



Designation: ~~C118~~—~~11~~ C118 – 15

Standard Specification for Concrete Pipe for Irrigation or Drainage¹

This standard is issued under the fixed designation C118; 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 nonreinforced concrete pipe to be used for the conveyance of irrigation water with working pressures, including hydraulic transients, as shown in [Table 1](#) and for use in drainage.

1.2 A complete SI companion to Specification C118 has been developed—C118M; therefore, no SI equivalents are presented in this specification.

NOTE 1—This specification is for manufacturing and purchase only and does not include requirements for bedding, backfill, installation, or field repairs. The owner is cautioned that he must correlate field conditions with the characteristics of the pipe specified and provide inspection during installation.

2. Referenced Documents

2.1 *ASTM Standards:*²

~~C33~~[C33/C33M](#) Specification for Concrete Aggregates

~~C150~~[C150/C150M](#) Specification for Portland Cement

~~C260~~[C260M](#) Specification for Air-Entraining Admixtures for Concrete

~~C494~~[C494M](#) Specification for Chemical Admixtures for Concrete

~~C497~~ Test Methods for Concrete Pipe, Manhole Sections, or Tile

~~C595~~[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~~[C989/C989M](#) Specification for Slag Cement for Use in Concrete and Mortars

~~C1017~~[C1017M](#) Specification for Chemical Admixtures for Use in Producing Flowing Concrete

~~C1116~~[C1116M](#) Specification for Fiber-Reinforced Concrete

~~C1602~~[C1602M](#) Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete

3. Terminology

3.1 *Definitions*—For definitions of terms relating to concrete pipe, see Terminology [C822](#).

4. Classification

4.1 Pipe manufactured according to this specification shall be known as “ASTM Standard Concrete Irrigation Pipe,” “ASTM Standard Concrete Drainage Pipe,” or “ASTM Heavy-Duty Concrete Drainage Pipe.”

5. Basis of Acceptance

5.1 The acceptability of the pipe shall be determined by the results of the tests prescribed in this specification, if and when required and by inspection to determine whether the pipe conforms to this specification as to design and freedom from defects.

6. Materials

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

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

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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.

TABLE 1 Standard Dimensions, Working Pressure, and Test Requirements for Standard Concrete Irrigation Pipe^A

Internal Designated Diameter, in.	Thickness of Wall, T, in.	Working Pressure, ^B ft	Minimum Internal Hydrostatic Test Pressure, psi	Minimum Three-Edge-Bearing Load, lb/linear ft
6	7/8	30	50	1300
8	1	30	50	1350
10	1 1/8	30	50	1400
12	1 1/4	25	45	1500
14	1 3/8	25	45	1600
15	1 1/2	25	45	1650
16	1 1/2	25	45	1700
18	1 3/4	25	45	1800
20	2	25	40	1850
21	2 1/8	25	40	1900
24	2 1/4	25	40	2000

^AFor hydrostatic test requirements, refer to 10.5.

^BHigher working pressures are not prohibited up to a maximum of 40 ft for 6 through 8-in. diameters, 35 ft for 10 through 12-in. diameters, and 30 ft for 14-in. through 24-in. diameters. In these cases, the strength of the pipe shall be increased to give a minimum of at least four times the design working pressure when tested as specified in 10.5.

6.2 Cementitious Materials:

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, or slag-modified portland cement, or 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 *Fly Ash*—Fly ash shall conform to the requirements of Specification C618, Class F or Class C.

6.2.3 *Ground Granulated Blast Furnace Slag (GGBFS) Slag Cement*—GGBFS Slag cement shall conform to the requirements of Grade 100 or 120 of Specification C989/C989M.

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 Slag-modified portland cement or Portland-pozzolan cement only;

6.2.4.4 Portland-pozzolan or Portland-limestone cement only;

6.2.4.5 A combination of portland cement or portland-limestone cement and fly ash;

6.2.4.6 A combination of portland cement and ground granulated blast-furnace slag, or portland-limestone cement and slag cement;

6.2.4.7 A combination of portland cement or portland-limestone cement, fly ash (not to exceed 25 % of the total cementitious weight) and ground granulated blast furnace slag (not to exceed 25 % of the total cementitious weight) and slag cement; or

6.2.4.8 A combination of portland-pozzolan cement and fly ash.

6.3 *Aggregates*—Aggregates shall conform to the requirements of Specification C33/C33M, except that the requirements for gradation shall not apply.

6.4 *Admixtures and Blends*—Admixtures—Owner is not prohibited from obtaining the record of mix design used. The following admixtures and blends are allowable:

6.4.1 Air-entraining admixture conforming to Specification C260/C260M.

6.4.2 Chemical admixture conforming to Specification C494/C494M;

6.4.3 Chemical admixture for use in producing flowing concrete conforming to Specification C1017/C1017M; and

6.4.4 Chemical admixture or blend approved by the owner.

6.5 *Synthetic Fibers, Fibers*—Collated fibrillated virgin polypropylene fibers are not prohibited. Synthetic fibers and nonsynthetic fibers shall be allowed to be used, at the manufacturer's option, in concrete pipe as a nonstructural manufacturing material. Only Type III synthetic fibers (Type II and Type III) and nonsynthetic fiber (Type I) designed and manufactured specifically for use in concrete and conforming to the requirements of Specification C1116/C1116M shall be accepted.

6.6 *Water*—Water used in the production of concrete shall be potable or nonpotable water that meets the requirements of Specification C1602/C1602M.