



Designation: B 231/B 231M – 99

## Standard Specification for Concentric-Lay-Stranded Aluminum 1350 Conductors<sup>1</sup>

This standard is issued under the fixed designation B 231/B 231M; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

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

### 1. Scope

1.1 This specification covers aluminum 1350-H19 (extra hard), 1350-H16 or -H26 ( $\frac{3}{4}$  hard), 1350-H14 or -H24 ( $\frac{1}{2}$  hard), and 1350-H142 or -H242 ( $\frac{1}{2}$  hard), bare concentric-lay-stranded conductors constructed with a straight round central wire surrounded by one or more layers of helically layed wires. The conductors are for general use for electrical purposes (Explanatory Note 1 and Note 2).

1.2 The values stated in inch-pound or SI units are to be regarded separately as standard. The values in each system are not exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the specification.

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

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

NOTE 2—The aluminum and temper designations conform to ANSI Standard H35.1/H35.1M. Aluminum 1350 corresponds to Unified Numbering System A91350 in accordance with Practice E 527.

NOTE 3—Sealed conductors that are intended to prevent longitudinal water propagation and are further covered/insulated are also permitted within the guidelines of this specification.

### 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 193 Test Method for Resistivity of Electrical Conductor Materials<sup>2</sup>
- B 230/B 230M Specification for Aluminum 1350-H19 Wire for Electrical Purposes<sup>2</sup>
- B 263 Test Method for Determination of Cross-Sectional Area of Stranded Conductors<sup>2</sup>
- B 354 Terminology Relating to Uninsulated Metallic Electrical Conductors<sup>2</sup>

<sup>1</sup> 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.

Current edition approved April 10, 1999. Published June 1999. Originally published as B 231 – 48 T. Last previous edition B 231 – 95.

<sup>2</sup> Annual Book of ASTM Standards, Vol 02.03.

B 609/B 609M Specification for Aluminum 1350 Round Wire, Annealed and Intermediate Tempers, for Electrical Purposes<sup>2</sup>

B 682 Specification for Standard Metric Sizes of Electrical Conductors<sup>2</sup>

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications<sup>3</sup>

E 527 Practice for Numbering Metals and Alloys (UNS)<sup>4</sup>

#### 2.3 ANSI Documents:

ANSI H35.1 American National Standard Alloy and Temper Designation System for Aluminum<sup>5</sup>

ANSI H35.1M American National Standard Alloy and Temper Designation Systems for Aluminum [Metric]<sup>5</sup>

#### 2.4 NIST Document:

NBS Handbook 100—Copper Wire Tables<sup>6</sup>

#### 2.5 Aluminum Association Document:

Publication 50, Code Words for Overhead Aluminum Electrical Conductors<sup>7</sup>

### 3. Classification

3.1 For the purpose of this specification, conductors are classified as follows (Explanatory Note 1 and 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 weather-resistant materials, and for bare conductors where greater flexibility than is afforded by Class AA is required. Conductors intended for further fabrication into tree wire or to be insulated and laid helically with or around aluminum or ACSR messengers, shall be regarded as Class A conductors with respect to direction of lay only (see 7.4).

3.1.3 *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.

<sup>3</sup> Annual Book of ASTM Standards, Vol 14.02.

<sup>4</sup> Annual Book of ASTM Standards, Vol 01.01.

<sup>5</sup> Available from American National Standards Institute, 11 West 42nd St., 13th Floor, New York, NY 10036.

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

<sup>7</sup> Available from the Aluminum Association, Inc., 900 19th Street, NW, Suite 300, Washington, DC 20006.

