



Designation: A 855/A 855M – 98

Standard Specification for Zinc-5 % Aluminum-Mischmetal Alloy-Coated Steel Wire Strand¹

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1. Scope

1.1 This specification covers five grades of zinc-5 % aluminum-mischmetal (Zn-5 Al-MM) alloy-coated, steel wire strand, composed of a number of round, steel wires, with four weights of Zn-5 Al-MM alloy coatings, suitable for use as guys, messengers, span wires, and for similar purposes. The product is intended for applications requiring corrosion resistance and formability.

1.2 The five grades covered are as follows:

- 1.2.1 Utilities,
- 1.2.2 Common,
- 1.2.3 Siemens-Martin,
- 1.2.4 High-strength, and
- 1.2.5 Extra high-strength,

1.2.6 Minimum breaking strengths of strand for each grade are described in Section 8.

1.3 The four weights of coatings are: Type 1 and Classes A, B, and C. Minimum weights of Zn-5 Al-MM alloy are described in Section 12.

1.4 This specification is applicable to orders in either inch-pound units (as A 855) or acceptable SI units (as A 855M). Inch-pound units and SI units are not necessarily equivalent.

2. Referenced Documents

2.1 ASTM Standards:

A 90 Test Method for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles²

A 902 Terminology Relating to Metallic Coated Steel Products²

B 750 Specification for Zinc-5 % Aluminum-Mischmetal Alloy (UNS Z 38510) in Ingot Form for Hot-Dip Coatings³

E 47 Method for Chemical Analysis of Zinc Die-Casting Alloys⁴

¹ This specification is under the jurisdiction of ASTM Committee A-5 on Metallic Coated Iron and Steel Products and is the direct responsibility of Subcommittee A05.12 on Wire Specifications.

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² Annual Book of ASTM Standards, Vol 01.06.

³ Annual Book of ASTM Standards, Vol 02.04.

⁴ Annual Book of ASTM Standards, Vol 03.05.

E 1277 Test Method for Chemical Analysis of Zinc-5 % Aluminum-Mischmetal Alloy by ICP Argon Plasma Spectrometric Method⁵

2.2 Other Standard:

GF-1 Standard Practice for Determination of Cerium and Lanthanum Compositions in Galfan Alloy (5-Al-0.04 % La-0.04 % Ce-Bal SHG Zn)⁶

3. Terminology

3.1 *Definitions*—For definitions of terms used in this specification refer to Terminology A 902.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *strand*—the designation of the finished strand shall be expressed as the nominal diameter of the strand, the number of the wires in the strand and the minimum breaking strength of the strand (see Section 8), and the type or class of coating (see Section 12).

4. Ordering Information

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

4.1.1 Quantity of strand in feet (metres),

4.1.2 Nominal strand diameter, number of wires, grade, and minimum breaking strength of strand (Section 6 and Table 1),

4.1.3 Weight (type and class) of Zn-5 Al-MM alloy coating (Section 13 and Table 2), and

4.1.4 Length of strand in coils or on reels (Section 20).

5. Materials and Manufacture

5.1 *Base Metal*—The base metal shall be steel made by the open-hearth, basic-oxygen, or electric-furnace process and of such quality and purity that, when drawn to the size of wire specified and coated with Zn-5 Al-MM alloy, the finished strand and the individual wires shall be of uniform quality and have the properties and characteristics as prescribed in this specification.

5.2 *Coating Bath Analysis*—The bath metal used in continuous hot-dip Zn-5 Al-MM alloy-coating shall meet the chemical composition limits specified in Specification B 750.

⁵ Annual Book of ASTM Standards, Vol 03.06.

⁶ Available from International Lead Zinc Research Organization, 2525 Meridian Parkway, P.O. Box 12036, Research Triangle Park, NC 27709-2036.



TABLE 1 Physical Properties of Zn-5 Al-MM Alloy-Coated Steel Wire Strand

NOTE—The numbers in boldface indicate sizes and grades most commonly used and readily available.

Nominal Diameter of Strand, in. (mm)	Number of Wires in Strand	Nominal Diameter of Coated Wires in Strand, in. (mm)	Approximate Weight of Strand, lb/1000 ft (kg/ 304.8 m)	Minimum Breaking Strength of Strand, lbf (kN)				
				Utilities Grade ^A	Common Grade	Siemens-Martin Grade	High-Strength Grade	Extra High-Strength Grade
1/3 (3.18)	7	0.041 (1.04)	32 (15)	...	540 (2.402)	910 (4.048)	1 330 (5.916)	1 830 (8.140)
5/32 (3.97)	7	0.052 (1.32)	51 (23)	...	870 (3.870)	1 470 (6.539)	2 140 (9.519)	2 940 (13.078)
3/16 (4.76)	7	0.062 (1.57)	73 (33)	...	1 150 (5.115)	1 900 (8.452)	2 850 (12.677)	3 990 (17.748)
1/8 (3.18)	7	0.065 (1.65)	80 (36)	2 400 (10.676) (1)^B	...	...	...	...
7/32 (5.56)	3	0.104 (2.64)	88 (40)	...	1 400 (6.228)	2 340 (10.409)	3 500 (15.569)	4 900 (21.796)
1/4 (6.35)	7	0.072 (1.83)	98 (44)	...	1 540 (6.850)	2 560 (11.387)	3 850 (17.126)	5 400 (24.020)
3/16 (4.76)	3	0.120 (3.05)	117 (53)	3 150 (14.012) (2)^B	1 860 (8.274)	3 040 (13.523)	4 730 (21.040)	6 740 (29.981)
1/4 (6.35)	3	0.120 (3.05)	117 (53)	4 500 (20.017) (3)^B	...	...	...	...
3/16 (4.76)	7	0.080 (2.03)	121 (55)	...	1 900 (8.452)	3 150 (14.012)	4 750 (21.129)	6 650 (29.581)
5/32 (7.14)	3	0.130 (3.30)	137 (62)	...	2 080 (9.252)	3 380 (15.035)	5 260 (23.398)	7 500 (33.362)
1/4 (6.35)	7	0.093 (2.36)	164 (74)	4 600 (20.462) (1)^B	2 570 (11.432)	4 250 (18.905)	6 400 (28.469)	8 950 (39.812)
5/16 (7.94)	3	0.145 (3.68)	171 (78)	6 500 (28.913) (3)^B	2 490 (11.076)	4 090 (18.193)	6 350 (28.246)	9 100 (40.479)
5/16 (7.94)	7	0.104 (2.64)	205 (93)	...	3 200 (14.234)	5 350 (23.798)	8 000 (35.586)	11 200 (49.820)
5/16 (7.94)	7	0.109 (2.77)	225 (102)	6 000 (26.689) (1)^B	...	...	...	...
3/8 (9.52)	3	0.165 (4.19)	220 (100)	8 500 (37.810) (3)^B	3 330 (14.813)	5 560 (24.732)	8 360 (37.187)	11 800 (52.489)
3/8 (9.52)	7	0.120 (3.05)	273 (124)	11 500 (51.155) (4)^B	4 250 (18.905)	6 950 (30.915)	10 800 (48.040)	15 400 (68.503)
7/16 (11.11)	7	0.145 (3.68)	399 (181)	18 000 (80.068) (4)^B	5 700 (25.355)	9 350 (41.591)	14 500 (64.499)	20 800 (92.523)
1/2 (12.70)	7	0.165 (4.19)	517 (234)	25 000 (111.206) (4)^B	7 400 (32.917)	12 100 (53.823)	18 800 (83.627)	26 900 (119.657)
1/2 (12.70)	19	0.100 (2.54)	504 (229)	...	7 620 (33.895)	12 700 (56.492)	19 100 (84.961)	26 700 (118.768)
9/16 (14.29)	7	0.188 (4.78)	671 (304)	...	9 600 (42.703)	15 700 (69.837)	24 500 (108.981)	35 000 (155.688)
9/16 (14.29)	19	0.113 (2.87)	637 (289)	...	9 640 (42.881)	16 100 (71.616)	24 100 (107.202)	33 700 (149.905)
5/8 (15.88)	7	0.207 (5.26)	813 (369)	...	11 600 (51.599)	19 100 (84.961)	29 600 (131.667)	42 400 (188.605)
5/8 (15.88)	19	0.125 (3.18)	796 (361)	...	11 000 (48.930)	18 100 (80.513)	28 100 (124.995)	40 200 (178.819)
3/4 (19.05)	19	0.150 (3.81)	1 155 (524)	...	16 000 (71.172)	26 200 (116.543)	40 800 (181.487)	58 300 (259.331)
7/8 (22.22)	19	0.177 (4.50)	1 581 (717)	...	21 900 (97.416)	35 900 (159.691)	55 800 (248.211)	79 700 (354.523)
1 (25.40)	19	0.200 (5.08)	2 073 (940)	...	28 700 (127.664)	47 000 (209.066)	73 200 (325.610)	104 500 (464.839)
1 (25.40)	37	0.143 (3.63)	2 057 (933)	...	28 300 (125.885)	46 200 (205.508)	71 900 (319.827)	102 700 (456.832)
1 1/8	37	0.161 (4.09)	2 691 (1 221)	...	36 000 (160.136)	56 900 (262.000)	91 600 (407.457)	130 800 (581.827)
1 1/4 (31.75)	37	0.179 (4.55)	3 248 (1 473)	...	44 600 (198.391)	73 000 (324.720)	113 600 (505.318)	162 200 (721.502)

^A The utilities grade is used principally by communication and power and light industries.

^B Refer to elongation requirements specified in Section 9.

TABLE 2 Elongation Requirements for Grades of Strand

Grade of Strand	Elongation in 24 in. [610 mm], min, %
Utilities Grade (1) ^A and Common Strand	10
Utilities Grade (2) ^A and Siemens-Martin	8
Utilities Grade (3) ^A and High-Strength	5
Utilities Grade (4) ^A and Extra High-Strength	4

^A See Table 1, Footnote B.

5.2.1 For a two-step coating operation where the first coating is zinc (hot-dip galvanized or electrogalvanized) the final bath may have an aluminum content of up to 7.2 %, to prevent depletion of the aluminum content of the bath.

5.2.2 *Method of Analysis*—The determination of chemical composition shall be made in accordance with suitable chemical (see Test Method E 47 for tin) ICP Argon Plasma Spectro-

metric (see Test Method E 1277) or other methods. In case of dispute, the results secured by Test Method E 1277 shall be the basis of acceptance.

5.2.3 A standard practice of X-ray fluorescence spectrometry for determination of cerium and lanthanum in a zinc-5 % aluminum-mischmetal alloy has been established by the International Lead Zinc Research Organization (see Standard Practice GF-1). In case of dispute, the results secured by Test Method E 1277 shall be the basis of acceptance.

6. Stranding

6.1 Unless otherwise specified, strand shall have a left lay. A left lay is defined as a counter-clockwise twist away from the observer. All wires shall be stranded with uniform tension. Stranding shall be sufficiently close to ensure no appreciable reduction in diameter when stressed to 10 % of the minimum breaking strength.