Designation: F 142 – 93 (Reapproved 2000)ε1

Standard Test Method for Indentation of Resilient Floor Tiles (McBurney Test)[1]

This standard is issued under the fixed designation F 142; 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.

This standard has been approved for use by agencies of the Department of Defense.

ε[1] NOTE—The addresses in Footnotes 4 and 5 were updated editorially in October 2000.

1. Scope

1.1 This test method[2] covers the determination of the indentation of resilient nontextile floor tiles, such as vinyl composition.

1.2 *This standard does not purport to address all of the safety problems, 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:*

E 1 Specification for ASTM Thermometers[3]

3. Significance and Use

3.1 This test method measures the tendency of resilient tile to indent under continuous loads. The slope, *m* of a plot of log indentation (I) versus log time (T) is related to the indentation of tile in service. The 46°C (115°F) indentation is a measure of the tendency of the tile to indent at temperatures above 25°C (77°F). Consult the reference in footnote 2 for further information.

3.2 This test method does not measure the effect of recovery from indentation or of aging of the tile on indentation in service.

4. Apparatus

4.1 *Water Baths*, or atmosphere maintained at 25 ± 0.5°C (77 ± 0.9°F) and 46 ± 1°C (114.8 ± 1.8°F).

4.2 *Indentation Tester*[4,5]—The indentation tester is a spherical foot device consisting essentially of a rigidly mounted indentor acting under an initial load of 2.00 ± 0.02 lbf (8.90 ± 0.09 N) and a total deadweight load of 30.00 ± 0.25 lbf (133.45 ± 1.11 N) with a suitable dial indicator, calibrated in 0.0005 in. (0.01 mm) increments. The spherical foot shall be 0.250 ± 0.0005 in. (6.35 ± 0.01 mm) in diameter. A suitable apparatus is shown in Fig. 1.

4.3 *Flat Glass Plate*, of 0.25 in. (6.35 mm) minimum thickness for supporting the specimen and tester during test.

4.4 *Timing Device*, that will indicate the time in seconds.

4.5 *Thermometer*, calibrated as in Specification E 1.

4.6 *Circular Plexiglass Template*, 3.50 in. (88.9 mm) in diameter, 0.25 in. (6.35 mm) thick and having a 0.3125 in. (7.94 mm) diameter hole drilled in the center and a 0.75 in. (19.05 mm) diameter concentric circle etched on the face.

5. Test Specimen

5.1 The test specimen shall be a full tile, usually 12 by 12 in. (approximately 300 by 300 mm) or 9 by 9 in. (approximately 230 by 230 mm). Larger tiles shall be cut to one of the above sizes.

6. Conditioning

6.1 *Testing in Atmosphere*—condition the specimen(s) for 1 h at the test temperature.

6.2 *Testing in Water*—condition the specimen(s) at the test temperature for 15 min minimum and 30 min maximum.

6.3 Condition the indentation tester and glass plate in the same medium and for at least the same time period as the specimen(s).

7. Procedure

7.1 *Nonembossed Surfaces*:

7.1.1 Place the specimen on the glass plate with the wearing surface up.

7.1.2 Place the indentor on the specimen. Be sure the indentor tip is retracted into the base when the instrument is placed on the specimen and when being moved to another test location.

7.1.3 Apply the initial 2-lbf (8.9-N) load (shaft assembly) to the specimen surface. Proper 2-lbf loading and positioning of the 28-lbf (124.5-N) load is accomplished by holding down, with the thumb, the shaft cross bar facing you and gently

[1] This test method is under the jurisdiction of ASTM Committee F06 on Resilient Floor Coverings and is the direct responsibility of Subcommittee F06.30 on Physical Service Properties.

Current edition approved Nov. 15, 1993. Published January 1994. Originally published as F 142-71. Last previous edition F 142-82 (1987)ε1.

[2] McBurney, J. W., "Indentation of Asphalt Tile," *Proceedings*, ASTEA, ASTM, Vol 34, Part II, 1934, p. 591.

[3] *Annual Book of ASTM Standards*, Vol 14.03.

[4] Instructions on the care and maintenance of the McBurney Indentation Tester are available from the Resilient Floor Covering Institute, 401 East Jefferson Street, Suite 120, Rockville, MD 20850.

[5] McBurney Indentation Testers may be purchased from Frazier Precision Instrument Co., 925 Sweeney Drive, Hagerstown, MD 21740–7123.

