



Designation: C373 – 14

# Standard Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products, Ceramic Tiles, and Glass Tiles<sup>1</sup>

This standard is issued under the fixed designation C373; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This test method covers procedures for determining water absorption, bulk density, apparent porosity, and apparent specific gravity of fired unglazed whiteware products, glazed or unglazed ceramic tiles, and glass tiles.

1.2 The values stated in metric units are normative. The values given in parentheses are mathematical conversions to inch-pound units that are provided for information only and are not normative.

1.3 *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. Significance and Use

2.1 Measurement of density, porosity, and specific gravity is a tool for determining the degree of maturation of a ceramic body, or for determining structural properties that may be required for a given application.

## 3. Apparatus and Materials

3.1 *Balance*, of adequate capacity, suitable to weigh accurately to 0.01 g (0.00002 lb).

3.2 *Oven*, capable of maintaining a temperature of  $150 \pm 5^\circ\text{C}$  ( $302 \pm 9^\circ\text{F}$ ).

3.3 *Wire Loop, Halter, or Basket*, capable of supporting specimens under water for making suspended mass measurements.

3.4 *Suspended Mass Container (If Determination of Suspended Mass is Desired)*—A glass beaker or similar container of such size and shape that the sample, when suspended from the balance by the wire loop, specified in 3.3, is completely

immersed in water with the sample and the wire loop completely free of contact with any part of the container.

3.5 *Stainless Steel Boiling Container*, suitable for boiling water and with sufficient capacity to hold the test specimens and quantity of water specified in 5.2. The container shall be equipped with a loose removable cover which does not allow pressure to build.

3.6 *Deionized (DI) Water*.

3.7 *Leather Chamois*.

3.8 *Heat Source*, such as a hot plate, burner, or equivalent to heat the water to boiling.

3.9 *Desiccator*, a sealed chamber containing desiccants which is of sufficient size and capacity to allow specimens to cool while preventing the specimens from absorbing moisture from ambient air.

## 4. Test Specimens

4.1 *Ceramic Whitewares*

4.1.1 At least five representative test specimens shall be selected that have not been previously tested. The specimens shall be unglazed and shall have as much of the surface freshly fractured as is practical. Sharp edges or corners shall be removed. The specimens shall contain no cracks. The individual test specimens shall weigh at least 50 g.

4.2 *Ceramic Tiles and Glass Tiles*

4.2.1 The specimens shall contain no visible damage or cracks prior to testing. At least five representative test specimens shall be selected that have not been previously tested. Cutting of specimens, as described in the following sections, shall consist of scoring and snapping, or sawing when impossible to score and snap with conventional tile scoring equipment (as can be the case with some glass tiles and highly textured and structured porcelain tiles).

4.2.2 For tiles less than or equal to  $205 \times 205$  mm ( $8 \times 8$  in.), specimens shall be cut in half, within 10 mm (0.4 in.). Specimens shall be cut perpendicular to the longest side if the specimen has unequal sides. Select one half at random from each specimen for testing.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee C21 on Ceramic Whitewares and Related Products and is the direct responsibility of Subcommittee C21.03 on Methods for Whitewares and Environmental Concerns.

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