



## Standard Specification for Porous Concrete Pipe [Metric]<sup>1</sup>

This standard is issued under the fixed designation C 654M; 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.

*This standard has been approved for use by agencies of the Department of Defense.*

### 1. Scope

1.1 This specification covers porous nonreinforced concrete pipe for use in underdrains.

1.2 This specification is the metric counterpart of Specification C 654.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

C 33 Specification for Concrete Aggregates<sup>2</sup>

C 150 Specification for Portland Cement<sup>3</sup>

C 497M Test Methods for Concrete Pipe, Manhole Sections, or Tile [Metric]<sup>4</sup>

C 595 Specification for Blended Hydraulic Cements<sup>3</sup>

C 618 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete<sup>2</sup>

C 822 Terminology Relating to Concrete Pipe and Related Products<sup>4</sup>

C 1116 Specification for Fiber-Reinforced Concrete and Shotcrete<sup>2</sup>

### 3. Terminology

3.1 *Definitions*—For definitions of terms relating to concrete pipe, see Terminology C 822.

### 4. Classification

4.1 Pipe manufactured according to this specification shall be of two classes identified as “Standard-Strength Porous Nonreinforced Concrete Pipe” and “Extra-Strength Porous Nonreinforced Concrete Pipe.”

### 5. Basis of Acceptance

5.1 The acceptability of the pipe shall be determined by the results of the strength and porosity or rate of infiltration tests, and by inspection to determine whether the pipe conforms to this specification as to design and freedom from defects.

5.2 The pipe shall be acceptable under the strength tests when they have met the requirements as prescribed in Section 10.

5.3 *Acceptance as to Infiltration Properties*—Pipe shall be acceptable under the infiltration test when all test pipe conform to the test requirements as prescribed in Section 10.

### 6. Materials

6.1 *Concrete*—The concrete shall consist of cementitious materials, mineral aggregates, and water.

#### 6.2 Cementitious Materials:

6.2.1 *Cement*—Cement shall conform to the requirements for portland cement of Specification C 150 or shall be portland blast-furnace slag cement or portland-pozzolan cement conforming to the requirements of Specification C 595, except that the pozzolan constituent in the Type IP portland-pozzolan cement shall be fly ash.

6.2.2 *Fly Ash*—Fly ash shall conform to the requirements of Specification C 618, Class F or Class C.

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

6.2.3.1 Portland cement only,

6.2.3.2 Portland blast furnace slag cement only,

6.2.3.3 Portland pozzolan cement only, or

6.2.3.4 A combination of portland cement and fly ash.

NOTE 1—The user of this specification is advised that porous pipe may experience leaching detrimental to durability when subjected to drainage of soft or acid waters (less than 50 ppm hardness or less than 6.0 pH). Type V portland cement should be specified where high sulfate resistance is required, and Type II or IIA portland cement should be specified where the pipe will be exposed to moderate sulfate conditions. More than 3000 ppm of chiefly sodium or magnesium sulfates, or both, may be considered high sulfate content.

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee C13 on Concrete Pipe and is the direct responsibility of Subcommittee C13.01 on Reinforced Concrete Sewer, Drain, and Irrigation Pipe.

Current edition approved July 10, 2003. Published September 2003. Originally approved in 1980. Last previous edition approved in 1999 as C 654M – 99.

<sup>2</sup> *Annual Book of ASTM Standards*, Vol 04.02.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 04.01.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 04.05.