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STEEL, CORROSION RESISTANT, FLAT WIRE
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 flat wire.

1.2 Application:

Flat wire has been used typically for retaining rings requiring corrosion and heat resistance up to 400 °F (204 °C) and which require moderate to severe forming and bending, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other documents shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2248 Chemical Check Analysis Limits, Wrought Corrosion and Heat Resistant Steels and Alloys, Maraging and other Highly-Alloyed Steels, and Iron Alloys

AMS 2371 Quality Assurance Sampling and Testing, Corrosion and Heat Resistant Steels and Alloys, Wrought Products and Forging Stock

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2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM A 370 Mechanical Testing of Steel Products
 ASTM E 353 Chemical Analysis of Stainless, Heat-Resisting, Maraging, and
 Other Similar Chromium-Nickel-Iron Alloys

2.3 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins
 Avenue, Philadelphia, PA 19111-5094.

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

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the percentages by weight shown in Table 1, determined by
 wet chemical methods in accordance with ASTM E 353, by spectrochemical
 methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - Composition

Element	Min	Max
Carbon	--	0.15
Manganese	--	2.00
Silicon	--	2.00
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, descaled, and rerolled to required size.

3.3 Properties:

Wire shall conform to the following requirements, determined in accordance
 with ASTM A 370.

3.3.1 Tensile Properties: Square wire, and rectangular wire having nominal width not greater than ten times the nominal thickness, shall have tensile properties as shown in Table 2.

TABLE 2A - Tensile Properties, Inch/Pound Units

Nominal Thickness Inch	Tensile Strength ksi	Elongation in 2 Inches %, min
0.008 to 0.022, incl	210 - 250	-
Over 0.022 to 0.047, incl	200 - 240	3
Over 0.047 to 0.062, incl	185 - 235	3
Over 0.062 to 0.074, incl	175 - 225	3
Over 0.074 to 0.089, incl	165 - 215	3
Over 0.089 to 0.095, incl	155 - 205	3

TABLE 2B - Tensile Properties, SI Units

Nominal Thickness mm	Tensile Strength MPa	Elongation in 50.8 mm % min
0.20 to 0.56, incl	1448 - 1724	-
Over 0.56 to 1.19, incl	1379 - 1655	3
Over 1.19 to 1.57, incl	1276 - 1620	3
Over 1.57 to 1.88, incl	1207 - 1551	3
Over 1.88 to 2.26, incl	1138 - 1482	3
Over 2.26 to 2.41, incl	1069 - 1413	3

3.3.1.1 The rectangular cross-section area of the wire specimen for the tensile test shall be determined from measurements of thickness and width taken prior to the tensile test. the tensile test load shall be determined as shown in Equation 1 and Equation 2.

$$A = T \times W - 0.12(T)^2 \quad (\text{Eq.1})$$

$$F = S \times A \times 1000; \text{ for SI, } F = S \times A \quad (\text{Eq.2})$$

where, A = area (for this test) or wire cross-section, in², (mm²)
 T = thickness of wire specimen, inch, (mm)
 W = width of wire specimen, inch, (mm)
 F = tensile test load, lbf, (N)
 S = tensile stress specified in Table 2, ksi (MPa)

3.3.2 Hardness: Shall be as shown in Table 3, determined in accordance with ASTM A 370.

TABLE 3 - Hardness

Nominal Thickness Inch	Nominal Thickness mm	Hardness
0.008 to 0.015, incl	0.20 to 0.38, incl	83.0 - 86.0 HR15N
Over 0.015 to 0.022, incl	Over 0.38 to 0.56, incl	64.0 - 69.5 HR30N
Over 0.022 to 0.047, incl	Over 0.56 to 1.19, incl	72.0 - 74.9 HRA
Over 0.047 to 0.062, incl	Over 1.19 to 1.57, incl	39.8 - 48.5 HRC
Over 0.062 to 0.074, incl	Over 1.57 to 1.88, incl	38.0 - 47.0 HRC
Over 0.074 to 0.089, incl	Over 1.88 to 2.26, incl	36.5 - 45.0 HRC
Over 0.089 to 0.095, incl	Over 2.26 to 2.41, incl	34.5 - 44.0 HRC

3.3.2.1 Wire shall not be rejected on the basis of hardness of the tensile properties specified in 3.3.1 are met.

3.4 Quality:

Wire, as received by purchaser, shall be uniform in quality and condition, sound, and free from kinks, twists, scrapes, splits, pipes, seams, blisters, laminations, inclusions, and other imperfections detrimental to usage of the wire.

