Designation: A368 – 95a (Reapproved 2019)

Standard Specification for Stainless Steel Wire Strand[1]

This standard is issued under the fixed designation A368; 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 stainless steel wire strand composed of a multiplicity of round wires and suitable for use as guy wires, overhead ground wires, and similar purposes.

1.2 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.

1.3 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

A555/A555M Specification for General Requirements for Stainless Steel Wire and Wire Rods

A751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products

3. Ordering Information

3.1 It is the responsibility of the purchaser to specify all requirements that are necessary for material ordered under this specification. Such requirements may include, but are not limited to, the following:

3.1.1 Quantity (length of strand or weight of quantity ordered, or both; see 13.1 and Table 1),

3.1.2 Name of material (stainless steel),

3.1.3 Form (wire strand in coils or on reels),

3.1.4 Applicable dimensions (for nominal strand diameter, see Table 1),

3.1.5 Number of wires per strand (Table 1),

3.1.6 Minimum breaking strength (medium or high strength),

3.1.7 Type designation (see Section 7),

3.1.8 ASTM designation, and date of issue, and

3.1.9 Special requirements, if any.

NOTE 1—A typical ordering description is as follows: 1000 ft, stainless steel 7-wire strand, 7/16-in. diameter, medium strength, on reel, Type 302, ASTM A368 dated _____.

4. General Requirements for Delivery

4.1 In addition to the requirements of this specification, all requirements of the current edition of Specification A555/A555M shall apply. Failure to comply with the general requirements of Specification A555/A555M constitutes nonconformance with this specification.

5. Stranding

5.1 Three-wire strand shall have a left lay with a uniform pitch of not less than 10 nor more than 16 times the nominal diameter of the strand. Seven-wire strand and the outer layer of 19-wire strand, shall have a left lay with a uniform pitch of not less than 12 nor more than 16 times the nominal diameter of the strand. 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 specified strength.

5.2 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.

6. Joints

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

6.2 In 3-wire strand, there shall be no joints in the individual wires.

6.3 In 7-wire strand, joints in individual wires shall be acceptable provided there is not more than one joint in any 150-ft (46-m) section of the completed strand and the location

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[1] This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee A01.17 on Flat-Rolled and Wrought Stainless Steel.

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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.

TABLE 1 Mechanical Properties of Stainless Steel Wire Strand

Nominal Diameter of Strand, in. (mm)	Number of Wires in Strand	Nominal Diameter of Stainless Wires, in. (mm)	Approximate Weight of Strand per 1000 ft (304.80 m), lb (kg)	Minimum Breaking Strength of Strand, lbf (kN)	
				Medium Strength	High Strength
13/64 (5.16)	3	0.093 (2.36)	72 (32.66)	3 150 (14.01)	4 500 (20.02)
7/32 (5.56)	3	0.104 (2.64)	90 (40.82)	3 950 (17.57)	5 650 (25.13)
1/4 (6.35)	3	0.120 (3.05)	120 (54.43)	5 300 (23.58)	7 550 (33.58)
5/16 (7.94)	3	0.145 (3.68)	175 (79.38)	7 700 (34.25)	11 000 (48.93)
3/8 (9.52)	3	0.165 (4.19)	225 (102.06)	10 000 (44.48)	14 300 (63.61)
7/32 (5.56)	7	0.072 (1.83)	100 (45.36)	4 500 (20.02)	6 300 (28.02)
1/4 (6.35)	7	0.083 (2.11)	132 (59.87)	5 950 (26.47)	8 500 (37.81)
9/32 (7.14)	7	0.093 (2.36)	167 (75.75)	7 350 (32.69)	10 500 (46.71)
5/16 (7.94)	7	0.104 (2.64)	208 (94.35)	9 200 (40.92)	13 200 (58.72)
3/8 (9.52)	7	0.120 (3.05)	278 (126.10)	12 500 (55.60)	18 000 (80.07)
7/16 (11.11)	7	0.145 (3.68)	405 (183.71)	18 200 (80.96)	26 000 (115.65)
1/2 (12.70)	7	0.165 (4.19)	525 (238.14)	23 600 (104.98)	33 700 (149.90)
3/8 (9.52)	19	0.075 (1.90)	295 (133.81)	11 800 (52.49)	16 800 (74.73)
7/16 (11.11)	19	0.087 (2.21)	400 (181.44)	15 800 (70.28)	22 500 (100.08)
1/2 (12.70)	19	0.100 (2.54)	530 (240.40)	21 000 (93.41)	30 000 (133.45)
9/16 (14.29)	19	0.110 (2.79)	640 (290.30)	25 400 (112.98)	36 200 (161.02)
5/8 (15.88)	19	0.125 (3.18)	825 (374.21)	33 000 (146.79)	47 000 (209.07)
3/4 (19.05)	19	0.150 (3.81)	1,190 (539.78)	47 500 (211.29)	67 500 (300.25)
7/8 (22.22)	19	0.175 (4.44)	1,620 (734.82)	64 000 (284.69)	91 400 (406.57)

of each wire joint is marked on the strand with paint or some other distinguishing mark.

6.4 In 19-wire strand, joints in the individual wires of the outer layer of 12 wires shall be acceptable provided there is not more than one joint in any 150-ft (46-m) section and the location of each wire joint is marked on the strand with paint or some other distinguishing mark. Joints in the 7-wire inner layer of 19-wire strand shall be acceptable provided there is not more than one joint in any 150-ft section.