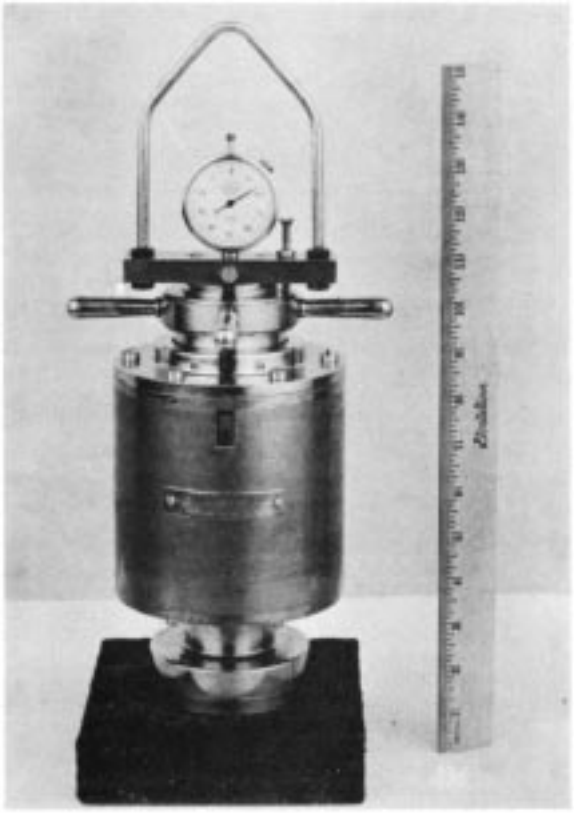

FIG. 1 Indentation Tester

lowering the load until the shaft cross bar is forced upward until there is essentially no clearance between the shaft cross bar and the upper wear plate.

7.1.4 Set the dial gage at zero.

7.1.5 Release the 28-lbf (124.5-N) load and start the timing device. (Steps 7.1.3-7.1.5 should not exceed a total of 5 s.) Load release should be smooth and as mechanical as possible. Turn the collar at least one-half turn beyond release to allow sufficient travel for indentation. Do not hold the collar handle after the load is released as this may tilt the instrument from vertical.

7.1.6 Read the depth of indentation at 1 min ± 1 s and 10 min ± 1 s to the nearest 0.0001 in. (0.0025 mm) for 25°C (77°F) testing and at 30 s ± 1 s for 46°C (114.8°F) testing.

7.1.7 Perform three of the required tests at randomly selected locations on the specimens. Record the three individual readings and the median for each time period.

7.2 *Embossed Surfaces*:

7.2.1 Prior to conditioning, use the template described in 4.6 to locate areas on the specimen where a flat surface lies within the 0.75 in. (19.05 mm) diameter circle etched in the template. Mark the area for placement of the indentor by tracing around the template with a pencil. Follow the procedure detailed in 7.1-7.1.7 after placing the indentor with its base inside the circle.

NOTE 1—If the embossed surface of the tile is such that a 0.75 in. diameter smooth area cannot be located in the same or parallel plane that the indentor base will rest on, or the surface is completely nonuniform such as a textured surface, or both, the test shall not be made.

8. Report

8.1 Report the tile indentation as the median value(s) of the three tests made at each temperature and time interval. These shall be designated as the 1-min, 10-min and 30-s indentation values. Include in the report the nominal gauge of the tile; that is, 1/16, 3/32, or 1/8 in. (approximately 1.5, 2 and 3 mm, respectively).

9. Precision and Bias

9.1 *Precision*—This precision statement is based on round robin testing performed at committee members' laboratories using this procedure to perform the tests.

9.1.1 *Repeatability*—The estimated repeatability at the 95 % confidence limit is as follows:

For 1 and 10-min indentations	± 0.0005 in.
For 30 s indentation	± 0.001 in.
For slope *m* of the log *I*/log *T*	± 0.008 mils/decade min

9.1.2 *Reproducibility*—Based on a limited study, the estimated reproducibility is as follows:

For 1 and 10-min indentations	± 0.001 in.
For 30 s indentation	± 0.002 in.
For slope *m* of the log *I*/log *T*	± 0.02 mils/decade min

9.2 *Accuracy*—No justifiable statement on accuracy can be made, since the true value of the property cannot be established by an accepted reference method.

10. Keywords

10.1 floor; indentation; McBurney; resilient; tile