

*Standard Specification
for*

Clay Drain Tile

AASHTO DESIGNATION: M 179-84
(ASTM DESIGNATION: C4-62 (1981))

1. SCOPE

1.1 This specification covers drain tile made from clay, shale, fire clay, or mixtures thereof, and burned. In this specification, the term drain tile or tile shall mean tile made only from these materials.

2. CLASSIFICATION

2.1 Three types of drain tile are covered:

2.1.1 Type I, Standard Drain Tile;

2.1.2 Type II, Extra-Quality Drain Tile; and

2.1.3 Type III, Heavy-Duty Drain Tile.

2.2 Unless otherwise specified by the purchaser, Type II or Type III Drain Tile shall be accepted in lieu of Type I Drain Tile, and Type III Drain Tile in lieu of Type II. Type I Drain Tile may be furnished and shall be considered as meeting these specifications unless another class is specified by the purchaser.

3. PHYSICAL REQUIREMENTS

3.1 Drain tile shall conform to the physical requirements for the class specified as prescribed in Table 1.

3.2 *Waiver of Absorption Requirements.* Requirements prescribed in Table 1 for water absorption (5-hour boiling) shall be waived provided a sample consisting of five drain tile, meeting all other requirements, shows no disintegration or spalling and no loss in dry weight of any individual tile greater than 5 percent when subjected to the freezing and thawing test, made as prescribed in Sections 16 and 17. The number of cycles of

freezing and thawing to which each class of tile shall be subjected are:

Type	Number of Cycles
I. Standard	36
II. Extra-Quality	48
III. Heavy-Duty	48

3.2.1 If tile meet the requirements of the freezing and thawing test, the average percentage absorption of the specimens used in the test shall be adopted as the maximum allowable average absorption for the contract in question. At least 80 percent of all tile tested shall meet the requirements prescribed in Section 3.2.

4. SIZES

4.1 Sizes of drain tile shall be designated by their inside diameters.

4.2 Drain tile smaller than 12 in. (305 mm) in diameter shall have a nominal length of not less than 12 in. (305 mm). Tile 12 to 30 in. (305 to 762 mm) in diameter, inclusive, shall have nominal lengths not less than their diameters. Tile larger than 30 in. (762 mm) in diameter shall have a nominal length not less than 30 in. (762 mm).

5. MATERIALS, WORKMANSHIP, AND FINISH

5.1 Presence in drain tile of any minerals or chemicals that are known to cause slaking or disintegration of the tile shall be deemed valid grounds for rejection, unless satisfactory proof is submitted that the tile are durable and permanent.

5.2 Drain tile shall be free from cracks, checks, or chips extending into the body of the tile in such a manner as would decrease the strength appreciably. There shall be no breaks in the tile that would admit earth into the drain.

5.3 Drain tile shall be reasonably smooth on the inside and shall be approximately circular in cross-section, except when otherwise specified in advance. They shall be approximately straight, except in the case of special connections. The ends of butt-end tile shall be so regular and smooth as to make possible close joints by turning and pressing together the ends of adjoining tile. Butt-end tile shall be furnished unless otherwise specified by the purchaser.

5.4 Drain tile shall conform to the general physical characteristics prescribed in Table 2.

6. INSPECTION AND REJECTION

6.1 All drain tile shall be given a thorough inspection by a competent inspector approved by the purchaser. The tile shall be inspected at a location and time agreed upon by the purchaser and seller. The purposes of the inspection shall be to (1) cull and reject imperfect individual tile, and (2) determine whether the tile, by visual inspection, meet the requirements set forth in Sections 5 and 6.

6.2 Drain tile in a dry condition shall give a clear ring when held free of the ground or tipped on edge, and tapped lightly with a hammer that has a head not exceeding 4 oz (113 g) in weight.

