AEROSPACE MATERIAL SPECIFICATION

AMS4784™	REV. H

Issued 1968-11
Reaffirmed 2018-10
Revised 2024-10

Superseding AMS4784G

(R) Gold-Palladium-Nickel Alloy, Brazing Filler Metal, High Temperature
50Au - 25Pd - 25Ni
2015 to 2050 °F (1102 to 1121 °C) Solidus-Liquidus Range
(Composition similar to UNS P00500)

RATIONALE

AMS4784G is the result of a Five-Year Review and update of the specification. The revision prohibits unauthorized exceptions (see 3.5, 4.4.1, 5.1.3, and 8.5), updates reporting of composition (see 3.1.3), removes unnecessary mesh designations (see 3.5.3.1 rev G), reorganizes properties and conditions (see 3.2 and 3.3), removes color requirements (see 3.3.1 rev G), updates terminology (see 4.3.3), adds reporting country or origin (see 4.4), and adds ordering information for mesh size (see 8.6).

1. SCOPE

1.1 Form

This specification covers a gold-palladium-nickel alloy in the form of wire, rod, sheet, strip, foil, pig, powder, shot, chips, preforms, and a viscous mixture (paste) of the powder in a suitable binder.

1.2 Application

This filler metal has been used typically for joining corrosion- and heat-resistant steels and alloys where corrosion- and oxidation-resistant joints with good strength at elevated temperatures are required, but usage is not limited to such applications.

1.3 Classifications

Filler metal supplied to this specification is classified as follows:

Class 1 - Standard composition
Class 2 - Supplementary composition control

Where no class is specified, Class 1 shall apply.

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.

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**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS4784H/

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2222 Tolerances, Copper and Copper Alloy Sheet, Strip, and Plate

AMS2224 Tolerances, Copper and Copper Alloy Wire

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 B214 Sieve Analysis of Metal Powders

3. TECHNICAL REQUIREMENTS

3.1 Composition

Composition shall conform to the percentages by weight shown in Table 1, determined by spectrochemical methods or other analytical methods acceptable to the purchaser (see 8.3).

Table 1 - Composition

Element	Min	Max
Gold	49.50	50.50
Palladium	24.50	25.50
Nickel	24.50	25.50
Other Elements, total (3.1.1)	--	0.15

3.1.1 Determination not required for routine acceptance.

3.1.2 For Class 2, copper shall be limited to 0.06% maximum, carbon to 0.005% maximum, and the following elements shall be limited to 0.002% maximum each: aluminum, cadmium, lead, magnesium, phosphorus, silicon, and zinc. The total of these elements shall not exceed 0.05% maximum.

3.1.3 The producer may test for any element not listed in Table 1 and include this analysis in the report of 4.4. Reporting of any element not listed in the composition table, and 3.1.2 for Class 2, is not a basis for rejection unless limits of acceptability are specified by the purchaser.

3.2 Condition

The product shall be supplied in the following condition:

3.2.1 Wire

Clean and bright. Annealed, unless otherwise specified.

3.2.2 Rod

As fabricated and cleaned.

3.2.3 Sheet, Strip, and Foil

Cold rolled and annealed, unless otherwise specified.

3.2.3.1 Flatness

When unrolled, strip and foil shall lie flat with no undue tendency to re-coil.

3.2.4 Pig, Powder, Shot, and Chips

As fabricated.

3.2.5 Paste

Unless otherwise specified by the purchaser, shall consist of 84 to 90% by weight powder in a suitable binder and shall not contain flux.

3.2.5.1 Paste shall have a shelf life of not less than 6 months from date of manufacture; not more than thorough mixing shall be required to restore paste for use during that time.

3.2.5.2 Paste shall leave no adherent residue when heated in a protective atmosphere to a temperature higher than 1000 °F (538 °C).

3.2.6 Preforms

As fabricated.

3.3 Quality

The product, as received by the 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.

3.4 Sizes and Tolerances

The product shall be supplied in the following standard sizes and to the tolerances shown.

3.4.1 Wire and Rod

3.4.1.1 Nominal Diameters

Shall be as shown in Table 2.

Table 2 - Standard diameter sizes

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

3.4.1.2 Diameter Tolerances for Drawn Wire and Rod

Shall be in accordance with AMS2224 as applicable to refractory alloys.

3.4.1.3 Diameter Tolerances for Rolled or Extruded Wire and Rod

Shall be as shown in Table 3.

