



Designation: B116 – 95 (Reapproved 2017)

# Standard Specification for Figure-9 Deep-Grooved and Figure-8 Copper Trolley Wire for Industrial Haulage<sup>1</sup>

This standard is issued under the fixed designation B116; 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 ( $\epsilon$ ) 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.

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

[B9 Specification for Bronze Trolley Wire](#)

[B47 Specification for Copper Trolley Wire](#)

[B49 Specification for Copper Rod for Electrical Purposes](#)

[B193 Test Method for Resistivity of Electrical Conductor Materials](#)

## 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 [B49](#) 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

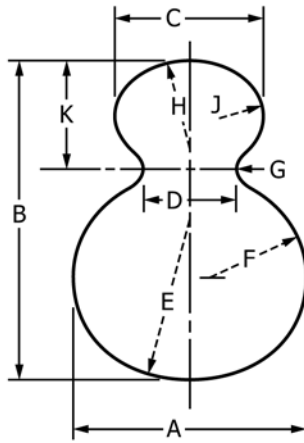
6.1 Standard sections of figure-8 trolley wire shall be those shown in [Fig. 1](#).

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

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee [B01](#) on Electrical Conductors and is the direct responsibility of Subcommittee [B01.04](#) on Conductors of Copper and Copper Alloys.

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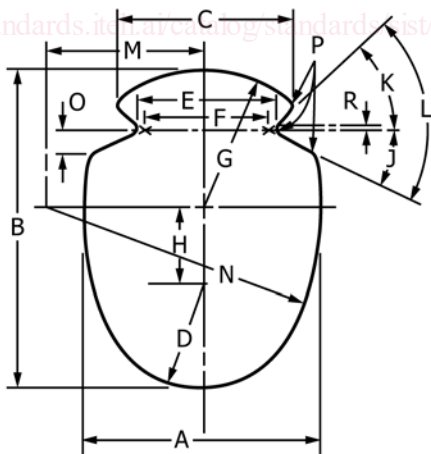
<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.



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

Nominal Size, cmils	105 600	133 100	167 800	211 600	350 000
Area, in. <sup>2</sup> (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. <sup>2</sup> (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