



Designation: **B701/B701M—06 B701/B701M – 13**

Standard Specification for Concentric-Lay-Stranded Self-Damping Aluminum Conductors, Steel Reinforced (ACSR/SD)¹

This standard is issued under the fixed designation B701/B701M; 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 concentric-lay-stranded self-damping aluminum conductor, steel-reinforced (ACSR/SD), and its component wires for use as overhead electrical conductors (Explanatory [Notes 1 and 2](#)).

1.2 The values stated in inch-pound or SI units are to be regarded separately as standard. Each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the specification. For conductor sizes designated by AWG or kcmil, the requirements in SI units have been numerically converted from corresponding values stated or derived in inch-pound units. For conductor sizes designated by SI units only, the requirements are stated or derived in SI units.

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

NOTE 1—ACSR/SD is designed to control aeolian vibration by integral damping. The conductors consist of a central core of a round steel wire or wires surrounded by two layers of trapezoidal aluminum 1350-H19 wires or two layers of trapezoidal aluminum 1350-H19 wires and one layer of round aluminum 1350-H19 wires ([Fig. 1](#)). The trapezoidal-wire layers are separated from each other and from the steel core by two small annular gaps that provide the conductors self-damping characteristics. The round aluminum wires are in tight layer contact between themselves and the underlying trapezoidal wire layer. Different strandings of the same size of conductor are identified by type, which is the approximate ratio of steel area to aluminum area, expressed in percent ([Table 1](#) and [Table 2](#)).

NOTE 2—The aluminum and temper designations conform to ANSI Standard H 35.1. Aluminum 1350 corresponds to UNS A91350 in accordance with Practice [E527](#).

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

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

[B230/B230M](#) Specification for Aluminum 1350–H19 Wire for Electrical Purposes

[B232/B232M](#) Specification for Concentric-Lay-Stranded Aluminum Conductors, Coated-Steel Reinforced (ACSR)

[B263](#) Test Method for Determination of Cross-Sectional Area of Stranded Conductors

~~[B341/B341M](#) Specification for Aluminum-Coated (Aluminized) Steel Core Wire for Aluminum Conductors, Steel Reinforced (ACSR/AZ) (Withdrawn 2007)~~³

[B354](#) Terminology Relating to Uninsulated Metallic Electrical Conductors

[B498/B498M](#) Specification for Zinc-Coated (Galvanized) Steel Core Wire for Use in Overhead Electrical Conductors

[B500/B500M](#) Specification for Metallic Coated or Aluminum Clad Stranded Steel Core for Use in Overhead Electrical Conductors

[B502](#) Specification for Aluminum-Clad Steel Core Wire for Use in Overhead Electrical Aluminum Conductors

[B549](#) Specification for Concentric-Lay-Stranded Aluminum Conductors, Aluminum-Clad Steel Reinforced for Use in Overhead Electrical 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, 2006~~ May 1, 2013. Published ~~March 2006~~ June 2013. Originally approved in 1981. Last previous edition approved in ~~2000~~ 2006 as B701/B701M—00—06. DOI: ~~10.1520/B0701-B0701M-06~~ 10.1520/B0701_B0701M-13.

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.

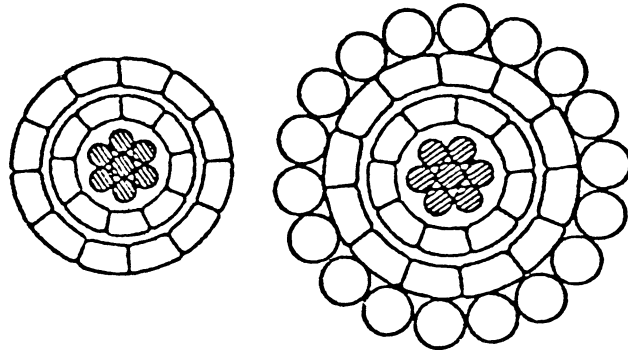


FIG. 1 Illustrations of Typical ACSR/SD Strandings

B606 Specification for High-Strength Zinc-Coated (Galvanized) Steel Core Wire for Aluminum and Aluminum-Alloy Conductors, Steel Reinforced

