



Designation: **B 549 – 9300**

## Standard Specification for Concentric-Lay-Stranded Aluminum Conductors, Aluminum- Clad Steel Reinforced (ACSR/AW)<sup>1</sup>

This standard is issued under the fixed designation B 549; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This specification covers concentric-lay-stranded conductors made from round aluminum 1350-H19 (extra hard) aluminum wires and round aluminum-clad steel core wires for use as overhead electrical conductors (Explanatory Note 1 and Note 2).

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

~~NOTE 2—Aluminum 1350 corresponds to Unified Numbering System A91350 in accordance with Practice E 527.~~

1.2 ~~The SI values stated in inch-pound units of density and resistivity are to be regarded as standard. For all other properties the inch-pound units are regarded as standard with the exception of density and resistivity. The values given in parentheses are for information only; the SI units may be approximate.~~

### 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:*

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<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.

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- B 230 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>
- B 502 Specification for Aluminum-Clad Steel Core Wire for Aluminum Conductors, Aluminum-Clad Steel Reinforced<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 Standards:*<sup>4</sup>

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

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

*Annual Book of ASTM*

<sup>4</sup> Available from the American National Standards, ~~Vol 04-01:~~ Institute, 11 West 42nd St., 13th Floor, New York, NY 10036.

ANSI C 42.100 Dictionary of Electrical and Electronics Terms  
 ANSI H 35.1 American National Standard Alloy and Temper Designation Systems for Aluminum  
 2.4 ~~Other Document:~~ Standard:

*NBS Handbook 100—Copper Wire Tables of the National Bureau of Standards*<sup>5</sup>

**3. Terminology**

3.1 *Description of Terms Specific to This Standard*

3.1.1 ACSR covered by this specification has one type of steel core wire which is designated by the following abbreviation (Explanatory Note 2):

3.1.1.1 ACSR/AW—ACSR using aluminum-clad steel wire (Explanatory Note 2).

**4. Classification**

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

4.1.1 *Class AA*—For bare conductors usually used in overhead lines. These conductors are used as follows:

4.1.1.1 Conductors used for regular overhead line construction and

4.1.1.2 Conductors having a high ratio of mechanical strength to current-carrying capacity used for overhead ground wires and for extra-long span construction.

4.1.2 *Class A*—For conductors to be covered with weather-resistant (weatherproof) materials.

**5. Ordering Information**

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

- 5.1.1 Quantity of each size, stranding, and class,
- 5.1.2 Conductor size: circular mil area or AWG of aluminum wires (Section 9 and Table 1),
- 5.1.3 Number of wires, aluminum and aluminum-clad steel (Table 1),
- 5.1.4 Direction of lay of outer layer of aluminum wires if other than right-hand (see 8.2),
- 5.1.5 Special tests, if required (see 15.3 and 15.5),
- 5.1.6 Package size (see 17.1 and Explanatory Note ~~3~~, 5),
- 5.1.7 Special package marking, if required (Section 17),
- 5.1.8 Lagging, if required (see 17.3), and
- 5.1.9 Place of inspection (Section 16).

5.2 ~~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 (S1, S2, and S3).~~

**6. Requirement for Wires**

6.1 Before stranding, the aluminum wires used shall meet all the requirements of Specification B 230.

6.2 Before stranding, the aluminum-clad steel core wires used shall meet all the requirements of Specification B 502.

**7. Joints**

7.1 Electric-butt welds, cold-pressure welds, or electric-butt, cold-upset welds in the finished individual aluminum wires composing the conductor may be made during the stranding process. No weld shall occur within 50 ft (15 m) of a weld in the same wire or in any other wire of the completed conductor (Explanatory Note ~~4~~, 1).

7.2 There shall be no joints of any kind made in the finished aluminum-clad steel wires.

**TABLE 1 Construction Requirements of Concentric-Lay-Stranded Aluminum Conductors, Aluminum-Clad Steel Reinforced<sup>A</sup>**

NOTE 1—The sizes in boldface indicate more commonly used sizes.— (+) indicates conductors with high strength to current capacity ratios.

Conductor Size (Aluminum Wire) Class				Stranding				Rated Strength				Linear Density			
Mass per Unit Length	cmil	Code Name	AWG/mm <sup>2</sup>	Aluminum		Number of Wires	Aluminum-clad Steel		Aluminum-Clad Steel		lb/10 000 ft	kg/km	Nominal Diameter lb/1000 ft	kg/km	kip (1000 lb)
				mm	Class		Nominal Diameter		kip (1000 lb)	kN					
							mm	mm							
in.	mm	in.	mm	kN	lb/1000 ft	kg/km	mm	mm	mm	mm	kip	kg/km	ft	kg/km	(1000 lb)

<sup>5</sup> Available from the American National Standards Institute, 11 West 42nd St., 13th Floor, New York, NY 10036. Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22161.

