Designation: C1895 – 20

Standard Test Method for Determination of Mohs Scratch Hardness[1]

This standard is issued under the fixed designation C1895; 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 procedures to determine the Mohs scratch hardness of ceramic tile, glass tile, and other hard surfaces.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Significance and Use

2.1 Mohs scratch hardness is a useful tool for determining a ceramic tile's resistance to scratching. The resistance to scratching is determined based on a visual observation of the ceramic tile surface after an attempt to scratch the surface using a pick of known hardness.

3. Apparatus

3.1 *Hardness Picks:*[2]

3.2 *Hardness Pick Sled*—A fixture used to hold the hardness pick at a 70 ± 5° angle (see Fig. 1a, Fig. 1b, and Fig. 1c). The sled shall be capable of applying a force of 7 ± 0.5 lb. (3.2 ± 0.2 kg) where the hardness point contacts the test specimen (see Fig. 2). This may be accomplished by adding an auxiliary weight to the top of the sled. The sled shall be equipped with a handle to aid in pulling the hardness pick across the test specimen.

NOTE 1—The total weight necessary to apply the required force will vary based on the overall weight of the sled and location of the weight on the sled, if an auxiliary weight is used.

3.3 *Jeweler's Loupe or Other Suitable Magnification Device.*

3.4 *Sharpening Stone or Whetstone*—A surface constructed of suitable material to sharpen the hardness picks. Diamond coated sharpening stones and sharpening stones constructed of aluminum oxide or corundum have been known to work.

4. Reagents and Materials

4.1 Optional staining solution, such as methylene blue solution, 1 %.

5. Test Specimens

5.1 *Number of Test Specimens*—The test sample shall consist of at least one tile.

5.2 *Size of Test Specimens*—Test specimens up to 6 × 6 in. (15 × 15 cm) shall remain uncut for testing. Specimens with edges greater than 6 in. may be reduced in size to no smaller than 6 in. (15 cm) for ease of handling.

6. Preparation of Apparatus

6.1 *Sharpening Hardness Points*—The hardness points may wear with use. Prior to testing, inspect the point of the pick under magnification to assure that a sharp point exists with an even taper (see Fig. 3). Sharpening of the hardness points may be necessary to remove any flat spots or imperfections.

6.1.1 To sharpen the hardness point, remove the hardness point from the hardness pick and place it into the chuck of an electric drill.

6.1.2 Hold the hardness point against a sharpening stone at approximately a 20° angle to the sharpening stone and use the electric drill to rotate the hardness point (see Note 2).

NOTE 2—Excessive heat caused by friction may change the hardness of the pick. To prevent excessive heating, keep the sharpening stone wet and do not attempt to sharpen for intervals greater than 10 s. If additional

[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.

Current edition approved April 1, 2020. Published April 2020. Originally approved in 2019. Last previous edition approved in 2019 as C1895 – 19. DOI: 10.1520/C1895-20.

[2] The sole source of supply of the apparatus known to the committee at this time is Mineralab, LLC, 2860 W. Live Oak Drive, Prescott, AZ 86305. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

FIG. 1 a—Hardness Pick Sled (Side View)

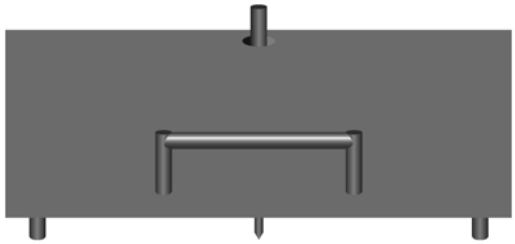

FIG. 1 b—Hardness Pick Sled (Rear View)

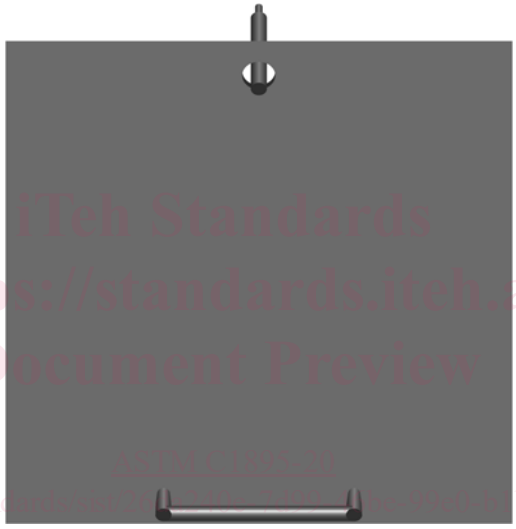

FIG. 1 c—Hardness Pick Sled (Top View)

FIG. 2 Hardness Pick Sled With Auxiliary Weight Added

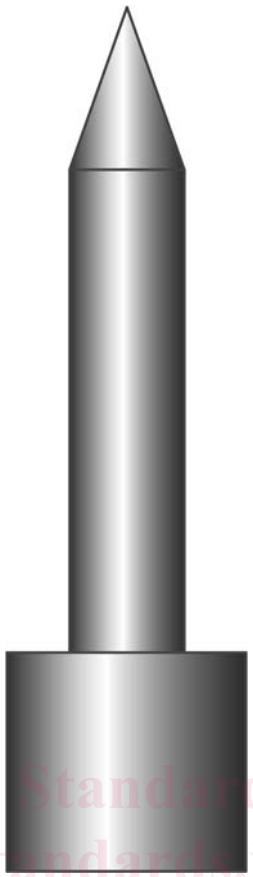

FIG. 3 Hardness Point After Sharpening

sharpening is necessary, allow the hardness pick to cool prior to additional sharpening.

6.2 Beginning with the No. 8 hardness point, secure the hardness pick to the sled such that the hardness pick will be at a 70 ± 5° angle to the test specimen (see Fig. 4).

7. Procedure

7.1 Place the assembled sled with auxiliary weight (if applicable) such that the tip of the hardness pick is resting on the test specimen.

7.2 Pull the sled along the surface of the test specimen at least ½ the length of the test specimen or 3 in. (7.5 cm), whichever is smaller.

7.3 To assist in viewing the effect of the hardness point in the test area, a 1 % aqueous solution of methylene blue or other suitable stain, may be used. Apply the solution to the face of the test specimen in the test area and wipe off with a damp cloth after approximately 1 min.

7.4 Inspect the test specimen for the presence of a scratch (see Fig. 5). A jeweler's loupe or other suitable means of magnification may be used to assist in viewing the test area.

7.4.1 If a scratch is present, repeat 6.2 – 7.2 using the next lower numerical hardness point. If no scratch is present, repeat 6.2 – 7.2 using the next higher numerical hardness point.

7.4.2 Material transfer from the hardness point to the test specimen is not a scratch (see Fig. 6). Please note, viewing

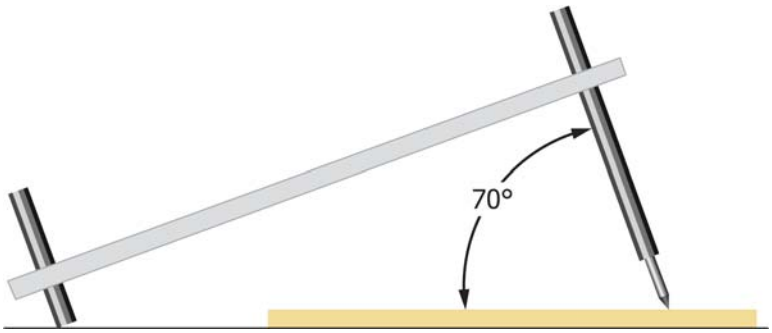

FIG. 4 Sled Positioned on Test Specimen at Required Angle