



Designation: C1027 – 09

Standard Test Method for Determining Visible Abrasion Resistance of Glazed Ceramic Tile¹

This standard is issued under the fixed designation C1027; 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 is designed to measure the resistance of tile surfaces to visible surface abrasion. Certain irregular surfaces may not be evaluated properly by this test method because of wear patterns.

1.2 This procedure does not make provisions for the apparent difference in abrasion values between light and dark colored tile.

1.3 This procedure does not optimally evaluate loss of gloss with abrasion.

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.5 *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 *ISO Standard:*
*ISO 10545-14*²

3. Significance and Use

3.1 The abrasion resistance of tile surfaces is determined by rotation of an abrasive load on the surface and the assessment of the resultant wear by means of visual comparison of the abraded test specimens and nonabraded tiles. A staining agent in light oil may be used to help determine whether abrasion surface is likely to result in mechanical entrapment of dirt particles.

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

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² Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

4. Abrasive Load

4.1 The total load on each test specimen consists of the following:

- 4.1.1 Grade 25 chrome steel balls of various diameters:
- 4.1.1.1 70.0 g of 5-mm diameter steel balls.
 - 4.1.1.2 52.5 g of 3-mm diameter steel balls.
 - 4.1.1.3 43.75 g of 2-mm diameter steel balls.
 - 4.1.1.4 8.75 g of 1-mm diameter steel balls.
- 4.1.2 3.0 g No. 80 grit aluminum oxide, and
- 4.1.3 20 ± 0.5-mL demineralized water.

5. Reagents and Apparatus

5.1 *Abrasion Apparatus*—The abrasion apparatus shall consist of a steel case with a built-in electrical drive to a horizontal supporting plate with positions for a maximum of nine test specimens of dimensions at least 100 by 100 mm (see Fig. 1), but an apparatus with fewer positions may be used. The distance between the center of each position shall be 195 mm. There shall be equal distance between each adjacent position. The supporting plate rotates at 300 revolutions/min with an eccentricity of 22.5 mm so that every part of each test specimen describes a circular motion of 45-mm diameter. The test specimens are held down with the aid of metal holders, which are provided with rubber seals (see Fig. 2). The internal diameter of the holders is 83 mm, thus providing a test area of about 54 cm². The thickness of the rubber is 2.5 mm and the height of the space under the holder is 25.5 mm. The apparatus switches off automatically after completion of a preset number of revolutions. The supporting plate with holders and test specimens should have a cover during operation.

5.2 *Apparatus for Visual Assessment*—A viewing box (see Fig. 3) equipped with fluorescent lighting of color temperature 5000 to 6500K placed vertically above the surface to be observed providing 300-lux illumination. The interior of the box shall be painted a neutral gray.

5.3 *Drying Oven*, capable of operation at (110 + 5)°C.

5.4 *10 % (v/v) Hydrochloric Acid Solution*, prepared by adding 263 mL of 38 % hydrochloric acid to 837 mL of distilled or demineralized water.

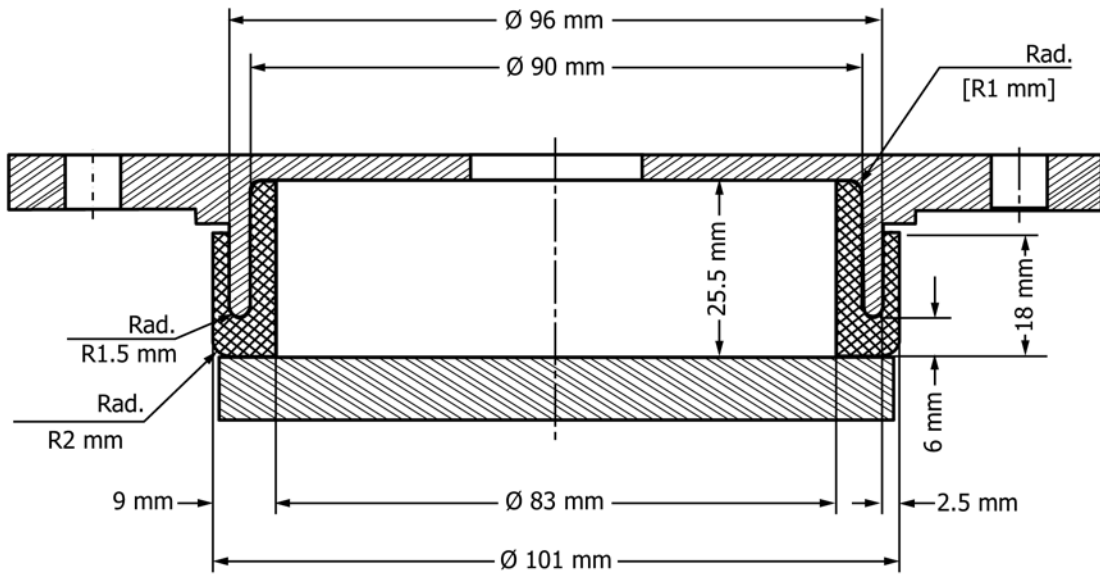


FIG. 1 Top View of the Abrasion Tester

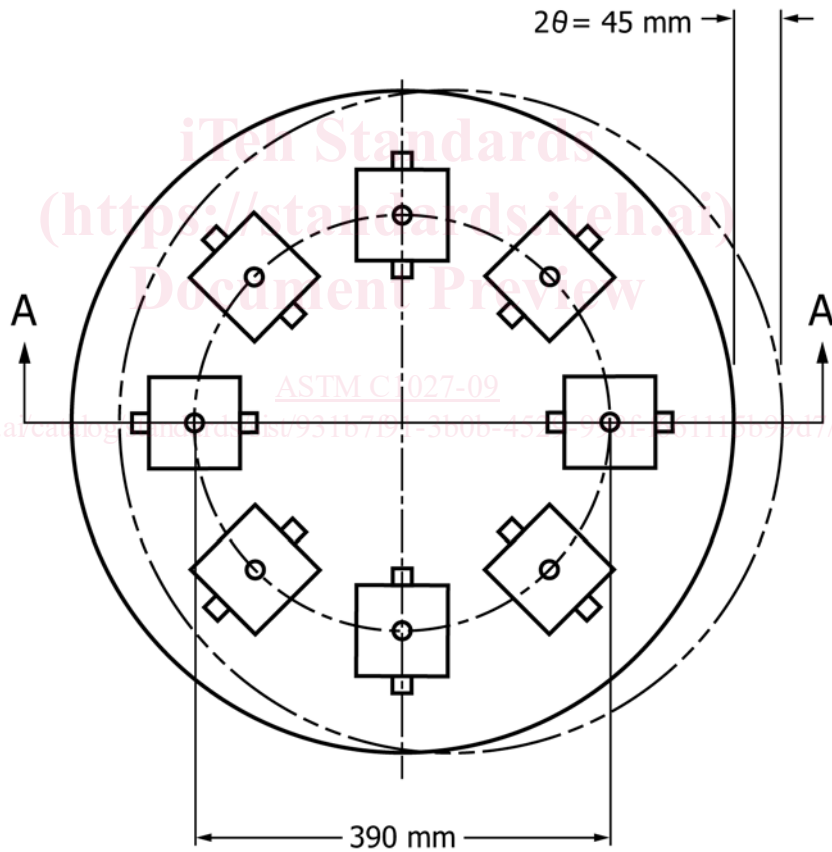


FIG. 2 Side View of the Abrasion Tester