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2312000	...	-1174	1171.49	AA	76	0.1744	4.430	19	0.0814	2.068	55.3	246	2472	3678		
2312000	Thrasher/AW	...	1171.49	AA	76	0.1744	4.4298	19	0.0814	2.068	55.3	246.0	2472	3679		
2167000	...	-1098	1098.02	AA	72	0.1735	4.407	-7	0.1157	2.939	49.1	219	2262	3367		
2167000	Kiwi/AW	...	1098.02	AA	72	0.0174	0.4407	7	0.1157	2.939	49.1	218.4	2262	3366		
2156000	...	-1092	Bluebird/AW	...	1092.45	AA	84	0.1602	4.069	19	0.0961	2.441	59.0	262	2437	3626
2156000	...	-1092	Bluebird/AW	...	1092.45	AA	84	0.1602	4.0691	19	0.0961	2.441	59.0	262.4	2437	3627
1780000	901-9	...	901.93	AA	84	0.1456	3.698	19	0.0874	2.220	49.4	220	2013	2995		
1780000	Chukar/AW	...	901.93	AA	84	0.1456	3.6982	19	0.0874	2.220	49.4	219.7	2013	2996		
1590000	...															
1590000	805-7	...	805.65	AA	54	0.1716	4.359	19	0.1030	2.616	53.0	236	1960	2917		
1590000	Falcon/AW	...	805.65	AA	54	0.1716	4.3586	19	0.1030	2.616	53.0	235.7	1960	2917		
1590000	805-7	...	805.65	AA	45	0.1880	4.775	-7	0.1253	3.183	41.8	186	1746	2598		
1590000	Lapwing/AW	...	805.65	AA	45	0.1880	4.7752	7	0.1253	3.183	41.8	185.9	1746	2598		
1510000	...	765.1	765.37	AA	54	0.1672	4.247	19	0.1003	2.548	50.3	224	1860	2768		
1510500	Parrot/AW	...	765.37	AA	54	0.1672	4.2469	19	0.1003	2.548	50.3	223.7	1860	2768		
1510000	...	765.1	765.37	AA	45	0.1832	4.653	-7	0.1221	3.101	39.7	176	1658	2467		
1510500	Nuthatch/AW	...	765.37	AA	45	0.1832	4.6533	7	0.1221	3.101	39.7	176.8	1658	2467		
1431000	725.1	...	725.09	AA	54	0.1628	4.135	19	0.0977	2.482	47.7	212	1764	2625		
1431000	Plover/AW	...	725.09	AA	54	0.1628	4.1351	19	0.0977	2.482	47.7	212.2	1764	2625		
1431000	725.1	...	725.09	AA	45	0.1783	4.529	-7	0.1189	3.020	37.6	167	1570	2337		
1431000	Bobolink/AW	...	725.09	AA	45	0.1783	4.5288	7	0.1189	3.020	37.6	167.2	1570	2336		
1351000	...															
1351500	684-6	...	684.81	AA	54	0.1582	4.018	19	0.0949	2.410	45.1	200	1665	2478		
1351500	Martin/AW	...	684.81	AA	54	0.1582	4.0183	19	0.0949	2.410	45.1	200.6	1665	2478		
1351000	...	684.6	684.81	AA	45	0.1733	4.402	-7	0.1155	2.934	35.5	158	1483	2207		
1351500	Dipper/AW	...	684.81	AA	45	0.1733	4.4018	7	0.1155	2.934	35.5	157.9	1483	2207		
1272000	...	644.5	AA	54	0.1535	3.899	19	0.0921	2.339	42.4	189	1568	2333-1568	2333		
1272000	Pheasant/AW	...	644.52	AA	54	0.1535	3.8989	19	0.0921	2.339	42.4	188.6	1568	2333		
1272000	644.5	...	644.52	AA	45	0.1681	4.270	-7	0.1121	2.847	33.4	149	1396	2078		
1272000	Bittern/AW	...	644.52	AA	45	0.1681	4.2697	7	0.1121	2.847	33.4	148.6	1396	2078		
1272000	Skylark/AW	...	644.52	AA	36	0.1880	4.7752	1	0.1880	4.775	25.7	114.3	1272	1893		
1272000	...	644.5	AA	36	0.1880	4.775	-4	0.1880	4.775	25.7	114	1272	1893			
1192500	...	604.2	604.24	AA	54	0.1486	3.774	19	0.0892	2.266	40.2	179	1470	2187		
1192500	Grackle/AW	...	604.24	AA	54	0.1486	3.7744	19	0.0892	2.266	40.2	178.8	1470	2188		
1192500	...	604.2	604.24	AA	45	0.1628	4.135	-7	0.1085	2.756	31.3	139	1309	1948		
1192500	Bunting/AW	...	604.24	AA	45	0.1628	4.1351	7	0.1085	2.756	31.3	139.2	1309	1948		
1113000	564-0	...	563.96	AA	54	0.1436	3.647	19	0.0862	2.489	37.5	167	1373	2043		
1113000	Finch/AW	...	563.96	AA	54	0.1436	3.6474	19	0.0862	2.489	37.5	166.8	1373	2043		
1113000	564-0	...	563.96	AA	45	0.1573	3.995	-7	0.1049	2.664	29.3	130	1222	1819		
1113000	Bluejay/AW	...	563.96	AA	45	0.1573	3.9954	7	0.1049	2.664	29.3	130.3	1222	1819		
1033500	...	523.7	523.67	AA	54	0.1383	3.513	-7	0.1383	3.513	35.6	158	1274	1896		
1033500	Curlew/AW	...	523.67	AA	54	0.1383	3.5128	7	0.1383	3.513	35.6	158.3	1274	1896		
1033500	...	523.7	523.67	AA	45	0.1515	3.848	-7	0.1010	2.565	27.1	120.5	1134	1688		
1033500	Ortolan/AW	...	523.67	AA	45	0.1515	3.8481	7	0.1010	2.565	27.1	120.5	1134	1688		
1033500	...	523.7	523.67	AA	36	0.1694	4.303	-4	0.1694	4.303	21.1	93.7	1033	1537		
1033500	Tanager/AW	...	523.67	AA	36	0.1694	4.3028	1	0.1694	4.303	21.1	93.9	1033	1537		
954000	...															
954000	483-4	...	483.39	AA	54	0.1329	3.376	-7	0.1329	3.376	32.9	146	1177	1754		
954000	Cardinal/AW	...	483.39	AA	54	0.1329	3.3757	7	0.1329	3.376	32.9	146.3	1177	1752		
954000	483-4	...	483.39	AA	45	0.1456	3.698	-7	0.0971	2.466	25.4	113	1047	1558		
954000	Rail/AW	...	483.39	AA	45	0.1456	3.6982	7	0.0971	2.466	25.4	113.0	1047	1558		
954000	...	483.4	483.39	AA	36	0.1628	4.135	-4	0.1628	4.135	19.5	86.6	954	1419		
954000	Catbird/AW	...	483.39	AA	36	0.1628	4.1351	1	0.1628	4.135	19.5	86.7	954	1420		
900000	...	456.0	456.03	AA	54	0.1291	3.279	-7	0.1291	3.279	31.0	137.9	1111	1653		
900000	Canary/AW	...	456.03	AA	54	0.1291	3.2791	7	0.1291	3.279	31.0	137.9	1111	1653		
900000	...	456.0	456.03	AA	45	0.1414	3.592	-7	0.0943	2.395	24.0	107	988	1470		
900000	Ruddy/AW	...	456.03	AA	45	0.1414	3.5916	7	0.0943	2.395	24.0	106.8	988	1470		
795000	...	402.8	402.83	AA	30	0.1628	4.135	19	0.0977	2.482	37.1	165	1160	1726		
795000	Mallard/AW	...	402.83	AA	30	0.1628	4.1351	19	0.0977	2.482	37.1	165.0	1160	1726		
795000	...	402.8	402.83	AA	54	0.1213	3.081	-7	0.1213	3.081	27.8	123.7	980	1458		
795000	Condor/AW	...	402.83	AA	54	0.1213	3.0810	7	0.1213	3.081	27.8	123.7	980	1458		
795000	402-8	...	402.83	AA	45	0.1329	3.376	-7	0.0886	2.250	21.5	95.4	872	1298		
795000	Tern/AW	...	402.83	AA	45	0.1329	3.3757	7	0.0886	2.250	21.5	95.6	872	1298		
795000	402-8	...	402.83	AA	26	0.1749	4.442	-7	0.1360	3.454	30.5	136	1041	1549		
795000	Drake/AW	...	402.83	AA	26	0.1749	4.4425	7	0.1360	3.454	30.5	135.7	1041	1549		
795000	402-8	...	402.83	AA	24	0.1820	4.623	-7	0.1213	3.081	27.5	122	981	1459		
795000	Cuckoo/AW	...	402.83	AA	24	0.1820	4.6228	7	0.1213	3.081	27.5	122.3	981	1460		

