



Standard Test Method for Electrical Resistance of Conductive Ceramic Tile¹

This standard is issued under the fixed designation C 483; 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 determination of the electrical resistance of conductive ceramic tile prior to installation.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

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. Referenced Documents

2.1 ASTM Standards:

C 242 Terminology of Ceramic Whitewares and Related Products²

D 2240 Test Method for Rubber Property—Durometer Hardness³

3. Terminology

3.1 Definitions:

3.1.1 *conductive ceramic tile*—tile made from special body compositions or by methods that result in specific properties of electrical conductivity while retaining other normal physical properties of ceramic tile.

3.1.2 *tile*—for the definition of the term “tile”, refer to Terminology C 242.

4. Summary of Test Method

4.1 This test method consists of measuring the electrical resistance between an electrode resting upon the tile to be tested and a bed of iron filings on a stainless steel plate.

5. Significance and Use

5.1 This test method provides a means for determining whether conductive ceramic tile meets electrical resistance requirements to prevent the accumulation of dangerous electrostatic charges which, in the presence of flammable gases,

may cause possible explosions through spark discharges. Such electrical resistance requirements are specifically called for in hospital operating rooms and for floors of other rooms where flammable agents are stored or handled.⁴

6. Apparatus

6.1 *Ohmmeter*—A suitably calibrated d-c ohmmeter with a nominal open-circuit output voltage of 500 V and a short-circuit current of 2.5 to 10 mA, having wire leads and alligator clamps.

6.2 *Electrodes*—Two electrodes weighing 5.0 lb (2.2 kg) each and having a dry, flat circular contact area 2.5 in. (63.5 mm) in diameter. The contact area shall comprise a surface of aluminum or tin foil 0.0005 to 0.0010 in. (0.013 to 0.025 mm) thick, in electrical contact with the electrode and backed by a layer of rubber 0.25 in. (6.4 mm) thick and having a hardness of 50 ± 10 as determined with a Shore Type A durometer as described in Test Method D 2240.

6.3 *Iron Filings*, dry clean, reasonably free of oxidation, and approximately 50-mesh size (0.297-mm opening).

6.4 *Stainless Steel Plate*, 16 gage (1.29 mm) or heavier and 15 by 15 in. (380 by 380 mm) in size.

7. Sampling

7.1 *Size of Sample*—Sufficient individual conductive ceramic tile to cover a minimum area of 3 by 3 in. (76 by 76 mm) shall constitute a sample. If mounted, all the tile for one sample shall be taken from the same sheet.

7.2 *Selection of Sample*—One sample shall be taken from each 200 ft² (approximately 19 m²) of tile, but in no case shall less than five samples be tested from a lot. In the case of patterns using a combination of conductive and nonconductive tile, only the conductive tile shall be sampled.

7.3 *Preparation of Sample*—The tile shall be dry and, if previously mounted, shall be thoroughly cleaned to remove all mounted material and adhesive. They shall then be dried at 200°F (95°C) to constant weight and cooled to room temperature before testing.

8. Procedure

8.1 *Group*—Place two 1.0-in. (25.4-mm) wide and 0.0625-in. (1.6-mm) thick metal strips parallel to each other on one half side of the steel plate. The length of these strips and the

¹ This test method is under the jurisdiction of ASTM Committee C-21 on Ceramic Whitewares and Related Products and is the direct responsibility of Subcommittee C21.06 on Ceramic Tile.

Current edition approved Sept. 10, 1995. Published November 1995. Originally published as C 483 – 61 T. Last previous edition C 483 – 66 (1990).

² *Annual Book of ASTM Standards*, Vol 15.02.

³ *Annual Book of ASTM Standards*, Vol 09.01.

⁴ See the National Fire Protection Association *Pamphlet No. 56*, Ch. 25 (June 1959).

distance between them depends upon the size of the sample to be tested. Fill the space between the metal strips with iron filings and use a straight-edge to level the layer. The thickness of the metal strips assure a uniform thickness of 0.0625-in. (1.6 mm). Any other apparatus that can be devised that assures the uniform 0.0625-inch (1.6-mm) layer of iron filings in contact with the stainless plate is acceptable. Place the tile to be tested on the filings so that they are in contact with each other without free space between them, and so that they present a level surface. Take resistance measurements with the ohmmeter by placing one electrode on the tile to be tested and the other on the free half side of the steel plate. As an alternative method, the steel plate may be directly connected to the ohmmeter by lead wire and alligator clamp, which eliminates the second electrode.

8.2 *Individual Tile*—After the resistance range has been determined on the group, remove the tile from the filings and

test each tile individually in the same manner. Insulated side supports should be provided to help balance the electrode upon a single tile.

9. Report

9.1 Report the following information:

9.1.1 Number of samples tested,

9.1.2 Number of tile comprising a sample,

9.1.3 Electrical resistance of each sample, in ohms, and

9.1.4 Electrical resistance of each tile in each sample, in ohms.

10. Precision and Bias

10.1 No justifiable statement can be made either on the precision or bias of this test method. Bias depends primarily on the accuracy of the measuring devices and the care taken to set up and operate the equipment.

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