3.4.1 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.

3.4.2 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:

3.5.1 Edges: Wire shall have commercial round edges as shown in Figure 1 and maximum camber shall be 0.5 inch in 8 feet (12.7 mm in 2.4 m).

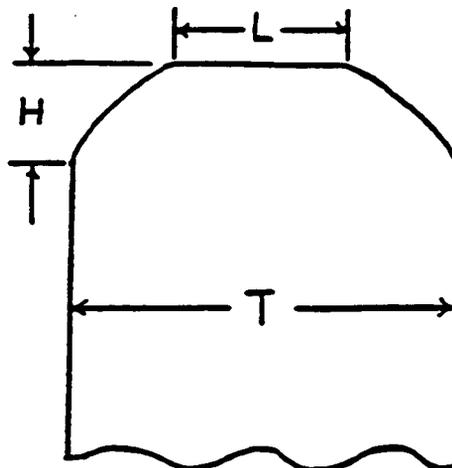


FIGURE 1 - Wire Rounded Edges

- 3.5.1.1 For wire thickness "T" 0.021 inch (0.53 mm) and under, the crown dimension "H" shall be 0.005 inch (0.13 mm) minimum and the maximum dimension "L" shall be 0.010 inch (0.25 mm) less than thickness "T".
- 3.5.1.2 For wire thickness "T" over 0.021 inch (0.53 mm), the crown dimension "H" shall be 0.010 inch (0.25 mm) minimum and the maximum dimension of "L" shall be 0.020 inch (0.51 mm) less than thickness "T".
- 3.5.2 Thickness Tolerance: Shall be as shown in Table 4.

Table 4A - Thickness Tolerance, Inch/Pound Units

Thickness Inch	Tolerance, Inch Plus and Minus
Up to 0.010, incl	0.00035
Over 0.010 to 0.021, incl	0.0005
Over 0.021 to 0.045, incl	0.00075
Over 0.045 to 0.060, incl	0.0010
Over 0.060 to 0.089, incl	0.0015
Over 0.089	0.0020

TABLE 4B - Thickness Tolerance, SI Units

Thickness mm	Tolerance, mm Plus and Minus
Up to 0.25, incl	0.008
Over 0.25 to 0.53, incl	0.013
Over 0.53 to 1.14, incl	0.0190
Over 1.14 to 1.52, incl	0.025
Over 1.52 to 2.26, incl	0.038
Over 2.26	0.051

- 3.5.3 Width Tolerance: Shall be as shown in Table 5.

TABLE 5A - Width Tolerances, Inch/Pound Units

Width Inch	Tolerance, Inch Plus	Tolerance, Inch Minus	Tolerance, Inch in 15 Continuous Feet
Up to 0.045, incl	0.002	0.002	0.001
Over 0.045 to 0.079, incl	0.003	0.002	0.001
Over 0.079 to 0.119, incl	0.004	0.003	0.001
Over 0.119 to 0.159, incl	0.005	0.003	0.001
Over 0.159 to 0.299, incl	0.005	0.004	0.0015
Over 0.299 to 0.499, incl	0.006	0.004	0.002
Over 0.499	0.007	0.005	0.002

TABLE 5B - Width Tolerance, SI Units

Width mm	Tolerance, mm		Tolerance, mm
	Plus	Minus	in 15 Continuous Meters
Up to 1.14, incl	0.05	0.05	0.025
Over 1.14 to 2.01, incl	0.08	0.05	0.025
Over 2.01 to 3.02, incl	0.10	0.08	0.025
Over 3.02 to 4.04, incl	0.13	0.08	0.025
Over 4.04 to 7.59, incl	0.13	0.10	0.038
Over 7.59 to 12.67, incl	0.15	0.10	0.051
Over 12.67	0.18	0.13	0.051

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. 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 for all technical requirements are acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling and Testing:

Shall be in accordance with AMS 2371.

4.4 Reports:

(R)

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 and hardness of each lot. This report shall include the purchase order number, heat and lot number, AMS 5866A, size, and quantity.

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 legibly marked, using a durable label or tag, with not less than the purchase order number, AMS 5866A, heat number, nominal size, quantity, manufacturer's identification, and weight of coil.