6.5 Joints in the individual wires shall be flash or upset butt-welded. Care shall be taken to prevent injury to the wire during welding.

7. Chemical Composition

7.1 The steel shall be Type 302, 304, 305, 316, 316Cb, or 316Ti and shall conform to the requirements as to chemical composition specified in Table 2.

7.2 Methods and practices relating to chemical analysis required by this specification shall be in accordance with Test Methods, Practices, and Terminology A751.

8. Mechanical Requirements

8.1 The tensile strength requirements, based upon the nominal strand diameter and the number of wires in each strand, shall conform to the requirements specified in Table 1. All tension tests shall be made upon lengths of strand that do not contain welds in the individual wires.

8.2 The individual wires of the completed strand shall not fracture when wrapped in a close helix of at least two turns upon itself as a mandrel at a rate not exceeding 15 turns/min.

9. Dimensions, Mass, and Permissible Variations

9.1 The nominal diameter of the finished strand and of the individual wires, the number of wires per strand, and the approximate weight per 1000 ft (or per 304.80 m) of strand are shown in Table 1.

9.2 The diameter of the individual wires forming the strand shall not vary from the nominal wire diameters by more than ±0.001 in. (±0.025 mm).

10. Workmanship, Finish, and Appearance

10.1 The finished strand shall be tight, smooth, and free of imperfections not consistent with good commercial practice.

10.2 The diameter of the finished strand shall be uniform, except for a minor increase in diameter due to a wire joint.

11. Sampling

11.1 Sampling for determination of compliance to this specification shall be performed on each lot of completed

TABLE 2 Chemical Requirements

UNS Designation	Type	Composition, %									
		Carbon, max	Manganese, max	Phosphorus, max	Sulfur, max	Silicon, max	Chromium	Nickel	Molybdenum	Nitrogen, max	Other Elements
S30200	302	0.15	2.00	0.045	0.030	1.00	17.00–19.00	8.00–10.00	. . .	0.10	. . .
S30400	304	0.08	2.00	0.045	0.030	1.00	18.00–20.00	8.00–10.50	. . .	0.10	. . .
S30500	305	0.12	2.00	0.045	0.030	1.00	17.00–19.00	10.50–13.00	. . .	. . .	. . .
S31600	316	0.08	2.00	0.045	0.030	1.00	16.00–18.00	10.00–14.00	2.00–3.00	0.10	. . .
S31635	316Ti	0.08	2.00	0.045	0.030	1.00	16.00–18.00	10.00–14.00	2.00–3.00	0.10	Ti 5×(C+N) min, 0.70 max
S31640	316Cb	0.08	2.00	0.045	0.030	1.00	16.00–18.00	10.00–14.00	2.00–3.00	0.10	(Cb+Ta) 10×C min, 1.10 max

strand. A lot shall consist of all strand of one size (nominal strand diameter, nominal wire diameter, and number of wires per strand) and grade in each shipment.

12. Number of Tests and Retests

12.1 The number of samples tested shall be as follows:

Lot Size	No. of Tests
Up to 500 ft (152 m), incl	1
Over 500 to 5000 ft (152 to 1524 m), incl	2
Over 5000 to 10 000 ft (1524 to 3048 m), incl[A]	3
Over 10 000 ft (3048 m)[A]	4

[A] When a lot consists of only one reel, tests must be of necessity be limited to two in number (one from each end).

12.1.1 Each strand sample shall be subjected to the tension test as specified in 8.1.

12.1.2 In addition to the strand testing specified in 12.1.1, the individual wires shall be subjected to the wrapping test specified in 8.2. The number of individual wires to be tested from each strand shall be as follows:

3-wire strand:	test all 3 wires
7-wire strand:	test any 4 wires
19-wire strand:	test 3 wires from each layer (inner and outer layer), for a total of 6 tests

12.2 In case of reasonable doubt in the first tests as to the failure of the wire or strand to meet any requirement of this specification, two additional tests shall be made on samples of wire or strand from the same coil (or reel). If failure occurs in either of these tests, the lot shall be rejected. However, the producer may, at his option, requalify individual coils (or reels) by performing the required tests on an individual coil (or reel) basis.

13. Packaging and Marking

13.1 Wire strand shall be furnished in standard lengths (see 13.1.1) and in compact coils or on reels (see 13.1.2) as specified by the purchaser; otherwise lengths shall be as agreed upon at the time of purchase.

13.1.1 Standard lengths of strand are as follows: 100 ft (30.48 m), 250 ft (76.2 m), 500 ft (152.40 m), 1000 ft (304.80 m), 2500 ft (762.00 m), and 5000 ft (1524.00 m).

13.1.2 Standard practice is to furnish all strand of 7⁄16 in. (11.11 mm) and over in diameter on reels in lengths of 1000 ft (304.80 m) and over. Strand lengths of less than 1000 ft are regularly furnished in coils.

13.2 The strand shall be protected against damage in ordinary handling and shipping as agreed upon at the time of purchase. Each coil (or reel) shall have a strong weather-proof tag securely fastened to it showing the minimum breaking strength, the nominal diameter of the strand, the length of the strand, the steel type designation, ASTM Designation A368 dated _____, and the name or mark of the manufacturer.

14. Keywords

14.1 stainless steel; wire strand