



Designation: C1645/C1645M – 09

Standard Test Method for Freeze-thaw and De-icing Salt Durability of Solid Concrete Interlocking Paving Units¹

This standard is issued under the fixed designation C1645/C1645M; 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 approval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This test method evaluates the resistance to freezing and thawing of solid interlocking concrete paving units conforming to the dimensional requirements of Specification C936/C936M. Units are tested in a test solution that is either tap water or 3 % saline solution, depending on the intended use of the units in actual service.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.3 *This standard does not purport to address all of the safety concerns, in 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 limitation prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

C936/C936M Specification for Solid Concrete Interlocking Paving Units

3. Significance and Use

3.1 This test method is intended to determine the effects of freezing and thawing on units conforming to the dimensional requirements of Specification C936/C936M while immersed in a test solution. Other types of segmental concrete paving units that do not conform to the dimensional requirements of Specification C936/C936M may be tested using this test method.

3.2 The results from this test method are not intended to provide a quantitative measure of the length of service from

concrete paving units conforming to the dimensional requirements of Specification C936/C936M.

4. Apparatus

4.1 *Freezing-and-Thawing Apparatus*—The freezing apparatus shall consist of suitable cabinet or cold room with controls to reach and maintain within 1 h of introduction of specimens an air temperature of $-5 \pm 3^{\circ}\text{C}$ [$23 \pm 5^{\circ}\text{F}$] at all locations within the chamber regardless of the number of specimens in the chamber. The thawing chamber shall maintain a controlled air temperature. This temperature shall never be greater than $+30^{\circ}\text{C}$ [86°F].

4.2 *Balance*—A balance capable of weighing 500 g with an accuracy of ± 0.1 g shall be used for measuring the mass of the fine spalled material.

4.3 *Drying Oven*—The drying oven shall be vented and capable of being maintained at 100 to 115°C [212 to 239°F].

4.4 *Specimen Container*—The specimen container shall be made of non-corroding flexible material and have dimensions that allow complete submersion of the specimen in the test solution. The size of the container shall be less than or equal to three times the volume of the unit that is being tested. The container shall prevent evaporation of the test solution.

5. Sampling

5.1 *Selection of Test Specimens*—Select whole units representative of the lot from which they are selected. The units shall be free from visible cracks, chipped edges, and structural defects.

5.2 *Number of Test Specimens*—Sample according to the requirements of Specification C936/C936M.

5.3 *Identification*—Mark each test specimen so that it is identifiable at any time.

6. Preparation of Test Specimens

6.1 *Curing and Conditioning*—When possible, specimens shall be full-sized units. When the units cannot be tested full-size due to specimen configuration or lack of suitable specimen containers, obtain a specimen by saw-cutting a full-height coupon with a surface area of at least 190 cm^2 [29.5 in.^2]. Test specimens shall be a minimum of 28 days old before freeze-thaw cycling begins. After sampling, all test specimens shall be cured for 14 days in a moist chamber

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.