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795000	...	402.8	402.83	AA	36	0.1486	3.774	-1	0.1486	3.774	16.6	73.8	-795	1182
795000	Coot/AW	...	402.83	AA	36	0.1486	3.7744	1	0.1486	3.774	16.6	73.8	795	4182
-1183														
-745-000	...	362.3	362.54	AA	30	0.1544	3.922	49	0.0926	2.352	33.4	148	1043	1552
715500	Redwing/AW	...	362.54	AA	30	0.1544	3.9218	19	0.0926	2.352	33.4	148.6	1043	1552
-745-000	...	362.3	362.54	AA	26	0.1659	4.244	-7	0.1290	3.277	27.5	122.3	-936	1393
715500	Starling/AW	...	362.54	AA	26	0.1659	4.2139	7	0.1290	3.277	27.5	122.3	936	1393
-745-000	...	362.3	362.54	AA	24	0.1727	4.387	-7	0.1151	2.924	24.8	110.3	-883	1314
715500	Stilt/AW	...	362.54	AA	24	0.1727	4.3866	7	0.1151	2.924	24.8	110.3	883	1314
666600	...	337.8	337.77	AA	26	0.1601	4.067	-7	0.1245	3.162	26.0	115.6	-872	1298
666600	Gannet/AW	...	337.77	AA	26	0.1601	4.0665	7	0.1245	3.162	26.0	115.6	872	1298
666600	...	337.8	337.77	AA	24	0.1667	4.234	-7	0.1111	2.822	23.1	102.7	-823	1224
666600	Flamingo/AW	...	337.77	AA	24	0.1667	4.2342	7	0.1111	2.822	23.1	102.7	823	1224
-1225														
636000	...	322.3	322.26	AA	30	0.1456	3.698	49	0.0874	2.220	29.9	133.0	-928	1381
636000	Egret/AW	...	322.26	AA	30	0.1456	3.6982	19	0.0874	2.220	29.9	133.0	928	1381
636000	...	322.3	322.26	AA	30	0.1456	3.698	-7	0.1456	3.698	29.3	130.3	-936	1391
636000	Sooter/AW	...	322.26	AA	30	0.1456	3.6982	7	0.1456	3.698	29.3	130.3	936	1391
636000	...	322.3	322.26	AA	26	0.1564	3.973	-7	0.1216	3.089	24.8	110.3	-832	1238
636000	Grosbeak/AW	...	322.26	AA	26	0.1564	3.9726	7	0.1216	3.089	24.8	110.3	832	1238
636000	...	322.3	322.26	AA	24	0.1628	4.135	-7	0.1085	2.756	22.0	97.9	-785	1168
636000	Rook/AW	...	322.26	AA	24	0.1628	4.1351	7	0.1085	2.756	22.0	97.9	785	1168
636000	...	322.3	322.26	AA	36	0.1329	3.376	-4	0.1329	3.376	13.6	60.6	-636	946
636000	Swift/AW	...	322.26	AA	36	0.1329	3.3757	1	0.1329	3.376	13.6	60.5	636	946
636000	...	322.3	322.26	AA	18	0.1880	4.775	-4	0.1880	4.775	15.0	66.7	-676	1005
636000	Kingbird/AW	...	322.26	AA	18	0.1880	4.7752	1	0.1880	4.775	15.0	66.7	676	1006
-														
605000	...	306.6	306.55	AA	30	0.1420	3.607	49	0.0852	2.164	28.5	126.6	-883	1314
605000	Teal/AW	...	306.55	AA	30	0.1420	3.6068	19	0.0852	2.164	28.5	126.8	883	1314
605000	...	306.6	306.55	AA	30	0.1420	3.607	-7	0.1420	3.607	28.4	126	-889	1323
605000	Wood Duck/AW	...	306.55	AA	30	0.1420	3.6068	7	0.1420	3.607	28.4	126.3	889	1323
605000	...	306.6	306.55	AA	26	0.1525	3.873	-7	0.1186	3.012	23.6	105.0	-794	1177
605000	Squab/AW	...	306.55	AA	26	0.1525	3.8735	7	0.1186	3.012	23.6	105.0	791	1177
605000	...	306.6	306.55	AA	24	0.1588	4.034	-7	0.1059	2.690	21.0	93.4	-747	1414
605000	Peacock/AW	...	306.55	AA	24	0.1588	4.0335	7	0.1059	2.690	21.0	93.4	747	1414
-1112														
556500	...	282.0	281.98	AA	30	0.1362	3.459	-7	0.1362	3.459	26.8	119.2	-818	1217
556500	Eagle/AW	...	281.98	AA	30	0.1362	3.4595	7	0.1362	3.459	26.8	119.2	818	1217
556500	...	282.0	281.98	AA	26	0.1463	3.716	-7	0.1138	2.891	21.9	97.4	-728	1084
556500	Dove/AW	...	281.98	AA	26	0.1463	3.7160	7	0.1138	2.891	21.9	97.4	728	1083
556500	...	282.0	281.98	AA	24	0.1523	3.868	-7	0.1015	2.578	19.3	85.8	-687	1022
556500	Parakeet/AW	...	281.98	AA	24	0.1523	3.8684	7	0.1015	2.578	19.3	85.8	687	1022
556500	...	282.0	281.98	AA	18	0.1758	4.465	-4	0.1758	4.465	13.2	58.9	-594	879
556500	Ospray/AW	...	281.98	AA	18	0.1758	4.4653	1	0.1758	4.465	13.2	58.7	591	880
-														
477000	...	241.7	241.70	AA	30	0.1261	3.203	-7	0.1261	3.203	23.4	104.1	-704	1043
477000	Hen/AW	...	241.70	AA	30	0.1261	3.2029	7	0.1261	3.203	23.4	104.1	701	1043
477000	...	241.7	241.70	AA	26	0.1354	3.439	-7	0.1053	2.675	18.9	84.1	-624	929
477000	Hawk/AW	...	241.70	AA	26	0.1354	3.4392	7	0.1053	2.675	18.9	84.1	624	929
477000	...	241.7	241.70	AA	24	0.1440	3.581	-7	0.0940	2.388	16.7	74.3	-589	877
477000	Flicker/AW	...	241.70	AA	24	0.1440	3.5814	7	0.0940	2.388	16.7	74.3	589	877
477000	...	241.7	241.70	AA	18	0.1628	4.135	-4	0.1628	4.135	11.5	51.2	-507	755
477000	Pelican/AW	...	241.70	AA	18	0.1628	4.1351	1	0.1628	4.135	11.5	51.2	507	755
-														
397500	...	201.4	201.41	AA	30	0.1151	2.9235	7	0.1151	2.924	19.6	87.2	584	869
397500	Lark/AW	...	201.41	AA	30	0.1151	2.9235	7	0.1151	2.924	19.6	87.2	584	869
397500	Ibbs/AW	...	201.41	AA	30	0.1151	2.924	-7	0.1151	2.924	19.6	87.2	-584	869
-397-500	...	201.4	201.41	AA	26	0.1236	3.139	7	0.0961	2.441	15.8	70.2	520	773
397500	...	201.4	201.41	AA	26	0.1236	3.1394	7	0.0961	2.441	15.8	70.3	520	774
397500	...	201.4	201.41	AA	24	0.1287	3.269	-7	0.0858	2.179	14.1	62.7	-494	731
397500	Brant/AW	...	201.41	AA	24	0.1287	3.2690	7	0.0858	2.179	14.1	62.7	491	731
397500	...	201.4	201.41	AA	18	0.1486	3.774	-4	0.1486	3.774	9.8	43.5	-422	628
397500	Chickadee/AW	...	201.41	AA	18	0.1486	3.7744	1	0.1486	3.774	9.8	43.5	422	628
-														
-336-400	...	170.5	170.45	AA	30	0.1059	2.690	7	0.1059	2.690	16.7	74.5	495	736
-336-400	...	170.5	170.45	AA	30	0.1059	2.6899	7	0.1059	2.690	16.7	74.3	495	737
-336-400	...	170.5	170.45	AA	26	0.1137	2.888	7	0.0884	2.245	13.5	60.0	440	654
-336-400	...	170.5	170.45	AA	26	0.1137	2.8880	7	0.0884	2.245	13.5	60.0	440	655
-336-400	...	170.5	170.45	AA	18	0.1367	3.472	1	0.1367	3.472	8.54	38.0	357	532

