

ENGINEERING MATERIAL SPECIFICATION

Material Name

Specification Number

STEEL WIRE, HARD DRAWN LOW TENSILE QUALITY

ESB-M1A138-A

1. SCOPE

The material defined by this specification is a round or flat steel wire processed to meet the physical requirements of this specification.

2. APPLICATION

This specification was released originally for materials used for various seat spring components such as border wires, arch wires, tension wires, and paper covered tie wires.

3. REQUIREMENTS

3.1 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

3.2 CHEMICAL COMPOSITION

Carbon	0.45 - 0.75*
Manganese	0.60 - 1.20**
Phosphorus	0.045 max
Sulphur	0.050 max
Silicon	0.10 - 0.30

* Not varying more than 20 points in any one lot.

**Not varying more than 30 points in any one lot.

Date	Action	Revisions
2002 09 23	Revised	Updated and renumbered
1978 11 10		Metricated and Retyped CAH1-RD572066-166
1964 05 30		Released AT1 #1368

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3.3 MECHANICAL PROPERTIES

Acceptance of this class of materials will be based on the tensile strength. The tensile properties shall be as follows:

<u>Tensile Strength, Ksi (MPa)</u>				<u>Tensile Strength, Ksi (MPa)</u>			
<u>Gage</u>	<u>Dia.,in(mm)</u>	<u>Min</u>	<u>Max</u>	<u>Gage</u>	<u>Dia.,in(mm)</u>	<u>Min</u>	<u>Max</u>
	0.028(0.71)	271(1870)	311(2145)	9	0.148(3.76)	203(1400)	234(1610)
21	0.032(0.81)	265(1825)	305(2100)	8	0.162(4.11)	200(138)	230(1585)
20	0.035(0.89)	261(1800)	301(2075)	7	0.177(4.49)	195(1345)	225(1550)
19	0.041(1.04)	255(1760)	293(2020)	6	0.192(4.88)	192(1325)	221(1525)
18	0.047(1.19)	248(1710)	286(1970)	5	0.207(5.26)	190(1310)	218(1500)
17	0.054(1.37)	243(1675)	279(1925)	4	0.225(5.72)	186(1280)	214(1475)
16	0.0625(1.59)	237(1635)	272(1875)		0.250(6.35)	182(1255)	210(1450)
15	0.072(1.83)	232(1600)	266(1835)		0.312(7.92)	174(1200)	200(1380)
14	0.080(2.03)	227(1565)	261(1800)		0.375(9.53)	167(1150)	193(1330)
13	0.093(2.36)	220(1515)	253(1745)		0.437(11.10)	165(1135)	190(1310)
12	0.105(2.67)	216(1490)	248(1710)		0.500(12.70)	156(1075)	180(1240)
11	0.120(3.05)	210(1450)	241(1660)		0.562(14.27)	152(1045)	176(1210)
10	0.135(3.43)	206(1420)	237(1635)		0.625(15.88)	147(1015)	170(1170)

3.4 BEND TEST

The wire must withstand winding on its own diameter without cracking or breaking.

3.5 DIMENSION VARIATION

The diameter of the wire shall not vary from that specified by more than the following:

<u>Size of Wire</u>	<u>Allowable Variation</u>
0.028 in (0.71 mm) - 0.075 in (1.90 mm)	+/- 0.001 in (0.03 mm)
0.076 in (1.93 mm) - 0.375 in (9.53 mm)	+/- 0.002 in (0.05 mm)
0.376 in (9.55 mm) and over	+/- 0.003 in (0.08 mm)

The wire shall not be out of round more than one half the total permissible variations prescribed in the first part of this paragraph.

3.6 WORKMANSHIP

The wire shall be uniform in quality and temper and shall not be wavy or crooked. Each bundle shall be one continuous length of wire, properly coiled, and firmly tied.

3.7 SURFACE CONDITION

The surface of the wire as received shall be free from rust and excessive scale. The surface of the wire shall be free from serious seams and deep scratches which will materially affect the quality of the finished product.