

**AEROSPACE
MATERIAL
SPECIFICATION**

AMS 5689C
Superseding AMS 5689B

Issued 11-1-52
Revised 4-1-83

STEEL WIRE, CORROSION AND HEAT RESISTANT
18Cr - 9.5Ni - 0.40Ti (SAE 30321)
Solution Heat Treated

UNS S32100

1. SCOPE:

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

1.2 Application: Primarily for screening and stitching applications requiring good corrosion resistance and which may be subjected to elevated temperatures during fabrication or in service. Wire has satisfactory oxidation resistance up to 1500°F (815°C) but is useful at that temperature only when stresses are low.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) 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 2241 - Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire

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

AMS 2371 - Quality Assurance Sampling of Corrosion and Heat Resistant Steels and Alloys, Wrought Products Except Forgings and Forging Stock

SAE Technical Board rules provide that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade or their use by governmental agencies is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

- 2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM E8 - Tension Testing of Metallic Materials

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 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

2.3.2 Military Standards:

MIL-STD-163 - Steel Mill Products, Preparation for Shipment and Storage

3. TECHNICAL REQUIREMENTS:

- 3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E353, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by 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	8.00 - 11.00	
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 requirements of AMS 2248.

- 3.2 Condition: Solution heat treated free from continuous carbide network and bright finished.

- 3.3 Properties: Wire shall conform to the following requirements:

- 3.3.1 Tensile Strength: Shall be as specified in Table I, determined in accordance with ASTM E8.

TABLE I

Nominal Diameter Inch	Tensile Strength, psi, max	
	Coils	Straight Lengths
0.010 to 0.020, incl	125,000	135,000
Over 0.020 to 0.125, incl	115,000	125,000
Over 0.125 to 0.250, incl	105,000	115,000

TABLE I (SI)

Nominal Diameter Millimetres	Tensile Strength, MPa, max	
	Coils	Straight Lengths
0.25 to 0.50, incl	860	930
Over 0.50 to 3.15, incl	795	860
Over 3.15 to 6.25, incl	725	795

- 3.3.1.1 Tensile strength requirements for wire under 0.010 in. (0.25 mm) or over 0.250 in. (6.25 mm) in nominal diameter shall be as agreed upon by purchaser and vendor.
- 3.3.2 Bending: Wire shall withstand, without cracking, bending at room temperature flat on itself.
- 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, and other imperfections detrimental to usage of the wire. The surface shall have a bright, smooth finish free from pits, abrasions, and other defects.
- 3.5 Tolerances: Unless otherwise specified, tolerances shall conform to all applicable requirements of AMS 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 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 wire conforms to the requirements of this specification.
- 4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling: Shall be in accordance with AMS 2371.

4.4 Reports:

4.4.1 The vendor of wire shall furnish with each shipment three copies of a report showing the results of tests for chemical composition of each heat and for tensile and bending properties of each lot. This report shall include the purchase order number, heat number, AMS 5689C, nominal size, and quantity from each heat.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, AMS 5689C, contractor or other direct supplier of wire, part number, and quantity. When wire for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of wire to determine conformance to the requirements of this specification and shall include in the report either a statement that the wire conforms or copies of laboratory reports showing the results of tests to determine conformance.

4.5 Resampling and Retesting: Shall be in accordance with AMS 2371.

Ø

5. PREPARATION FOR DELIVERY:

5.1 Identification:

5.1.1 Coils or reels of wire shall each be identified by a durable tag marked with the purchase order number, AMS 5689C, heat number, nominal size, quantity, and manufacturer's identification.

5.1.2 Straight lengths shall be bundled or boxed and shall have attached to each bundle or box a tag marked with the information of 5.1.1.

5.2 Packaging:

5.2.1 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. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.

5.2.2 For direct U.S. Military procurement, packaging shall be in accordance with MIL-STD-163, Level A or Level C, as specified in the request for procurement. Commercial packaging as in 5.2.1 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.