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-336-400 ...336400	Merlin/AW ...	170.45	AA	18	0.1367	3.4722	1	0.1367	3.472	8.5	38.0	357	531
-300-000 ...	152.0 ...	152.01	AA	26	0.1074	2.728	7	0.0835	2.121	12.1	54.0	392	584
-300-000 ...300000	Ostrich/AW ...	152.01	AA	26	0.1074	2.7280	7	0.0835	2.121	12.1	53.8	392	583
-266-800 ...	135.2 ...	135.19	AA	26	0.1013	2.573	7	0.0788	2.002	10.8	48.0	349	520
-266-800 ...266800	Partridge/AW ...	135.19	AA	26	0.1013	2.5730	7	0.0788	2.002	10.8	48.0	349	519
-266-800 ...	135.2 ...	135.19	AA	18	0.1217	3.091	1	0.1217	3.091	6.82	30.3	283	421
-266-800 ...266800	Waxwing/AW ...	135.19	AA	18	0.1217	3.0912	1	0.1217	3.091	6.8	30.3	283	421
211600	Penguin/AW	0000	AA,A	-6	0.1878	4.770	-4	0.1878	4.770	7.69	34.2	-277	-411
211600	Penguin/AW	0000	AA,A	6	0.1878	4.7701	1	0.1878	4.770	7.7	34.2	277	412
211300		0000	AA(+)	42	0.1327	3.374	-7	0.1327	3.371	19.8	88.0	-477	-709
211300		0000	AA(+)	12	0.1327	3.3706	7	0.1327	3.371	19.8	88.1	477	710
203200		0000	AA(+)	46	0.1127	2.863	49	0.0977	2.482	27.4	120	-604	-894
203200		0000	AA(+)	16	0.1127	2.8626	19	0.0977	2.482	27.1	120.5	601	894
-190-800		0000	AA(+)	42	0.1261	3.203	-7	0.1261	3.203	18.3	81.3	-431	-641
190800		0000	AA(+)	12	0.1261	3.2029	7	0.1261	3.203	18.3	81.4	431	641
-176-900		0000	AA(+)	42	0.1214	3.084	-7	0.1214	3.084	16.9	75.4	-399	-594
176900		0000	AA(+)	12	0.1214	3.0836	7	0.1214	3.084	16.9	75.2	399	594
-594													
-167-800 000	85.02 Pigeon/AW	000	AA,A	6	0.1672	4.2469	1	0.1672	4.247	1	6.3	0.1672	4.247
-167-800 000	85.02 Pigeon/AW	000	AA,A	6	0.1672	4.2469	1	0.1672	4.247	1	6.3	0.1672	4.247
159000		000	AA(+)	42	0.1151	2.924	7	0.1151	2.924	15.3	68.0	-359	-534
159000		000	AA(+)	12	0.1151	2.9235	7	0.1151	2.924	15.3	68.1	359	534
152500		000	AA(+)	-5	0.1747	4.437	2	0.1747	4.437	9.66	43.0	-281	-418
152500		000	AA(+)	5	0.1747	4.4374	2	0.1747	4.437	9.7	43.0	281	418
141300		000	AA(+)	-4	0.1880	4.775	3	0.1880	4.775	14.2	62.9	-373	-555
141300		000	AA(+)	4	0.1880	4.7752	3	0.1880	4.775	14.2	63.2	373	555
134600		000	AA(+)	42	0.1059	2.690	7	0.1059	2.690	13.0	57.8	-304	-452
134600		000	AA(+)	12	0.1059	2.6899	7	0.1059	2.690	13.0	57.8	304	452
-452													
133100	Quail/AW	00	AA,A	-6	0.1489	3.782	-4	0.1489	3.782	5.13	22.8	-174	-259
133100	Quail/AW	00	AA,A	6	0.1489	3.7821	1	0.1489	3.782	5.1	22.8	174	259
121000		00	AA(+)	-5	0.1556	3.952	-2	0.1556	3.952	8.03	35.7	-223	-332
121000		00	AA(+)	5	0.1556	3.9522	2	0.1556	3.952	8.0	35.7	223	332
112100		00	AA(+)	-4	0.1674	4.252	-3	0.1674	4.252	11.9	52.7	-296	-440
112100		00	AA(+)	4	0.1674	4.2520	3	0.1674	4.252	11.9	52.9	296	441
110800		00	AA(+)	42	0.0961	2.441	-7	0.0961	2.441	10.8	48.0	-250	-372
110800		00	AA(+)	12	0.0961	2.4409	7	0.0961	2.441	10.8	48.0	250	372
-372													
105600	Raven/AW	0	AA,A	-6	0.1327	3.374	-4	0.1327	3.374	4.25	18.9	-138	-205
105600	Raven/AW	0	AA,A	6	0.1327	3.3706	1	0.1327	3.371	4.3	18.9	138	205
101800		0	AA(+)	12	0.0921	2.339	-7	0.0921	2.339	9.91	44.1	-230	-342
101800		0	AA(+)	12	0.0921	2.3393	7	0.0921	2.339	9.9	44.1	230	342
99830		0	AA(+)	-3	0.1824	4.633	-4	0.1824	4.633	16.4	72.7	-395	-588
99830		0	AA(+)	3	0.1824	4.6330	4	0.1824	4.633	16.4	72.9	395	588
95910		0	AA(+)	-5	0.1385	3.518	-2	0.1385	3.518	6.58	29.3	-177	-263
95910		0	AA(+)	5	0.1385	3.5179	2	0.1385	3.518	6.6	29.3	177	263
88840		0	AA(+)	-4	0.1429	3.6297	3	0.1490	3.785	-3	0.1490	3.785	9.68
88840		0	AA(+)	4	0.1429	3.6297	3	0.1490	3.785	9.7	43.1	234	9.68
-83-600													
83690	Robin/AW	4	AA,A	-6	0.1181	2.997	-4	0.1181	3.000	3.45	15.3	-109	-163
83690	Robin/AW	1	AA,A	6	0.1181	2.9977	1	0.1181	3.000	3.5	15.3	109	162
80000		4	AA(+)	-8	0.1000	2.540	-4	0.1670	4.242	4.89	21.7	-138	-205
80000		1	AA(+)	8	0.1000	2.5400	1	0.1670	4.242	4.9	21.8	138	205
79130		4	AA(+)	-3	0.1624	4.125	-4	0.1624	4.125	13.8	61.2	-313	-466
79130		1	AA(+)	3	0.1624	4.1250	4	0.1624	4.125	13.8	61.4	313	466
76080		4	AA(+)	-5	0.1234	3.134	-2	0.1234	3.134	5.45	24.3	-140	-209
76080		1	AA(+)	5	0.1234	3.1344	2	0.1234	3.134	5.5	24.2	140	208
70480		4	AA(+)	-4	0.1327	3.374	-3	0.1327	3.371	8.1	36.0	-186	-276
70480		1	AA(+)	4	0.1327	3.3706	3	0.1327	3.371	8.1	36.0	186	276
-277													
66360	Sparate/AW	2	AA,A	-7	0.0974	2.474	-4	0.1299	3.299	3.51	15.6	-100	-149
66360	Sparate/AW	2	AA,A	7	0.0974	2.4740	1	0.1299	3.299	3.5	15.6	100	149
66360	Sparrow/AW	2	AA,A	-6	0.1052	2.672	-4	0.1052	2.672	2.76	12.3	86.8	-129
66360	Sparrow/AW	2	AA,A	6	0.1052	2.6721	1	0.1052	2.672	2.8	12.3	86.8	12810
64920		2	AA(+)	-2	0.1802	4.577	-5	0.1802	4.577	19.5	86.9	-430	-640
64920		2	AA(+)	2	0.1802	4.5771	5	0.1802	4.577	19.5	86.7	430	640
62770		2	AA(+)	-3	0.1446	3.673	-4	0.1446	3.673	11.2	50.0	-248	-369
62770		2	AA(+)	3	0.1446	3.6728	4	0.1446	3.673	11.2	49.8	248	369
60340		2	AA(+)	-5	1.1099	28.1915	2	0.1099	2.791	-2	0.1099	2.791	4.37
60340		2	AA(+)	5	1.1099	28.1915	2	0.1099	2.791	4.4	0.1099	2.791	4.37
												19.4	11165
												19.4	11165

