AEROSPACE MATERIAL SPECIFICATION

AMS4764	REV. F

Issued 1996-09
Revised 2007-11
Reaffirmed 2013-09

Superseding AMS4764E

Copper Alloy, Brazing Filler Metal
52.5Cu - 38Mn - 9.5Ni
1615 to 1700 °F (879 to 927 °C) Solidus-Liquidus Range
(Composition similar to UNS C69950)

RATIONALE

AMS4764F has been reaffirmed to comply with the SAE five-year review policy.

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

This material has been used typically for joining corrosion- and heat-resistant alloys where high strength, good ductility, and short-time oxidation resistance above 1000 °F (538 °C) are required, but usage is not limited to such applications. A very good color match is provided for corrosion-resistant steels.

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 724-776-4970 (outside USA), www.sae.org.

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

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: http://www.sae.org

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS4764F

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 B 214	Sieve Analysis of Granular Metal Products
ASTM E 53	Chemical Analysis of Copper
ASTM E 581	Chemical Analysis of Manganese-Copper Alloys
ASTM E 1473	Chemical Analysis of Nickel, Cobalt, and High Temperature Alloys

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1. Methods for analysis may be by spectrochemical methods or other analytical methods acceptable to purchaser, but in case of dispute, the referee methods shall be those given in ASTM E 53, ASTM E 581 and ASTM E 1473 as applicable.

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 Rod

As-fabricated temper.

3.2.3 Sheet, Strip, and Foil

Cold rolled, bright.

3.2.4 Powder

As fabricated.

3.2.5 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 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 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

Shall be as shown in Table 2.

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 as applicable to refractory alloys.

3.5.2 Sheet, Strip, and Foil

3.5.2.1 Nominal Thicknesses

Shall be as shown in Table 3.

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 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
140F	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 the performance all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to specified requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

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 Periodic Tests

Shelf life of paste (3.3.1) is a periodic test 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 Composition

For all products except powder, one sample from each lot; for powder, one sample from each furnace charge.