



Designation: A 648 – 95 (Reapproved 2000)

Standard Specification for Steel Wire, Hard Drawn for Prestressing Concrete Pipe¹

This standard is issued under the fixed designation A 648; 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 two classes of uncoated, high-strength, hard-drawn steel wire for use in the manufacture of prestressed concrete pipe. In application, the wire is helically wrapped on the pipe maintaining tension by mechanical means not including drawing dies.

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

1.3 The following caveat pertains only to the test method portions of this specification, 6.2.3 and 6.4.3: *This standard does not purport to address the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products²

A 510 Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel²

A 700 Practices for Packaging, Marking, and Loading Methods for Steel Products for Domestic Shipment³

E 328 Test Methods for Stress Relaxation Tests for Materials and Structures⁴

2.2 ANSI Standard:

C 304 Standard for Design of Prestressed Concrete Cylinder Pipe⁵

3. Ordering Information

3.1 Orders for material to this specification should include the following information:

3.1.1 Quantity (weight),

3.1.2 Name of material (hard-drawn steel wire for prestressing concrete pipe),

3.1.3 Wire diameter (see Table 1),

3.1.4 Class (see Table 1),

3.1.5 Packaging (see Section 12), and

3.1.6 ASTM designation and year of issue.

NOTE 1—A typical ordering description is as follows: 100 000-lb, Hard-Drawn Steel Wire for Prestressing Concrete Pipe, 0.192 in. in diameter, Class III, 1500-lb coils, to ASTM A 648 – _____.

4. Manufacture

4.1 The steel shall be made by the open-hearth, basic-oxygen, or electric-furnace process.

4.2 The steel shall be free of injurious piping and undue segregation.

4.3 The wire shall be cold drawn to produce the desired mechanical properties. The wire manufacturer shall take dependable precautions during wire drawing to preclude detrimental strain aging of the wire.

NOTE 2—Allowing wire to remain at elevated temperatures, such as 400°F (204°C) for more than 5 s or 360°F (182°C) for more than 20 s, can result in detrimental strain aging of the wire. Detrimentially strain aged wire typically has reduced ductility and increased susceptibility to hydrogen embrittlement.

4.4 There shall be no welds or joints in the finished wire. Any welds or joints made during manufacture to promote continuity of operations shall be removed.

5. Chemical Requirements

5.1 The cast or heat analysis of the steel shall conform to the chemical requirements specified in Table 2.

5.2 An analysis of each cast or heat of steel shall be furnished by the manufacturer showing the percentages of the elements specified in Table 2. The wire shall be subject to permissible variation for product analysis specified in Specification A 510, Table 10.

6. Mechanical Requirements

NOTE 3—Mechanical requirements are applicable only prior to or during pipe manufacture.

¹ This specification is under the jurisdiction of ASTM Committee A-1 on Steel, Stainless Steel, and Related Alloys and is the direct responsibility of Subcommittee A01.05 on Steel Reinforcement.

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² Annual Book of ASTM Standards, Vol 01.03.

³ Annual Book of ASTM Standards, Vol 01.05.

⁴ Annual Book of ASTM Standards, Vol 03.01.

⁵ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.