Society of Automotive Engineers, Inc.
TWO PENNSYLVANIA PLAZA, NEW YORK, N.Y. 10001

AEROSPACE MATERIAL SPECIFICATION

AMS 4771B
Superseding AMS 4771A

Issued 8-15-58
Revised 11-15-72

BRAZING FILLER METAL, SILVER
50Ag - 16Cd - 15.5Zn - 15.5Cu - 3.0Ni
1170 - 1270 F (632 - 688 C) Melting Range

1. SCOPE:

1.1 Form: This specification covers a silver-base alloy in the form of wire, rod, strip, sheet, pig, powder, shot, and chips.

1.2 Application: Primarily for joining ferrous metals, including austenitic steels, where high joint strength up to 400 F (204 C) is required, and for joining nonferrous metals except those having base of aluminum or magnesium.

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 Society of Automotive Engineers, Inc., Two Pennsylvania Plaza, New York, New York 10001.

2.1.1 Aerospace Material Specifications:

AMS 2222 - Tolerances, Copper and Copper Alloy Plate, Sheet, and Strip
AMS 2224 - Tolerances, 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, Pennsylvania 19103.

ASTM B214 - Sieve Analysis of Granular Metal Powders
ASTM B293 - Subsieve Analysis of Granular Metal Powders by Air Classification
ASTM E56 - Chemical Analysis of Silver Brazing Alloys

2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

2.3.1 Federal Standards:

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

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E56, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other approved analytical methods.

	min	max
Silver	49.0	51.0
Cadmium	15.0	17.0
Zinc	13.5	17.5
Copper	14.5	16.5
Nickel	2.5	3.5
Other Elements, total (3.1.1)	--	0.15

3.1.1 Determination not required for routine acceptance.

3.2 Condition: The product shall be supplied in the following condition:

3.2.1 Wire and Rod: Cold drawn, cold rolled, or extruded, as ordered, then annealed and pickled.

3.2.2 Sheet and Strip: Cold rolled hard.

3.2.3 Pig, Powder, Shot, and Chips: As fabricated.

3.3 Properties:

3.3.1 Color: Shall be yellow-white.

3.3.2 Flatness: When unrolled, strip shall lie flat with no undue tendency to recoil.

3.4 Quality: The product shall be uniform in color, quality, and condition and free from foreign materials and from imperfections detrimental to its working qualities. Wire, rod, sheet, and strip shall be clean, sound, bright, and free from slivers, splitting, ragged edges, damaged ends, and other injurious imperfections. Pig, powder, shot, and chips shall have a metallic luster.

3.5 Sizes and Tolerances: Unless otherwise specified, the product shall be supplied in the following standard sizes and to the tolerances shown:

3.5.1 Wire and Rod:

3.5.1.1 Nominal Diameters:

Inch	(Millimeters)	Inch	(Millimeters)
0.005	(0.13)	1/16	(1.59)
0.007	(0.18)	3/32	(2.38)
0.010	(0.25)	1/8	(3.18)
0.015	(0.38)	0.175	(4.44)
0.025	(0.64)	3/16	(4.76)
1/32	(0.79)	0.225	(5.72)
0.040	(1.02)	1/4	(6.35)
3/64	(1.19)		

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

3.5.1.3 Diameter Tolerance for Rolled or Extruded Wire and Rod:

Nominal Diameter or Distance Between Parallel Sides		Tolerance, Inch (mm) Plus and Minus	
Inch	(Millimeters)	Round	Square
1/32 to 1/16, incl	(0.79 to 1.59, incl)	0.005 (0.13)	--
Over 1/16 to 1/8, incl	(Over 1.59 to 3.18, incl)	0.006 (0.15)	--
Over 1/8 to 3/16, incl	(Over 3.18 to 4.76, incl)	0.007 (0.18)	0.009 (0.23)
Over 3/16 to 1/4, incl	(Over 4.76 to 6.35, incl)	0.008 (0.20)	0.010 (0.25)

3.5.2 Sheet and Strip:

3.5.2.1 Nominal Thicknesses:

Inch	(Millimeter)	Inch	(Millimeter)
0.001	(0.02)	0.006	(0.15)
0.0015	(0.038)	0.008	(0.20)
0.002	(0.05)	0.010	(0.25)
0.003	(0.08)	0.014	(0.36)
0.004	(0.10)	0.020	(0.51)
0.005	(0.13)	0.030	(0.76)

3.5.2.2 Tolerances: Unless otherwise specified, thicknesses less than 0.002 in. (0.05 mm) shall have a tolerance of ± 0.0002 in. (± 0.005 mm); thicknesses 0.002 in. (0.05 mm) and over shall have tolerances conforming to AMS 2222 as applicable to refractory alloys. Width of individual rolls of strip shall not vary more than ± 0.010 in. (± 0.25 mm) from nominal. The length of strip in a roll is not limited except that no roll shall weigh more than 75 lb (34 kg).

3.5.3 Powder:

3.5.3.1 Nominal Sizes: -60, -100, -200, and -325 mesh.

3.5.3.2 Tolerances: Unless otherwise agreed upon by purchaser and vendor, the nominal mesh sizes shown in 3.5.3.1 shall be supplied in accordance with the following tolerances on particle size distribution, determined in accordance with ASTM B214:

Nominal Mesh Size	100% Through U.S. Sieve Series Number	No More Than 10% Through U.S. Sieve Series Number
-60	60	100
-100	100	200
-200	200	325
-325	325	As in 3.5.3.2.1

3.5.3.2.1 No more than 10% finer than a 10 micron particle size, determined in accordance with ASTM B293.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product shall supply all samples 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 perform such confirmatory testing as he deems necessary to assure 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 or routine control tests.

4.3 Sampling: Shall be in accordance with the following; a lot shall consist of all material produced from a single furnace charge.

4.3.1 Composition: One sample from each lot.

4.3.2 Properties: One sample from each lot.

4.4 Reports:

4.4.1 The vendor of the product shall furnish with each shipment three copies of a report of the results of tests on each lot to determine conformance to the composition requirements and a statement that the product conforms to all other technical requirements of this specification. This report shall include the purchase order number, material specification number and its revision letter, heat or lot number, form, size, and quantity from each heat.

4.4.2 When parts made of this filler metal or assemblies requiring the use of this filler metal are supplied, the vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, contractor or other direct supplier of filler metal, part number, and quantity. When filler metal for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of filler metal to determine conformance to the requirements of this specification, and shall include in the report a statement that the filler metal conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

4.5 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the product may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the product represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Identification:

5.1.1 The product shall be identified as agreed upon by purchaser and vendor.

5.1.2 Each container or package shall be permanently and legibly marked to give the following information:

BRAZING FILLER METAL
AMS 4771B
HEAT OR LOT NUMBER_____
MANUFACTURER'S IDENTIFICATION_____
MANUFACTURER_____
NOMINAL DIMENSIONS_____
WEIGHT, TROY OZ (or g)_____

5.2 The product shall be suitably wrapped, sealed, and boxed or otherwise packaged for protection against injury and contamination during shipment and storage under normal dry storage conditions. Packages shall be prepared for shipment in accordance with commercial practice to assure carrier acceptance and safe transportation to the point of delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.

6. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS: Material not conforming to this specification or to authorized modifications will be subject to rejection.

8. NOTES:

8.1 This alloy has an approximate solidus temperature of 1170 F (632 C) and an approximate liquidus temperature of 1270 F (688 C).