



Designation: B258 – 18

Standard Specification for Standard Nominal Diameters and Cross-Sectional Areas of AWG Sizes of Solid Round Wires Used as Electrical Conductors¹

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This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This specification prescribes standard nominal diameters and cross-sectional areas of American Wire Gage (AWG) sizes of solid round wires, used as electrical conductors, and gives equations and rules for the calculation of standard nominal mass and lengths, resistances, and breaking strengths of such wires (Explanatory [Note 1](#)).

1.2 The values stated in inch-pound or SI units are to be regarded separately as standard. Each system shall be used independently of the other. Combining values of the two systems may result in nonconformance with the specification. For conductor sizes designated by AWG or kcmil sizes, the requirements in SI units have been numerically converted from the corresponding values stated or derived, in inch-pound units. For conductor sizes designated by SI units only, the requirements are stated or derived in SI units.

1.2.1 For density, resistivity and temperature, the values stated in SI units are to be regarded as standard.

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:*²

[A111 Specification for Zinc-Coated \(Galvanized\) “Iron” Telephone and Telegraph Line Wire](#)

[A326 Specification for Zinc-Coated \(Galvanized\) High Tensile Steel Telephone and Telegraph Line Wire \(Withdrawn 1990\)](#)³

[B1 Specification for Hard-Drawn Copper Wire](#)

[B2 Specification for Medium-Hard-Drawn Copper Wire](#)

[B3 Specification for Soft or Annealed Copper Wire](#)

[B9 Specification for Bronze Trolley Wire](#)

[B33 Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes](#)

[B47 Specification for Copper Trolley Wire](#)

[B105 Specification for Hard-Drawn Copper Alloy Wires for Electric Conductors](#)

[B189 Specification for Lead-Coated and Lead-Alloy-Coated Soft Copper Wire for Electrical Purposes](#)

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

[B227 Specification for Hard-Drawn Copper-Clad Steel Wire](#)
[B230/B230M Specification for Aluminum 1350–H19 Wire for Electrical Purposes](#)

[B314 Specification for Aluminum 1350 Wire for Communication Cable \(Withdrawn 1994\)](#)³

[B396 Specification for Aluminum-Alloy 5005-H19 Wire for Electrical Purposes \(Withdrawn 2003\)](#)³

[B398/B398M Specification for Aluminum-Alloy 6201-T81 and 6201-T83 Wire for Electrical Purposes](#)

[B415 Specification for Hard-Drawn Aluminum-Clad Steel Wire](#)

[B498/B498M Specification for Zinc-Coated \(Galvanized\) Steel Core Wire for Use in Overhead Electrical Conductors](#)

[B502 Specification for Aluminum-Clad Steel Core Wire for Use in Overhead Electrical Aluminum Conductors](#)

[B606 Specification for High-Strength Zinc-Coated \(Galvanized\) Steel Core Wire for Aluminum and Aluminum-Alloy Conductors, Steel Reinforced](#)

¹ This specification is under the jurisdiction of ASTM Committee B01 on Electrical Conductors and is the direct responsibility of Subcommittee B01.02 on Methods of Test and Sampling Procedure.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

- B609/B609M** Specification for Aluminum 1350 Round Wire, Annealed and Intermediate Tempers, for Electrical Purposes
- B800** Specification for 8000 Series Aluminum Alloy Wire for Electrical Purposes—Annealed and Intermediate Tempers
- B802** Specification for Zinc-5% Aluminum-Mischmetal Alloy-Coated Steel Core Wire for Aluminum Conductors, Steel Reinforced (ACSR)[Metric](Discontinued 1998-Replaced by B 802/B802M) B0802_B0802M
- B803** Specification for High-Strength Zinc-5 % Aluminum-Mischmetal Alloy-Coated Steel Core Wire for Use in Overhead Electrical Conductors
- B957** Specification for Extra-High-Strength and Ultra-High-Strength Zinc-Coated (Galvanized) Steel Core Wire for Overhead Electrical Conductors
- B958** Specification for Extra-High-Strength and Ultra-High-Strength Class A Zinc-5% Aluminum-Mischmetal Alloy-Coated Steel Core Wire for Use in Overhead Electrical Conductors
- E29** Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
- F205** Test Method for Measuring Diameter of Fine Wire by Weighing

3. Standard Reference Temperature

3.1 For the purpose of this specification, all wire dimensions and properties shall be considered as occurring at the internationally standardized reference temperature of 20°C (68°F).

