SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5693B

Issued JUL 1982
Revised APR 1994

Superseding AMS 5693A

Submitted for recognition as an American National Standard

STEEL, CORROSION RESISTANT, WIRE
18Cr - 9.ONi
Cryogenically Produced, High Tensile Strength

UNS S30200

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of April 1994. It is recommended, therefore, that this specification not be specified for new designs.

This cover sheet should be attached to the "A" revision of the subject specification.

"NONCURRENT" refers to those materials which have previously been widely used and which may be required on some existing designs in the future. The Aerospace Materials Division, however, does not recommend these as standard materials for future use in new designs. Each of these "NONCURRENT" specifications is available from SAE upon request.

PREPARED UNDER THE JURISDICTION OF AMS COMMITTEE "F"

The Engineering Society For Advancing Mobility Land Sea Air and Space ®

400 Commonwealth Drive, Warrendale, PA 15096

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 5693A

Issued 7-1-82
Revised 4-1-88

Superseding AMS 5693

STEEL WIRE, CORROSION RESISTANT
18Cr - 9.0Ni (SAE 30302)
Cryogenically Produced, High Tensile Strength

UNS S30200

THIS REVISIONS CONTAINS ONLY EDITORIAL CHANGES.

1. SCOPE:

1.1 Form: This specification covers a corrosion resistant steel in the form of round, square, and rectangular wire.

1.2 Application: Primarily for springs requiring corrosion and heat resistance up to 500°F (260°C).

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications 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
MAM 2241 - Tolerances, Metric, 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

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 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 spectrochemical methods, or by other analytical methods acceptable to purchaser:

	min	max
Carbon	-	0.15
Manganese	-	2.00
Silicon	-	1.00
Phosphorus	-	0.040
Sulfur	-	0.030
Chromium	17.00	19.00
Nickel	8.00	10.00
Molybdenum	-	0.75
Copper	-	0.75

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

3.2 Condition: Spring temper, cryogenically cold drawn to required size.

3.2.1 Wire shall be supplied in coils or as ordered.

3.3 Properties: Wire shall conform to the following requirements:

3.3.1 As Cryogenically Cold Drawn:

3.3.1.1 Tensile Properties: Shall be as follows for rectangular wire having nominal width not more than four times the nominal thickness and for round wire and square wire 0.050 - 0.148 inch (1.27 - 3.76 mm) in nominal diameter or thickness, determined in accordance with ASTM E8:

Form	Tensile Strength
Rounds	275,000 - 310,000 psi (1895 - 2135 MPa)
Square and Rectangular	245,000 - 280,000 psi (1690 - 1930 MPa)

3.3.1.1.1 When straightened or flattened cut lengths are ordered, tensile strength requirements shall be as agreed upon by purchaser and vendor.

3.3.1.2 Wrapping: Round wire shall withstand, without cracking, wrapping at room temperature five full, closely-spaced turns around a diameter equal to the nominal diameter of the wire.

3.3.1.3 Coiling: Round wire 0.050 - 0.148 inch (1.27 - 3.76 mm) in nominal diameter shall show a uniform pitch with no splits or fractures when wound into a tightly closed coil on an arbor of the size specified in Table I and the resultant coil stretched to a permanent set of four times its as-wound length.

TABLE I

Nominal Wire Diameter Inch	Arbor Diameter Inch
Over 0.050 to 0.055, incl	0.21
Over 0.055 to 0.125, incl	0.25
Over 0.125 to 0.148, incl	0.38

TABLE I (SI)

Nominal Wire Diameter Millimetres	Arbor Diameter Millimetres
Over 1.27 to 1.40, incl	5.33
Over 1.40 to 3.18, incl	6.35
Over 3.18 to 3.76, incl	9.65

3.3.2 As Stress Relieved: Wire shall have the following properties after being stress relieved by heating to 800° - 850°F (425° - 455°C), holding at heat for 30 minutes ± 5, and cooling in air:

3.3.2.1 Tensile Properties: Shall be as follows for rectangular wire having nominal width not more than four times the nominal thickness, and for round wire and square wire 0.050 - 0.148 inch (1.27 - 3.76 mm) in nominal diameter or thickness, determined in accordance with ASTM E8:

Form	Tensile Strength
Rounds	290,000 - 340,000 psi (2000 - 2345 MPa)
Square and Rectangular	260,000 - 310,000 psi (1795 - 2135 MPa)

3.3.3 Wire under 0.050 inch (1.27 mm) or over 0.148 inch (3.76 mm) in nominal diameter or thickness shall have properties as agreed upon by purchaser and vendor.

3.4 Quality: Wire, as received by purchaser, shall be uniform in quality and condition, sound, and free from kinks, twists, scrapes, splits, cold shuts, and other imperfections detrimental to its use.

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 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 a report showing the results of tests for chemical composition of each heat and for tensile properties of each lot. This report shall include the purchase order number, heat number, AMS 5693A, size, and quantity.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 5693A, 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.

5. PREPARATION FOR DELIVERY:

5.1 Identification: Each coil, spool, drum, and box shall be marked with a durable label or tag showing not less than the manufacturer's identification, purchase order number, AMS 5693A, nominal size, and quantity.

5.2 Packaging:

5.2.1 Coils shall be individually wrapped in waterproof paper or packed in waterproof drums. Spools, when ordered, shall be boxed.

5.2.2 Wire furnished in straight lengths shall be bundled in a waterproof container or boxed.

5.2.3 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.

5.2.4 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, 5.2.2, and 5.2.3 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.

7. REJECTIONS: Wire not conforming to this specification, or to modifications authorized by purchaser, will be subject to rejection.

8. NOTES:

8.1 Marginal Indicia: This revision contains only editorial changes from the previous issue of this specification and, therefore, no phi (0) symbols indicating technical changes are required.

8.2 Following fabrication by purchaser, parts should be stress relieved by heating to 800° - 850°F (425° - 455°C), holding at heat for 30 minutes ± 5, and cooling in air to produce the optimum properties.