55890		2	28.32	AA(+)	-4	0.1182	3.002	-3	0.1182	3.002	6.60	29.4	-147	-219
55890		2	28.32	AA(+)	4	0.1182	3.0023	3	0.1182	3.002	6.6	29.4	147	-219
-219														
52620	Swallow/AW	3	26.66	A	-6	0.0937	2.380	-4	0.0937	2.380	2.23	9.92	-69	-102
52620	Swallow/AW	3	26.66	A	6	0.0937	2.3800	1	0.0937	2.380	2.2	9.9	69	103
54500		3	26.10	AA(+)	-2	0.1605	4.077	-5	0.1605	4.077	16.5	73.3	-344	-508
51500		3	26.10	AA(+)	2	0.1605	4.0767	5	0.1605	4.077	16.5	73.4	341	507
49780		3	25.22	AA(+)	-3	0.1288	3.272	-4	0.1288	3.272	9.69	43.4	-197	-293
49780		3	25.22	AA(+)	3	0.1288	3.2715	4	0.1288	3.272	9.7	43.1	197	293
47850		3	24.25	AA(+)	-5	0.0978	2.484	-2	0.0978	2.484	3.50	15.6	88.0	-131
47850		3	24.25	AA(+)	5	0.0978	2.4841	2	0.0978	2.484	3.5	15.6	88	131
44320		3	22.46	AA(+)	-4	1.1053	28.0746	3	1.1053	2.675	-3	0.1053	2.675	5.26
44320		3	22.46	AA(+)	4	1.1053	28.0746	3	1.1053	2.675	5.3	0.1053	2.675	5.26
-174														
41740	Swanate/AW	4	21.15	AA,A	-7	0.0772	1.961	-1	0.1029	2.614	2.28	10.1	62.7	93.3
41740	Swanate/AW	4	21.15	AA,A	7	0.0772	1.9609	1	0.1029	2.614	2.3	10.1	62.7	93
41740	Swan/AW	4	21.15	AA,A	-6	0.0834	2.118	-1	0.0834	2.118	1.78	7.93	54.5	84.4
41740	Swan/AW	4	21.15	AA,A	6	0.0834	2.1184	1	0.0834	2.118	1.8	7.9	54.5	81
40840		4	20.69	AA(+)	-2	0.1429	3.630	-5	0.1429	3.630	13.5	59.9	-270	-402
40840		4	20.69	AA(+)	2	0.1429	3.6297	5	0.1429	3.630	13.5	60.0	270	402
39470		4	20.00	AA(+)	-3	0.1147	2.913	-4	0.1147	2.913	7.72	34.3	-156	-232
39470		4	20.00	AA(+)	3	0.1147	2.9134	4	0.1147	2.913	7.7	34.3	156	232
37950		4	19.23	AA(+)	-5	0.0871	2.212	-2	0.0871	2.212	2.79	12.4	69.8	-104
37950		4	19.23	AA(+)	5	0.0871	2.2123	2	0.0871	2.212	2.8	12.4	69.8	104
35150		4	17.81	AA(+)	-4	0.0937	2.380	-3	0.0937	2.380	4.19	18.6	92.6	-138
35150		4	17.81	AA(+)	4	0.0937	2.3800	3	0.0937	2.380	4.2	18.6	92.6	138
32390		4	16.41	AA(+)	-2	0.1273	3.233	-5	0.1273	3.233	11.3	50.3	-215	-319
32390		4	16.41	AA(+)	2	0.1273	3.2334	5	0.1273	3.233	11.3	50.3	215	320
31300		4	15.86	AA(+)	-3	0.1022	2.596	-4	0.1022	2.596	6.13	27.3	-124	-186
31300		4	15.86	AA(+)	3	0.1022	2.5959	4	0.1022	2.596	6.1	27.3	124	185
25690		4	13.02	AA(+)	-2	0.1133	2.878	-5	0.1133	2.878	8.96	39.9	-170	-253
25690		4	13.02	AA(+)	2	0.1133	2.8778	5	0.1133	2.878	9.0	39.9	170	253