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

**TABLE 1 Construction Requirements and Recommended Reel Sizes and Shipping Lengths of Aluminum Conductors, Concentric-Lay-Stranded, Class AA, and Class A**

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

Conductor Size				Required Construction		Mass		Rated Strength		Recommended Package Sizes <sup>A</sup>			
cmils <sup>B</sup> or AWG	mm <sup>2</sup>	Code Words <sup>C</sup>	Class	Number of Wires	Diameter of Wire		Per 1000 ft, lb	Per km, kg	kips	kN	Reel Designation <sup>D</sup>	Nominal Length of Each Piece, ft <sup>B</sup>	Nominal Mass of Each Length, lb <sup>B</sup>
					in.	mm							
3 500 000	1 773	Bluebonnet	A	127	0.1660	4.22	3 345	4 977	58.7	261	RMT 90.45	2 840	9 530
3 000 000	1 520	Trillium	A	127	0.1537	3.90	2 840	4 226	50.3	223	RMT 90.45	3 350	9 530
2 750 000	1 393	Bitterroot	A	91	0.1738	4.42	2 602	3 872	46.1	205	RMT 90.45	3 490	9 100
2 500 000	1 267	Lupine	A	91	0.1657	4.21	2 365	3 519	41.9	186	RMT 90.45	3 840	9 100
2 250 000	1 140	Sagebrush	A	91	0.1572	3.99	2 128	3 166	37.7	167	RMT 90.45	4 270	9 100
2 000 000	1 013	Cowslip	A	91	0.1482	3.77	1 873	2 787	34.2	153	RMT 90.45	4 850	9 100
1 750 000	886.7	Jessamine	AA	61	0.1694	4.30	1 641	2 442	29.7	132	RMT 90.45	5 940	9 760
1 590 000	805.7	Coreopsis	AA	61	0.1614	4.10	1 489	2 216	27.0	120	RMT 90.45	6 540	9 760
											RM 68.38	3 270	4 880
1 510 500	765.4	Gladiolus	AA, A	61	0.1574	4.00	1 417	2 108	25.6	114	RMT 90.45	6 880	9 760
											RM 68.38	3 440	4 880
1 431 000	725.1	Carnation	AA, A	61	0.1532	3.89	1 342	1 997	24.3	108	RMT 90.45	7 270	9 760
											RM 68.38	3 635	4 880
1 351 000	694.8	Columbine	AA, A	61	0.1488	3.78	1 266	1 884	23.4	104	RMT 90.45	7 690	9 760
											RM 68.38	3 845	4 880
1 272 000	644.5	Narcissus	AA, A	61	0.1444	3.67	1 192	1 774	22.0	98.1	RMT 90.45	8 170	9 760
											RM 68.38	4 085	4 880
1 192 500	604.2	Hawthorn	AA, A	61	0.1398	3.55	1 117	1 662	21.1	93.5	RMT 90.45	9 340	9 760
											RM 68.38	4 360	4 880
1 113 000	564.0	Marigold	AA, A	61	0.1351	3.43	1 044	1 553	19.7	87.3	RMT 90.45	9 340	9 760
