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

AEROSPACE MATERIAL SPECIFICATION

AMS 7232F
Superseding AMS 7232E
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UNS N06600

ALLOY RIVETS, CORROSION AND HEAT RESISTANT
74Ni - 15.5Cr - 8.0Fe

1. SCOPE:

1.1 Form: This specification covers a corrosion and heat resistant nickel alloy in the form of rivets.

1.2 Application: Primarily for fastener applications requiring corrosion resistance and heat and oxidation resistance up to 2000°F (1095°C), but with reduced strength at the higher temperatures. Rivets shall not be hand peened during driving.

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 2269 - Chemical Check Analysis Limits, Wrought Nickel Alloys and Cobalt Alloys
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 E140 - Standard Hardness Conversion Tables for Metals (Relationship between Brinell Hardness, Vickers Hardness, Rockwell Hardness, Rockwell Superficial Hardness, and Knoop Hardness)
ASTM E354 - Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel and Cobalt Alloys
ASTM E384 - Microhardness of Materials

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

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	min	max
Carbon	--	0.06
Manganese	--	1.00
Silicon	--	0.50
Sulfur	--	0.015
Chromium	14.00	17.00
Nickel + Cobalt	72.00	--
Iron	6.00	10.00
Cobalt (3.1.1)	--	1.00
Columbium + Tantalum (3.1.1)	--	1.00
Titanium (3.1.1)	--	0.50
Aluminum (3.1.1)	--	0.35
Copper	--	0.50

3.1.1 Determination not required for routine acceptance.

3.1.2 Check Analysis: Composition variations shall meet the requirements of AMS 2269.

3.2 Condition: Cold headed, unless purchaser permits machining, annealed, and descaled if necessary. Rivets shall be fabricated from wire cold drawn from hot finished wire or rod which has been previously ground or has had surface preparation (other than by pickling) for removal of seams and other injurious surface imperfections.

3.3 Annealing: Rivets shall be annealed by heating to 1950°F ± 25 (1065°C ± 15), holding at heat for 5 - 20 min., and cooling as required. The furnace atmosphere shall be such that it will not cause surface hardening.

3.4 Properties: Rivets shall conform to the following requirements:

3.4.1 Hardness: Shall be not higher than 151 HV or equivalent, determined in accordance with ASTM E384 on a flat, smooth, filed or ground surface near the mid-length of the shank. (Conversions to Vickers from other scales shall be in accordance with ASTM E140, using the table for nickel alloys.)
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3.4.2 Formability: Solid-shank rivets shall withstand being driven cold to form a crack-free head having a diameter of 1.25 - 1.5 times the nominal shank diameter and a height within the range shown below and with expansion of the shank to the full diameter of the hole in which it is installed, provided that the hole diameter is not more than 0.006 in. (0.15 mm) greater than the nominal shank diameter.
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Nominal Rivet Diameter		Head Height
Inch	(Millimetres)	Proportion of Nominal Diameter
0.062 - 0.094	(1.57 - 2.39)	0.5 - 1.0
0.125 - 0.250	(3.18 - 6.35)	0.5 - 0.8
0.312 - 0.375	(7.92 - 9.52)	0.5 - 0.7

3.4.3 Flarability: Hollow-end rivets shall withstand being flared to a diameter of 1.5 times the nominal shank diameter without bending the shank and without cracking in the flared end.
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3.5 Quality: Rivets, as received by purchaser, shall be uniform in quality and condition, sound, smooth, and free from foreign materials and from internal and external imperfections detrimental to their performance.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of rivets 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 such confirmatory testing as he deems necessary to ensure that the rivets conform to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for composition (3.1) and hardness (3.4.1) are classified as acceptance tests and shall be performed on each heat or lot as applicable.

4.2.2 Periodic Tests: Tests to determine conformance to requirements for formability (3.4.2) or flarability (3.4.3) are classified as periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling: Shall be in accordance with the following; a lot shall be all rivets of the same part number annealed in a single furnace charge and presented for vendor's inspection at one time:

4.3.1 For Acceptance Tests:

4.3.1.1 Composition: One sample from each heat.

4.3.1.2 Hardness: One sample, consisting of five rivets, from each lot.

4.3.2 For Periodic Tests: As agreed upon by purchaser and vendor.

4.4 Reports: The vendor of rivets shall furnish with each shipment three copies of a report showing the results of tests for chemical composition and hardness and stating that the rivets conform to the other technical requirements of this specification. This report shall include the purchase order number, lot number, AMS 7232F, part number, and quantity.

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

5. PREPARATION FOR DELIVERY:

5.1 Identification and Packaging:

5.1.1 Rivets of each different part number shall be packaged in separate containers.

5.1.2 Each container shall be marked to show not less than the following information:

RIVETS, CORROSION AND HEAT RESISTANT ALLOY
AMS 7232F
PART NUMBER _____
PURCHASE ORDER NUMBER _____
QUANTITY _____
MANUFACTURER'S IDENTIFICATION _____