



Designation: A 363 – 98

Standard Specification for Zinc-Coated (Galvanized) Steel Overhead Ground Wire Strand¹

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1. Scope

1.1 This specification covers high-strength, extra-high-strength, and utilities grades of concentric lay steel wire strand composed of three wires or seven wires with Class A, Class B, or Class C zinc coatings specifically intended for use as overhead ground wires or static wires for electric power transmission lines.

1.2 The values stated in inch-pound units are to be regarded as the standard. The SI units given in parentheses are for information only.

2. Referenced Documents

2.1 ASTM Standards:

A 90/A 90M Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings²

A 902 Terminology Relating to Metallic-Coated Steel Products²

B 6 Specification for Zinc³

3. Terminology

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

4. Ordering Information

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

4.1.1 Quantity of each size,

4.1.2 Size and grade of strand (Table 1), and

4.1.3 Class of zinc coating (Section 17 and Table 2).

5. Materials and Manufacture

5.1 The base metal shall be steel produced by the basic-oxygen, open-hearth, or electric-furnace process and shall be of such quality and purity that when drawn to the size of wire

specified and coated with zinc, the finished strand will have the properties and characteristics prescribed in this specification.

5.2 The slab zinc when used for the coating shall be any grade of zinc conforming to Specification B 6.

6. Joints and Splices

6.1 There shall be no joints of any kind made in the finished wire entering into the construction of the strand.

6.2 Electric-welded butt joints made prior to the start of cold drawing of the wire are permitted; however, no electric-welded butt joints of the wire shall be made during the cold drawing application.

6.3 There shall be no strand joints or strand splices in any length of the completed strand.

7. Stranding

7.1 The strand shall have a left lay with a uniform pitch of not more than 16 times the nominal diameter of the strand. A left lay is defined as a counter-clockwise twist away from the observer. Stranding shall be sufficiently close to ensure no significant reduction in diameter when stressed to 10 % of the minimum breaking strength.

8. Preforming Strand

8.1 Preformed strand shall be supplied when so specified by the purchaser. Strand is preformed when the component wires are set to the helical form which they assume in the product by any means of process other than by merely laying them about the strand core.

9. Physical Properties

9.1 The nominal size of the component wires, the weight per 1000 ft (305 m) of strand, and the minimum breaking strength of the three grades of strand covered in this specification shall conform to the requirements prescribed in Table 1.

10. Elongation

10.1 The elongation of the strand in 24 in. (610 mm), determined as specified in 10.2, shall be not less than 5 % for the high-strength and for the 5/16-in. (7.94-mm), 3-wire utilities grades, and 4 % for the extra-high-strength and for the 3/8-in. (9.52-mm), 7-wire Utilities grades.

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 Annual Book of ASTM Standards, Vol 01.06.

³ Annual Book of ASTM Standards, Vol 02.04.



TABLE 1 Physical Properties of Zinc-Coated Steel Overhead Ground Wire Strand

Nominal Diameter of Strand, in. (mm)	Number of Wires in Strand	Nominal Diameter of Coated Wire in Strand, in. (mm) ^A	Approximate Weight of Strand, lb/1000 ft (kg/m)	Minimum Breaking Strength of Strand, lbf (kN)		
				High-Strength Grade	Extra-High-Strength Grade	Utilities Grade
5/16 (7.94)	3	0.145 (3.68)	171 (0.255)	...	...	6 500 (28.9)
5/16 (7.94)	7	0.104 (2.64)	205 (0.305)	8 000 (35.6)	11 200 (49.8)	...
3/8 (9.52)	7	0.120 (3.05)	273 (0.407)	10 800 (48.0)	15 400 (68.4)	11 500 (51.2)
7/16 (11.11)	7	0.145 (3.68)	399 (0.595)	14 500 (64.5)	20 800 (92.5)	...
1/2 (12.7)	7	0.165 (4.19)	517 (0.770)	18 800 (83.6)	26 900 (119.6)	...

^A It is recognized that the surfaces of heavy zinc coating, particularly those produced by hot galvanizing, are not perfectly smooth and devoid of irregularities. If the tolerances shown above are rigidly applied to such irregularities that are inherent to the product, unjustified rejections of wire that would actually be satisfactory for use could occur. Therefore, it is intended that these tolerances be used in gaging the uniform areas of the galvanized wire.