170      253

<sup>A</sup>Conversion factors:

1 mil = 5.067 E-04 mm<sup>2</sup>

1 in. = 2.54 E + 0.1 mm

1 lb/1000 ft = 1.488 kg/km.

1 kip = 4.448 E + 00 kN.

## 8. Lay

8.1 The length of lay of the various layers of wires in a conductor shall conform to Table 2 (Explanatory Note 5).

8.2 The direction of lay of the outside layer of wires shall be right hand unless otherwise specified in the purchase order. The direction of lay of the aluminum and aluminum-clad steel wires shall be reversed in successive layers.

**TABLE 2 Lay Factors for Aluminum Conductors, Aluminum-Clad Steel Reinforced, Concentric-Lay-Stranded**

Stranding Class	Stranding	Ratio of Length of Lay of a Layer to Nominal Outside Diameter of that Layer															
		Aluminum Wire Layers								Aluminum-Clad Steel Wire Layers							
		First (outside)			Second			Third		Fourth (inside)		12-Strand			6-Strand		
min	pref <sup>A</sup>	max	min	pref	max	min	max	min	max	min	pref	max	min	pref	max		
A	6/1, 7/1	8	...	16	...	...	...	...	...	...	...	...	...	...	...		
AA	76/19, 84/19	10	11	13	10	13	16	10	17	10	17	16	20	24	18	25	30
	72/7	10	11	13	10	13	16	10	17	10	17	...	...	...	18	25	30
	54/19	10	11	13	10	13	16	10	17	...	...	16	20	24	18	25	30
	54/7, 48/7, 45/7, 42/7	10	11	13	10	13	16	10	17	...	...	...	...	...	18	25	30
	36/1	10	11	13	10	13	16	10	17	...	...	...	...	...	...	...	...
	30/19	10	11	13	10	13	16	...	...	...	...	16	20	24	18	25	30
	30/7, 26/7, 24/7	10	11	13	10	13	16	...	...	...	...	...	...	...	18	25	30
	18/1	10	11	13	10	13	16	...	...	...	...	...	...	...	...	...	...
	16/19	10	12.5	14.5	...	...	...	...	...	...	...	16	20	24	18	25	30
	12/7	10	12.5	14.5	...	...	...	...	...	...	...	...	...	...	18	25	30
	6/1, 7/1, 8/1	12	14	16	...	...	...	...	...	...	...	...	...	...	...	...	...
	5/2, 4/3, 3/4, 2/5	12 <sup>B</sup>	14 <sup>B</sup>	16 <sup>B</sup>	...	...	...	...	...	...	...	...	...	...	12 <sup>B</sup>	14 <sup>B</sup>	16 <sup>B</sup>

<sup>A</sup> Preferred (pref).

<sup>B</sup> Mixed aluminum and aluminum-clad steel (Fig. 1).

**9. Construction**

9.1 The number and diameter of aluminum and steel wires and the areas of cross section of aluminum wires shall conform to the requirements prescribed in Table 1 and Fig. 1.