B802/B802M Specification for Zinc-5 % Aluminum-Mischmetal Alloy-Coated Steel Core Wire for Aluminum Conductors, Steel Reinforced (ACSR)

B803 Specification for High-Strength Zinc-5 % Aluminum-Mischmetal Alloy-Coated Steel Core Wire for Use in Overhead Electrical Conductors

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

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

2.3 *ANSI Documents:*³

ANSI H35.1 American National Standard Alloy and Temper Designation Systems for Aluminum

2.4 *NIST Documents:*⁴

NBS Handbook 100—*Copper Wire Tables of the National Bureau of Standards*

2.5 *Aluminum Association Documents:*⁵

Publication 50, Code Words for Overhead Aluminum Electrical Conductors

3. Terminology

3.1 *Abbreviations: Definitions of Terms Specific to This Standard:*

3.1.1 ACSR/SD covered by this specification has five types of coated core wire and one type of aluminum-clad core wire which are designated by abbreviations as follows (Explanatory **Note 2/Notes 2 and 10**):

3.1.2 **ACSR/SD/AW**—**ACSR/SD/AW2**—ACSR/SD using aluminum-clad steel wire (Specification **B502**).

3.1.3 **ACSR/SD/AZ**—ACSR/SD using aluminum-coated (aluminized) steel wire (Specification **B341/B341M**).

3.1.3 **ACSR/SD/GA**—**ACSR/SD/GA2**—ACSR/SD using Class A zinc-coated steel wire (Specification **B498/B498M**).

3.1.4 **ACSR/SD/GB**—**ACSR/SD/GC2**—ACSR/SD using Class **BC** zinc-coated steel wire (Specification **B498/B498M**).

3.1.6 **ACSR/SD/GC**—ACSR/SD using Class **C** zinc-coated steel wire (Specification **B498/B498M**).

3.1.5 **ACSR/SD/HS**—**ACSR/SD**—ACSR/SD using extra high strength high-strength steel wire (Specification **B606**).

3.1.6 **ACSR/SD/MA**—**ACSR/SD/MA2**—ACSR/SD using Class A zinc-5 % aluminum-mischmetal alloy-coated steel core wire (Specification **B802/B802M**).

3.1.7 **ACSR/SD/MB**—**ACSR/SD/MB2**—ACSR/SD using Class B zinc-5 % aluminum-mischmetal alloy-coated steel core wire (Specification **B802/B802M**).

3.1.8 **ACSR/SD/MC**—**ACSR/SD/MC2**—ACSR/SD using Class V zinc-5 % aluminum-mischmetal alloy-coated steel core wire (Specification **B802/B802M**).

3.1.9 **ACSR/SD/MS**—**ACSR/SD**—ACSR/SD using high-strength zinc-5 % Aluminum-mischmetal alloy-coated steel core wire (Specification **B803**).

3.2 For definitions of terms relating to conductors, refer to Terminology Standard **B354**.

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

⁴ Available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 3460, 1070, Gaithersburg, MD 20899-3460, 20899-1070, <http://www.nist.gov>.

⁵ Available from Aluminum Association Inc., 900 19th Street, NW, Suite 300, Washington, DC 20006, Association, Inc., 1525 Wilson Blvd., Suite 600, Arlington, VA 22209, <http://www.aluminum.org>.



TABLE 1 Construction Requirements of Aluminum Conductors, Self Damping, Concentric-Lay-Stranded, Steel-Reinforced