6.3 The seller may appeal decisions of the inspector when such decisions are based on visual inspection alone, in

TABLE 1 Physical Test Requirements for Clay Drain Tile

Internal Diameter of Tile, in. (mm)	Standard Drain Tile				Extra-Quality Drain Tile				Heavy Duty Drain Tile			
	Minimum Crushing Strength ^a lb per lin ft (kN/m)		Maximum Water Absorption by 5-hr Boiling ^b , Percent		Minimum Crushing Strength, lb per lin ft (kN/m)		Maximum Water Absorption by 5-hr Boiling, Percent		Minimum Crushing Strength, lb per lin ft (kN/m)		Maximum Water Absorption by 5-hr Boiling, Percent	
	Average of Five Tile	Individual	Average of Five Tile	Individual	Average of Five Tile	Individual	Average of Five Tile	Individual	Average of Five Tile	Individual	Average of Five Tile	Individual
4 102	800 (11.7)	680 (9.9)	13	16	1100 (16.1)	990 (14.4)	11	13	1400 (20.4)	1260 18.4	11	13
5 127	800 (11.7)	680 (9.9)	13	16	1100 (16.1)	990 (14.4)	11	13	1400 (20.4)	1260 18.4	11	13
6 152	800 (11.7)	680 (9.9)	13	16	1100 (16.1)	990 (14.4)	11	13	1400 20.4	1260 18.4	11	13
8 203	800 (11.7)	680 (9.9)	13	16	1100 (16.1)	990 (14.4)	11	13	1500 21.9	1350 19.7	11	13
10 254	800 (11.7)	680 (9.9)	13	16	1100 (16.1)	990 (14.4)	11	13	1550 22.6	1400 20.4	11	13
12 305	800 (11.7)	680 (9.9)	13	16	1100 (16.1)	990 (14.4)	11	13	1700 24.8	1530 22.3	11	13
14 356	840 (12.2)	720 (10.5)	13	16	1100 (16.1)	990 (14.4)	11	13	1850 27.0	1660 24.2	11	13
15 381	870 (12.7)	740 (10.8)	13	16	1150 (16.8)	1030 15.0	11	13	1980 28.9	1780 26.0	11	13
16 406	—	—	—	—	1200 (17.5)	1080 (15.8)	11	13	2100 30.6	1890 27.6	11	13
18 457	—	—	—	—	1300 (19.0)	1170 17.1	11	13	2340 34.1	2110 30.8	11	13
21 533	—	—	—	—	1450 (21.2)	1300 19.0	11	13	2680 39.1	2410 35.2	11	13
24 610	—	—	—	—	1600 (23.4)	1440 21.0	11	13	3000 43.8	2700 39.4	11	13
27 686	—	—	—	—	1800 (26.3)	1620 23.6	11	13	3330 48.6	3000 43.8	11	13
30 762	—	—	—	—	2000 (29.2)	1800 26.3	11	13	3590 52.4	3230 47.1	11	13

^a Strengths of sizes not listed may be interpolated between tabular values of sizes and strengths of the nearest listed diameters.

^b In case tile fails to meet absorption requirements, see Section 3.2.

TABLE 2 Distinctive General Physical Properties of Clay Drain Tile

Physical Properties Specified	Standard Drain Tile	Extra-Quality Drain Tile	Heavy-Duty Drain Tile
Permissible variation of average diameter below specified diameter, percent	3	3	3
Permissible variation between maximum and minimum diameters of same tile, percentage of thickness of wall	75	65	65
Permissible variation of average length below manufacturer's specified length, percent	3	3	3
Permissible variation from straightness, percentage of length	3	3	3
Permissible thickness of exterior blisters, lumps, and flakes which do not weaken tile and are few in number, percentage of thickness of wall	20	15	15
Permissible diameters of above blisters, lumps, and flakes, percentage of inside diameter	15	10	10
General Inspection	rigid	very rigid	very rigid

which case the point of issue shall be determined by standard physical tests made in accordance with Sections 9 to 18. Costs of such tests based on an appeal shall be paid by the seller if the tests confirm the inspector's decision; otherwise, these costs shall be paid by the purchaser.

6.4 The inspector shall plainly mark all rejected drain tile, which shall be removed promptly by the seller at the expense of the seller.

6.5 No drain tile shall be rejected by the purchaser on the basis of physical tests unless the laboratory test report is made available to the seller.

7. SAMPLING AND TESTING

7.1 Tile shall be tested in accordance with Sections 9 to 18.

7.2 For purposes of the test, full-size, unbroken drain tile shall be selected by the purchaser or by his authorized representative. Specimens shall be representative of the whole lot of tile from which they are selected, after culling undesirable tile which fail to meet visual inspection requirements. The place or places of selection shall be designated when the purchase order is issued. The manufacturer or seller shall furnish specimens for test without charge.

7.3 Each specimen shall be so marked that it may be identified at any time.

7.4 Unless otherwise specified in the purchase order, costs of tests shall be paid as follows:

7.4.1 If results of tests show that tile do not conform to the requirements of these specifications, the cost shall be paid by the seller.

7.4.2 If results of test show that tile do conform to requirements of these specifications, the cost shall be paid by the purchaser, except, that in the case of the freezing and thawing tests, when specifically requested by the seller in