



AEROSPACE MATERIAL SPECIFICATION

AMS5648™

REV. N

Issued 1947-12
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Revised 2022-10

Superseding AMS5648M

Steel, Corrosion- and Heat-Resistant, Bars, Wire, Forgings,
Mechanical Tubing, Rings, and Stock for Forgings and Rings
17Cr - 12Ni - 2.5Mo (316)
Solution Heat Treated
(Composition similar to UNS S31600)

RATIONALE

AMS5648N is the result of a Five-Year Review and update of the specification. The revision updates the title to match the scope, prohibits unauthorized exceptions (3.6, 4.4.8, 5.2.1.1, 8.5), updates composition testing and reporting (3.1, 3.1.1), adds hot and cold finish properties to Table 2, specifies strain rate for tensile testing (3.3.1.1.1), updates hardness (3.3.2), adds reference to AS1182 (3.4.2, 8.3), and allows prior revisions (8.4).

1. SCOPE

1.1 Form

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

1.2 Application

These products have been used typically for parts requiring corrosion and heat resistance up to 1600 °F (871 °C), but usage is not limited to such applications.

1.2.1 At comparable elevated temperatures, strength of this steel is slightly higher than, and oxidation resistance is similar to the 18-8 type steels.

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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<https://www.sae.org/standards/content/AMS5648N/>

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), 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
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
AMS2806	Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Corrosion- and Heat-Resistant Steels and Alloys
AMS2808	Identification, Forgings
AMS7490	Rings, Flash Welded Corrosion- and Heat-Resistant Austenitic Steels, Austenitic-Type Iron, Nickel, or Cobalt Alloys, or Precipitation-Hardenable Alloys
AS1182	Standard Stock Removal Allowance, Aircraft-Quality and Premium Aircraft-Quality Steel Bars and Mechanical Tubing
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 A262	Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels
ASTM A276	Standard Specification for Stainless Steel Bars and Shapes
ASTM A370	Mechanical Testing of Steel Products
ASTM A751	Chemical Analysis of Steel Products

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 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 purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	--	0.08
Manganese	1.25	2.00
Silicon	--	1.00
Phosphorous	--	0.040
Sulfur	--	0.030
Chromium	16.00	18.00
Nickel	10.00	14.00
Molybdenum	2.00	3.00
Copper	--	1.00

3.1.1 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.

3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2248.

3.2 Condition

The product shall be supplied in the following condition:

3.2.1 Bars, Wire, Forgings, Flash Welded Rings, and Mechanical Tubing

Solution heat treated.

3.2.1.1 Bars and Wire

3.2.1.1.1 All hexagons, regardless of size, other bars 2.75 inches (69.8 mm) and under in nominal diameter or least distance between parallel sides, and wire shall be cold finished after solution heat treatment.

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

3.2.1.1.3 Bars shall not be cut from plate (also see 4.4.4).

3.2.1.2 Mechanical Tubing

Shall be cold finished after solution heat treatment.

3.2.1.3 Flash Welded Rings

Shall not be supplied unless specified or permitted on purchaser's part drawing. When supplied, rings shall be manufactured in accordance with AMS7490.

3.2.2 Stock for Forging or Flash Welded Rings

As ordered by the forging or flash welded ring manufacturer.