											RM 68.38	4 670	4 880
1 033 500	523.7	Bluebell	AA	37	0.1671	4.25	968.4	1 441	17.7	78.8	RMT 84.45	7 630	7 400
											RM 66.32	3 815	3 700
											NR 48.28	1 910	1 850
1 033 500	523.7	Larkspur	A	61	0.1302	3.31	969.2	1 442	18.3	81.3	RMT 90.45	10 060	9 760
											RM 68.38	5 030	4 880
1 000 000	506.7	Hawkweed	AA	37	0.1644	4.18	937.3	1 395	17.2	76.2	RMT 84.45	7 880	7 400
											RM 66.32	3 940	3 700
											NR 48.28	1 970	1 850
1 000 000	506.7	Camellia	A	61	0.1280	3.25	936.8	1 394	17.7	78.3	RMT 90.45	10 400	9 760
											RM 68.38	5 200	4 880
954 000	483.4	Magnolia	AA	37	0.1606	4.08	894.5	1 331	16.4	72.6	RMT 84.45	8 260	7 400
											RM 66.32	4 130	3 700
											NR 48.28	2 065	1 850
954 000	483.4	Goldenrod	A	61	0.1251	3.18	894.8	1 331	16.9	75.0	RMT 90.45	10 900	9 760
											RM 68.38	5 450	4 880
900 000	456.0	Cockscomb	AA	37	0.1560	3.96	844.0	1 256	16.4	68.4	RMT 84.45	8 760	7 400
											RM 66.32	4 390	3 700
											NR 48.28	2 190	1 850
900 000	456.0	Snapdragon	A	61	0.1215	3.09	844.0	1 256	15.9	70.8	RMT 90.45	11 550	9 760
											RM 68.38	5 775	4 880
795 00	402.8	Arbutus	AA	37	0.1466	3.72	745.3	1 109	13.9	61.8	RMT 84.45	9 920	7 400
											RM 66.32	4 960	3 700
											NR 48.28	2 480	1 850
795 000	402.8	Lilac	A	61	0.1142	2.90	745.7	1 110	14.3	63.8	RMT 90.45	13 080	9 760
											RM 68.38	6 540	4 880
750 000	380.0	Petunia	AA	37	0.1424	3.62	703.2	1 046	13.1	58.6	RMT 84.45	10 510	7 400
											RM 66.32	5 255	3 700
											NR 48.28	2 630	1 850
750 000	380.0	Cattail	A	61	0.1109	2.82	703.2	1 046	13.5	60.3	RMT 90.45	13 860	9 760
											RM 68.38	6 930	4 880
715 500	362.6	Violet	AA	37	0.1391	3.53	671	998.5	12.8	56.7	RTM 84.45	11 020	7 400
											RM 66.32	5 510	3 700
											NR 48.28	2 755	1 850
715 500	362.6	Nasturtium	A	61	0.1083	2.75	671	998.5	13.1	58.4	RMT 90.45	14 530	9 760
											RM 68.38	7 265	4 880
700 000	354.7	Verbena	AA	37	0.1375	3.49	655.7	975.7	12.5	55.4	RMT 84.45	11 260	7 400
											RM 66.32	5 630	3 700
											NR 48.28	2 815	1 850

