



Standard Test Method for Evaluating the Freeze-Thaw Durability of Manufactured Concrete Masonry Units and Related Concrete Units¹

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1. Scope *

1.1 This test method covers the resistance to freezing and thawing manufactured concrete masonry and related concrete units. Units are tested either in water or in a saline solution depending on the intended use of the units in actual service.

NOTE 1—Concrete masonry and related concrete units include units such as hollow and solid concrete masonry units, concrete brick, segmental retaining wall units, concrete pavers, and concrete roof pavers.

1.2 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- C 140 Test Methods of Sampling and Testing Concrete Masonry Units²
- C 1093 Practice for the Accreditation of Testing Agencies for Unit Masonry²
- C 1209 Terminology of Concrete Masonry Units and Related Units²

3. Terminology

3.1 Terminology defined in Terminology C 1209 shall apply for this test method.

4. Significance and Use

4.1 The procedure described in this test method is intended to determine the effects of freezing and thawing on concrete units in the presence of water or saline solution.

4.2 The procedure is not intended to provide a quantitative measure of the length of service that may be expected from a specific type of concrete unit.

NOTE 2—The testing laboratory performing this test method should be evaluated in accordance with Practice C 1093.

NOTE 3—Compressive strength and absorption tests should be performed on different but representative specimens. While compressive

strength and absorption values by themselves have been shown by research to not be reliable indicators of durability, they have been shown to be good reference values for units manufactured from a given set of materials.

5. Apparatus

5.1 Freezing-and-Thawing Apparatus:

5.1.1 In the event that a chamber or chambers are used to subject the specimens to the specified freezing or thawing cycles, or both, the chamber or chambers shall be capable of maintaining the air temperature throughout the chamber within the specified test ranges when measured at any given time. If the apparatus operates automatically, it must be able to provide reproducible cycles within the specified temperature requirements.

5.1.2 The apparatus includes a non-rigid plastic container for each test specimen and test specimen supports as illustrated in Fig. 1. The containers shall be of sufficient size to provide a minimum of ⅛ in. (3 mm) and a maximum of 1½ in. (38 mm) water surrounding the specimen. Test specimen supports to hold the specimen above the container bottom shall be two ⅛ ± ¼ in. (3 ± 1 mm) rods of a solid noncorrosive, nonabsorptive material (brass, plastic, etc.). The container shall be flat enough that when the specimen coupon is set on the support rods the specimen shall not deviate from level by more than ¼ in. (2 mm) from one end of the specimen to the opposite end.

5.2 *Temperature-Measuring Equipment*—Thermometers, resistance thermometers, or thermocouples, capable of measuring the temperature at various points within the test chamber to within 2°F (1°C).

5.3 *Scales*—Scales for weighing full-size specimens shall have a capacity of at least 50 % greater than the weight of the largest specimen tested and shall be accurate to at least 1 g (0.002 lb). Scales for weighing the filter paper and specimen residue (spall), as required in 8.2.3, shall be accurate to at least 0.2 g (0.0005 lb).

6. Sampling

6.1 *Selection of Test Specimens*—Select whole units representative of the lot from which they are selected. The units shall be free from visible cracks or structural defects.

6.2 *Number of Specimens*—Select five units for freezing and thawing tests. If compression and absorption tests are to be performed on the same set of units in accordance with Test Methods C 140, select additional units as required. Specimens

¹ This test method is under the jurisdiction of ASTM Committee C-15 on Manufactured Masonry Units and is the direct responsibility of Subcommittee C15.03 on Concrete Masonry Units and Related Units.

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² *Annual Book of ASTM Standards*, Vol 04.05.