9.2 Where compressed stranding is required in order to insulate the conductor properly, one or more aluminum layers of any stranded conductor consisting of 7 wires or more may be slightly compressed, thereby reducing the outside diameter of the conductor by not more than 3 %, provided that the area of cross section after compressing is in accordance with Section 13.

~~Note 3—The user’s attention is called to the claim that certain compressed strand constructions may be subject to patent rights, for example Patents 3,383,704 and 3,444,684.~~

**10. Rated Strength of Conductor**

10.1 The rated strength of a completed conductor shall be taken as the aggregate strength of the aluminum and aluminum-clad steel components, calculated as follows. The strength contribution of the aluminum wires shall be taken as the percentage, according to the number of layers of aluminum wires, indicated in Table 3, of the sum of the strengths of the 1350-H19 wires, calculated from their specified nominal wire diameter and the appropriate specified minimum average tensile strength given in Specification B 230. The strength contribution of the aluminum-clad steel core wires shall be taken as the percentage according to the number of layers of aluminum-clad steel wires, indicated in Table 3, of the sum of the strengths of the aluminum-clad steel wires, calculated from their specified nominal wire diameter and the appropriate specified minimum stress at 1 % extension given in Specification B 502.

10.2 Rated strength and breaking strength values shall be rounded to three significant figures, in the final value only, in accordance with the rounding method of Practice E 29.

**11. Density**

11.1 For the purpose of calculating ~~linear densities,~~ mass, cross sections, etc., the density of aluminum 1350 shall be taken as 2705 kg/m<sup>3</sup> (0.0975 lb/in.<sup>3</sup>) at 20°C (68°F) (Explanatory Note 6).

11.2 For the purpose of calculating ~~linear densities,~~ mass, cross sections, etc., the density of aluminum-clad steel wire shall be taken as 6590 kg/m<sup>3</sup>(0.2381 lb/in.<sup>3</sup>) at 20°C (68°F).

**12. Mass and Electrical Resistance**

12.1 The mass and electrical resistance of a unit length of stranded conductor are a function of the length of lay. The approximate mass and electrical resistance may be determined using the standard increments shown in Table 4. When greater accuracy is desired, the increment based on the specific lay of the conductor may be calculated (Explanatory Note 7).

12.2 In the calculation of the electrical resistance of a completed conductor, the resistivity of the aluminum-clad steel core wire shall be taken as 0.08480 Ω·mm<sup>2</sup>/m (51.01 Ω·cmil/ft) at 20°C (68°F).



○ ALUMINUM      ● ALUMINUM-CLAD STEEL

**FIG. 1 Suggested Configurations for Conductors with Mixed Wire Layers**

**TABLE 3 Rating Factors**

Stranding				Rating Factor, %	
Number of Wires		Number of Layers <sup>A</sup>		Aluminum	Aluminum-Clad Steel
Aluminum	Aluminum-Clad Steel	Aluminum	Aluminum-Clad Steel	Aluminum	Aluminum-Clad Steel
2	5	1	1	96	96
3	4	1	1	96	96
4	3	1	1	96	96
5	2	1	1	96	96
6	1	1	<i>B</i>	96	
7	1	1	<i>B</i>	96	
8	1	1	<i>B</i>	96	
18	1	2	<i>B</i>	93	
36	1	3	<i>B</i>		
		1	1	96	96
	7	2	1	93	96
	7	2	1	93	96
	7	2	1	93	96
	7	3	1	91	96
	7	3	1	91	96
	7	3	1	91	96
	7	3	1	91	96
	7	4	1	90	96
16	19	1	2	96	93
30	19	2	2	93	93
54	19	3	2	91	93
76	19	4	2	90	93
84	19	4	2	90	93

<sup>A</sup> For purposes of determining strength rating factors, mixed layers are considered to be full layers for each material.

<sup>B</sup> Central aluminum-clad steel wire only; the 96 % rating factor is applied to the single aluminum-clad steelwire core as a factor of safety in the event the aluminum-clad steel wire contains a weld (made prior to drawing).

**TABLE 4 Standard Increments Due to Stranding**

Stranding of ACSR/AW Number of Wires		Increment (Increase), % Mass and Electrical Resistance	
Aluminum	Aluminum-Clad Steel	Aluminum	Aluminum-Clad Steel
2	5	0.75	1.5
3	4	1.5	1.1
4	3	1.1	1.5
5	2	1.2	1.5
6	1	1.5	0
7	1	1.5	0
8	1	2.0	0
18	1	2.0	0
36	1	2.0	0
12	7	2.5	0.4
24	7	2.5	0.4
26	7	2.5	0.4
30	7	2.75	0.4
42	7	2.5	0.4
45	7	2.5	0.4
48	7	2.5	0.4
54	7	2.5	0.4
72	7	3.0	0.4
16	19	2.5	0.6
30	19	2.75	0.6
54	19	3.0	0.6
76	19	3.0	0.6
84	19	3.0	0.6

### 13. Variation in Area

13.1 The area of cross section of the aluminum wires of a conductor shall be not less than 98 % of the area specified. Unless otherwise specified by the purchaser, the manufacturer may have the option of determining the cross-sectional area by either of the following methods, except that in case of question regarding area compliance, the method in 13.1.2 shall be used:

13.1.1 The area of cross section may be determined by calculations from diameter measurements, expressed to four decimal places, of the component aluminum wires at any point when measured perpendicularly to their axes.

13.1.2 The area of cross section of the aluminum wires of a conductor may be determined by Test Method B 263. In applying

that method the increment in ~~linear density~~ mass resulting from stranding may be the applicable value specified in 12.1 or may be calculated from the measured component dimensions of the sample under test. In case of question regarding area compliance, the actual ~~linear density~~ mass increment due to stranding shall be calculated.

#### **14. Finish**

14.1 The conductor shall be free of all imperfections not consistent with good commercial practice.

#### **15. Mechanical and Electrical Tests**

15.1 Tests for mechanical and electrical properties of aluminum wires shall be made before stranding (Explanatory Note 8).

15.2 All aluminum wires composing the conductors shall be capable of meeting the bending properties stated in Specification B 230 after stranding. Routine production testing after stranding is not required.