Conductor Size	Type ^D	Code Word ^E	Stranding Number of Wires and Diameter, in. ^A		Steel ^C	Nominal Aluminum Lay Factor	Mass per 1000 ft, lb	Rated Strength, kip ^{A,B}	Nominal Outside Diameter, in.
			Aluminum						
kcmil			Round	Trapezoidal ^F	Round				
2156	8	Bluebird	—	10 × 0.2179 15 × 0.2184	19 × 0.0961	14.5 12.1 11.0	2504	60.7	1.716
1780	8	Chukar	21 × 0.2145	9 × 0.2041 13 × 0.2150	19 × 0.0874	14.5 12.0 11.0	2068	51.1	1.565
1780	5	Smew	—	8 × 0.2171 14 × 0.2128	7 × 0.1144	16.0 12.5 11.5	1921	43.6	1.531
1590	13	Falcon	21 × 0.1914	10 × 0.1891 14 × 0.1977	19 × 0.1030	13.5 11.7 11.5	2039	55.1	1.521
1590	7	Lapwing	—	8 × 0.2059 12 × 0.2130	7 × 0.1253	15.9 12.8 11.5	1791	42.6	1.468
1590	5	Ratite	21 × 0.1835	8 × 0.2095 13 × 0.2143	7 × 0.1083	15.4 12.5 11.5	1715	39.1	1.447
1431	13	Plover	—	10 × 0.1792 14 × 0.1868	19 × 0.0977	13.5 11.7 11.5	1835	49.6	1.448
1431	7	Bobolink	24 × 0.1609	8 × 0.1946 12 × 0.2015	7 × 0.1189	15.1 12.2 11.5	1612	38.9	1.398
1431	5	Popinjay	—	8 × 0.1936 13 × 0.1972	7 × 0.1025	16.0 12.5 11.5	1544	35.3	1.381
1351.5	13	Martin	21 × 0.1726	11 × 0.1604 15 × 0.1652	19 × 0.0949	14.7 12.8 11.5	1733	46.8	1.417
1351.5	10	Frigate	—	9 × 0.1786 14 × 0.1757	7 × 0.1377	14.5 12.2 11.0	1629	41.7	1.389
1351.5	7	Dipper	21 × 0.1735	8 × 0.1890 12 × 0.1954	7 × 0.1155	15.2 12.2 11.0	1522	36.7	1.361
1351.5	5	Ringdove	—	8 × 0.1946 12 × 0.1949	7 × 0.0997	16.0 12.8 11.5	1458	33.4	1.344
1272	13	Pheasant	21 × 0.1680	11 × 0.1552 15 × 0.1599	19 × 0.0921	14.7 12.8 11.5	1631	44.1	1.378
1272	7	Bittern	—	8 × 0.1829 12 × 0.1894	7 × 0.1121	14.5 12.3 11.5	1433	34.6	1.323
1272	5	Scissortail	21 × 0.1653	7 × 0.1929 11 × 0.2029	7 × 0.0967	15.7 12.3 11.5	1372	31.4	1.305
1192.5	13	Grackle	—	10 × 0.2147 16 × 0.2138	19 × 0.0892	14.2 11.5 11.5	1526	41.9	1.274
1192.5	7	Bunting	21 × 0.1631	8 × 0.1768 12 × 0.1831	7 × 0.1085	15.1 12.2 11.5	1343	32.4	1.284
1192.5	5	Oxbird	—	7 × 0.1868 11 × 0.1960	7 × 0.0936	15.7 12.3 11.5	1286	29.5	1.266
1113	13	Finch	21 × 0.1582	9 × 0.2188 15 × 0.2133	19 × 0.0862	14.2 11.5 11.5	1424	39.1	1.233
1113	7	Bluejay	—	8 × 0.1705 12 × 0.1765	7 × 0.1049	15.9 12.8 11.5	1254	30.3	1.242
1113	5	Avocet	—	7 × 0.1818 12 × 0.1798	7 × 0.0904	16.0 12.4 11.5	1200	27.5	1.226
1033.5	13	Curlew	21 × 0.1533	9 × 0.2106 14 × 0.2129	7 × 0.1383	14.2 11.5 11.5	1329	36.3	1.191
1033.5	7	Ortolan	—	8 × 0.2168 14 × 0.2167	7 × 0.1010	15.2 11.5 11.5	1161	28.1	1.145