TABLE 2 Minimum Weights of Coating

Nominal Diameter of Coated Wire, in. (mm)	Minimum Weight of Coating, oz/ft ² (kg/m ²) of Uncoated Wire Surface		
	Class A	Class B	Class C
0.104 (2.64)	0.80 (0.24)	1.60 (0.49)	2.40 (0.73)
0.120 (3.05)	0.85 (0.26)	1.70 (0.52)	2.55 (0.78)
0.145 (3.68)	0.90 (0.27)	1.80 (0.55)	2.70 (0.82)
0.165 (4.19)	0.90 (0.27)	1.80 (0.55)	2.70 (0.82)

10.2 The elongation shall be measured as the percentage increase in separation between the jaws of the testing machine from the position after application of the initial load, to the position at initial failure in the test specimen. The separation of the jaws of the testing machine shall be approximately 2 ft (0.61 m) when under an initial load equal to 10 % of the required minimum breaking strength of the strand. The elongation values shall be recorded only for specimens that break over 1 in. (25.4 mm) from jaws of the testing machine.

11. Ductility of Steel

11.1 The individual wires of the completed strand shall not fracture when wrapped at a rate not exceeding 15 turns per minute in a close helix of at least two turns around a cylindrical mandrel equal to three times the nominal diameter of the wire under test.

12. Adherence of Coating

12.1 The zinc coating shall adhere to the wire without flaking and without being removable by rubbing with the bare fingers after the individual wires have been wrapped at a rate not exceeding 15 turns per minute, in a close helix of at least two turns around a cylindrical mandrel equal to three times the nominal diameter of the wire under test.

NOTE 1—Loosening or detachment during the adhesion tests of superficial, small particles of zinc formed by mechanical polishing of the surface of zinc-coated wire shall not be considered cause for rejection.

13. Permissible Variations in Wire Size

13.1 The diameter of the zinc-coated wire forming the strand shall conform to the nominal diameter shown in Table 1 within a tolerance of ± 0.004 in. (0.102 mm) for Wire Sizes 0.104 in. (2.642 mm) and 0.120 in. (3.048 mm) and ± 0.005 in. (0.127 mm) for Wire Sizes 0.145 in. (3.683 mm) and 0.165 in. (4.191 mm).

14. Size of Strand

14.1 The size of the finished strand shall be expressed as the approximate diameter of the strand in fractions of an inch.

15. Workmanship, Finish, and Appearance

15.1 The zinc-coated wire shall be uniform in diameter and shall be free from splints, scales, inequalities, flaws, and other imperfections not consistent with good commercial practice. The coating shall be continuous and reasonably uniform.

16. Sampling

16.1 The number of samples to be taken shall be determined by lot size as follows:

Lot Size	Number of Samples
1 to 3 reels	1 from each reel
4 to 30 reels	3 min
31 reels or greater	4 min

16.2 Each sample taken shall be subjected to all tests prescribed in Sections 7, 9, and 10.

16.3 In addition to the strand testing in 8.1, the individual wires shall be tested. The number of individual wires to be selected from each sample of strand and tested to determine compliance with Sections 9, 12, 13, and 17 shall be as follows:

3-wire strand	3 wires
7-wire strand	4 wires

NOTE 2—Individual wire samples selected for compliance to Section 13 shall be discarded if any distortion of the wire occurred during the stranding operation.

16.4 Instead of testing the wires from the completed strand in accordance with 16.3, the producer may elect to establish compliance with Sections 10, 11, 12, and 16 of this specification by tests made on the wires prior to stranding, unless otherwise stipulated by the purchaser. However, if the producer makes this election, the purchaser shall still reserve the right to test wires from the completed strand for compliance.

17. Weight of Coating

17.1 The weight of zinc coating, in ounces per square foot, or per square metre, of uncoated wire surface shall not be less than that specified in Table 2.

17.2 *Weight of Coating Test*—The zinc coating shall be tested for weight by a stripping test in accordance with Test Method A 90/A 90M.

