

AEROSPACE MATERIAL SPECIFICATION

SAE AMS5689

REV. F

Issued 1952-11
Revised 2001-11
Reaffirmed 2012-04

Superseding AMS5689E

Steel, Corrosion and Heat Resistant, Wire
18Cr - 10.5Ni - 0.40Ti (SAE 30321)
Solution Heat Treated

(Composition similar to UNS S32100)

RATIONALE

AMS5689F has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE:

1.1 Form:

This specification covers a corrosion and heat resistant steel in the form of wire.

1.2 Application:

This wire has been used typically for screening and stitching applications requiring good corrosion resistance, but usage is not limited to such applications. It may be subjected to elevated temperatures during fabrication such as from brazing and welding and in service without formation of a continuous carbide network. This wire has satisfactory oxidation resistance up to 1500 °F (816 °C) but is useful at that temperature only when stresses are low.

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 canceled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or www.sae.org.

AMS 2241 Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire

MAM 2241 Tolerances, Metric, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire

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on this Technical Report, please visit
<http://www.sae.org/technical/standards/AMS5689F>**

2.1 (Continued):

- AMS 2248 Chemical Check Analysis Limits, Corrosion and Heat Resistant Steels and Alloys, Maraging and Other Highly-Alloyed Steels, and Iron Alloys
- AMS 2371 Quality Assurance Sampling and Testing, Corrosion and Heat Resistant Steels and Alloys, Wrought Products and Forging Stock
- AMS 2806 Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Corrosion and Heat Resistant Steels and Alloys

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or www.astm.org.

- ASTM A 262 Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels
- ASTM E 8 Tension Testing of Metallic Materials
- ASTM E 8M Tension Testing of Metallic Materials (Metric)
- ASTM E 353 Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E 353, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - Composition

Element	min	max
Carbon	--	0.08
Manganese	--	2.00
Silicon	0.40	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	17.00	19.00
Nickel	9.00	12.00
Titanium	5x (C + N)	0.70
Molybdenum	--	0.75
Copper	--	0.75
Nitrogen	--	0.10

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

3.2 Condition:

Solution heat treated and bright finished.

3.3 Properties:

Wire shall conform to the following requirements:

- 3.3.1 Tensile Strength: Shall be not higher than shown in Table 2, determined in accordance with ASTM E 8 or ASTM E 8M.

TABLE 2A - Maximum Tensile Strength, Inch/Pound Units

Nominal Diameter Inch	Tensile Strength Coils	Tensile Strength Straight Lengths
	ksi	ksi
0.010 to 0.020, incl	125	135
Over 0.020 to 0.125, incl	115	125
Over 0.125 to 0.250, incl	105	115

TABLE 2B - Maximum Tensile Strength, SI Units

Nominal Diameter Millimeters	Tensile Strength Coils	Tensile Strength Straight Lengths
	MPa	MPa
0.25 to 0.51, incl	862	931
Over 0.51 to 3.18, incl	793	862
Over 3.18 to 6.35, incl	724	793

- 3.3.2 Bending: Wire shall withstand, without cracking, bending at room temperature flat on itself.

- 3.3.3 Susceptibility to Intergranular Attack: Specimens from the product, after sensitizing treatment, shall pass the intergranular corrosion test performed in accordance with ASTM A 262, Practice E.

3.4 Quality:

Wire, as received by purchaser, shall be uniform in quality and condition, cylindrical, and free from kinks, twists, scrapes, splits, cold shuts, pits, and other imperfections detrimental to usage of the wire.

3.5 Tolerances:

Shall conform to all applicable requirements of AMS 2241 or MAM 2241.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of wire shall supply all samples for vendor's tests and shall be responsible for the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the wire conforms to specified requirements.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Composition (3.1), tensile strength (3.3.1), bending (3.3.2) and tolerances (3.5) are acceptance tests and shall be performed on each heat or lot as applicable.

4.2.2 Periodic Tests: Susceptibility to intergranular attack (3.3.3) is a periodic test and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing:

Shall be in accordance with AMS 2371.

4.4 Reports:

The vendor of wire shall furnish with each shipment a report showing the results of tests for chemical composition of each heat and for tensile and bending properties of each lot, and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, heat and lot numbers, AMS 5689F, nominal size, and quantity.

4.5 Resampling and Retesting:

Shall be in accordance with AMS 2371.

5. PREPARATION FOR DELIVERY:

5.1 Wire shall be supplied in coils, on reels, or in straight lengths, as ordered.

5.2 Identification:

Shall be in accordance with AMS 2806.

5.3 Packaging:

Wire 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 wire to ensure carrier acceptance and safe delivery.