**TABLE 1** *Continued*

Conductor Size		Required Construction				Mass		Rated Strength		Recommended Package Sizes <sup>A</sup>			
cmils <sup>B</sup> or AWG	mm <sup>2</sup>	Code Words <sup>C</sup>	Class	Number of Wires	Diameter of Wire		Per 1000 ft, lb	Per km, kg	kips	kN	Reel Designation <sup>D</sup>	Nominal Length of Each Piece, ft <sup>E</sup>	Nominal Mass of Each Length, lb <sup>E</sup>
					in.	mm							
700 000	354.7	Flag	A	61	0.1071	2.72	655.8	975.8	12.9	57.1	RMT 90.45 RM 68.38	14 850 7 425	9 760 4 880
650 000	329.4	Heuchera	AA	37	0.1326	3.37	609.8	907.4	11.6	51.7	RMT 84.45 RM 66.32 NR 48.28	12 130 6 065 3 035	7 400 3 700 1 850
636 000	322.3	Orchid	AA, A	37	0.1311	3.33	596.0	886.9	11.4	50.4	RMT 84.45 RM 66.32 NR 48.28	12 400 6 200 3 100	7 400 3 700 1 850
600 000	304.0	Meadowsweet	AA, A	37	0.1273	3.23	562.0	836.3	10.7	47.5	RMT 84.45 RM 66.32 NR 48.28	13 140 6 570 3 285	7 400 3 700 1 850
556 500	282.0	Dahlia	AA	19	0.1711	4.35	521.4	775.8	9.75	43.3	RM 66.32 NR 48.28 NR 42.28	7 270 3 635 2 425	3 800 1 900 1 265
556 500	282.0	Mistletoe	A	37	0.1226	3.12	521.3	775.7	9.94	44.3	RMT 84.45 RM 66.32 NR 48.28	14 170 7 085 3 545	7 400 3 700 1 850
500 000	253.3	Zinnia	AA	19	0.1622	4.12	468.5	697.1	8.76	38.9	RM 66.32 NR 48.28 NR 42.28	8 100 4 050 2 700	3 800 1 900 1 265
500 000	253.3	Hyacinth	A	37	0.1162	2.95	468.3	696.8	9.11	40.5	RMT 84.45 RM 66.32 NR 48.28	15 760 7 880 3 940	7 400 3 700 1 850
477 000	241.7	Cosmos	AA	19	0.1584	4.02	446.8	664.8	8.36	37.0	RM 66.32 NR 48.28 NR 42.28	8 490 4 245 2 830	3 800 1 900 1 265
477 000	241.7	Syringa	A	37	0.1135	2.88	446.8	664.8	8.69	38.6	RMT 84.45 RM 66.32 NR 48.28	16 530 8 265 4 135	7 400 3 700 1 850
450 000	228.0	Goldentuft	AA	19	0.1539	3.91	421.8	627.6	7.89	35.0	RM 66.32 NR 48.28 NR 42.28	9 000 4 500 3 000	3 800 1 900 1 265
397 500	201.4	Canna	AA, A	19	0.1447	3.67	372.9	554.9	7.11	31.6	RM 66.32 NR 48.28 NR 42.28	10 180 5 090 3 395	3 800 1 900 1 265
350 000	177.3	Daffodil	A	19	0.1357	3.45	327.9	487.9	6.39	28.4	RM 66.32 NR 48.28 NR 42.28	11 560 5 780 3 855	3 800 1 900 1 265
336 400	170.5	Tulip	A	19	0.1331	3.38	315.5	469.5	6.15	27.3	RM 66.32 NR 48.28 NR 42.28	12 030 6 015 4 010	3 800 1 900 1 265
300 000	152.0	Peony	A	19	0.1257	3.19	281.4	418.3	5.48	24.3	RM 66.32 NR 48.28 NR 42.28	13 490 6 745 4 495	3 800 1 900 1 265
266 800	135.2	Daisy	AA	7	0.1953	4.96	250.2	372.3	4.83	21.4	NR 42.28 NR 36.22	5 590 2 795	1 400 700
266 800	135.2	Laurel	A	19	0.1185	3.01	250.1	372.2	4.97	22.1	RM 66.32 NR 48.28 NR 42.28	15 170 7 585 5 055	3 800 1 900 1 265
250 000	126.7	Sneezewort	AA	7	0.1890	4.80	234.4	348.8	4.52	20.1	NR 42.28 NR 36.22	5 970 2 985	1 400 700
250 000	126.7	Valerian	A	19	0.1147	2.91	234.3	348.6	4.66	20.7	RM 66.32 NR 48.28 NR 42.28	16 190 8 095 5 395	3 800 1 900 1 265
4/0	107.2	Oxlip	AA, A	7	0.1739	4.42	198.4	295.2	3.83	17.0	NR 42.28 NR 36.22	7 050 3 525	1 400 700
3/0	85.0	Phlox	AA, A	7	0.1548	3.93	157.2	233.9	3.04	13.5	NR 42.28 NR 36.22	8 890 4 445	1 400 700
2/0	67.4	Aster	AA, A	7	0.1379	3.50	124.8	185.7	2.51	11.1	NR 42.28 NR 36.22	11 210 5 605	1 400 700

