

BRAZING FILLER METAL, COPPER
52.5Cu - 38Mn - 9.5Ni
1615°- 1700°F (880° - 925°C) Solidus-Liquidus Range

1. SCOPE:

- 1.1 Form: This specification covers a copper alloy in the form of wire, rod, \emptyset sheet, strip, foil, and powder and a viscous mixture (paste) of the powder in a suitable binder.
- 1.2 Application: Primarily for joining corrosion and heat resistant alloys where high strength, good ductility, and only short-time oxidation resistance above 1000°F (540°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 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 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
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 B214 - Sieve Analysis of Granular Metal Powders
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.

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2.3.1 Federal Standards:

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

2.3.2 Military Standards:

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:

	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.
Ø

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: Cold drawn, cold rolled, or extruded, as ordered, in hard temper,
Ø and cleaned.

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

3.2.4 Powder: As fabricated.

3.2.5 Paste: Shall consist of 84 - 90% by volume powder in a suitable binder
Ø and, unless otherwise agreed upon by purchaser and vendor, shall not contain flux.

3.3 Properties of Paste:

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

3.3.2 Paste shall leave no undesirable residue when heated in a protective atmosphere to 1000°F (540°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: The product shall be supplied in the following standard sizes and to the tolerances shown, unless otherwise specified:

3.5.1 Wire and Rod:

3.5.1.1 Nominal Diameters:

<u>Inch</u>		<u>Millimetres</u>	
0.005	0.062	0.12	1.55
0.007	0.094	0.18	2.35
0.010	0.125	0.25	3.12
0.015	0.175	0.38	4.40
0.025	0.188	0.62	4.70
0.031	0.225	0.78	5.60
0.040	0.250	1.00	6.25
0.047		1.18	

3.5.1.2 Diameter Tolerance: AMS 2224 or MAM 2224 as applicable to refractory alloys.

3.5.2 Sheet, Strip, and Foil:

3.5.2.1 Nominal Thicknesses:

<u>Inch</u>		<u>Millimetre</u>	
0.001	0.006	0.02	0.15
0.0015	0.008	0.038	0.20
0.002	0.010	0.05	0.25
0.003	0.014	0.08	0.35
0.004	0.020	0.10	0.50
0.005	0.030	0.12	0.75

3.5.2.2 Tolerances:

3.5.2.2.1 Thickness: Nominal thicknesses under 0.002 in. (0.05 mm) shall have a tolerance of + 0.0002 in. (+5 μm); nominal thicknesses 0.002 in. (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 in. (150 mm) shall vary not more than $+0.010$ in. ($+0.25$ mm) from the width ordered. Nominal widths 6 in. (150 mm) and over shall vary not more than 0.015 in. (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 lb (35 kg).

3.5.3 Powder:

3.5.3.1 Nominal Sizes: -140, U.S. Standard (-150, Tyler).

3.5.3.2 Tolerances: Powder shall be of such fineness that not more than a trace will be retained on a No. 120 ($125 \mu\text{m}$) U.S. Standard or Tyler sieve and not less than 80% will pass through a No. 140 ($106 \mu\text{m}$) U.S. Standard (No. 150 ($104 \mu\text{m}$) Tyler) sieve, tested in accordance with ASTM B214.

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. 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 product 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 the following:

4.3.1 Composition: One sample from each lot.

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

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

4.3.4 A lot of powder shall be a uniform blend of powder produced from one or more furnace charges and presented for vendor's inspection at one time.

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