Designation: F1304 – 08 (Reapproved 2013)

Standard Test Method for Deflection of Resilient Floor Tile[1]

This standard is issued under the fixed designation F1304; 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 used to determine the deflection of relatively rigid resilient floor tile such as vinyl composition tile.

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

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

F141 Terminology Relating to Resilient Floor Coverings

2.2 *ANSI Standards:*

ANSI/ASQC Z1.4 Sampling Procedures and Tables for Inspection by Attributes[3]

3. Significance and Use

3.1 This test method measures a physical property associated with resilient floor tile's ability to conform to an uneven subfloor without breaking or cracking.

4. Apparatus

4.1 *Deflection Frame,* as shown in Fig. 1.

4.2 *Tensile Test Apparatus,* capable of holding the deflection frame and having a movement of at least 2.5 in. (64 mm) at a rate of 4 in. (100 mm)/min at a load of 10 lb (4.54 kg).

4.3 *Measuring Device,* for measuring the deflection of the specimen at break or pull out from between the support bars to a tolerance of 0.05 in. (1.3 mm).

4.4 *Cutting Device,* for cutting the samples to 2 by 9 in. (50 by 229 mm).

5. Sampling

5.1 For sampling, refer to ANSI/ASQC Z1.4–most recent version.

5.2 Specimens for test shall be 2 ± 1/32 by 9 ± 1/32 in. (50 ± 0.8 by 229 ± 0.8 mm).

5.3 Six samples shall be taken from each test unit, three cut with the long dimension in the machine direction, and three with the long dimension across the machine direction. These samples are tested for deflection.

6. Preparation of Apparatus

6.1 Install the deflection frame in the tensile tester. Check to see that the three bars are parallel, and that the center bar is accurately centered between the two outside bars. Position the frame so that the test sample can be placed with the wearing surface touching the center bar, and the back surface touching the two outer bars, without deflection of the sample. This is the zero point for measuring deflection. Check that the deflection speed of the tester is 4 ± 1/8 in./min. (102 ± 3 mm/min.). Check the deflection measuring device to see that it accurately measures the relative movement between the center bar and the frame holding the two outer bars.

NOTE 1—If a pendulum-type weighing system is used on the test machine, which has appreciable movement of the attached jaw, the mechanism may be locked in place to make measurement of the deflection easier, and to maintain the specified deflection rate, since measurement of the load is not required. Electronic load cell machines usually have negligible movement.

7. Conditioning

7.1 After cutting the samples to size, condition the samples at 73.4 ± 1.8°F (23 ± 1°C) and 50 ± 5 % relative humidity for 3 h before testing.

[1] This test method is under the jurisdiction of ASTM Committee F06 on Resilient Floor Coverings and is the direct responsibility of Subcommittee F06.20 on Test Methods - Products Construction/Materials.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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

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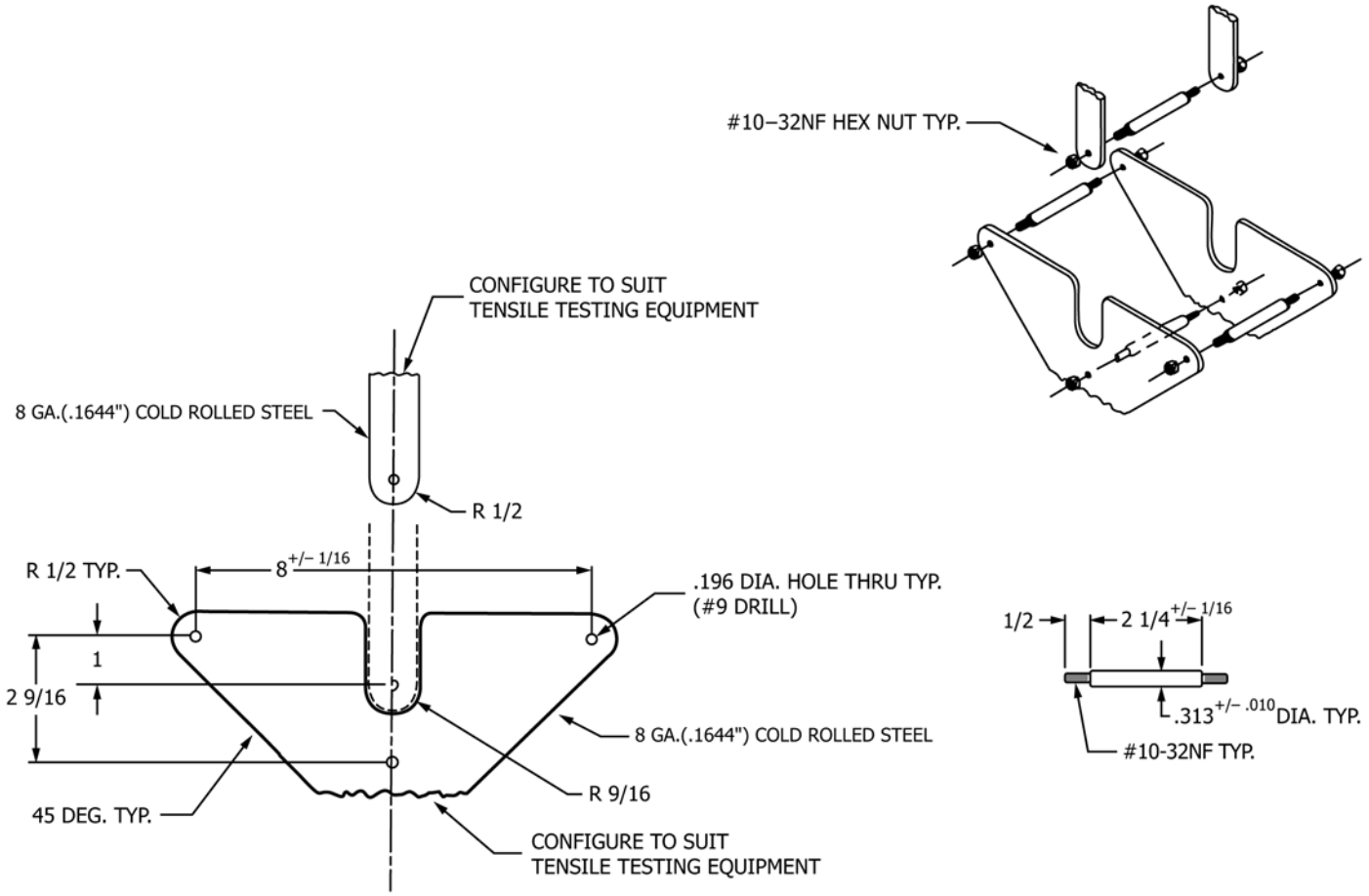

