SAE 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 5688H

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Superseding AMS 5688G

STEEL WIRE, CORROSION RESISTANT
18Cr - 9.0Ni (SAE 30302)
Spring Temper

UNS S30200

1. SCOPE:

1.1 Form: This specification covers a corrosion-resistant steel in the form of 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

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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 or by spectrographic or other analytical methods approved by 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, cold drawn or rolled 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 Tensile Strength: Round wire, square wire, and rectangular wire having nominal width not greater than 4 times the nominal thickness shall have tensile strength as shown in Table I, determined in accordance with ASTM E8.

3.3.1.1 Tensile strength requirements for each size of straightened or flattened cut lengths, when ordered, may be reduced by 10% of the applicable tensile strength value shown in Table I.

3.3.1.2 Tensile strength requirements for intermediate sizes shall be as specified for the next larger standard size.

3.3.1.3 Tensile strength requirements for wire over 0.394 in. (9.85 mm) in nominal diameter or thickness shall be as agreed upon by purchaser and vendor.

3.3.2 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.

3.3.3 Coiling: Round wire, 0.180 in. (4.50 mm) and under 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 II and the resultant coil stretched to a permanent set of 4 times its as-wound length. Coiling requirements for round wire over 0.180 in. (4.50 mm) in nominal diameter shall be as agreed upon by purchaser and vendor.

TABLE II

Nominal Wire Diameter Inch	Arbor Diameter Inch
Up to 0.034, incl	0.102
Over 0.034 to 0.045, incl	0.145
Over 0.045 to 0.055, incl	0.212
Over 0.055 to 0.125, incl	0.250
Over 0.125 to 0.180, incl	0.380

TABLE II (SI)

Nominal Wire Diameter Millimetres	Arbor Diameter Millimetres
Up to 0.85, incl	2.55
Over 0.85 to 1.12, incl	3.62
Over 1.12 to 1.38, incl	5.30
Over 1.38 to 3.00, incl	6.25
Over 3.00 to 4.50, incl	9.50

3.4 Quality:

3.4.1 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 usage of the wire.

3.4.2 Wire shall have a bright, smooth, cold drawn or rolled surface free from pits, abrasions, and other surface imperfections. Wire for coiling on automatic spring winding machines shall be furnished with a lubricating coating suitable for such purpose.

3.4.3 All welds made on coiled or spooled wire shall be marked and the method of marking shall be specified on the spool, label, or tag. Straightened or flattened cut lengths shall have no welds.

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, wrapping, and coiling properties of each lot. This report shall include the purchase order number, heat number, AMS 5688H, nominal 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 5688H, 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, or box shall be marked with a durable label or tag marked with not less than the purchase order number, AMS 5688H, heat number, nominal size, quantity, manufacturer's identification, and method of marking welds.

5.2 Packaging:

5.2.1 Coils of wire 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 Containers of 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 is a five-year editorial update and, therefore, no phi (Ø) symbol has been used to indicate technical changes from the previous issue of this specification.

8.2 Dimensions and properties in inch/pound units and the Fahrenheit temperatures are primary; dimensions and properties in SI units and the Celsius temperatures are shown as the approximate equivalents of the primary units and are presented only for information.

8.3 For direct U.S. Military procurement, purchase documents should specify not less than the following:

Title, number, and date of this specification
Shape (round, square, rectangular) of wire desired
Nominal size of wire desired
Quantity of wire desired
Type of packaging desired (coil, spool, drum, box)
Applicable level of packaging (See 5.2.4)

8.4 Wire meeting the requirements of this specification has been classified under Federal Supply Classification (FSC) 9505.