Table 3A - Diameter tolerances, inch/pound units

Nominal Diameter or Distance Between Parallel Sides Inches	Tolerance, Inches Plus and Minus Rounds	Tolerance, Inches Plus and Minus Squares
0.031 to 0.062, incl	0.005	0.008
Over 0.062 to 0.125, incl	0.006	0.009
Over 0.125 to 0.188, incl	0.007	0.009
Over 0.188 to 0.250, incl	0.008	0.010

Table 3B - Diameter tolerances, SI units

Nominal Diameter or Distance Between Parallel Sides Millimeters	Tolerance, Millimeters Plus and Minus Rounds	Tolerance, Millimeters Plus and Minus Squares
0.79 to 1.57, incl	0.13	0.20
Over 1.57 to 3.18, incl	0.15	0.23
Over 3.18 to 4.78, incl	0.18	0.23
Over 4.78 to 6.35, incl	0.20	0.25

3.4.2 Sheet, Strip, and Foil

3.4.2.1 Nominal Thicknesses

Shall be as shown in Table 4.

Table 4 - Standard thicknesses

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

3.4.2.2 Tolerances

3.4.2.2.1 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 AMS2222 as applicable to refractory alloys.

3.4.2.2.2 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.

3.4.2.2.3 Length in Individual Roll

Shall not be limited except that no roll shall weigh more than 75 pounds (34 kg).

3.4.3 Powder

3.4.3.1 Mesh Designations

Powder shall be supplied in accordance with the limits on particle size distribution shown in Table 5, unless some other distribution is specified. Tests shall be in accordance with ASTM B214. When a mesh designation is not specified, 140F (106F) shall be supplied.

Table 5A - Particle size distribution

U.S. Mesh Designation	U.S. Standard Sieve No.	Distribution %
60	Through a 40 Through a 60 Through a 325	100 95 Minimum 10 Maximum
100	Through a 60 Through a 100 Through a 325	100 95 Minimum 15 Maximum
140C	On a 100 On a 140 Through a 325	0.5 Maximum 10 Maximum 20 Maximum
140F	On a 100 On a 140 Through a 325	0.5 Maximum 10 Maximum 55 Maximum
200	On a 140 On a 200 Through a 325	0.5 Maximum 10 Maximum 65 Maximum
325	On a 200 On a 325 Through a 325	0.5 Maximum 10 Maximum 90 Minimum

Table 5B - Particle size distribution, metric

µm Mesh Designation	Sieve Opening µm	Distribution %
250	Through a 425 Through a 250 Through a 45	100 95 Minimum 10 Maximum
150	Through a 250 Through a 150 Through a 45	100 95 Minimum 15 Maximum
106C	On a 150 On a 106 Through a 45	0.5 Maximum 10 Maximum 20 Maximum
106F	On a 150 On a 106 Through a 45	0.5 Maximum 10 Maximum 55 Maximum
75	On a 106 On a 75 Through a 45	0.5 Maximum 10 Maximum. 65 Maximum
45	On a 75 On a 45 Through a 45	0.5 Maximum 10 Maximum 90 Minimum

3.5 Exceptions

Any exceptions shall be authorized by the purchaser and reported as in 4.4.1.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of the product shall supply all samples for the producer's tests and shall be responsible for the performance of all required tests. The 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 (see 3.2.5.1), are acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests

Shelf life of paste (see 3.2.5.1) is a periodic test and shall be performed at a frequency selected by the producer unless frequency of testing is specified by the purchaser.

4.3 Sampling and Testing

Shall be in accordance with the following:

4.3.1 Composition

One sample shall be taken from each furnace charge.

4.3.2 Properties Except Shelf Life of Paste

One sample from each lot.

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, in the same size heat-treat condition, and presented for the producer'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, each meeting the requirements of 3.1, and presented for the producer's inspection at one time.

4.3.5 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 the producer's inspection at one time.

4.4 Reports

The producer of the product shall furnish with each shipment a report showing the producer's name, the country where the metal was melted (e.g., the final melt in the case of metal processed by multiple melting operations), the results of tests 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, AMS4784H, form, size, and quantity.

4.4.1 When material produced to this specification has exceptions taken to the technical requirements listed in Section 3, the report shall contain a statement "This material is certified as AMS4784H(EXC) because of the following exceptions:" and the specific exceptions shall be listed (see 5.1.3)

4.5 Resampling and Retesting

Not applicable.