FIG. 1 Deflection Frame

8. Procedure

8.1 Insert a specimen in the frame as described in 6.1 with the wearing surface against the center bar, and the back against the two outer bars. Start the machine and record the deflection at the point where the sample breaks, or pulls free from the outer bars. Record the deflection to the nearest 0.05 in. (1.3 mm). Remove the sample from the apparatus, and return the deflection frame to the zero point described in 6.1. Insert the next sample and test.

9. Report

9.1 Report the following information:

9.1.1 Deflection for each specimen, and

9.1.2 Direction of the long dimension of the sample (that is, machine direction or across machine direction).

10. Precision and Bias

10.1 A round robin was conducted for Test Method F1304. There were six participating laboratories, ten material samples and three determinations made on each sample. The minimum requirements per Practice E691 are minimum six laboratories, four materials and two determinations.

10.2 *Precision Statement for Test Method: Inches Deflection*—Precision, characterized by repeatability, Sr, r, and reproducibility, SR, R, has been determined for the materials as shown in Table 1.

TABLE 1 Precision Data

Materials	Average[A]	Sr[B]	SR[C]	r[D]	R[E]
1 MD	1.68278	0.06852	0.32643	0.19184	0.91401
1 AMD	1.37278	0.16979	0.33205	0.47540	0.92975
2 MD	2.08000	0.07990	0.21821	0.22371	0.61099
2 AMD	1.96556	0.14922	0.23402	0.41782	0.65527
3 MD	2.00889	0.06729	0.24824	0.18841	0.69506
3 AMD	2.05111	0.09826	0.27306	0.27514	0.76458
4 MD	2.04389	0.15013	0.36584	0.42036	1.02434
4 AMD	1.98833	0.10127	0.28642	0.28356	0.80197
5 MD	2.00833	0.08343	0.36727	0.23361	1.02836
5AMD	1.81222	0.18404	0.30865	0.51532	0.86422

[A] Average is the numerical average of test results for all replicates from all laboratories.
[B] Sr = within-laboratory standard deviation of the average.
[C] r = 2.83 Sr.
[D] SR = between-laboratory standard deviation of the average.
[E] R = 2.83 SR.

10.2.1 *Repeatability*—In comparing two average values for the same material obtained by the same operator using the same equipment on the same day, the means should be judged not equialent if they differ by more than the r value for that material and condition.

10.2.2 *Reproducibility*—In comparing two average values for the same material obtained by different equipment on different days, the means should be judged not equivalent if they differ by more than the R values for that material and

condition. (This applies between different laboratories or between different equipment within the same laboratory.

10.2.3 These judgements will have an approximate 0.95 (95 %) probability of being correct. Other materials may give somewhat different results. For further information on the methodology used, consult Practice E691.

10.3 *Bias*—No information can be presented on the bias of the test method because material having an accepted reference value is unavailable.

10.4 A synopsis of the round robin test data will be available from ASTM International as a research report.

11. Keywords

11.1 cutting device; deflection; resilient; tensile; test apparatus; tile

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