



AEROSPACE MATERIAL SPECIFICATION

AMS5628™**REV. G**

Issued 1948-05
Reaffirmed 2015-05
Revised 2026-01

Superseding AMS5628F

(R) Steel, Corrosion-Resistant, Bars, Wire, Forgings, Mechanical Tubing
and Forging Stock,
16Cr - 2.5Ni (SAE 51431),
Aircraft Quality
(Composition similar to UNS S43100)

RATIONALE

AMS5628G is the result of a Five-Year Review and update of the specification. The revision updates the Title to match the Scope and adds product quality, revises composition testing and reporting (see 3.1 and 3.1.2), addresses finish on larger bar sizes (see 3.2.2.3), prohibits bar cut from plate (see 3.2.3 and 4.4.6), updates response to heat-treatment requirements in new Table adding pyrometry control and updating quenching requirements (see Table 2), adds strain rate control during tensile tests (see 3.3.1.2), clarifies condition and revises method for microstructure testing consistent with available equipment (see 3.3.2), adds ultrasonic testing as an alternative to MPI for product cleanliness evaluation (see 3.4.1, 4.2.1, 4.2.2, 4.3.3, and 4.4.3), adds country of origin to reports (see 4.4), adds requirements for reporting of forging stock (see 4.4.8), addresses prior revisions (see 8.4), updates microstructure figures based on new magnification requirements, and prohibits unauthorized exceptions (see 3.6, 4.7, 5.2.1.1, and 8.5).

1. SCOPE

1.1 Form

This specification covers a heat-treatable, corrosion-resistant steel in the form of bars, wire, forgings, mechanical tubing, and stock for forging or heading.

1.2 Application

These products have been used typically for parts and fittings requiring corrosion resistance and high strength at room and elevated (up to 500 °F [260 °C]) temperature, but usage is not limited to such applications.

1.2.1 Certain design and processing procedures may cause these products to become susceptible to stress-corrosion cracking. ARP1110 recommends practices to minimize such conditions.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

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2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (U.S. and Canada only) or +1 724-776-4970 (outside U.S. and Canada), www.sae.org.

AMS2241	Tolerances, Corrosion- and Heat-Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire
AMS2243	Tolerances, Corrosion and Heat-Resistant Steel Tubing
AMS2248	Chemical Check Analysis Limits, Corrosion- and Heat-Resistant Steels and Alloys, Maraging and Other Highly Alloyed Steels, and Iron Alloys
AMS2303	Steel Cleanliness, Aircraft Quality, Martensitic Corrosion-Resistant Steels, Magnetic Particle Inspection Procedure
AMS2371	Quality Assurance Sampling and Testing, Corrosion- and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock
AMS2374	Quality Assurance Sampling and Testing, Corrosion- and Heat-Resistant Steel and Alloy Forgings
AMS2750	Pyrometry
AMS2806	Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Corrosion and Heat-Resistant Steels and Alloys
AMS2808	Identification, Forgings
AMS-STD-2154	Inspection, Ultrasonic, Wrought Metals, Process for
ARP1110	Minimizing Stress Corrosion Cracking in Wrought Forms of Steels and Corrosion Resistant Steels and Alloys
AS7766	Terms Used in Aerospace Metals Specifications

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM A370	Mechanical Testing of Steel Products
ASTM A751	Chemical Analysis of Steel Products
ASTM E112	Determining Average Grain Size
ASTM E140	Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness
ASTM E407	Microetching Metals and Alloys

2.3 U.S. Government Publications:

Copies of these documents are available online at <https://quicksearch.dla.mil>.

MIL-S-18732	Steel Bars, Wire, Forging Stock, Forgings, Tubing (431), Special Quality
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2.4 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Composition shall conform to the percentages by weight shown in Table 1, determined in accordance with ASTM A751 or by other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	0.12	0.17
Manganese	0.30	0.80
Silicon	0.20	0.60
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	15.50	16.50
Nickel (see 3.1.1)	2.00	3.00
Molybdenum	--	0.25
Copper	--	0.50
Nitrogen	--	0.10

3.1.1 When stock for heading is ordered, nickel content may be as low as 1.50 for bars and wire under 0.66 inch (16.8 mm) in nominal diameter.

