



AEROSPACE MATERIAL SPECIFICATION	AMS5689™	REV. H
	Issued 1952-11 Reaffirmed 2012-04 Revised 2023-02	
Superseding AMS5689G		
Steel, Corrosion- and Heat-Resistant, Wire 18Cr - 10.5Ni - 0.40Ti (321) Solution Heat Treated (Composition similar to UNS S32100)		

RATIONALE

AMS5689H is the result of a Five-Year Review and update of the specification. The revision prohibits unauthorized exceptions (1.1, 3.3.2, 3.6, 4.4.1, 8.4), updates composition testing (3.1, 3.1.1), and revises tensile test method (3.3.1).

1. SCOPE

1.1 Form

This specification covers a corrosion- and heat-resistant steel in the form of wire 0.010 inch (0.25 mm), up to and including 0.25 inch (6.35 mm).

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

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
- AMS2248 Chemical Check Analysis Limits, Corrosion- and Heat-Resistant Steels and Alloys, Maraging and Other Highly Alloyed Steels, and Iron Alloys

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For more information on this standard, visit
<https://www.sae.org/standards/content/AMS5689H/>

- AMS2371 Quality Assurance Sampling and Testing, Corrosion- and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock
- AMS2806 Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Corrosion- and Heat-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 A262 Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels
- ASTM A370 Mechanical Testing of Steels
- 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	--	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 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

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 A370.

Table 2A - Maximum tensile strength, inch/pound units

Nominal Diameter Inches	Tensile Strength	Tensile Strength
	Coils ksi	Straight Lengths 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	Tensile Strength
	Coils MPa	Straight Lengths 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 Mechanical property requirements for product outside the size range of Table 2 shall be as agreed upon by purchaser and producer and reported in 4.4.1.

3.3.3 Bending

Wire shall withstand, without cracking, bending at room temperature flat on itself.

3.3.4 Susceptibility to Intergranular Attack

Specimens from the product, after sensitizing treatment, shall pass the intergranular corrosion test performed in accordance with ASTM A262, 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 AMS2241.

3.6 Exceptions

Any exceptions shall be authorized by the purchaser and reported as in 4.4.1.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of wire shall supply all samples for producer'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 (3.3.3), 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 (3.3.4) is a periodic test and shall be performed at a frequency selected by the producer unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing

Shall be in accordance with AMS2371.

4.4 Reports

The producer of wire shall furnish with each shipment a report showing the producer's name and the country where the metal was melted (e.g., final melt in the case of metal processed by multiple melting operations), and 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, AMS5689H, nominal size, and quantity.

4.4.1 When material produced to this specification is beyond the sizes allowed in the scope or tables or other exceptions taken to the technical requirements listed in Section 3 (see 5.2.1), the report shall contain a statement "This material is certified as AMS5689H(EXC) because of the following exceptions:" and the specific exceptions shall be listed.

4.5 Resampling and Retesting

Shall be in accordance with AMS2371.

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 AMS2806.

5.2.1 When technical exceptions are taken (see 4.4.1), the material shall be marked with AMS5689H(EXC).

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.