4. Standard Rules for Rounding

4.1 All calculations for the standard nominal dimensions and properties of solid round wires shall be rounded in the *final* value only, in accordance with rounding method of Practice **E29**.

5. Standard Nominal Diameters

5.1 Standard nominal diameters of AWG sizes of solid round wires shall be calculated in accordance with the conventional mathematical law of the American Wire Gage (see Explanatory **Note 1**) and in accordance with Section 4.

5.2 For wire sizes 4/0 to 10 AWG, inclusive, expressed in mil units, and for wire sizes 4/0 to 18 AWG, inclusive, expressed in millimetre units, nominal diameters shall be expressed in no more than four significant figures.

5.3 For wire sizes 11 AWG and smaller, expressed in mil units, and for wire sizes in 19 AWG and smaller expressed in

TABLE 1 Standard Nominal Diameters and Cross-Sectional Areas of AWG Sizes of Solid Round Wires at 20°C

Size		Diameter		Cross-Sectional Area		Size		Diameter		Cross-Sectional Area				
AWG	mils	mm	cmils	mm ²	AWG	mils	mm	cmils	mm ²	AWG	mils	mm	cmils	mm ²
4/0	460.0	11.68	211 600	107.2	29	11.3	0.287	128	0.0647					
3/0	409.6	10.40	167 800	85.01	30	10.0	0.254	100	0.0507					
2/0	364.8	9.266	133 100	67.43	31	8.90	0.226	79.2	0.0401					
1/0	324.9	8.252	105 600	53.49	32	8.00	0.203	64.0	0.0324					
1	289.3	7.348	83 690	42.41	33	7.10	0.180	50.4	0.0255					
2	257.6	6.543	66 360	33.62	34	6.30	0.160	39.7	0.0201					
3	229.4	5.827	52 620	26.66	35	5.60	0.142	31.4	0.0159					
4	204.3	5.189	41 740	21.15	36	5.00	0.127	25.0	0.0127					
5	181.9	4.620	33 090	16.77	37	4.50	0.114	20.2	0.0103					
6	162.0	4.115	26 240	13.30	38	4.00	0.102	16.0	0.00811					
7	144.3	3.665	20 820	10.55	39	3.50	0.0889	12.2	0.00621					
8	128.5	3.264	16 510	8.367	40	3.10	0.0787	9.61	0.00487					
9	114.4	2.906	13 090	6.631	41	2.80	0.0711	7.84	0.00397					
10	101.9	2.588	10 380	5.261	42	2.50	0.0635	6.25	0.00317					
11	90.7	2.304	8 230	4.168	43	2.20	0.0559	4.84	0.00245					
12	80.8	2.052	6 530	3.308	44	2.00	0.0508	4.00	0.00203					
13	72.0	1.829	5 180	2.627	45	1.76	0.0447	3.10	0.00157					
14	64.1	1.628	4 110	2.082	46	1.57	0.0399	2.46	0.00125					
15	57.1	1.450	3 260	1.652	47	1.40	0.0356	1.96	0.000993					
16	50.8	1.290	2 580	1.308	48	1.24	0.0315	1.54	0.000779					
17	45.3	1.151	2 050	1.040	49	1.11	0.0282	1.23	0.000624					
18	40.3	1.024	1 620	0.823	50	0.99	0.0252	0.980	0.000497					
19	35.9	0.912	1 290	0.653	51	0.88	0.0224	0.774	0.000392					
20	32.0	0.813	1 020	0.519	52	0.78	0.0198	0.608	0.000308					
21	28.5	0.724	812	0.412	53	0.70	0.0178	0.490	0.000248					
22	25.3	0.643	640	0.324	54	0.62	0.0157	0.384	0.000195					
23	22.6	0.574	511	0.259	55	0.55	0.0140	0.302	0.000153					
24	20.1	0.511	404	0.205	56	0.49	0.0124	0.240	0.000122					
25	17.9	0.455	320	0.162										
26	15.9	0.404	253	0.128										
27	14.2	0.361	202	0.102										
28	12.6	0.320	159	0.0804										