



Designation: B 397 – 85 (Reapproved 1999)

Standard Specification for Concentric-Lay-Stranded Aluminum-Alloy 5005-H19 Conductors¹

This standard is issued under the fixed designation B 397; 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.

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

1. Scope

1.1 This specification covers concentric-lay-stranded conductors, made of round aluminum-alloy 5005-H19 (extra-hard) wires, for general use for electrical purposes. These conductors shall be constructed with a central core wire surrounded by one or more layers of helically laid wires (Explanatory Note 1 and Explanatory Note 2).

1.2 The values stated in inch-pound units are to be regarded as the standard, with the exception of resistivity. The SI equivalents of inch-pound units may be approximate.

NOTE 1—The alloy and temper designations conform to ANSI H35.1. Aluminum-alloy 5005 corresponds to unified numbering system alloy A95505 in accordance with Practice E 527.

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:

B 263 Test Method for Determination of Cross-Sectional Area of Stranded Conductors²

B 354 Terminology Relating to Uninsulated Metallic Electrical Conductors²

B 396 Specification for Aluminum-Alloy 5005-H19 Wire for Electrical Purposes²

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications³

E 527 Practice for Numbering Metals and Alloys (UNS)⁴

2.3 American National Standard:

ANSI H35.1 American National Standard Alloy and Temper Designation System is for Aluminum⁵

2.4 National Institute of Standards and Technology:

NBS Handbook 100—Copper Wire Tables⁶

3. Classification

3.1 For the purposes of this specification, conductors are classified as follows (Explanatory Note 1 and Explanatory Note 2):

3.1.1 *Class AA*—For bare conductors usually used in overhead lines.

3.1.2 *Class A*—For conductors to be covered with suitable weather-resistant materials and usually used as line wire or as tree wire.

4. Ordering Information

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

4.1.1 Quantity,

4.1.2 Conductor size: circular-mil area or aluminum 1350 equivalent size (Section 7 and Table 1 or Table 2),

4.1.3 Class (Section 3),

4.1.4 When physical tests shall be made (see 14.2 and 14.4),

4.1.5 Package size (see 16.1),

4.1.6 Special package marking, if required (Section 17),

4.1.7 Heavy wood lagging, if required (see 16.2), and

4.1.8 Place of inspection (Section 15).

4.2 In addition, Supplementary Requirements shall apply only when specified by the purchaser in the inquiry, contract, or purchase order for direct procurement by agencies of the U.S. Government (S2, S3, and S4).

5. Joints

5.1 Joints may be made in the six outer wires of seven-wire conductors by cold-pressure welding or by electric-butt, cold-upset welding, but not by electric-butt welding. Joints are not permitted in the finished center wire of seven-wire conductors.

5.2 Joints may be made in any of the wires in conductors of 19 or more wires by electric-butt welding, cold-pressure welding, or electric-butt, cold-upset welding.

5.3 The minimum distance between a wire joint and another joint either in the same wire or in other wires of the completed conductor shall be as prescribed in Table 3.

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

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² Annual Book of ASTM Standards, Vol 02.03.

³ Annual Book of ASTM Standards, Vol 14.02.

⁴ Annual Book of ASTM Standards, Vol 01.01.

⁵ Available from American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036.

⁶ Available from the National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22161.

TABLE 1 Construction Requirements of Concentric-Lay-Stranded Aluminum-Alloy 5005 Conductor Sized to Have Diameter Equal to ACSR Class AA and Class A^A

NOTE 1—Metric values listed below represent a soft conversion and as such they may not be the same as those metric weights which are calculated from the basic metric density.

Conductor Size, cmil	Approximate Aluminum 1350 Size Having Equivalent Resistance			Size and Stranding of ACSR with Equal Diameter Size				Required Construction				Weight		Rated Strength		
	mm ²	cmil	AWG	mm ²	cmil	AWG	mm ²	Stranding	Num- ber of wires	Diameter of wires, in.	mm ²	Class	lbs/1000 ft	kg/km	KIPS	KN
927 200	469.8	795 000	...	402.8	795 000	...	402.8	26/7	37	0.1583	4.021	AA	873.5	1300.	23.9	106
740 800	375.4	636 000	...	322.3	636 000	...	322.3	26/7	37	0.1415	3.594	AA	697.9	1039.	19.3	85.9
652 400	330.6	556 500	...	282.0	556 500	...	282.0	26/7	19	0.1853	4.707	AA	614.6	914.5	16.2	72.1
587 200	297.5	506 500	...	256.6	556 500	...	282.0	18/1	19	0.1758	4.465	AA	553.2	823.2	14.6	65.0
559 500	283.5	477 000	...	241.7	477 000	...	241.7	26/7	19	0.1716	4.359	AA	527.1	784.3	13.9	61.8
503 600	255.2	434 500	...	220.2	477 000	...	241.7	18/1	19	0.1628	4.135	AA	474.4	705.9	12.5	55.6
465 400	235.8	397 500	...	201.4	397 500	...	201.4	26/7	19	0.1565	3.975	AA	438.4	652.4	12.2	54.3
419 600	212.6	362 000	...	183.4	397 500	...	201.4	18/1	19	0.1486	3.774	AA	395.3	588.2	11.2	49.8
394 500	199.9	336 400	...	170.5	336 400	...	170.5	26/7	19	0.1441	3.660	AA, A	371.7	553.1	10.5	46.7
355 100	179.9	306 400	...	155.3	336 400	...	170.5	18/1	19	0.1367	3.472	A	334.5	497.7	9.60	42.7
312 800	158.5	266 800	...	135.2	266 800	...	135.2	26/7	19	0.1283	3.259	A	297.7	438.4	8.45	37.6
281 400	142.6	242 900	...	123.1	266 800	...	135.2	18/1	19	0.1217	3.091	A	265.1	394.5	7.61	33.9
246 900	125.1	211 600	0000	107.2	211 600	0000	107.2	6/1	7	0.1878	4.770	AA	232.6	346.1	6.33	28.2
195 700	99.16	167 800	000	85.02	167 800	000	85.02	6/1	7	0.1672	4.247	AA, A	184.4	274.3	5.02	22.3
155 400	78.74	133 100	00	67.44	133 100	00	67.44	6/1	7	0.1490	3.785	AA, A	146.4	217.9	4.28	19.0
123 300	62.48	105 600	0	53.51	105 600	0	53.51	6/1	7	0.1327	3.371	AA, A	116.1	172.8	3.44	15.3
77 470	39.25	66 360	2	33.62	66 360	2	33.62	6/1	7	0.1052	2.672	AA, A	72.98	108.6	2.22	9.88
48 690	24.67	41 740	4	21.15	41 740	4	21.15	6/1	7	0.0834	2.118	A	45.87	68.25	1.43	6.36
30 580	15.49	26 240	6	13.30	26 240	6	13.30	6/1	7	0.0661	1.679	A	28.81	42.87	0.922	4.10

^AConversion factors: 1 cmil = 5067 E - 04 mm². 1 in. = 25.4 mm. 1 lbf = 4.448 E - 03 kN. 1 lb/1000 ft = 1.488 E + 00 kg/km. 1 ft = 3.048 E - 01 m. 1 lb = 4.536 E - 01 kg.