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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Specification for Figure-9 Deep-Grooved and Figure-8 Copper Trolly Wire for Industrial Haulage[1]

This standard is issued under the fixed designation B 116; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers figure-9 deep-section grooved and figure-8 copper trolley wire for use in industrial haulage (Explanatory Note 1).

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 *ASTM Standards:*

B 9 Specification for Bronze Trolley Wire[2]

B 47 Specification for Copper Trolley Wire[2]

B 49 Specification for Copper Redraw Rod for Electrical Purposes[3]

B 193 Test Method for Resistivity of Electrical Conductor Materials[2]

3. Ordering Information

3.1 Orders for material under this specification shall include the following information:

3.1.1 Quantity of each size and section,

3.1.2 Wire size: circular-mil area (Section 6, Fig. 1 or Fig. 2),

3.1.3 Shape of section (Section 1),

3.1.4 Type of copper, if special (Section 4),

3.1.5 Package size (see 14.3),

3.1.6 Lagging, if required (see 14.1),

3.1.7 Relation between vertical axis of grooved wire and axis of reel (see 14.1),

3.1.8 Size of arbor hole if other than for a 2½-in. (64-mm) shaft (see 14.2),

3.1.9 Special package marking, if required (see 14.4), and

3.1.10 Place of inspection (Section 12).

4. Materials and Manufacturer

4.1 The material shall be copper of such quality and purity that the finished product shall have the properties and characteristics prescribed in this specification.

NOTE 1—Specification B 49 defines the materials suitable for use.

4.2 Copper bars of special qualities, forms, or types, as may be agreed upon between the manufacturer and the purchaser, and that will conform to the requirements prescribed in this specification may also be used.

5. Tensile Properties

5.1 Figure-8 wire shall conform to the requirements as to tensile properties specified in Table 1.

5.2 Figure-9 deep-section grooved wire shall conform to the requirements as to tensile properties specified in Table 2.

5.3 Tests on a specimen of wire containing a joint shall show at least 95 % of the tensile strength specified in Table 1 or Table 2, as may be applicable. Elongation tests shall not be made on specimens containing joints.

5.4 Tension tests shall be made on representative samples. The elongation shall be determined as the permanent increase in length, due to the breaking of the wire in tension, measured between gage marks placed originally 10 in. apart upon the test specimen (Explanatory Note 1). The fracture shall be between the gage marks and not closer than 1 in. (25 mm) to either gage mark.

5.5 The twist test shall be omitted.

6. Sections

6.1 Standard sections of figure-8 trolley wire shall be those shown in Fig. 1.

6.2 Standard sections of figure-9 deep-section grooved trolley wire shall be those shown in Fig. 2.

7. Dimensions and Permissible Variations

7.1 The size shall be expressed as the nominal area of cross section in circular mils.

7.2 The standard sizes of figure-8 trolley wire shall be as specified in Fig. 1.

7.3 The standard sizes of figure-9 deep-section grooved trolley wire shall be as specified in Fig. 2.

7.4 The weight in pounds per mile in figure-8 and figure-9 trolley wire calculated from the weight of a specimen not less than 18 in. (457 mm) in length shall not vary more than ±5 % from that specified in Fig. 1 and Fig. 2, respectively.

7.5 Conformance of the trolley wire to the specified dimensions shall be determined by taking the measurements shown in Fig. 1 and Fig. 2 under heading, "Dimensions for Inspection,

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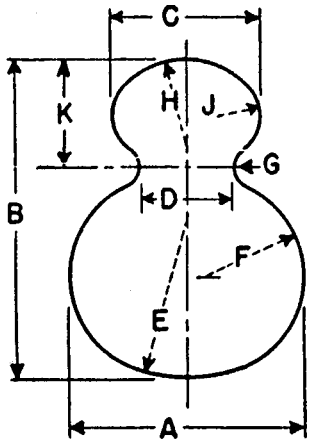
[2] *Annual Book of ASTM Standards*, Vol 02.03..

