieve Analysis of Granular Metal Powders
ASTM E 478 Chemical Analysis of Copper Alloys

Printed in U.S.A.
91-0942/ EG

2.3 U.S. Government Publications:

Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-2073-1 DOD Materiel, Procedures for Development and Application of Packaging Requirements

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E 478, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - Composition

Element	min	max
Copper	51.0	54.0
Manganese	36.0	40.0
Nickel	8.5	10.5
Other Elements, total (3.1.1)	--	0.5

3.1.1 Determination not required for routine acceptance.

3.1.2 The requirements of 3.1 apply to paste after removal of the binder.

3.2 Condition:

The product shall be supplied in the following condition:

3.2.1 Wire: Cold drawn and bright annealed.

3.2.2 (R) Rod: Cold drawn, cold rolled, or extruded, as ordered, in as-fabricated temper, and cleaned.

3.2.3 Sheet, Strip, and Foil: Cold rolled, bright.

3.2.4 Powder: As fabricated.

3.2.5 (R) Paste: Paste not containing flux (3.2.5.1) shall be supplied unless paste containing flux (3.2.5.2) is specified.

3.2.5.1 Paste Without Flux: Shall consist of 84 to 90% by weight powder in a suitable binder.

3.2.5.2 (R) Paste Containing Flux: Shall consist of 55 to 80% by weight powder in a suitable binder and flux combination.

3.3 Properties of Paste:

3.3.1 Paste shall have a shelf life of not less than six months from date of manufacture; not more than thorough mixing shall be required to restore paste for use during that time.

3.3.2 (R) Paste without flux shall leave no adherent residue when heated in a protective atmosphere to 1000 °F (538 °C) or higher.

3.4 Quality:

The product, as received by purchaser, shall be uniform in color, quality, and condition and free from foreign materials and from imperfections detrimental to its working qualities. Wire, rod, sheet, strip, and foil shall be clean, sound, bright, and free from slivers, splitting, ragged edges, damaged ends, and other injurious imperfections. Powder shall have a metallic luster.

3.5 Sizes and Tolerances:

Shall be supplied in the standard sizes and to the tolerances shown in Table 2, Table 3, 3.5.2.2, and 3.5.3.

3.5.1 Wire and Rod:

3.5.1.1 Nominal Diameters:

TABLE 2 - Standard Diameter Sizes

Inch		Millimeters	
0.005	0.062	0.13	1.57
0.007	0.094	0.18	2.39
0.010	0.125	0.25	3.18
0.015	0.175	0.38	4.44
0.025	0.188	0.64	4.78
0.031	0.225	0.79	5.72
0.040	0.250	1.02	6.35
0.047		1.19	

3.5.1.2 Diameter Tolerances for Drawn Wire and Rod: AMS 2224 or MAM 2224 as applicable to refractory alloys.

3.5.2 Sheet, Strip, and Foil:

3.5.2.1 Nominal Thicknesses:

TABLE 3 - Standard Thicknesses

Inch		Millimeter	
0.001	0.006	0.025	0.15
0.0015	0.008	0.038	0.20
0.002	0.010	0.05	0.25
0.003	0.014	0.08	0.36
0.004	0.020	0.10	0.51
0.005	0.030	0.13	0.76

3.5.2.2 Tolerances:

3.5.2.2.1 Thickness: Nominal thicknesses under 0.002 inch (0.05 mm) shall have a tolerance of ±0.0002 inch (±5 μm); nominal thicknesses 0.002 inch (0.05 mm) and over shall have tolerances conforming to AMS 2222 or MAM 2222 as applicable to refractory alloys.

3.5.2.2.2 Width of Individual Rolls: Nominal widths under 6 inches (152 mm) shall vary not more than ±0.010 inch (±0.25 mm) from the width ordered. Nominal widths 6 inches (152 mm) and over shall vary not more than 0.015 inch (0.38 mm) from the width ordered.

3.5.2.2.3 Length in Individual Roll: Shall not be limited except that no roll shall weigh more than 75 pounds (34 kg).

3.5.3 Powder:

3.5.3.1 Particle Size Distribution: Powder shall be supplied in accordance with the limits on particle size distribution shown in Table 4 unless some other distribution is specified. Tests shall be in accordance with ASTM B 214.

TABLE 4 - Particle Size Distribution

Mesh Designation	U.S Standard Sieve	
140 F	On a No. 100 sieve -	0.5% maximum
	On a No. 140 sieve -	10% maximum
	Through a No. 325 sieve -	55% maximum

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of the product shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 (R) Acceptance Tests: Tests for all technical requirements, other than shelf life of paste (3.3.1), are acceptance tests and shall be performed on each lot.

4.2.2 (R) Periodic Tests: Test for shelf life of paste (3.3.1) are periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing:

Shall be in accordance with the following:

4.3.1 (R) Composition: For all products except powder, one sample from each lot; for powder, one sample from each furnace charge.

4.3.2 Adherent Residue of Paste: One sample from each lot.

4.3.3 Other Technical Requirements: As agreed upon by purchaser and vendor.

4.3.4 A lot shall be all product, other than powder or paste, which has been tested and found to conform to 3.1, in the same temper and size, and presented for vendor's inspection at one time.

4.3.5 A lot of powder shall be a uniform blend of powder produced from one or more furnace charges, each meeting the requirements of 3.1, and presented for vendor's inspection at one time.

4.3.6 A lot of paste shall be that paste produced from a single lot of powder combined with binder from the same manufacturing batch and presented for vendor's inspection at one time.

4.4 Reports:

The vendor of the product shall furnish with each shipment a report showing the results of tests on each lot to determine conformance to the composition requirements and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, lot number or numbers, AMS 4764D, form, nominal size, and quantity.

4.5 Resampling and Retesting:

Not applicable.