SAE The Engineering Resource For Advancing Mobility®

400 Commonwealth Dr., Warrendale, PA 15096

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

SAE AMS 7229F

Issued 11-1-48
Revised 1-1-86

Superseding AMS 7229E

RIVETS, STEEL, CORROSION AND HEAT RESISTANT
18Cr - 10.5Ni - (Cb + Ta)
Solution Heat Treated

1. SCOPE:

1.1 Type: This specification covers rivets made of a corrosion and heat resistant steel.

1.2 Application: Primarily for joining corrosion-resistant steel parts where corrosion, heat, and oxidation resistance up to approximately 1500°F (815°C) are required but high shear strength is not 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 shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2248 - Chemical Check Analysis Limits, Wrought Corrosion and Heat Resistant Steels and Alloys, Maraging and Other Highly-Alloyed Steels, and Iron 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 A262 - Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels
ASTM E353 - Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron 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 Military Specifications:

MIL-H-6875 - Heat Treatment of Steel, Process for

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: Rivets shall conform to the following percentages by weight, Ø determined by wet chemical methods in accordance with ASTM E353 or by spectrographic or other analytical methods approved by purchaser:

	min	max
Carbon	--	0.08
Manganese	--	2.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	17.00 -	19.00
Nickel	9.00 -	12.00
Columbium + Tantalum	10xC -	1.10
Molybdenum	--	0.75
Copper	--	0.75

3.1.1 Check Analysis: Composition variations shall meet the requirements of AMS 2248.

3.2 Condition: Cold-headed from cold-drawn wire or bar, unless purchaser Ø permits machining. Rivets, after forming, shall be solution heat treated free from continuous carbide network and descaled if necessary; solution heat treatment shall be performed in a furnace atmosphere which will not cause surface hardening. Furnace surveys and calibration of temperature controllers and recorders shall be in accordance with MIL-H-6875.

3.3 Properties: Rivets shall conform to the following requirements:

3.3.1 Hardness: Shall be not higher than 165 HV10, or equivalent, determined in accordance with MIL-STD-1312, Test No. 6.

3.3.2 Formability: Solid-shank rivets shall drive cold satisfactorily with a full head free from cracks and with expansion of the shank to the full diameter of the hole in which it is installed.

3.3.3 Flarability: Hollow-end rivets shall flare to a diameter of 1.5 times the nominal shank diameter without bending the shank and without cracking in the flared end.

3.3.4 Embrittlement: Representative rivets, after sensitizing treatment, shall meet the copper/copper sulfate/sulfuric acid test conducted in accordance with ASTM A262, practice E.

3.4 Quality: Rivets, as received by purchaser, shall be uniform in quality and Ø condition, sound, and free from foreign materials and from imperfections detrimental to usage of the rivets.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of rivets shall supply all samples Ø 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 any confirmatory testing deemed 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 Ø composition (3.1) and hardness (3.3.1) 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 Ø formability (3.3.2) or flarability (3.3.3) as applicable, and embrittlement (3.3.4) 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 Ø rivets of the same part number from the same heat of steel, solution heat treated in one 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 bars or wire 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 a report showing the results of tests for chemical composition of each heat and for hardness of each lot in the shipment 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 7229F, 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 packed in separate containers.

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

RIVETS, STEEL, CORROSION AND HEAT RESISTANT
AMS 7229F
PART NUMBER _____
PURCHASE ORDER NUMBER _____
QUANTITY _____
MANUFACTURER'S IDENTIFICATION _____

5.1.3 Ø 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.

5.1.4 For direct U.S. Military procurement, packaging shall be in accordance with MIL-STD-794, Level A or Level C, as specified in the request for procurement. Commercial packaging as in 5.1.1 and 5.1.3 will be acceptable if it meets the requirements of Level C.

6. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS: Rivets not conforming to this specification or to modifications authorized by purchaser will be subject to rejection.

8. NOTES: