Designation: A475 – 03 (Reapproved 2014)

# Standard Specification for Zinc-Coated Steel Wire Strand[1]

This standard is issued under the fixed designation A475; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

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

## 1. Scope

1.1 This specification covers five grades of zinc-coated, steel wire strand, composed of a number of round, steel wires, with four weights of zinc coatings, suitable for use as guys, messengers, span wires, and for similar purposes.

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 7.

1.3 The four weights of zinc coatings are: Class 1 and Classes A, B, and C. Minimum weights of zinc coatings are described in Section 10.

1.4 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

## 2. Referenced Documents

2.1 *ASTM Standards:*[2]
A90/A90M Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
A902 Terminology Relating to Metallic Coated Steel Products
B6 Specification for Zinc

## 3. Terminology

3.1 *Definitions*—For definitions of terms used in this standard, refer to Terminology A902.

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, the minimum breaking strength of the strand (see Section 7), and the class of coating (see Section 10).

## 4. Ordering Information

4.1 Orders for material under this specification shall include the following information:
4.1.1 Quantity of strand in feet,
4.1.2 Nominal strand diameter, number of wires, grade, and minimum breaking strength of strand (Section 7 and Table 1),
4.1.3 Weight (class) of zinc coating (Section 10 and Table 2),
4.1.4 Length of strand in coils or on reels (Section 18), and
4.1.5 ASTM designation and year of issue.

## 5. Materials and Manufacture

5.1 The base metal shall be steel made by any commercially accepted steel making process and of such quality and purity that, when drawn to the size of wire specified and coated with zinc, 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 The slab zinc, when used for the coating, shall be any grade of zinc conforming to Specification B6.

## 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.

6.2 The 3-wire strand shall consist of three wires concentrically twisted with a uniform pitch of not less than 14 nor more than 20× the specified nominal diameter of the strand.

6.3 The 7-wire strand shall consist of a center wire with a 6-wire layer concentrically twisted over it with a uniform pitch of not more than 16× the specified nominal diameter of the strand.

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

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[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.

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**TABLE 1 Physical Properties of Zinc-Coated Steel Wire Strand**

NOTE 1—The numbers in boldface type 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/km) | | Minimum Breaking Strength of Strand, lbf (kN) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Utilities Grade[A] | Common Grade | Siemens-Martin Grade | High-Strength Grade | Extra High-Strength Grade |
| 1/8 | (3.18) | 7 | 0.041 (1.04) | 32 | (48) | . . . | **540 (2.402)** | 910 (4.048) | 1 330 (5.916) | 1 830 (8.140) |
| 5/32 | (3.97) | 7 | 0.052 (1.32) | 51 | (76) | . . . | **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 | (109) | . . . | **1 150 (5.115)** | 1 900 (8.452) | 2 850 (12.677) | 3 990 (17.748) |
| 3/16 | (4.76) | 7 | 0.065 (1.65) | 80 | (119) | **2 400 (10.676)** (1)[B] | . . . | . . . | . . . | . . . |
| 7/32 | (5.56) | 3 | 0.104 (2.64) | 88 | (131) | . . . | 1 400 (6.228) | 2 340 (10.409) | 3 500 (15.569) | 4 900 (21.796) |
| 7/32 | (5.56) | 7 | 0.072 (1.83) | 98 | (146) | . . . | 1 540 (6.850) | 2 560 (11.387) | 3 850 (17.126) | 5 400 (24.020) |
| 1/4 | (6.35) | 3 | 0.120 (3.05) | 117 | (174) | **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 | (174) | **4 500 (20.017)** (3)[B] | . . . | . . . | . . . | . . . |
| 1/4 | (6.35) | 7 | 0.080 (2.03) | 121 | (180) | . . . | **1 900 (8.452)** | **3 150 (14.012)** | 4 750 (21.129) | 6 650 (29.581) |
| 9/32 | (7.14) | 3 | 0.130 (3.30) | 137 | (204) | . . . | 2 080 (9.252) | 3 380 (15.035) | 5 260 (23.398) | 7 500 (33.362) |
| 9/32 | (7.14) | 7 | 0.093 (2.36) | 164 | (244) | **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 | (255) | **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 | (305) | . . . | **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 | (335) | **6 000 (26.689)** (1)[B] | . . . | . . . | . . . | . . . |
| 3/8 | (9.52) | 3 | 0.165 (4.19) | 220 | (328) | **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 | (407) | **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 | (595) | **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 | (770) | **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 | (751) | . . . | 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 | (1000) | . . . | 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 | (949) | . . . | 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 | (1211) | . . . | 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 | (1186) | . . . | 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 | (1721) | . . . | 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 | (2356) | . . . | 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 | (3089) | . . . | 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 | (3065) | . . . | 28 300 (125.885) | 46 200 (205.508) | 71 900 (319.827) | 102 700 (456.832) |
| 1 1/8 | (28.58) | 37 | 0.161 (4.09) | 2 691 | (4010) | . . . | 36 000 (160.136) | 58 900 (262.000) | 91 600 (407.457) | 130 800 (581.827) |
| 1 1/4 | (31.75) | 37 | 0.179 (4.55) | 3 248 | (4840) | . . . | 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 8.



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