**B701/B701M - 13****TABLE 1 Continued**

Conductor Size	Type ^D	Code Word ^E	Stranding Number of Wires and Diameter, in. ^A		Steel ^C	Nominal Aluminum Lay Factor	Mass per 1000 ft, lb	Rated Strength, kip ^{A,B}	Nominal Outside Diameter, in.
			Aluminum						
kcmil			Round	Trapezoidal ^F	Round				
1033.5	5	Snowbird	—	7 × 0.1746 12 × 0.1731	7 × 0.871	16.0 12.4 11.5	1115	25.9	1.185
954	13	Cardinal	21 × 0.1481	8 × 0.2147 13 × 0.2122	7 × 0.1329	14.2 11.5	1227	33.5	1.147
954	7	Rail		8 × 0.2080 13 × 0.2163	7 × 0.0971	15.2 11.5	1073	26.1	1.103
954	5	Phoenix		7 × 0.2196 13 × 0.2178	7 × 0.0836	15.6 11.5	1027	23.7	1.088
795	16	Drake		9 × 0.1865 13 × 0.1926	7 × 0.1360	13.9 11.5	1093	31.8	1.077
795	13	Condor		8 × 0.1957 12 × 0.2018	7 × 0.1213	14.2 11.5	1023	28.2	1.055
795	10	Puffin		7 × 0.2067 12 × 0.2033	7 × 0.1056	14.7 11.5	956	25.1	1.034
795	7	Tern		7 × 0.2034 11 × 0.2144	7 × 0.0886	15.2 11.5	893	21.9	1.013
795	5	Macaw		6 × 0.2167 11 × 0.2160	7 × 0.0764	15.6 11.5	856	19.8	0.999
636	16	Grosbeak		9 × 0.1666 13 × 0.1723	7 × 0.1216	13.9 11.5	874	25.4	0.975
636	13	Rook		8 × 0.1749 12 × 0.1806	7 × 0.1085	14.3 11.5	818	22.9	0.955
636	10	Goldfinch		7 × 0.1848 12 × 0.1819	7 × 0.0945	14.7 11.5	765	20.1	0.935
636	7	Killdeer		7 × 0.1815 12 × 0.1838	7 × 0.0793	15.2 11.5	715	17.7	0.917
636	5	Pipit		6 × 0.1938 11 × 0.1932	7 × 0.0684	15.8 11.5	684	16.1	0.903
556.5	16	Dove		9 × 0.1557 13 × 0.1613	7 × 0.1138	14.0 11.5	765	22.6	0.919
556.5	13	Parakeet		8 × 0.1637 13 × 0.1662	7 × 0.1015	14.3 11.5	716	20.0	0.901
556.5	10	Sapsucker		7 × 0.1728 12 × 0.1702	7 × 0.0884	14.7 11.5	669	17.8	0.882
556.5	7	Sunbird		7 × 0.1707 11 × 0.1790	7 × 0.0741	15.2 11.5	625	15.5	0.863
556.5	5	Blackbird		6 × 0.1820 10 × 0.1892	1 × 0.1692	15.8 11.5	599	13.6	0.843
477	16	Hawk		9 × 0.1438 13 × 0.1496	7 × 0.1053	14.0 11.5	655.8	19.5	0.860
477	13	Flicker		8 × 0.1515 13 × 0.1502	7 × 0.0940	14.4 11.5	613.5	17.2	0.843
477	10	Toucan		7 × 0.1599 12 × 0.1576	7 × 0.0818	14.8 11.5	573.4	15.3	0.824
477	7	Jackdaw		7 × 0.1577 12 × 0.1589	7 × 0.0686	15.2 11.5	535.8	13.3	0.808
477	5	Kestrel		6 × 0.1656 10 × 0.1768	1 × 0.1566	16.0 11.5	513.3	11.7	0.787
397.5	16	Ibis		9 × 0.1278 14 × 0.1338	7 × 0.0961	14.2 11.5	546.5	16.4	0.771
397.5	10	Stork		7 × 0.1424 12 × 0.1459	7 × 0.0747	15.0 11.5	477.9	12.9	0.750
397.5	7	Longspur		6 × 0.1501 11 × 0.1544	1 × 0.1657	15.8 11.5	446.1	10.6	0.725
397.5	5	Erne		6 × 0.1558 10 × 0.1587	1 × 0.1430	15.6 11.5	427.7	9.74	0.717
336.4	16	Linnet		10 × 0.1041 16 × 0.1194	7 × 0.0884	14.7 11.5	462.4	14.3	0.716
336.4	10	Woodcock		8 × 0.1215 14 × 0.1249	7 × 0.0687	15.1 11.5	404.5	11.0	0.688
336.4	7	Hummingbird		6 × 0.1406 11 × 0.1407	1 × 0.1525	15.6 11.5	377.7	9.13	0.664
336.4	5	Cowbird		6 × 0.1416 10 × 0.1470	1 × 0.1315	15.9 11.5	361.9	8.5	0.667
266.8	16	Partridge		10 × 0.0881 12 × 0.1256	7 × 0.0788	15.0 11.5	367.0	11.35	0.645
266.8	10	Spoonbill		8 × 0.0978 11 × 0.1315	1 × 0.1619	16.0 11.3	320.0	8.45	0.610
266.8	7	Eider		7 × 0.1080 13 × 0.1193	1 × 0.1358	16.0 11.2	299.4	7.61	0.601



