



Designation: C1821/C1821M – 25

Standard Practice for Installation of Underground Circular Precast Concrete Manhole Structures¹

This standard is issued under the fixed designation C1821/C1821M; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This practice covers the procedures to be followed in the planning, site preparation, installation, testing and backfilling of underground vertical reinforced circular precast concrete manholes and components manufactured in accordance with Specification C478/C478M and used in sewer, drainage, and water works.

1.2 Concrete pipe and box culverts are not covered under this practice. Also, precast concrete utility structures covered in Specification C858 are excluded from this practice.

1.3 *Units*—The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

1.4 *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.*

1.5 *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

¹ This test method is under the jurisdiction of ASTM Committee C13 on Concrete Pipe and is the direct responsibility of Subcommittee C13.06 on Manholes and Specials.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

- C443 Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
- C443M Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric)
- C478/C478M Specification for Circular Precast Reinforced Concrete Manhole Sections
- C822 Terminology Relating to Concrete Pipe and Related Products
- C858 Specification for Underground Precast Concrete Utility Structures
- C881/C881M Specification for Epoxy-Resin-Base Bonding Systems for Concrete
- C923/C923M Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals
- C928/C928M Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs
- C969 Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines and Manholes
- C969M Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines (Metric)
- C990/C990M Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
- C1107/C1107M Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
- C1244/C1244M Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill
- C1478/C1478M Specification for Storm Drain Resilient Connectors Between Reinforced Concrete Storm Sewer Structures, Pipes, and Laterals
- D2487 Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- D2488 Practice for Description and Identification of Soils (Visual-Manual Procedures)



F2510/F2510M Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures and Corrugated Dual- and Triple-Wall Polyethylene and Polypropylene Pipes

2.2 *AASHTO Standard:*

AASHTO M145 Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes³

2.3 *Federal Standard:*

29 CFR Part 1926 Safety and Health Regulations for Construction⁴

3. Terminology

3.1 *Definitions*—For definitions of terms relating to concrete manholes, see Terminology **C822**. For terminology related to soil classifications, see Practices **D2487** and **D2488**.

3.2 *engineer, n*—owner’s representative, either designer of record or inspector, with responsible charge of the owner’s interest during the installation phase of construction.

3.3 *installer, n*—prime contractor, subcontractor, or work crew assigned the responsibility to excavate, place, and backfill the furnished manhole structure.

3.4 *non-shrink grout, n*—a cementitious material in accordance with Specification **C1107/C1107M**, or Specification **C928/C928M**, or polymer modified in accordance with Specification **C881/C881M**.

4. Significance and Use

4.1 This practice is useful as a reference by an owner and/or the engineer in preparing project specifications.

4.2 The practice is useful as a reference by an owner, engineer, or installing contractor to properly install precast concrete circular manholes.

5. Site Inspection

5.1 The construction area shall be carefully inspected by the installer using the project drawings and a checklist to identify the work to be done and to determine that the plans are correct.

5.1.1 The location of the circular manhole structure should be where it will cause minimal interference with traffic and shall be clearly defined on project documents.

5.1.2 All underground facilities and structures that are in possible conflict with the installation shall be located and identified. Location markings shall be placed by the affected utilities before the construction.

5.2 The jobsite inspection shall identify any obstacles that will interfere with manhole excavation, unloading or setting operations, product storage, work progress, or create a safety hazard. Precautionary arrangements shall be made before excavation begins.

5.3 The jobsite inspection shall give consideration to the soil structure and ground water table so that proper shoring or sloping or both may be planned in advance of the excavation work that will affect the installation of the manhole structure.

6. Planning

6.1 Permits required to do work in accordance with the detail plans and project construction schedule shall be secured before commencement of the manhole installation.

6.2 All utilities and owners of surface and subsurface facilities and structures in the area shall be given advance notification of proposed excavation directly by the installer or at a designated pre-construction meeting.

6.3 Planning shall include the coordination of all responsible parties, including the designated precast concrete manhole manufacturer to arrange for the delivery, distribution, and storage of required material. If such material cannot be stored on the site, other storage areas or delivery arrangements shall be provided.

6.4 Prior to ordering of the manhole components the installer shall review all proposed manhole installation locations on the project with the design engineer and identify any potential conflicts or reasons for movement of the manhole to a more appropriate location. If a conflict is identified onsite prior to excavation or while performing layout, the engineer shall be notified immediately to propose alternative location and to provide the precast manhole producer opportunity to alter production of the manhole structure.

6.5 The installer shall notify the precast concrete manufacturer if any delays in permits, utility location, or other unforeseen conditions will alter the original agreed delivery schedule or revise a precast manhole structure configuration as shown in the project plans or approved fabrication drawings.

6.6 As required by the owner, engineer, installer or manhole manufacturer shop drawings shall be prepared for approval prior to fabrication. The shop drawings shall include, but not limited to detailed information describing each structure component to be fabricated and the associated assembly of the manhole structures by the installing contractor.

6.6.1 Shop drawings shall also include steel layout details of any specialty items including flattop slabs, flattop reducing slabs, base sections, special barrel section openings, reducer cones.

6.6.2 The shop drawings shall include certification of compliance to the project plans and specifications or clearly note any specific exceptions to the same.

7. Delivery

7.1 Manufacturer shall verify manhole components are in compliance to approved shop drawings prior to shipment to the project site.

7.2 The installer shall inspect the manhole components for damage during shipping and unloading, and any non-compliance to approved shop drawings.

³ Available from American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St., NW, Suite 249, Washington, DC 20001, <http://www.transportation.org>.

⁴ Available from U.S. Government Printing Office, Superintendent of Documents, 732 N. Capitol St., NW, Washington, DC 20401-0001, <http://www.access.gpo.gov>.