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

AEROSPACE MATERIAL SPECIFICATION

AMS 7233C
Superseding AMS 7233B
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UNS N04400

RIVETS, SOLID, ALLOY, CORROSION RESISTANT
67Ni - 31Cu

1. SCOPE:

1.1 Form: This specification covers solid rivets fabricated from a corrosion-resistant nickel-copper alloy.

1.2 Application: Primarily for use as a locking device where corrosion resistance up to 800°F (425°C) is required and where ease of driving and full heads are essential. 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 E76 - Chemical Analysis of Nickel-Copper Alloys

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
MIL-STD-1312 - Fasteners, 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 E76, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other analytical methods approved by purchaser:

	min	max
Nickel + Cobalt	63.0	--
Copper	28.0 - 34.0	
Iron	--	2.5
Manganese	--	2.0
Cobalt (3.1.1)	--	1.0
Silicon	--	0.50
Carbon	--	0.16
Sulfur	--	0.024
Phosphorus (3.1.1)	--	0.02
Zinc (3.1.1)	--	0.02
Lead (3.1.1)	--	0.006
Tin (3.1.1)	--	0.006

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, from cold drawn wire. Unless otherwise specified, rivets, after forming, shall be annealed and descaled if necessary.

3.3 Properties: Rivets shall conform to the following requirements:

3.3.1 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.

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

3.3.2 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.

3.3.3 Shear Strength: The shank shall have shear strength of 49,000 - 59,000 psi (338 - 407 MPa), determined in accordance with MIL-STD-1312, Test No. 44.

3.4 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 shear strength (3.3.3) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Tests to determine conformance to requirements for formability (3.3.1) or flarability (3.3.2) 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 one furnace charge and presented for vendor's inspection at one time:

4.3.1 Acceptance Tests:

4.3.1.1 Composition: One sample from each heat.

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

4.3.2 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 stating that the rivets conform to the condition, chemical composition, and other technical requirements of this specification. This report shall include the purchase order number, AMS 7233C, part number, and quantity.

4.5 Resampling and Retesting: If any rivet or specimen used in the above tests fail 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 Package Marking: Each container shall be marked to show not less than the following information:

RIVETS, ALLOY, CORROSION RESISTANT
AMS 7233C
PART NUMBER _____
PURCHASE ORDER NUMBER _____
QUANTITY _____
MANUFACTURER'S IDENTIFICATION _____

5.1.3 Containers of rivets 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 the rivets to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.