3.1.2 The producer may test for any element not listed in Table 1 and include this analysis in the report of 4.4. Reporting of any element not listed in the composition table is not a basis for rejection unless limits of acceptability are specified by the purchaser.

3.1.3 Check Analysis

Composition variations shall meet the applicable requirements of AMS2248, except that no variation over maximum is permitted for nitrogen.

3.2 Condition

3.2.1 Temper

Forging and heading stock shall be furnished as ordered. Other product shall be furnished annealed with a maximum hardness of 302 HBW, or equivalent (see 8.2), determined in accordance with ASTM A370.

3.2.2 Surface

3.2.2.1 Round bars and heading stock up to 0.50 inch (12.7 mm), inclusive, in nominal diameter shall be cold drawn or ground; over 0.50 to 1.50 inches (12.7 to 38 mm), inclusive, in nominal diameter shall be ground or smooth turned; and over 1.50 inches (38 mm) in nominal diameter shall be ground or turned. Round forging stock shall be ground or turned.

3.2.2.2 Bars, other than rounds, 2.75 inches (69.8 mm) and under in nominal distance between parallel sides and all hexagons, wire, and mechanical tubing shall be cold finished.

3.2.2.3 Bars, other than rounds and hexagons, over 2.75 inches (69.8 mm) in nominal diameter or least distance between parallel sides shall be hot finished or cold finished.

3.2.2.4 Other bars and forging stock shall be hot finished and descaled.

3.2.2.5 Forgings shall be free of scale.

3.2.3 Bars shall not be cut from plate (see 4.4.6).

3.3 Properties

The product shall conform to the following requirements:

3.3.1 Response to Heat Treatment

Longitudinal tensile specimens, taken from the product or from precursor material (for forgings, see 3.3.1.1), having a minimum nominal diameter of 0.250 inch (6.35 mm), which have been heat treated in accordance with Table 2 and tested in accordance with ASTM A370, shall meet the requirements shown in Table 3. Pyrometry shall be in accordance with AMS2750.

3.3.1.1 To test forgings, specimens may be taken from forgings, forging stock, or stock which has been forged to simulate the least reduced section of the forgings.

3.3.1.2 Unless otherwise specified, the strain rate shall be set at 0.005 in/in/min (0.005 mm/mm/min) and maintained within a tolerance of ± 0.002 in/in/min (± 0.002 mm/mm/min) through 0.2% offset yield strain. The requirement for compliance becomes effective for material produced 1 year after the publication date of this specification.

Table 2 - Response to heat-treatment processing

Processing Step ⁽¹⁾		Temperature	Time at Temperature Minimum
1	Heat	1875 °F $\pm$ 25 °F (1024 °C $\pm$ 14 °C)	30 minutes
2	Quench in Oil		
3	Cool to Room Temperature in Water		
4	Subzero Cool	-100 °F (-73 °C)	2 hours
5	Temper in Air	550 °F $\pm$ 25 °F (288 °C $\pm$ 14 °C)	2 hours
6	Retemper in Air	550 °F $\pm$ 25 °F (288 °C $\pm$ 14 °C)	2 hours

⁽¹⁾ Note that all processing must be performed in the order noted.

Table 3 - Mechanical properties (minimum)

Property	Value
Tensile Strength	200 ksi (1379 MPa)
Yield Strength at 0.2% Offset	150 ksi (1034 MPa)
Elongation in 2 Inches or 4D	10%
Reduction of Area	40%

Note: The yield strength value is not supported by AMS statistical analysis of currently available test results. However, the value has been used successfully for many years for procurement in accordance with company specifications and MIL-S-18732.