



Designation: B801 – 18

Standard Specification for Concentric-Lay-Stranded Conductors of 8000 Series Aluminum Alloy for Subsequent Covering or Insulation¹

This standard is issued under the fixed designation B801; 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 aluminum alloys in the 8000 series cited in **B800** in tempers “0” and H1X or H2X bare compact-round, compressed and conventional concentric-lay-stranded conductors made from round or shaped wires used as covered or insulated electrical conductors. These conductors shall be composed of a central core surrounded by one or more compacted, compressed or conventional layers of helically applied wires (Explanatory **Note 1** and **Note 2**).

1.2 The SI values for resistivity are regarded as standard. For all other properties, the inch-pound units are regarded as standard and the SI units may be approximate.

1.3 Sealed conductors that are intended to prevent longitudinal water propagation are also permitted within the guidelines of this specification.

1.4 *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 The following documents of the issue in effect on date of material purchase form a part of this specification to the extent referenced herein.

2.2 *ASTM Standards:*²

B193 Test Method for Resistivity of Electrical Conductor Materials

B263 Test Method for Determination of Cross-Sectional Area of Stranded Conductors

¹ This specification is under the jurisdiction of ASTM Committee B01 on Electrical Conductors and is the direct responsibility of Subcommittee B01.07 on Conductors of Light Metals.

Current edition approved March 1, 2018. Published March 2018. Originally approved in 1988. Last previous edition approved in 2016 as B801 – 16. DOI: 10.1520/B0801-18.

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.

B354 Terminology Relating to Uninsulated Metallic Electrical Conductors

B800 Specification for 8000 Series Aluminum Alloy Wire for Electrical Purposes—Annealed and Intermediate Tempers

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

2.3 *ANSI Standard:*³

ANSI H35.1 Alloy and Temper Designation Systems for Aluminum

2.4 *National Bureau of Standards:*⁴

NBS Handbook 100—Copper Wire Tables

3. Classification

3.1 For the purpose of this specification, conductors are classified as follows:

3.1.1 *Class A*—For conductors to be covered with weather/resistant materials.

3.1.2 *Class B*—For conductors to be insulated with various materials such as rubber, paper, varnished cloth, etc., and for the conductors indicated under Class A where greater flexibility is required.

3.1.3 *Class C and D*—For conductors where greater flexibility is required than is provided by Class B conductors.

4. Ordering Information

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

4.1.1 Quantity of each size and class (**Table 1**).

4.1.2 Conductor size; circular-mil area or Awg (**Section 7**),

4.1.3 Class (See **3.1**),

4.1.4 Temper (**Section 12**),

4.1.5 Lay direction if nonstandard (See **6.3** and **6.4**), reversed or unidirectional (See **6.3**) or special (See **6.4**),

4.1.6 Special tension test, if required (See **8.2**),

4.1.7 Packaging (**Section 19**),

4.1.8 Special package marking (**Section 19**), and

4.1.9 Place of inspection (**Section 18**).

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁴ Available from National Technical Information Service (NTIS), 5285 Port Royal Rd., Springfield, VA 22161, <http://www.ntis.gov>.

TABLE 1 Continued

Conductor Size			Class	Number ^A of Wires	Nominal Conductor Diameter						Compact		Nominal Mass		Nominal d-c resistance ^B at 20°C	
					Conventional		Reverse Concentric Compressed		Unilay Compressed ^C							
Kcmil	AWG	mm ²			in.	mm	in.	mm	in.	mm.	in	mm	lbs/1000 ft	kg/km	Ω/1000 ft	Ω/km
167800	000	85.0	C	37	0.471	12.0	0.457	11.6			0.423	10.7	158	235	0.1033	0.3389
167800	000	85.0	B	19	0.470	11.9	0.456	11.6	0.443	11.3	0.423	10.7	158	235	0.1033	0.3389
167800	000	85.0	A	7	0.464	11.8	0.450	11.4			0.423	10.7	158	235	0.1033	0.3389
133100	00	67.4	B	19	0.419	10.6	0.406	10.3	0.395	10.0	0.376	9.55	125	186	0.1303	0.4275
133100	00	67.4	A	7	0.414	10.5	0.402	10.2			0.376	9.55	125	186	0.1303	0.4275
105600	0	53.5	B	19	0.373	9.46	0.362	9.19			0.336	8.53	99.4	148	0.1642	0.5387
105600	0	53.5	A	7	0.368	9.36	0.357	9.07	0.352	8.94	0.336	8.53	99.4	148	0.1642	0.5387
83690	1	42.4	B	19	0.332	8.43	0.322	8.18	0.313	7.95	0.299	7.59	78.8	117	0.2072	0.6798
66360	2	33.6	B, A	7	0.292	7.42	0.283	7.19			0.268	6.81	62.5	93.0	0.2613	0.8573
52620	3	26.7	B, A	7	0.260	6.61	0.252	6.41			0.238	6.05	49.5	73.7	0.3296	1.0814
41740	4	21.2	B, A	7	0.232	5.88	0.225	5.72			0.213	5.41	39.3	58.5	0.4155	1.3633
26240	6	13.3	B, A	7	0.184	4.66	0.178	4.53			0.169	4.29	24.7	36.8	0.6609	2.1684
16510	8	8.37	B, A	7	0.146	3.70	0.142	3.60			0.134	3.40	15.5	23.1	1.0504	3.4464

