



Designation: ~~C1089~~—~~13~~ **C1089** – 19

Standard Specification for Spun Cast Prestressed Concrete Poles¹

This standard is issued under the fixed designation C1089; 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 spun cast prestressed concrete poles for use as structural supports for electric transmission, distribution, and communication lines; streetlights; and traffic signals.

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

- ~~A82/A82M~~ Specification for Steel Wire, Plain, for Concrete Reinforcement (Withdrawn 2013)³
- A416/A416M Specification for Low-Relaxation, Seven-Wire Steel Strand for Prestressed Concrete
- A421/A421M Specification for Stress-Relieved Steel Wire for Prestressed Concrete
- ~~A496/A496M~~ Specification for Steel Wire, Deformed, for Concrete Reinforcement (Withdrawn 2013)³
- A615/A615M Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- ~~A617/A617M~~ Specification for Axle-Steel Deformed and Plain Bars for Concrete Reinforcement (Withdrawn 1999)³
- A641/A641M Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
- A706/A706M Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement
- A722/A722M Specification for High-Strength Steel Bars for Prestressed Concrete
- ~~A996/A996M~~ Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
- ~~A1064/A1064M~~ Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- C31/C31M Practice for Making and Curing Concrete Test Specimens in the Field
- ~~E33C33/C33M~~ Specification for Concrete Aggregates
- C39/C39M Test Method for Compressive Strength of Cylindrical Concrete Specimens
- C42/C42M Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
- ~~E150C150/C150M~~ Specification for Portland Cement
- ~~E172C172/C172M~~ Practice for Sampling Freshly Mixed Concrete
- ~~E260C260/C260M~~ Specification for Air-Entraining Admixtures for Concrete
- ~~E330C330/C330M~~ Specification for Lightweight Aggregates for Structural Concrete
- C494/C494M Specification for Chemical Admixtures for Concrete
- ~~E595C595/C595M~~ Specification for Blended Hydraulic Cements
- C618 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

2.2 AASHTO Standard:

Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (LTS-5)³

¹ This specification is under the jurisdiction of ASTM Committee C27 on Precast Concrete Products and is the direct responsibility of Subcommittee C27.20 on Architectural and Structural Products.

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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.

³ Available from American Association of State Highway and Transportation Officials, 444 N. Capitol Street, NW, Washington, DC 20001.

2.3 IEEE Standard:

National Electrical Safety Code⁴

2.4 PCI Guides:

Guide for Design of Prestressed Concrete Poles⁵

Guide Specification for Prestressed Concrete Poles⁵

3. Terminology

3.1 Definitions:

3.1.1 *cracking load*—a load which creates a bending moment of enough magnitude to produce a tensile stress greater than the sum of induced compression plus the tensile strength of the concrete resulting in tensile cracks on the tension face of the pole.

3.1.2 *spun pole*—a pole in which the concrete is distributed and compacted through centrifugal force.

3.1.3 *ultimate load*—maximum load the pole will carry in the specified direction, before the concrete or steel will reach its limiting state.

4. Basis of Acceptance

4.1 Acceptability of spun prestressed concrete poles produced in accordance with this specification shall be determined by the results of compressive strength tests of concrete cylinders and mill certificates for the reinforcing steel. A written statement, signed by the manufacturer, shall verify that the cement, aggregates, admixtures, and steel conform to the applicable specifications for the material. Concrete strength shall be determined by the compressive strength tests of cylinders. The manufacturer's statement shall also certify adherence to tolerance on dimensions and mass. Acceptability of the poles produced in accordance with this specification may also be determined by the results of full-scale bending tests.

5. Materials

5.1 *Cement*—Portland cement shall conform to the requirements of Specification ~~E150~~C150/C150M or shall be portland blast-furnace slag cement or portland-pozzolan cement conforming to the requirements of Specification ~~E595~~C595/C595M.

5.2 *Aggregate*—Aggregates shall conform to Specification ~~E33~~C33/C33M except that the requirements for grading shall not apply. If a producer can demonstrate that aggregates conforming to Specification ~~E330~~C330/C330M could be used to manufacture an acceptable product, those aggregates may be used.

5.3 *Water*—Water used for mixing concrete shall be free of oils, organic matter, and other substances in amounts that may be deleterious to concrete, and it shall not contain concentration of chloride ions in excess of 500 ppm or sulfate ions in excess of 1000 ppm.

5.4 *Admixture*—Chemical admixtures shall conform to Specification ~~C494~~C494M. Air-entraining admixtures shall conform to Specification ~~E260~~C260/C260M. Fly ash or other pozzolanic admixtures shall conform to the requirements of Specification ~~C618~~. Admixtures shall not cause the chloride ion content of the concrete to exceed 0.06 % by mass of cement.

5.5 *Steel*—Prestressing steel shall conform to Specifications ~~A416~~A416M, ~~A421~~A421M, or ~~A722~~A722M. Non-tensioned longitudinal reinforcement shall conform to Specifications ~~A615~~A615M, ~~A617~~A617M, ~~A706~~A706M, ~~A996~~A996M or ~~A496~~A496M, ~~A1064~~A1064M. Circumferential wire reinforcement shall conform to Specification ~~A82~~A82M, ~~A1064~~A1064M, ~~A496~~A496M, or ~~A641~~A641M. Base plates, anchor bolts and top mount couplings shall conform to the ASTM specifications designated on contract drawings.

5.6 All inserts shall be corrosion resistant and used according to the manufacturer's specifications. No aluminum inserts shall be allowed.

6. Requirements

6.1 General Requirements:

6.1.1 *Concrete Cover*—The minimum concrete cover over all reinforcing steel shall be ¾ in. (19 mm) unless specified otherwise by purchaser. For street lighting poles, cover can be reduced to ½ in. (13 mm).

6.1.2 *Circumferential Wire*—Circumferential wire center-to-center spacing shall be a maximum of 4 in. (102 mm), except at the ends (measured from either the top or bottom to a distance of 1 ft (305 mm)) where the maximum spacing will be 1.25 in. (32 mm).

6.1.3 *Grounding*—The purchaser shall specify any grounding requirements needed.

6.1.4 *Exterior Surface Treatment*—Exterior concrete surface finish shall be as specified by the purchaser.

⁴ Available from Institute of Electrical and Electronics Engineers, Inc. (IEEE), 445 Hoes Ln., Piscataway, NJ 08854, <http://www.ieee.org>.

⁵ Available from Prestressed Concrete Institute, 209 West Jackson Blvd., Chicago, IL 60606.