**TABLE 1** *Continued*

Conductor Size				Required Construction		Mass		Rated Strength		Recommended Package Sizes <sup>A</sup>				
cmils <sup>B</sup> or AWG	mm <sup>2</sup>	Code Words <sup>C</sup>	Class	Number of Wires	Diameter of Wire		Per 1000 ft, lb	Per km, kg	kips	kN	Reel Designation <sup>D</sup>	Nominal Length of Each Piece, ft <sup>B</sup>	Nominal Mass of Each Length, lb <sup>B</sup>	
					in.	mm								
1/0	53.5	Poppy	AA, A	7	0.1228	3.12	98.9	147.2	1.99	8.84	NR 42.28	14 130	1 400	
1	42.4	Pansy	AA, A	7	0.1093	2.78	78.4	116.6	1.64	7.30	NR 36.22	7 065	700	
2	33.6	Iris	AA, A	7	0.0974	2.47	62.2	92.6	1.35	5.99	NR 36.22	8 915	700	
4	21.1	Rose	A	7	0.0772	1.96	39.1	58.2	0.881	3.91	NR 42.28	22 470	1 400	
6	13.3	Peachbell	A	7	0.0612	1.56	24.6	36.6	0.563	2.53	NR 36.22	11 235	700	
											NR 42.28	35 710	1 400	
											NR 36.22	17 855	700	
											NR 42.28	56 910	1 400	
											NR 36.22	28 455	700	

<sup>A</sup> For information only.

<sup>B</sup> Conversion factors: 1 cmil = 5.067 E-04 mm<sup>2</sup>, 1 mil + 2.54 E-02 mm, 1 lb/1000 ft = 1.488 E+00 kg/km, 1 ft = 3.048 E-01 m, 1 lb = 4.536 E-01 kg, 1 lbf = 4.448 E-03 kN.

<sup>C</sup> Code words shown in this column are from, "Publication 50, Code Words for Overhead Aluminum Electrical Conductors," by the Aluminum Association. They are provided here for information only.

<sup>D</sup> See Table 9 for dimensions of standard reels.

#### 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: square millimetres, if cross-sectional area is specified as a requirement (Section 8 and Tables 1-4),

4.1.2.1 Conductor size, number and diameter of wires for Class B, C, or D conductors, if cross-sectional area is not specified as a requirement (see 8.2),

4.1.3 Class (see 3.1),

4.1.4 Temper (see 5.1),

4.1.5 Details of special-purpose lays, when required (see 7.2 through 7.5),

4.1.6 Special tension tests if required (see 14.1 and 15.1),

4.1.7 Package size and type (see 17.1 and Table 1 or Table 2),

4.1.8 Special package marking, if required (Section 19),

4.1.9 Heavy wood lagging if required (see 18.2),

4.1.10 Place of inspection (Section 17), and

4.1.11 Method of cross-sectional area determination if not optional (see 12.1).

#### 5. Requirements for Wires

5.1 Aluminum wire employed in Classes AA and A conductors shall be 1350-H19, unless otherwise specified. The purchaser shall designate the temper of conductors of Classes B, C, and D.

5.1.1 For conductor tempers other than 1350-H19, when temper designations are not more specific in the inquiry and purchase order, the manufacturer shall have the following options on manufacturing method:

5.1.1.1 Strand the conductor from wires drawn to final temper;

5.1.1.2 Strand the conductor from wires drawn to H19 temper and annealed to final temper prior to stranding;

5.1.1.3 Strand the conductor from 1350-H19 wires and anneal the stranded conductor to final temper.

5.2 Before stranding, the aluminum wire used shall meet the requirements of Specifications B 230/B 230M or B 609/B 609M, whichever is applicable.

5.3 All wires in the conductor shall be of the same temper.

#### 6. Joints

6.1 Only cold-pressure joints or electric-butt, cold-upset joints may be made in the six outer finished wires of (1) Class AA conductors composed of seven wires or (2) Class A conductors composed of seven wires used in overhead lines. In other conductors, electric-butt welds, cold-pressure welds, or electric-butt, cold-upset welds may be made in the finished wires composing conductors, but such welds shall not be closer than prescribed in Table 5 (Explanatory Note 3).

#### 7. Lay

7.1 For Class AA conductors composed of seven wires or more the preferred lay of a layer of wires is 13.5 times the outside diameter of that layer, but the lay shall be not less than 10 nor more than 16 times this diameter.

7.2 For all other classes the lay of a layer of wires 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.

7.2.1 For conductors to be used in covered or insulated wires or cables, the lay length of the wires shall not be 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 outer two layers shall be at the option of the manufacturer, unless otherwise agreed upon.

