Society of Automotive Engineers, Inc.
TWO PENNSYLVANIA PLAZA, NEW YORK, N.Y. 10001

AEROSPACE MATERIAL SPECIFICATION

AMS 5688F
Superseding AMS 5688E
Issued 12-4-39
Revised 5-15-71

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

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 (AMS) shall apply; the applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., Two Pennsylvania Plaza, New York, New York 10001.

2.1.1 Aerospace Material Specifications:

AMS 2241 - Tolerances, Corrosion and Heat Resistant Steel Bars and Wire and Titanium and Titanium Alloy Bars and Wire
AMS 2248 - Chemical Check Analysis Limits, Wrought Heat and Corrosion Resistant Steels and Alloys
AMS 2350 - Standards and Test Methods
AMS 2371 - Quality Assurance Sampling of Corrosion and Heat Resistant Alloys, Wrought Products Except Forgings

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

ASTM A370 - Mechanical Testing of Steel Products
ASTM E353 - Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

2.3 Government Publications: Available from Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.

2.3.1 Federal Standards:

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

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 approved analytical methods.

	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; coils shall be supplied, unless otherwise ordered.

3.3 Properties:

3.3.1 Tensile Properties: Shall conform to the values shown in Table I, determined in accordance with ASTM A370. Tensile properties apply to round wire, square wire, and rectangular wire having nominal width not more than 4 times the nominal thickness.

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

3.3.1.2 Intermediate Sizes: Tensile properties shall be as specified for the next larger standard size.

3.3.1.3 Sizes Over 0.394 in. (10.01 mm) in Diameter or Thickness: Shall have tensile properties 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 shall show a uniform pitch with no splits or fractures when wound into a tightly closed coil on an arbor of size shown in Table II and the resultant coil stretched to a permanent set of 4 times its as-wound length. The requirement applies only to coiled wire 0.180 in. (4.572 mm) and under in diameter.

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 Millimeters	Arbor Diameter Millimeters
Up to 0.864, incl	2.591
Over 0.864 to 1.143, incl	3.683
Over 1.143 to 1.397, incl	5.385
Over 1.397 to 3.175, incl	6.350
Over 3.175 to 4.572, incl	9.652

3.4 Quality:

3.4.1 Wire shall be uniform in quality and condition, clean, sound, and free from kinks, twists, scrapes, splits, cold shuts, and other imperfections detrimental to fabrication or to performance of parts.

3.4.2 Wire shall have bright, smooth, cold drawn or rolled surfaces free from pits, abrasions, and other surface imperfections. Wire intended for coiling on automatic spring winding machines shall be furnished with a lubricating coating suitable for this 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. Unless otherwise permitted, straightened or flattened cut lengths shall have no welds.

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 shall supply all samples 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 perform such confirmatory testing as he deems necessary to assure that material 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 routine control tests.

4.3 Sampling: Shall be in accordance with AMS 2371.

4.4 Reports:

4.4.1 The vendor of the product shall furnish with each shipment three copies of a report of the results of tests for chemical composition of each heat in the shipment and for tensile, wrapping, and coiling, properties of each size from each heat. This report shall include the purchase order number, material specification number and its revision letter, heat number, 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, material specification number and its revision letter, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

4.5 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the product may be based on the testing of three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the material represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Identification:

5.1.1 Coils shall be individually wrapped in waterproof paper or packed in waterproof drums. Spools, when ordered, shall be boxed. Each coil, spool, drum, and box shall be marked with a suitable label or tag showing the manufacturer's identification, purchase order number, AMS 5688F, heat number, method of marking welds, nominal size, and quantity.

5.1.2 Wire furnished in straight lengths shall be bundled in a waterproof container or boxed and shall have attached to each bundle or box a tag or label marked as in 5.1.1.

5.2 Packaging: The product shall be prepared for shipment in accordance with commercial practice to assure carrier acceptance and safe transportation to the point of delivery. Packaging shall conform to requirements of carrier rules and regulations applicable to the mode of transportation.

6. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS: Material not conforming to this specification or to authorized modifications will be subject to rejection.

8. NOTES:

8.1 Marginal Indicia: No phi (ø) symbol is used to indicate where technical changes have been made in this specification because of the extensive nature of all changes.

8.2 Similar Specifications:

8.2.1 This specification exceeds the minimum requirements of Federal QQ-W-423A, Composition FS 302, Condition B, Amendment 1, dated 3 June 1964.

8.2.2 Federal QQ-W-423 is listed for information only and shall not be construed as an acceptable alternate unless all requirements of this AMS are met.