



Designation: C 1262 – 07

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

This standard is issued under the fixed designation C 1262; 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 test method covers the resistance to freezing and thawing manufactured concrete masonry and related concrete units. Units are tested in a test solution that is either water or 3 % 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:²

C 140 Test Methods of Sampling and Testing Concrete Masonry Units and Related Units

C 1093 Practice for the Accreditation of Testing Agencies for Unit Masonry

C 1209 Terminology of Concrete Masonry Units and Related Units

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 to determine an expected length of service for 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 $\frac{1}{8}$ in. (3 mm) and a maximum of $1\frac{1}{2}$ in. (38 mm) test solution surrounding the specimen. The container shall have a tightly fitting lid to reduce evaporation. Test specimen supports to hold the specimen above the container bottom shall be $\frac{1}{8} \pm \frac{1}{24}$ in. (3 ± 1 mm) rods of a solid noncorrosive, nonabsorptive material (brass, plastic, etc.). Support the specimen in both the longitudinal and transverse directions (see Note 4). 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 $\frac{1}{16}$ in. (2 mm) from one end of the specimen to the opposite end.

NOTE 4—Examples of longitudinal and transverse support configurations include placing the supports in I, Z, or box configurations.

5.2 Temperature-Measuring Equipment:

5.2.1 *Reference Temperature-Measuring Device*, shall be readable and accurate to $\pm 0.5^\circ\text{F}$ (0.2°C) within the range of use. A certificate or report that verifies the accuracy shall be

¹ This test method is under the jurisdiction of ASTM Committee C15 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 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.

*A Summary of Changes section appears at the end of this standard.

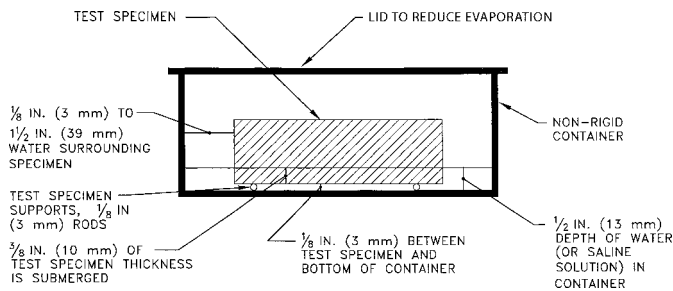


FIG. 1 Test Specimen in Freezing-and-Thawing Container

available in the laboratory for review. Verify the accuracy of liquid-in-glass reference temperature measuring devices at least once. Verify the accuracy of direct-reading resistance reference temperature-measuring devices every twelve months. The certificate or report shall provide documentation that the reference standard used in the verification is traceable to the National Institute of Standards and Technology (NIST).

5.2.2 *Temperature-Measuring Devices*, capable of measuring the temperature at various points within the test chamber to within 2°F (1°C). Verify the accuracy of the temperature-measuring devices at least every six months.

5.2.3 To verify the accuracy of the temperature-measuring devices, position the reference temperature-measuring device in the chamber in a readable position as near to the temperature-measuring device probe as possible. Close the door and leave undisturbed for at least 5 min. Read the temperature immediately after opening the chamber door. Record the temperature readings of both devices. If the temperature readings differ by more than 2°F, adjust or replace the temperature-measuring device.

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 (coupons) used for Test Methods C 140 tests shall not be used as specimens for freezing-and-thawing tests.

6.3 *Identification*—Mark each freezing-and-thawing specimen so that it is identifiable at any time.

7. Preparation of Test Specimens

7.1 *Freezing-and-Thawing Test Specimens*—Test specimens shall consist of solid coupons saw-cut from full sized units. Do not saw-cut test specimens from units that have been previously oven-dried. Do not subject test specimens to oven-drying prior to completion of freezing-and-thawing testing.

7.1.1 Cut one coupon from each of the five sampled units. Using a water-cooled saw, cut the coupon from the exposed surface of the unit as the unit is used in service unless the exposed surface is an architectural or other nonplanar surface (see Note 5). In the case of a unit with an exposed architectural or other nonplanar surface, cut the coupon from another flat molded surface ideally as far as possible from the architectural or other non-planar face and in no case less than 2 in. (50 mm) from that surface. Immediately following saw-cutting, remove loose particles and residue from the coupon by rinsing in tap water and brushing with a soft bristle brush. Do not fully immerse coupons in water.

NOTE 5—Split-faced surfaces are the most common surfaces used to provide an architectural appearance to segmental retaining walls. However, other means could be used to obtain similar architectural effects like tumbling, grinding, and slumping.

7.1.2 Place the coupons on edge on a 3/8 in. (10 mm) or coarser mesh such that there is an air space of not less than 1 in. (25 mm) between coupons. Allow the coupons to dry for not less than 48 h in laboratory air at a temperature of 75 ± 15°F (24 ± 8°C) and a relative humidity of less than 80 %.

7.1.3 The thickness of each coupon shall be 1/4 in. (32 mm) ± 1/16 in. (2 mm), unless the unit does not permit this minimum thickness, in which case the thickness shall be the maximum thickness that can be obtained from the unit. The thickness of the coupon shall not be less than 3/4 in. (19 mm).

7.1.4 The area of the submerged surface of the test specimen shall be at least 25 in.² (161 cm²) and shall not exceed 35 in.² (225 cm²), unless the unit does not permit a coupon meeting the minimum area, in which case the test specimen shall consist of two coupons. The combined area of the two coupons shall be at least 25 in.² (161 cm²) and shall not exceed 35 in.² (225 cm²). These two coupons shall be tested as and considered to be a single specimen.

8. Procedure

8.1 Specimen Conditioning:

8.1.1 After preparation of the freezing-and-thawing test specimens in accordance with Section 7, place the specimen in the container face down on the specimen supports such that the non-saw-cut surface of the specimen is in contact with the specimen supports. Add a sufficient amount of test solution at a temperature of 60 to 80°F (16 to 27°C) to the container to achieve a test solution depth of 1/2 ± 1/16 in. (13 ± 2 mm) (see Note 6 and Note 7). Do not pour test solution directly onto the specimen. The test solution shall be either potable tap water or a 3 ± 0.1 % (by weight) sodium chloride saline solution (see Note 8). Close the container lid tightly and store the container on a level surface in laboratory air as defined in 7.1.2.

NOTE 6—The submerged portion of the specimen is 3/8 in. (10 mm) of its thickness. There is 1/8 in. (3 mm) of test solution between the bottom of the container and the face of the specimen.

NOTE 7—One way to repeatedly achieve the specified water depth is to add a consistent volume of water which has been calibrated for a given specimen and container size combination to yield the specified depth.

NOTE 8—The 3 % saline solution can be prepared by adding 0.03 lb of sodium chloride to each 0.97 lb of water.

8.1.2 After 1 h ± 15 min, open the container and add test solution as necessary to maintain the water level required in