7.3 Other lays for special purposes shall be furnished by special agreement between the manufacturer and the purchaser (Explanatory Note 4).

7.4 The direction of lay of the outer layer shall be right-hand for Classes AA and A and left-hand for other classes, unless the direction of lay is specified otherwise by the purchaser.

**TABLE 2 Construction Requirements and Recommended Reel Sizes and Shipping Lengths of Aluminum Conductors, Concentric Lay-Stranded, Classes AA and A**

NOTE 1—Sizes selected from Specification B 682.

Conductor Size, mm <sup>2</sup>	Class	Stranding			Rated Strength 1350-H19, kN	Recommended Package Sizes <sup>A</sup>		
		Number of Wires	Diameter, mm	Mass, kg/km		Reel Designation <sup>B</sup>	Nominal Length of Each Piece, m	Nominal Mass of Each Length, kg
2000	A	127	4.48	5 632	294	RMT 90.45	770	4325
1600	A	127	4.01	4 512	236	RMT 90.45	960	4325
1250	A	91	4.18	3 479	183	RMT 90.45	1185	4130
1120	A	91	3.96	3 123	165	RMT 90.45	1320	4130
1000	A	91	3.74	2 785	151	RMT 90.45	1495	4130
900	AA	61	4.33	2 478	133	RMT 90.45	1785	4425
800	AA, A	61	4.09	2 211	119	RMT 90.45	2000	4425
						RM 68.38	1000	2215
710	AA, A	61	3.85	1 959	105	RMT 90.45	2260	4425
						RM 68.38	1130	2215
630	AA, A	61	3.63	1 742	96.6	RMT 90.45	2540	4425
						RM 68.38	1270	2215
560	AA, A	61	3.42	1 546	85.7	RMT 90.45	2860	4425
						RM 68.38	1430	2215
500	AA	37	4.15	1 381	75.1	RMT 84.45	2430	3355
						RM 66.32	1215	1680
						NR 48.28	610	840
500	A	61	3.23	1 379	76.5	RMT 90.45	3210	4425
						RM 68.38	1605	2215
450	AA	37	3.94	1 245	67.7	RMT 84.45	2695	3355
						RM 66.32	1350	1680
						NR 48.28	675	840
450	A	61	3.06	1 238	68.6	RMT 90.45	3575	4425
						RM 68.38	1790	2215
400	AA	37	3.71	1 104	61.9	RMT 84.45	3040	3355
						RM 66.32	1520	1680
						NR 48.28	760	840
400	A	61	2.89	1 104	63.0	RMT 90.45	4010	4425
						RM 68.38	2005	2215
355	AA	37	3.50	982	55.1	RMT 84.45	3415	3355
						RM 66.32	1710	1680
						NR 48.28	855	840
355	A	61	2.72	978	57.4	RMT 90.45	4525	4425
						RM 68.38	2265	2215
315	AA, A	37	3.29	868	48.7	RMT 84.45	3865	3355
						RM 66.32	1935	1680
						NR 48.28	970	840
280	AA	19	4.33	772	42.9	RM 66.32	2235	1725
						NR 48.28	1115	860
						NR 42.28	745	575
280	A	37	3.10	771	43.2	RMT 84.45	4350	3355
						RM 66.32	2180	1680
						NR 48.28	1090	840
250	AA	19	4.09	689	38.3	RM 66.32	2505	1725
						NR 48.28	1250	860
						NR 42.28	835	575
250	A	37	2.93	688	39.7	RMT 84.45	875	3355
						RM 66.32	2440	1680
						NR 48.28	1220	840
224	AA	19	3.87	617	34.3	RM 66.32	2795	1725
						NR 48.28	1395	860
						NR 42.28	930	575
200	AA, A	19	3.66	552	31.6	RM 66.32	3125	1725
						NR 48.28	1560	860
						NR 42.28	1040	575
180	A	19	3.47	496	28.4	RM 66.32	3480	1725
						NR 48.28	1730	860
						NR 42.28	1160	575
160	A	19	3.27	440	25.2	RM 66.32	3920	1725
						NR 48.28	1955	860
						NR 42.28	1305	575
140	AA	7	5.05	387.0	22.2	NR 42.28	1640	635
						NR 36.22	830	320
140	A	19	3.06	386	22.1	RM 66.32	4470	1725
						NR 48.28	2230	860
						NR 42.28	1490	575
125	AA	7	4.77	345	19.8	NR 42.28	1840	635
						NR 36.22	930	320



