



Designation: C1932 – 23

Standard Specification for Manufacture of Reinforced Precast Concrete End Sections for Pipe¹

This standard is issued under the fixed designation C1932; 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 the manufacture and acceptance of reinforced precast concrete end sections for pipe, herein referred to as “end section(s),” to conform to the owner’s requirements.

NOTE 1—End sections include but are not limited to; flared end sections; sloped end sections; parallel end sections, precast end walls; precast headwalls; etc. (see Fig. 1 for examples); or as designated by the owner.

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.

NOTE 2—This specification is a purchasing, manufacturing and acceptance specification and does not include requirements for bedding, backfill or installation. Care should be taken in assuring that the installation conforms to the project construction specifications.

1.3 *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.*

1.4 *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

A615/A615M Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

A706/A706M Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement
A820/A820M Specification for Steel Fibers for Fiber-Reinforced Concrete
A1064/A1064M Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
C33/C33M Specification for Concrete Aggregates
C39/C39M Test Method for Compressive Strength of Cylindrical Concrete Specimens
C150/C150M Specification for Portland Cement
C260/C260M Specification for Air-Entraining Admixtures for Concrete
C309 Specification for Liquid Membrane-Forming Compounds for Curing Concrete
C494/C494M Specification for Chemical Admixtures for Concrete
C497/C497M Test Methods for Concrete Pipe, Concrete Box Sections, Manhole Sections, or Tile
C595/C595M Specification for Blended Hydraulic Cements
C618 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
C822 Terminology Relating to Concrete Pipe and Related Products
C989/C989M Specification for Slag Cement for Use in Concrete and Mortars
C1017/C1017M Specification for Chemical Admixtures for Use in Producing Flowing Concrete (Withdrawn 2022)³
C1602/C1602M Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
C1837 Specification for Production of Dry Cast Concrete Used for Manufacturing Pipe, Box, and Precast Structures
D7508/D7508M Specification for Polyolefin Chopped Strands for Use in Concrete

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms relating to concrete pipe, see Terminology C822.

³ The last approved version of this historical standard is referenced on www.astm.org.

¹ This test method is under the jurisdiction of ASTM Committee C13 on Concrete Pipe and is the direct responsibility of Subcommittee C13.05 on Special Projects.

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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.

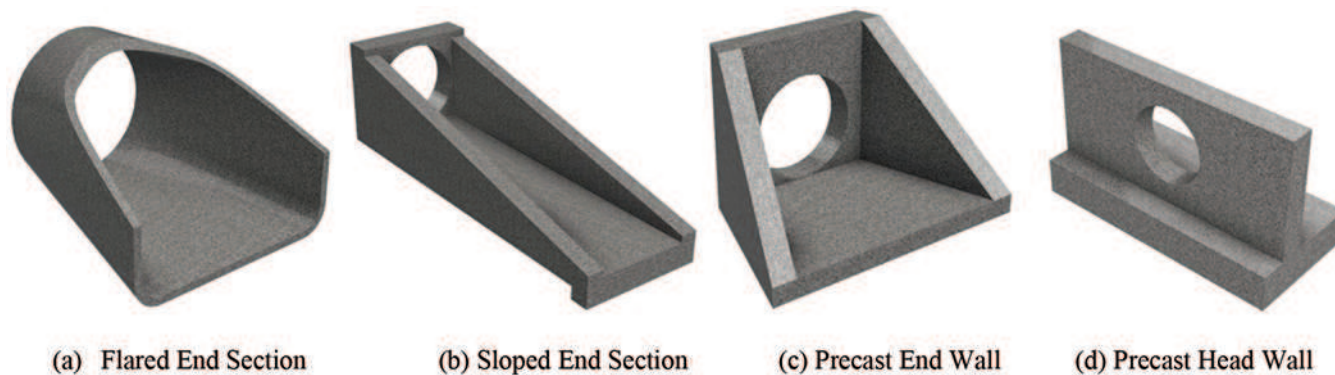


FIG. 1 Examples of Various Precast End Sections for Pipe

3.1.2 *precast concrete end section, n*—a reinforced precast concrete structure utilized at the inlet or outlet end of an installed pipe through the face of the slope. Reinforcement shall be comprised of any combination of steel wire, welded wire reinforcement, bars, and/or fibers of known strength.

