

BRAZING FILLER METAL, SILVER

60Ag - 30Cu - 10Sn

1115°- 1325°F (600° - 720°C) Solidus-Liquidus Range UNS P07600

1. SCOPE:

1.1 Form: This specification covers a silver alloy in the form of wire, rod,  $\emptyset$  sheet, strip, foil, pig, powder, shot, and chips and a viscous mixture (paste) of powder in a suitable binder.

1.2 Application: Primarily for joining ferrous metals, particularly austenitic steels and alloys, requiring high joint strength up to 600°F (315°C) for short-time service or up to 400°F (205°C) for long-time service, and for joining nonferrous metals except those having base of aluminum or magnesium. This filler metal is particularly suitable for brazing in hydrogen or inert atmosphere.

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 E56 - Chemical Analysis of Silver Brazing Alloys

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# AMS 4773C

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 Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

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 analytical methods approved by purchaser:

|                               | min  | max   |
|-------------------------------|------|-------|
| Silver                        | 59.0 | 61.0  |
| Copper                        | 29.0 | 31.0  |
| Tin                           | 9.5  | 10.5  |
| Phosphorus                    | --   | 0.025 |
| Other Elements, total (3.1.1) | --   | 0.15  |

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

3.2.1 Wire: Cold drawn or cold rolled, as ordered, in annealed temper, and cleaned.

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

3.2.3 Sheet, Strip, and Foil: Cold rolled, hard.  
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3.2.4 Pig, Powder, Shot, and Chips: As fabricated.

3.2.5 Paste: Shall consist of 84 - 90% by volume powder in a suitable binder and, unless otherwise agreed upon by purchaser and vendor, shall not contain flux.  
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3.3 Properties: Filler metal shall conform to the following requirements:

3.3.1 Color: Shall be yellow-white.

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

3.3.3 Paste:

3.3.3.1 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.

3.3.3.2 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. Pig, powder, shot, and chips 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:

| Inch  |       | Millimetres |      |
|-------|-------|-------------|------|
| 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 Tolerances for Drawn Wire and Rod: AMS 2224 or MAM 2224 as applicable to refractory alloys.

### 3.5.1.3 Diameter Tolerance for Rolled or Extruded Wire and Rod:

TABLE I

| Nominal Diameter or Distance<br>Between Parallel Sides<br>Inch | Tolerances, Inch<br>Plus and Minus |         |
|--|------------------------------------|---------|
|  | Rounds                             | Squares |
| 0.031 to 0.062, incl   | 0.005                              | --      |
| Over 0.062 to 0.125, incl                                      | 0.006                              | --      |
| Over 0.125 to 0.188, incl                                      | 0.007                              | 0.009   |
| Over 0.188 to 0.250, incl                                      | 0.008                              | 0.010   |

TABLE I (SI)

| Nominal Diameter or Distance<br>Between Parallel Sides<br>Millimetres | Tolerances, Millimetre<br>Plus and Minus |         |
|---|--|---------|
|   | Rounds                                   | Squares |
| 0.78 to 1.55, incl  | 0.12                                     | --      |
| Over 1.55 to 3.12, incl   | 0.15                                     | --      |
| Over 3.12 to 4.75, incl   | 0.18                                     | 0.22    |
| Over 4.75 to 6.25, incl   | 0.20                                     | 0.25    |

### 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  $\pm 0.0002$  in. ( $\pm 5 \mu\text{m}$ ); 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  $\pm 0.010$  in. ( $\pm 0.25$  mm) from the width ordered. Nominal widths 6 in. (150 mm) and over shall vary not more than  $\pm 0.015$  in. ( $\pm 0.38$  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: -60, -100, -200, and -325.

3.5.3.2 Tolerances: Nominal sizes shown in 3.5.3.1 shall be supplied in accordance with the following limit on particle size distribution, tested in accordance with ASTM B214:

| $\phi$ | Nominal Size | Not Less Than 95% Through U.S. Standard or Tyler Sieve Number |
|--------|--------------|---|
|        | -60          | 60  |
|        | -100         | 100   |
|        | -200         | 200   |
|        | -325         | 325   |

3.5.3.2.1 Control of fines shall be as specified by purchaser.  
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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.  
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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 Properties: 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 and in the same temper and size and presented for vendor's inspection at one time.  
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