^A For compact-stranded constructions, the number of wires may be reduced as follows:

- 19-Wire Constructions—18 Wires Minimum
- 37-Wire Constructions—35 Wires Minimum
- 61-Wire Constructions—58 Wires Minimum
- 91-Wire Constructions—87 Wires Minimum
- 127-Wire Constructions—122 Wires Minimum

^B Nominal d-c resistance is based on 61.0 % IACS conductivity (17.002 Ω/cmil/ft).

See Explanatory Note 3.

^C The diameters listed in the Unilay Compressed column correspond to Class B conductor constructions.

^D For 91-Wire Class B Constructions of 1100, 1250 and 1500 kcmil, as agreed upon between the manufacturer and the customer, these sizes may be produced with a 61 wire constructions of the appropriate wire size.

^E For 91-Wire Compact Constructions of 1100, 1250 and 1500 kcmil, as agreed upon between the manufacturer and the customer, these sizes may be produced with a 61 to 58 wire constructions of the appropriate wire size.

5. Joints

5.1 Joints may be made in any of the wires of any stranding by electric-butt welding, cold-pressure welding, or electric-butt, cold-upset welding.

5.2 Joints in the individual wires in a finished conductor shall be not closer together than 1 ft (0.3 m) for conductors of 19 wires or less, or closer than 1 ft (0.3 m) in a layer for conductors of more than 19 wires.

5.3 No joint or splice shall be made in a stranded conductor as a whole.

6. Lay

6.1 The length of lay for all classes shall be not less than 8 nor more than 16 times the outside diameter of that layer, except that for conductors composed of 37 wires or more, this requirement shall apply only to the two outer layers. The lay of the layers other than the two outer layers shall be at the option of the manufacturer, unless otherwise agreed upon.

6.1.1 For conductors to be used in covered or insulated wires or cables, the lay length of the wires shall be not less than 8 nor more than 16 times the outer diameter of the finished conductor. For conductors of 37 wires or more, this requirement shall apply to the wires in the outer two layers. The lay of the layers other than the two outer layers shall be at the option of the manufacturer, unless otherwise agreed upon.

6.2 The direction of lay for Class A conductors shall be right-hand.

6.3 The direction of lay of the outer layer shall be left-hand for all other classes, unless the direction is specified otherwise by the purchaser.

6.4 The direction of lay shall be reversed in successive layers in conventional and compressed constructions. In compact constructions, the lay of the successive layers may be either reversed or unidirectional.

6.4.1 For conductors to be used in covered or insulated wires or cables, the direction of lay of the outer layer shall be left-hand and may be reversed or unidirectional or unilay in successive layers, unless otherwise agreed upon with the purchaser.

6.5 The maximum length of lay for compact conductors AWG 2 and smaller shall be 17.5 times the outside diameter of that layer.

6.6 Other lay requirements may be furnished by special agreement between the manufacturer and the purchaser.

7. Construction

7.1 The construction of the conductors shall be as shown in Table 1 as to number of wires and cross-sectional area of the completed conductor, and the lay shall be in accordance with Section 6.

7.2 Wire used in the fabrication of conductor shall be of such dimensions as to produce a finished conductor having a nominal cross-sectional area and diameter as prescribed in Table 1.