3.1.3 *group of precast end sections, n*—each day's production run of precast end sections of a single concrete strength.

4. Basis of Acceptance of Design

4.1 *Manufacturing Design Data*—The manufacturer shall submit the following manufacturing data to the owner for approval as required.

4.1.1 End section geometry, dimensions (that is, length, width, height), weight and wall thickness.

4.1.2 Concrete strength.

4.1.3 *Steel Reinforcement*:

4.1.3.1 Applicable steel reinforcement specification(s),

4.1.3.2 Design yield strength(s),

4.1.3.3 Placement and design concrete cover,

4.1.3.4 Cross-sectional diameters,

4.1.3.5 Spacing,

4.1.3.6 Cross-sectional area,

4.1.3.7 Description of longitudinal members.

4.1.4 *Fiber Reinforcement*:

4.1.4.1 Type,

4.1.4.2 Applicable reinforcement specification(s),

4.1.4.3 Grade

4.1.4.4 Amount of fiber used in pounds per cubic yard.

4.1.5 Joint information if provided.

4.1.6 Manufacturing and curing process.

4.2 *Minimum End Section Requirements*:

(a) Minimum concrete compressive strength, $f'_c = 4,000$ psi. (27.6 MPa).

(b) Minimum reinforcement for temperature and shrinkage.

(c) Minimum reinforcement to safely handle at least 2 times the end section weight.

5. Basis of Acceptance of Precast Concrete End Sections

5.1 Acceptance of end sections shall be on the basis of concrete compression tests, materials tests, conformance to the manufacturing design data, conformance to this specification, owner's requirements and visual inspection of manufactured end sections for defects and imperfections.

5.2 When mutually agreed in writing by the owner and the manufacturer, a certification may be made on the basis of acceptance of the end section. This certification shall consist of a statement by the manufacturer that the end section conforms to the manufacturing design data and to this specification, and that the concrete and materials have been sampled and tested and conform to this specification.

5.3 *Age for Acceptance*—End sections shall be considered ready for acceptance when they conform to the requirements of this specification.

6. Material

6.1 *Reinforced Concrete*—The reinforced concrete shall consist of cementitious materials; mineral aggregates; admixtures, if used; and water in which steel reinforcement and/or fiber reinforcement has been embedded in such a manner that the reinforcement and concrete act together.

6.2 *Cementitious Material*:

6.2.1 *Cement*—Cement shall conform to the requirements for portland cement of Specification C150/C150M or shall be Portland-blast-furnace slag cement, Portland-limestone cement, or Portland-pozzolan cement conforming to the requirements of Specification C595/C595M, except that the pozzolan constituent in the Type IP Portland-pozzolan cement shall be fly ash.

6.2.2 *Slag Cement*—Slag cement shall conform to the requirements of Grade 100 or 120 of Specification C989/C989M.

6.2.3 *Fly Ash*—Fly ash shall conform to the requirements of Specification C618, Class F or Class C.

6.2.4 *Allowable Combinations of Cementitious Materials*—The combination of cementitious materials used in the concrete shall be one of the following:

6.2.4.1 Portland cement only.

6.2.4.2 Portland blast-furnace slag cement only.

6.2.4.3 Portland-pozzolan cement only.

6.2.4.4 Portland-limestone cement only,

6.2.4.5 A combination of Portland cement or Portland-limestone cement and slag cement.

6.2.4.6 A combination of Portland cement or Portland-limestone cement and fly ash.

6.2.4.7 A combination of Portland cement or Portland-limestone cement, slag cement, and fly ash.