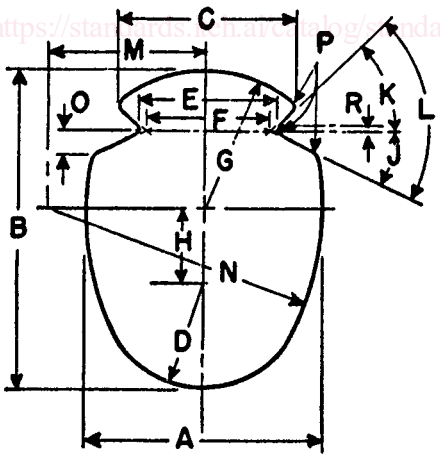
[3] *Annual Book of ASTM Standards*, Vol 02.01..



NOTE—For dimensions *E*, *F* and *H* the dimensional tolerance is ±0.016 in. (0.406 mm); for dimensions *G* and *J* the dimensional tolerance is ±0.008 in. (0.203 mm).

Nominal Size, cmils	105 600	133 100	167 800	211 600	350 000
Area, in.² (Explanatory Note 5)	0.0829	0.1045	0.1318	0.1662	0.2750
Area, cmils (Explanatory Note 5)	105 600	133 100	167 800	211 600	350 100
Weight, lb/mile (Explanatory Note 5)	1687	2127	2682	3382	5597
Dimensions for Inspection, in.					
A	$0.312^{+0.006}_{-0.012}$	$0.352^{+0.006}_{-0.012}$	$0.400^{+0.006}_{-0.012}$	$0.450^{+0.006}_{-0.012}$	$0.570^{+0.010}_{-0.020}$
B	0.420 ± 0.008	0.480 ± 0.009	0.540 ± 0.011	0.600 ± 0.012	0.754 ± 0.015
C	0.175 ± 0.004	0.196 ± 0.004	0.222 ± 0.005	0.250 ± 0.005	0.300 ± 0.007
D	$0.106^{+0.004}_{-0.006}$	$0.108^{+0.004}_{-0.006}$	$0.130^{+0.004}_{-0.006}$	$0.150^{+0.004}_{-0.006}$	$0.185^{+0.004}_{-0.006}$
Dimensions for Reference, in.					
E—Radius	0.210	0.240	0.300	0.300	0.359
F—Radius	0.090	0.100	0.110	0.130	0.205
G—Radius	0.050	0.050	0.060	0.075	0.075
H—Radius	0.110	0.140	0.160	0.175	0.188
J—Radius	0.060	0.070	0.070	0.075	0.075
K	0.170 ± 0.004	0.200 ± 0.004	0.210 ± 0.005	0.220 ± 0.005	0.253 ± 0.005

FIG. 1 Standard Sections Figure-8 Trolley Wire



NOTE—Dimension *R* is defined by two center lines of which the upper is the center line of the radius of the groove, and the lower is the center line of the groove.

Nominal size, cmils	350 000	400 000
Area, in.² (Explanatory Note 5)	0.2740	0.3120
Area, cmils (Explanatory Note 5)	348 900	397 200
Weight, lb/mile (Note 5)	5576	6347
Dimensions for Inspection, in.		
A	0.496 + 0.008 − 0.016	0.552 + 0.010 − 0.020
B	0.707 ± 0.014	0.745 ± 0.015
C	0.376 ± 0.007	0.376 ± 0.007
Dimensions for Reference, in.		
D—radius	0.208 ± 0.005	0.232 ± 0.005
E	0.267 ± 0.010	0.267 ± 0.010
F	0.250	0.250
G—radius	0.310 ± 0.005	0.310 ± 0.005
H	0.189 ± 0.005	0.203 ± 0.005
J	27 ± 2 deg	27 ± 2 deg
K	51 ± 2 deg	51 ± 2 deg
L	78 deg	78 deg
M	0.423 ± 0.008	0.423 ± 0.008
N—radius	0.671 ± 0.016	0.700 ± 0.016
O	0.066 ± 0.005	0.080 ± 0.005
P—radius	0.015 ± 0.010	0.015 ± 0.010
R	0.005 − 0.005	0.005 − 0.005

FIG. 2 Standard Sections Figure-9 Deep-Section Grooved Trolley Wire

in." The shape of the groove for figure-9 trolley wire shall be checked with the" go" and" no-go" slip gages described in Fig. 3. The gages shall be applied to the ends of the samples taken from each reel. Samples shall be clean and ends free from burrs. The groove shall be considered as conforming to this specification if the "go" gage can be pushed on the straightened wire by hand and the "no-go" gage cannot be pushed on the wire.