**TABLE 3 Construction Requirements of Aluminum Conductors, Concentric-Lay-Stranded, Class B, C, and D**

Conductor Size		Hard-Drawn Copper Equivalent		Stranding						Reverse Concentric Compressed Class B Diameter, in.	Unilay Compressed Class B Diameter, in.	Direct Current Resistance at 20°C	
cmils <sup>A</sup>	AWG	cmils <sup>A</sup>	AWG	Class B		Class C		Class D				Ω/1000 ft	Ω/km
				Number of Wires	Diameter of Wire, mils <sup>B</sup>	Number of Wires	Diameter of Wire, mils <sup>A</sup>	Number of Wires	Diameter of Wire, mils <sup>A</sup>				
4 000 000	...	2 520 000	...	217	135.8	271	121.5	271	121.5	...	...	0.00442	0.0145
3 500 000	...	2 200 000	...	169	143.9	217	127.0	271	113.6	...	...	0.00505	0.0166
3 000 000	...	1 890 000	...	169	133.2	217	117.6	271	105.2	...	...	0.00584	0.0192
2 500 000	...	1 570 000	...	127	140.3	169	121.6	217	107.3	...	...	0.00701	0.0229
2 000 000	...	1 260 000	...	127	125.5	169	108.8	217	96.0	1.583	1.533	0.00867	0.0284
1 900 000	...	1 195 000	...	127	122.3	169	106.0	217	93.6	1.542	1.494	0.00913	0.0299
1 800 000	...	1 132 000	...	127	119.1	169	103.2	217	91.1	1.502	1.454	0.00963	0.0316
1 750 000	...	1 101 000	...	127	117.4	169	101.8	217	89.8	1.480	1.434	0.0099	0.0325
1 700 000	...	1 069 000	...	127	115.7	169	100.3	217	88.5	1.459	1.413	0.0102	0.0335
1 600 000 <sup>C</sup>	...	1 006 000	...	127	112.2	169	97.3	217	85.9	1.415	1.371	0.0109	0.0357
1 500 000	...	943 000	...	91	128.4	127	108.7	169	94.2	1.370	1.327	0.0116	0.0380
1 400 000	...	880 000	...	91	124.0	127	105.0	169	91.0	1.323	1.282	0.0124	0.0407
1 300 000	...	818 000	...	91	119.5	127	101.2	169	87.7	1.275	1.236	0.0133	0.0436
1 250 000 <sup>C</sup>	...	786 000	...	91	117.2	127	99.2	169	86.0	1.250	1.212	0.0138	0.0453
1 200 000	...	755 000	...	91	114.8	127	97.2	169	84.3	1.225	1.187	0.0144	0.0472
1 100 000	...	692 000	...	91	109.9	127	93.1	169	80.7	1.173	1.137	0.0158	0.0518
1 000 000 <sup>B</sup>	...	629 000	...	61	128.0	91	104.8	127	88.7	1.117	1.084	0.0173	0.0568
900 000	...	566 000	...	61	121.5	91	99.4	127	84.2	1.060	1.028	0.0193	0.0633
800 000 <sup>C</sup>	...	503 000	...	61	114.5	91	93.8	127	79.4	1.000	0.969	0.0217	0.0712
750 000	...	472 000	...	61	110.9	91	90.8	127	76.8	0.968	0.939	0.0231	0.0758
700 000	...	440 000	...	61	107.1	91	87.7	127	74.2	0.935	0.907	0.0248	0.0814
650 000	...	409 000	...	61	103.2	91	84.5	127	71.5	0.901	0.874	0.0267	0.0876
636 000	...	400 000	...	...	...	...	...	...	...	...	...	...	...