15.3 Routine production testing after stranding is not required. However, when such tests are requested by the purchaser and agreed upon by the manufacturer at the time of ordering (or made for other reasons) aluminum wires removed from the completed conductor shall have tensile strengths of not less than 95 % of the minimum tensile strength specified for the wire before stranding. The electrical resistivity shall meet the minimum resistivity specified for wire before stranding. Elongation tests may be made for information purposes only and no minimum values are assigned (Explanatory Note 8). The frequency of these tests shall be decided upon between the purchaser and the manufacturer.

15.4 Tests for all properties of aluminum-clad steel wires shall be made before stranding (Explanatory Note 8).

15.5 Tests for demonstration of rated strength of the completed conductor are not required by this specification but may be made if agreed upon by the manufacturer and the purchaser at the time of placing an order. If tested, the breaking strength of the completed conductor shall be not less than the rated strength if failure occurs in the free length at least 1 in. (25 mm) beyond the end of either gripping device, or shall be not less than 95 % of the rated strength if failure occurs inside, or within 1 in. (25 mm) of the end of either gripping device (Explanatory Note 9).

#### **16. Inspection**

16.1 Unless otherwise specified in the contract or purchase order, the manufacturer shall be responsible for the performance of all inspection and test requirements specified.

16.2 All inspections and tests shall be made at the place of manufacture unless otherwise agreed to between the manufacturer and the purchaser at the time of purchase.

16.3 The manufacturer shall afford the inspector representing the purchaser all reasonable facilities to satisfy the inspector that the material is being furnished in accordance with this specification.

#### **17. Packaging and Package Marking**

17.1 Package sizes and kind of package, reels or coils, shall be agreed upon between the manufacturer and the purchaser (Explanatory Note ~~3~~–~~5~~).

17.2 There shall be only one length of conductor on a reel.

17.3 The conductors shall be protected against damage in ordinary handling and shipping. If heavy wood lagging is required, it shall be specified by the purchaser at the time of placing the purchase order.

17.4 The net mass, length size, kind of conductors, stranding, type of coating, and any other necessary identification shall be marked on a tag attached to the end of the conductor inside the package. This same information, together with the purchase order number, the manufacturer's serial number (if any) and all shipping marks and other information required by the purchaser shall appear on the outside of the package.

**NOTE 4**~~1~~—Multiple lengths per package are allowable only when the bare conductor is intended for re-manufacture, such as adding a covering or insulation. In such cases the position of each end of a length shall be clearly marked and the length of each portion shall be shown on the tag attached to the end of the conductor.

#### **18. Keywords**

18.1 aluminum clad steel reinforced; aluminum conductor; aluminum conductor—steel-reinforced; electrical conductor; electrical conductor—aluminum; stranded aluminum conductor; stranded electrical conductor

**EXPLANATORY NOTES**

NOTE 1—In this specification only concentrically-stranded aluminum conductors, aluminum-clad steel reinforced, are specifically designated. Conductor constructions not included in this specification shall be specifically agreed upon between the manufacturer and the purchaser when placing the order.

NOTE 2—For definitions of terms relating to conductors, reference should be made to ANSI C42.100 and ASTM Terminology B 354.

NOTE 3—Owing to the variation in coil weights, etc., it is common practice to allow a permissible variation in length of  $\pm 10\%$ . It is also common practice to allow an amount not exceeding 10% of the total weight of any one order to be shipped in random lengths with no piece shorter than 50% of the standard length ordered.

NOTE 4—The behavior of properly spaced wire joints in stranded conductors is related to both their tensile strength and elongation. Because of its higher elongation properties, the lower-strength electric-butt weld gives equivalent overall performance to that of a cold-pressure weld or an electric-butt, cold-upset weld in stranded conductors.

NOTE 5—The preferred ratio of the lay with respect to the outside diameter of a layer of wires varies for different layers and for different diameters of the conductor, being larger for the inside layers than for the outside layer, and larger for conductors of small diameter than for those of large diameter.

NOTE 6—This density is based upon aluminum of 99.50% purity.

NOTE 7—The increment of mass or electrical resistance of a completed concentric-lay-stranded conductor,  $k$ , in percent is

$$k = 100(m - 1) \quad (1)$$

where  $m$  is the stranding factor, and is also the ratio of the mass or electrical resistance of a unit length of stranded conductor to that of a solid conductor of the same cross-sectional area or of a stranded conductor with infinite length of stranding, that is, all wires parallel to the conductor axis. The stranding factor  $m$  for the completed stranded conductor is the *numerical average* of the stranding factors for each of the individual wires in the conductor, including the straight core wire, if any (for which the stranding factor is unity). The stranding factor ( $m_{ind}$ ) for any given wire in a concentric-lay-stranded conductor is

$$m_{ind} = \sqrt{1 + (9.8696/n^2)} \quad (2)$$

where:

$n$  = length of lay/diameter of helical path of the wire.

The derivation of the above is given in *NBS Handbook 100*.<sup>5</sup>

The factors  $k$  and  $m$  for composite conductors are to be determined separately for each different material involved.

NOTE 8—Wires unlaidd from conductors may have different physical properties from those of the wire when prepared for cabling, on account of the deformation brought about by stranding and again straightening for test. If tests of aluminum-clad steel wires are to be made after stranding, the purchaser and the manufacturer at the time of placing the order should agree on the properties to be met.

NOTE 9—To test ACSR/AW, for breaking strength successfully as a unit requires special devices for gripping the ends of the aluminum and aluminum-clad steel wires without causing damage that may result in failure below the actual strength of the conductor. Various special dead-end devices are available such as compression sleeves and split sleeves, but ordinary jaws or clamping devices usually are not suitable. **SUPPLEMENTARY REQUIREMENTS**

~~The following supplementary requirements shall apply only when specified by the purchaser in the inquiry, contract, or order, for agencies of the U.S. Government.~~

**S1. Referenced Documents**

~~S1.1 The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation:~~

~~S1.1.1 *Military Specifications*.<sup>6</sup>~~

~~MIL-C-12000 Cable, Cord, and Wire, Electric; Packaging — of~~

**S2. Inspection**

~~S2.1 The government shall have the right to perform any of the inspections and tests set forth in this specification when such tests are deemed necessary to assure that the material conforms to the prescribed requirements.~~

**S3. Packaging**

~~S3.1 Packaging shall be in accordance with MIL-C-12000.~~

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