



Designation: A475 – 22

Standard Specification for Metallic-Coated Steel Wire Strand¹

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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 metallic-coated, steel wire strand, composed of a number of round, steel wires, with four weights of metallic coatings, and four types of metallic 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 metallic coatings are: Class 1 and Classes A, B, and C. Minimum weights of metallic coatings are described in Section 10.

1.4 The four types of metallic coatings are type 1, 2, 5, and 10 as defined in Section 3.

1.5 *Units*—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.

1.6 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

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

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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

B750 Specification for GALFAN (Zinc-5 % Aluminum-Mischmetal) Alloy in Ingot Form for Hot-Dip Coatings¹

B997 Specification for Zinc-Aluminum Alloys in Ingot Form for Hot-Dip Coatings

3. Terminology

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

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *Coating Type 1, n*—zinc coating per 5.2.

3.2.2 *Coating Type 2, n*—95Zn/5Al-MM coating per 5.3.

3.2.3 *Coating Type 5, n*—95Zn/5Al coating per 5.4.

3.2.4 *Coating Type 10, n*—90Zn/10Al coating per 5.4.

3.2.5 *strand splice, n*—a production connection between two separate lengths of strand never intended to carry working loads in the intended application.

3.2.6 *weldless strand, n*—strand that does not contain any wires with electric-welded butt joints made after the cold drawing of the wire.

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,

4.1.3 Number of wires,

4.1.4 Class of coating (A, B, or C per Section 10 and Table 1),

4.1.5 Coating Type (1, 2, 5, or 10 per Section 5),

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.

TABLE 1 Nominal Diameters and Minimum Weights of Coating for Metallic-Coated Steel Wires^A

Nominal Diameter of Coated Wire in the Strand, in. (mm)	Minimum Weight of Coating, oz/ft ² (g/m ²) of Uncoated Wire Surface			
	Class 1 ^B	Class A ^C	Class B ^D	Class C ^D
0.041 (1.04)	0.15 (46)	0.40 (122)	0.80 (244)	1.20 (366)
0.052 (1.32)	0.15 (46)	0.40 (122)	0.80 (244)	1.20 (366)
0.062 (1.57)	0.15 (46)	0.50 (153)	1.00 (305)	1.50 (458)
0.065 (1.65)	0.15 (46)	0.50 (153)	1.00 (305)	1.50 (458)
0.072 (1.83)	0.15 (46)	0.50 (153)	1.00 (305)	1.50 (458)
0.080 (2.03)	0.30 (92)	0.60 (183)	1.20 (366)	1.80 (549)
0.093 (2.36)	0.30 (92)	0.70 (214)	1.40 (427)	2.10 (641)
0.100 (2.54)	0.30 (92)	0.70 (214)	1.40 (427)	2.10 (641)
0.104 (2.64)	0.30 (92)	0.80 (244)	1.60 (488)	2.40 (732)
0.109 (2.77)	0.30 (92)	0.80 (244)	1.60 (488)	2.40 (732)
0.113 (2.87)	0.30 (92)	0.80 (244)	1.60 (488)	2.40 (732)
0.120 (3.05)	0.30 (92)	0.85 (259)	1.70 (519)	2.55 (778)
0.125 (3.18)	0.30 (92)	0.85 (259)	1.70 (519)	2.55 (778)
0.130 (3.30)	0.30 (92)	0.85 (259)	1.70 (519)	2.55 (778)
0.143 (3.63)	0.40 (122)	0.90 (275)	1.80 (549)	2.70 (824)
0.145 (3.68)	0.40 (122)	0.90 (275)	1.80 (549)	2.70 (824)
0.150 (3.81)	0.40 (122)	0.90 (275)	1.80 (549)	2.70 (824)
0.161 (4.09)	0.40 (122)	0.90 (275)	1.80 (549)	2.70 (824)
0.165 (4.19)	0.40 (122)	0.90 (275)	1.80 (549)	2.70 (824)
0.177 (4.50)	0.40 (122)	0.90 (275)	1.80 (549)	2.70 (824)
0.179 (4.55)	0.40 (122)	0.90 (275)	1.80 (549)	2.70 (824)
0.188 (4.78)	0.40 (122)	1.00 (305)	2.00 (610)	3.00 (915)
0.200 (5.08)	0.40 (122)	1.00 (305)	2.00 (610)	3.00 (915)
0.207 (5.26)	0.40 (122)	1.00 (305)	2.00 (610)	3.00 (915)

^A For intermediate sizes of wire in the strand, the weight designations are the same as for the next finer size shown in this table.

^B Class 1 (formerly “galvanized”) coating applies to common grade of strand only.

^C Class A, “extra galvanized” and “double galvanized” are equivalent terms.

^D Class B and Class C coatings apply to zinc only.

4.1.6 Grade (Per 1.2 and Table 2),

4.1.7 Optional – Weldless Strand. Unless otherwise requested, strand will be provided as specified in 12.1 – 12.4,

4.1.8 Length of strand in coils or on reels (Section 18), and.

4.1.9 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 metallic coated, 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 Type 1 shall use zinc conforming to Specification B6.

5.3 Coating Type 2 shall use 95Zn/5Al alloy metal conforming to Specification B750 (only for classes 1 and A).

5.4 Coating Type 5 (95Zn/5Al) or Coating type 10 (90Zn/10Al) shall use zinc alloy metal conforming to the respective type in Specification B997 (only for classes 1 and A).

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.

6.4 The 19-wire strand shall consist of a center wire with a 6-wire layer concentrically twisted over it, having a right lay and a uniform pitch of not more than 16× the nominal diameter of this 7-wire core. The nominal diameter of this 7-wire core shall be considered to be 3× the nominal diameter of the wires. A 12-wire outer layer, having a left lay shall be concentrically twisted over the 7-wire core and shall have a uniform pitch of not more than 16× the specified nominal diameter of the strand.

6.5 The 37-wire strand shall consist of a center wire with a 6-wire layer concentrically twisted over it, having a left lay and a uniform pitch of not more than 16× the nominal diameter of this 7-wire inner core. The nominal diameter of this 7-wire inner core shall be considered to be 3× the nominal diameter of the wire. An intermediate layer of 12 wires having a right lay shall be concentrically twisted over this 7-wire core and shall have a uniform pitch of not more than 16× the nominal diameter of this 19-wire core. The nominal diameter of this 19-wire core shall be considered as 5× the nominal diameter of the wires. An 18-wire outer layer, having a left lay shall be concentrically twisted over the 19-wire core and shall have a uniform pitch of not more than 16× the specified nominal diameter of the strand.

6.6 All wires in the strand shall lie naturally in their true positions in the completed strand and, when the strand is cut, the ends shall remain in position or be readily replaced by hand and then remain in position. This may be accomplished by any means or process, such as preforming, post forming, or form setting.

7. Breaking Strength and Weight

7.1 The approximate weight per unit length of strand and the minimum breaking strength of the finished strand shall be as specified in Table 2.

7.2 A test in which the breaking strength is below the minimum specified and which may have been caused by the slipping of the specimen in the jaws of the testing machine, by breaking within the jaws or within 1 in. (25.4 mm) of the jaws, or by the improper socketing of a specimen shall be disregarded and another sample from the same coil or reel shall be tested. Tests shall be made on lengths of strand that do not contain wire joints or splices.

8. Elongation

8.1 The elongation of the strand in 24 in. (610 mm) shall be not less than that specified in Table 3.