600 000	...	377 000	...	61	99.2	91	81.2	127	68.7	0.866	0.840	0.0289	0.0948
550 000	...	346 000	...	61	95.0	91	77.7	127	65.8	0.829	0.804	0.0315	0.103
500 000	...	314 000	...	37	116.2	61	90.5	91	74.1	0.789	0.766	0.0347	0.114
477 000	...	300 000	...	...	...	...	...	...	...	...	...	...	...
450 000	...	283 000	...	37	110.3	61	85.9	91	70.3	0.749	0.727	0.0385	0.126
400 000 <sup>C</sup>	...	252 000	...	37	104.0	61	81.0	91	66.3	0.706	0.685	0.0434	0.142
350 000	...	220 000	...	37	97.3	61	75.7	91	62.0	0.661	0.641	0.0495	0.162
336 400	...	...	0000	...	...	...	...	...	...	...	...	...	...
300 000	...	188 700	...	37	90.0	61	70.1	91	57.4	0.611	0.594	0.0578	0.187
266 800	...	...	000	...	...	...	...	...	...	...	...	...	...
250 000	...	157 200	...	37	82.2	61	64.0	91	52.4	0.558	0.542	0.0694	0.228
211 600	0000	...	00	19	105.5	37	75.6	61	58.9	0.512	0.498	0.0820	0.269
167 800	000	...	0	19	94.0	37	67.3	61	52.4	0.456	0.443	0.103	0.338
133 100	00	...	1	19	83.7	37	60.0	61	46.7	0.405	0.395	0.130	0.427
105 600	0	...	2	19	74.5	37	53.4	61	41.6	0.362	0.352	0.164	0.538
83 690	1	...	3	19	66.4	37	47.6	61	37.0	0.322	0.313	0.207	0.679
66 360	2	...	4	7	97.4	19	59.1	37	42.4	0.283	...	0.261	0.856
52 620	3	...	5	7	86.7	19	52.6	37	37.7	0.252	...	0.330	1.08
41 740	4	...	6	7	77.2	19	46.9	37	33.6	0.225	...	0.416	1.36
33 090	5	...	7	7	68.8	19	41.7	37	29.9	0.200	...	0.523	1.72
26 240	6	...	8	7	61.2	19	37.2	37	26.6	0.178	...	0.661	2.17
20 820	7	...	9	7	54.5	19	33.1	37	23.7	0.159	...	0.834	2.74
16 510	8	...	10	7	48.6	19	29.5	37	21.1	0.142	...	1.05	3.44
13 090	9	...	11	7	43.2	19	26.2	37	18.8	0.126	...	1.32	4.33
10 380	10	...	12	7	38.5	19	23.4	37	16.7	0.113	...	1.67	5.48
	11	...	...	...	...	...	...	...	...	0.100	...	2.11	6.92
6 530	12	...	14	7	30.5	19	18.5	37	13.3	0.089	...	2.67	8.76
	13	...	...	...	...	...	...	...	...	0.080	...	3.34	10.96
4 110	14	...	16	7	24.2	19	14.7	37	10.5	0.071	...	4.22	13.8
2 580	16	...	18	7	19.2	19	11.7	...	...	...	...	6.71	22.0
1 620	18	...	20	7	15.2	...	...	...	...	...	...	10.7	35.1
1 020	20	...	22	7	12.1	...	...	...	...	...	...	16.9	55.4

<sup>A</sup> See Footnote B of Table 1.

<sup>B</sup> This size is sensibly equivalent to size 1 033 500 cmils within a difference of 3.24 %.

<sup>C</sup> These sizes are sensibly equivalent to sizes 1 590 000; 1 272 000; 795 000; and 397 500 cmil respectively within the cross-sectional area tolerances stipulated by this specification and associated Specifications B 230/B 230M and B 609/B 609M.