TABLE 1 Continued

Conductor Size		Stranding Number of Wires and Diameter, in. ^A				Nominal Aluminum Lay Factor	Mass per 1000 ft, lb	Rated Strength, kip ^{A,B}	Nominal Outside Diameter, in.
		Aluminum		Steel ^C					
kcmil	Type ^D	Code Word ^E	Round	Trapezoidal ^F	Round				
266.8	5	Titmouse		6 × 0.1183 12 × 0.1234	1 × 0.1171	16.0 11.1	286.9	6.92	0.593

^A Conversion Factors:

1 kcmil = 0.5067 mm² 1 in. = 25.4 mm 1 kip = 1000 lbf = 4.448 kN.

^B Rated strengths of complete conductors are calculated in accordance with 9.1 and with Class A zinc-coated steel core wire in accordance with Specification B498/B498M.

^C Lay factors for steel core are the same as for equivalent stranding of conventional ACSR.

^D The type number is the approximate ratio of the steel to aluminum area in percent.

^E Code words shown in this column are obtained from, "Publication 50, Code Words for Overhead Aluminum Electrical Conductors," by the Aluminum Association. They are provided here for information only.

^F Wire size indicates equal area round wire diameter.

TABLE 2 Comparison of ACSR/SD with Equivalent Stranding of ACSR^A

ACSR/SD Type Number ^B	Conventional ACSR Stranding ^C
5	42/7
7	45/7
8	84/19
10	22/7
13	54/7
13	54/19
13	24/7
16	26/7

^A The equivalent stranding is that stranding of conventional ACSR that has the same area of aluminum and steel as a given ACSR/SD type.

^B ACSR/SD type number is the approximate ratio of the steel area to the aluminum area in %.

^C See Specifications B232/B232M and B549.

4. Ordering Information

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

- 4.1.1 Quantity of each size and type (Note 1),
- 4.1.2 Conductor size: kcmil area,
- 4.1.3 Conductor type and number of wires, aluminum and steel (Table 1),
- 4.1.4 Type of steel core wire and if zinc or Zn-5 % Al-MM alloy coated, area density (Classes A, B, and C) of coating (see 5.2),
- 4.1.5 Special tension test, if required (see 9.2),
- 4.1.6 Place of inspection (Section 15),
- 4.1.7 Package size (see 16.1),
- 4.1.8 Special package marking, if required (Section 17), and
- 4.1.9 Heavy wood lagging, if required (see 16.3).

5. Requirement For Wires

5.1 Before stranding, the round and trapezoidal aluminum wires shall conform to the requirements of Specification B230/B230M except for shape and diameter tolerance of the trapezoidal wires. The tensile strength and elongation requirements of trapezoidal wires shall be the same as for round wires of equal area. The area tolerances shall be such that the finished conductor conforms to Section 12.

5.2 Before stranding, the steel core wire shall meet the requirements of Specifications B341/B341M, B498/B498M, B502, B606, B802/B802M, or B803, whichever is applicable.

6. Joints

6.1 Electric-butt welds, electric-butt, cold-upset welds, or cold-pressure welds may be made in the individual aluminum wires during the stranding process. No weld shall occur within 50 ft. [15 m] of any other weld in the completed conductor (Explanatory Note 3).

6.2 There shall be no joints made in the finished steel wires.

7. Lay

7.1 The nominal lay factors for the trapezoidal aluminum wires are shown in **Table 1** (Explanatory **Note 1** and **Note 4**).

