Designation: ~~B233 – 97 (Reapproved 2012)~~ B233 – 97 (Reapproved 2016)

Standard Specification for Aluminum 1350 Drawing Stock for Electrical Purposes[1]

This standard is issued under the fixed designation B233; 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 1350 drawing stock 0.375 in. (9.52 mm) to 1.000 in. (25.40 mm) in diameter, in the tempers shown in Table 1, for drawing into wire for electrical conductors (Explanatory Note 1 and Note 2).

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

NOTE 1—Prior to 1975, aluminum 1350 was designated as EC aluminum.

NOTE 2—The aluminum and temper designations conform to ANSI H35.1. Aluminum 1350 corresponds to unified numbering system A91350 in accordance with Practice E527.

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

B354 Terminology Relating to Uninsulated Metallic Electrical Conductors

B557 Test Methods for Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products

B830 Specification for Uniform Test Methods and Frequency

E34 Test Methods for Chemical Analysis of Aluminum and Aluminum-Base Alloys

E55 Practice for Sampling Wrought Nonferrous Metals and Alloys for Determination of Chemical Composition

E227 Test Method for Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys by the Point-to-Plane Technique (Withdrawn 2002)[3]

E527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

2.3 *American National Standard:*[4]

ANSI H35.1 Alloy and Temper Designation Systems for Aluminum

2.4 *National Bureau of Standards:*[5]

NBS Handbook 100 Copper Wire Tables

3. Ordering Information

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

3.1.1 Quantity,

3.1.2 Diameter (see 11.1),

3.1.3 Temper (see Table 1 and Explanatory Note 1 and Note 2),

3.1.4 Whether joints are permitted (see 8.1),

3.1.5 Whether tests of joints are required and number of specimens (see 8.2),

[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.

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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~~standard's Document Summary page on the ASTM website.

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

[4] Available from American National ~~Standard Institute, 11 W. 42nd St., 13th~~Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY ~~10036.~~10036, http://www.ansi.org.

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

TABLE 1 Tensile Property Limits[A]

Temper	Tensile Strength	
	ksi	MPa
1350-O	8.5–14.0	59–97
1350-H12 and -H22	12.0–17.0	83–117
1350-H14 and -H24	15.0–20.0[A]	103–138
1350-H16 and -H26	17.0–22.0[A]	117–152

[A] Applicable to stock sizes through 0.500-in. (12.70-mm) diameter. The values to apply for larger sizes in these tempers shall be negotiated at time of inquiry.

TABLE 2 Chemical Requirements[A]

Element	Composition, %
Silicon, max	0.10
Iron, max	0.40
Copper, max	0.05
Manganese, max	0.01
Chromium, max	0.01
Zinc, max	0.05
Boron, max	0.05
Gallium, max	0.03
Vanadium plus titanium, total, max	0.02
Other elements, each, max	0.03
Other elements, total, max	0.10
Aluminum, min	99.50

[A] Analysis shall regularly be made only for the elements specified in this table. If, however, the presence of other elements is suspected or indicated in amounts greater than the specified limits, further analysis shall be made to determine that these elements are not present in amounts in excess of the specified limits.

TABLE 3 Electrical Resistivity Limits

Temper	Resistivity, Ω·mm ^{2}/m, max	Equivalent Volume Conductivity, % IACS, min
1350-O	0.027899	61.8
1350-H12 and -H22	0.028035	61.5
1350-H14 and -H24	0.028080	61.4
1350-H16 and -H26	0.028126	61.3

TABLE 4 Equivalent Resistivity Values at 20°C[A]

Material	Volume Conductivity, % IACS	Resistivity Constants			
		Volume			
		Ω·mm^2/m	Ω·cmil/ft	μΩ·in.	μΩ·cm
Copper	100	0.017241	10.371	0.67879	1.7241
Aluminum	61.3	0.028126	16.919	1.1073	2.8126
	61.4	0.028080	16.891	1.1055	2.8080
	61.5	0.028035	16.864	1.1037	2.8035
	61.8	0.027899	16.782	1.0984	2.7899

[A] The equivalent resistivity values for 100 % IACS conductivity were each computed from the fundamental IEC value (1/58 Ω·mm^2/m) using conversion factors each accurate to at least seven significant figures. Corresponding values for other conductivities (aluminum) were derived from these by multiplying by the reciprocal of the conductivity ratios accurate to at least seven significant figures.

3.1.6 Coil size and weight (see 14.2),
3.1.7 Whether wrapping of coils is required (see 14.3),
3.1.8 Special marking on tags, if required (see 14.4), and
3.1.9 Whether inspection or witness of inspection and tests by purchaser's representative is required prior to shipment (see Section 13).

4. Manufacture

4.1 Unless otherwise agreed upon at the time of placing the order, the manufacturer shall have the option of producing the stock from either individually cast ingots or continuously cast bars. Only one method of production shall be used on any given order.