Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 4779A
Superseding AMS 4779
Issued 6-30-60
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BRAZING FILLER METAL, NICKEL
94Ni - 3.5Si - 1.8B
1800° - 1950°F (980° - 1065°C) Solidus-Liquidus Range

1. SCOPE:

1.1 Form: This specification covers a nickel alloy in the form of wire, rod, strip, and powder.

1.2 Application: Primarily for joining corrosion and heat resistant steels and alloys where corrosion and oxidation resistant joints with good strength at elevated temperatures are required. Also may be used as a corrosion and oxidation resistant hard coating. Flows well in most reducing and neutral atmospheres.

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., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

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 D638 - Tensile Properties of Plastics
ASTM E18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
ASTM E354 - Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt-Base Alloys

2.3 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 E354, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other analytical methods approved by purchaser:

	min	max
Carbon	--	0.06
Silicon	3.00	4.00
Phosphorus	--	0.02
Sulfur	--	0.02
Boron	1.50	2.20
Iron	--	1.50
Cobalt (3.1.2)	--	0.10
Titanium	--	0.05
Aluminum	--	0.05
Zirconium	--	0.05
Nickel	remainder	

3.1.1 The requirements of 3.1 apply to wire and strip after removal of the plastic bonding material.

Ø 3.1.2 Determination not required for routine acceptance.

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

3.2.1 Wire and Strip: Powder bonded in a suitable plastic.

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

3.2.3 Powder: As fabricated.

3.3 Properties: Filler metal shall conform to the following requirements:

3.3.1 Wire and Strip:

3.3.1.1 Burn-Off of Plastic: The plastic used for bonding powder to form wire and strip shall burn off, leaving no undesirable residue, when the product is heated to a temperature not higher than 1800°F (980°C).

3.3.1.2 Tensile Strength: Shall be not lower than 360 psi (2.5 MPa), determined in accordance with Ø ASTM D638, Speed B.

3.3.1.3 Metallic Content: The ratio of volume of powder to volume of plastic binder shall be the largest possible consistent with the requirements of 3.3.1.1 and 3.3.1.2.

Ø 3.3.2 Rod and Powder: Shall have properties as agreed upon by purchaser and vendor.

3.3.3 When used as a hard coating, alloy shall melt quickly and shall flow freely under neutral oxy-acetylene flame, without bubbling or boiling, so as to produce an adherent deposit free from Ø porosity due to blowholes, gas cavities, or slag inclusions.

3.3.3.1 Alloy, deposited as in 3.3.3, shall have hardness not lower than 56 HRC or equivalent, determined in accordance with Ø ASTM E18.

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

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:

3.5.1.1 Nominal Diameters:

Inch	(Millimetres)
0.031	(0.8)
0.062	(1.6)
0.125	(3.2)
0.188	(4.8)

3.5.1.2 Diameter Tolerance: ±0.004 in. (±0.10 mm).

3.5.2 Rod:

3.5.2.1 Nominal Diameters: Shall be as ordered.

3.5.2.2 Diameter Tolerance: ±0.031 in. (±0.8 mm).

3.5.2.3 Concentricity: When long lengths are supplied as welded composites of cast lengths, the diameters of the adjacent sections shall be concentric within ±0.031 in. (±0.8).

3.5.3 Strip: Shall be as agreed upon by purchaser and vendor.

3.5.4 Powder: Shall be of such fineness that not more than a trace of powder will be retained on a No. 120 sieve, not less than 90% will pass through a No. 140 sieve, and not more than 50% will pass through a No. 325 sieve, determined in accordance with ASTM B214.

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 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 of product.

4.3 Sampling: Shall be in accordance with the following; a lot shall be all product other than powder produced from a single furnace charge and presented for vendor's inspection at one time; a lot of powder shall be that product produced from a uniform blend of powder produced from one or more furnace charges and presented for vendor's inspection at one time:

Ø 4.3.1 Composition: One sample from each lot.

Ø 4.3.2 Properties: One sample from each lot.

Ø 4.3.3 Other Technical Requirements: As agreed upon by purchaser and vendor.

4.4 Reports:

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

4.4.2 Ø When parts made of this filler metal or assemblies requiring use of this filler metal are supplied, the part or assembly manufacturer shall inspect each lot of filler metal to determine conformance to the technical requirements of this specification and shall furnish with each shipment three copies of a report stating that the filler metal conforms. This report shall include the purchase order number, material specification number and its revision letter, part or assembly number, and quantity.

4.5 Ø 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 exterior container or package shall be permanently and legibly marked to show not less than the following information:

BRAZING FILLER METAL, NICKEL
AMS 4779A
LOT NUMBER _____
MANUFACTURER'S IDENTIFICATION _____
NOMINAL DIMENSIONS _____
WEIGHT _____

5.2 Packaging:

5.2.1 The product shall be suitably wrapped, sealed, and boxed or otherwise packaged for protection against injury and contamination during shipment and under normal dry storage conditions.

5.2.2 Ø Packages of filler metal shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of this filler metal to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.