7.2 The lay factor for the round aluminum wires shall be not less than 10 nor more than 13.

7.3 ~~The lay factor for the 6-wire layer of 7 and 19-wire steel cores shall be not less than 18 steel core shall be set forth by Specification **B500/B500M** nor more than 30.~~

7.4 ~~The lay factor for the 12-wire layer of 19-wire steel cores shall be no less than 16 nor more than 24.~~

7.4 The direction of lay of the outside layer of aluminum wires shall be right-hand.

7.5 The direction of lay of the aluminum and steel wires shall be reversed in successive layers.

7.6 For the purpose of this specification the lay factor is the ratio of the length of lay of a given layer divided by its outside diameter to the external diameter of the corresponding layer of wires or members in the stranded conductor.

8. Construction

8.1 The nominal aluminum cross-sectional area, type, stranding, and equivalent wire diameters shall be as shown in **Table 1** (Explanatory **Note 1**).

8.2 The smaller sizes of ACSR/SD consist of a steel core, an inner gap surrounded by a layer of trapezoidal aluminum wires (called the inner layer), and an outer gap surrounded by a second layer of trapezoidal aluminum wire (called the outer layer). The larger sizes of ACSR/SD consist of a steel core, an inner gap surrounded by a layer of trapezoidal aluminum wires (called the inner layer), an outer gap surrounded by a layer of trapezoidal aluminum wires (called the middle layer), and a layer of round aluminum wires (called the outer layer) fitting tightly over the middle layer. The diameter and number of steel core wires, the number and equivalent round wire diameters of the trapezoidal aluminum wires, and the number and diameter of the round aluminum wires shall be as shown in **Table 1**.

8.3 All conductor gaps shall be measured radially. The nominal thickness of the gap is 0.030 in. [0.75 mm]. The tolerance of both the inner and outer gaps shall be plus 0.000 in. [0.00 mm] and minus 0.010 in. [0.25 mm].

TABLE 1 Construction Requirements of Aluminum Conductors, Self Damping, Concentric Lay-Stranded, Steel-Reinforced

Conductor-Size		Stranding Number of Wires and Diameter, in. ^A				Nominal Aluminum Lay Factor	Mass per 1000 ft., lb	Rated Strength, kip ^{D,E}	Nominal Outside Diameter, in.
		Aluminum		Steel ^C					
kemil	Type ^D	Code-Word ^E	Round	Trapezoidal ^E	Round				
2156	8	Bluebird	—	10 × 0.2179	19 × 0.0961	14.5	2504	60.7	1.716
			21 × 0.2145	15 × 0.2184	12.1				
1780	8	Chukar	—	9 × 0.2041	19 × 0.0874	14.5	2068	51.1	1.565
			21 × 0.1957	13 × 0.2150	12.0				
1780	5	Smew	—	8 × 0.2171	7 × 0.1144	16.0	1921	43.6	1.531
			21 × 0.1914	14 × 0.2128	12.5				
1590	13	Falcon	—	10 × 0.1891	19 × 0.1030	13.5	2039	55.1	1.521
			24 × 0.1690	14 × 0.1977	11.7				
1590	7	Lapwing	—	8 × 0.2059	7 × 0.1253	15.9	1791	42.6	1.468
			21 × 0.1835	12 × 0.2130	12.8				
1590	5	Rattie	—	8 × 0.2095	7 × 0.1083	15.4	1715	39.1	1.447
			23 × 0.1669	13 × 0.2143	12.5				
1431	13	Plover	—	10 × 0.1792	19 × 0.0977	13.5	1835	49.6	1.448
			24 × 0.1609	14 × 0.1868	11.7				
1431	7	Bobolink	—	8 × 0.1946	7 × 0.1189	15.1	1612	38.9	1.398
			21 × 0.1747	12 × 0.2015	12.2				
1431	5	Popinjay	—	8 × 0.1936	7 × 0.1025	16.0	1544	35.3	1.381
			21 × 0.1726	13 × 0.1972	12.5				
1351.5	13	Martin	—	11 × 0.1604	19 × 0.0949	14.7	1733	46.8	1.417
			21 × 0.1772	15 × 0.1652	12.8				
1351.5	10	Frigate	—	9 × 0.1786	7 × 0.1377	14.5	1629	41.7	1.389
			21 × 0.1735	14 × 0.1757	12.2				
						11.0			