



AEROSPACE MATERIAL

AMS 4783

Society of Automotive Engineers, Inc. SPECIFICATION

TWO PENNSYLVANIA PLAZA, NEW YORK, N. Y. 10001

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Revised

BRAZING FILLER METAL, HIGH TEMPERATURE
Cobalt Base - 8.0Si - 19Cr - 17Ni - 4.0W - 0.80B

1. SCOPE:

- 1.1 Form: This specification covers a cobalt base alloy in the form of powder, wire, strip, and rod and a viscous mixture of the powder in a suitable liquid plastic binder.
- 1.2 Application: Primarily for joining cobalt base alloys where corrosion and oxidation resistant joints with good strength at high temperature are required.

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 Specification:
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 D638 - Tensile Properties of Plastics
ASTM E354 - Chemical Analysis of High Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt-Base Alloys
- 2.3 Government Publications: Available from Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.
- 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 E354, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other approved analytical methods:

	min	max
Carbon	0.35	0.45
Silicon	7.50	8.50
Phosphorus	--	0.03
Sulfur	--	0.03
Chromium	18.00	20.00
Nickel	16.00	18.00
Tungsten	3.50	4.50
Boron	0.70	0.90
Iron	--	1.00
Other Elements, total (1)	--	0.50
Cobalt		remainder

(1) Determination not required for routine acceptance.

3.1.1 For wire, strip, and the viscous mixture, the requirements of 3.1 apply only after removal of the plastic bonding material.

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

3.2.1 Powder: As fabricated.

3.2.2 Wire and Strip: Powder bonded in a suitable thermoplastic material.

3.2.3 Rod: As cast, with fins and projections removed.

3.2.4 Viscous Mixture: One part powder mixed with five parts of a suitable liquid plastic binder.

3.3 Properties:

3.3.1 Burn-Off of Plastic: The thermoplastic material used for bonding powder to form wire and strip and the liquid plastic of the viscous mixture shall burn off, leaving no undesirable residue, when the product is heated to not higher than 1800 F (982 C).

3.3.2 Tensile Strength of Wire and Strip: Shall be not lower than 360 psi (2.48 MN/m²), determined in accordance with ASTM D638, Speed B.

3.3.3 Metallic Content of Wire and Strip: The ratio of the volume of alloy powder to that of the plastic binder in wire and strip shall be as high as possible consistent with the requirements of 3.3.2.

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. Powder and rod shall have a metallic luster. Wire and strip shall be clean, sound, smooth, and free from splitting, ragged edges, damaged ends, and other injurious imperfections.

3.5 Size and Tolerances: Unless otherwise specified, material shall be supplied in the following standard sizes and to the tolerances shown.

3.5.1 Powder: Shall be of such fineness that none will be retained on a No. 100 sieve, not less than 90% will pass through a No. 140 sieve, and not more than 40% will pass through a No. 325 sieve, determined in accordance with ASTM B214.

3.5.2 Wire: Shall be furnished in the following nominal diameters; tolerance shall be $\pm 10\%$ of the nominal diameter:

<u>Nominal Diameter</u>	
<u>Inch</u>	<u>(Millimeter)</u>
1/32	(0.794)
1/16	(1.588)
1/8	(3.175)

3.5.3 Strip: Shall be furnished in sizes and to tolerances agreed upon by purchaser and vendor.

3.5.4 Rod:

3.5.4.1 Diameter: Shall be as specified on the purchase order. Rods shall not vary more than $\pm 1/32$ in. (± 0.794 mm) from the size ordered.

3.5.4.2 Concentricity: When long lengths are supplied as welded composites of cast lengths, the diameters of the adjacent sections shall be concentric within $\pm 1/32$ in. (± 0.794 mm).

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor 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 material conforms to the requirements of this specification.

4.2 Classification of Tests: Tests to determine conformance to all requirements of this specification are classified as routine control tests.

4.3 Sampling:

4.3.1 Composition: Shall be determined on one sample from each lot. A lot of powder shall be all material mixed at one time in one blender. A lot of rod shall be all material produced from a single furnace charge. A lot of wire, strip, and viscous mixture shall be all material of the same nominal size produced from a single lot of powder combined with plastic from the same manufacturing batch.

4.3.2 Properties: Shall be determined on one sample from each lot as defined in 4.3.1.

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 requirements of this specification. This report shall include the purchase order number, material specification number, form, nominal size, and quantity.

4.4.2 When parts made of this filler metal or assemblies requiring 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, this specification number, 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 testing of 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 material represented and no additional testing shall be permitted. Results of all tests shall be reported.