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Standard Test Method for
Assessment of Surface Appearance Change in Pile Floor Coverings Using Standard Reference Scales[1]

This standard is issued under the fixed designation D7330; 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.

ε¹ NOTE—Added research report footnote to Section 12 editorially in June 2009.

1. Scope

1.1 This test method covers the assessment of changes of surface appearance of pile floor coverings after exposure to actual or simulated foot traffic. This test method applies to pile yarn floor coverings that are, or have been, installed; laboratory floor-trafficked samples; or textiles floor coverings trafficked by mechanical traffic simulators. The subjective assessment is facilitated by use of reference scales that are based on digital images of representative pile yarn floor covering styles and constructions.

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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]*
D123 Terminology Relating to Textiles D5251 Practice for the Operation of the Tetrapod Walker Drum Tester
D5252 Practice for the Operation of the Hexapod Tumble Drum Tester
D5417 Practice for Operation of the Vettermann Drum Tester
D5684 Terminology Relating to Pile Floor Coverings
D6119 Practice for Creating Surface Appearance Changes in Pile Yarn Floor Covering from Foot Traffic
D6962 Practice for Operation of a Roller Chair Tester for Pile Yarn Floor Coverings
E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods
E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

3. Terminology

3.1 For definitions of terms relating to Pile Floor Coverings, refer to the Terminology D5684.

3.2 The following terms are relevant to this standard: carpet, crushing cut pile yarn floor covering, finished, finished pile yarn floor covering, loss of tuft definition, matting, pile, pile yarn floor covering, textile floor covering.

3.3 For definitions of other terms related to textiles, refer to Terminology D123.

4. Summary of Test Method

4.1 The floor covering shall be tested in a mechanical wear simulator or tested under controlled laboratory foot traffic tests referenced in Practices D5251, D5252, D5417, D6119, and D6962. The tested floor covering shall then be assessed for surface appearance change by comparing unexposed controls to the exposed sample by using the appropriate Appearance Change Grading Scale.

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[1] This test method is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.21 on Pile Floor Coverings.
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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.

5. Significance and Use

5.1 The determination of surface appearance change in pile yarn floor covering is useful in quality and cost control during manufacture of pile yarn floor covering. This test method is considered satisfactory for acceptance testing of commercial shipments because current estimates of between laboratory precision are acceptable, and this test method is commonly used in trade for acceptance testing.

5.2 If there are differences of practical significance between reported test results for two laboratories (or more), comparative test should be performed to determine if there is a statistical bias between them, using competent statistical assistance. As a minimum, use the samples for such comparative tests that are as homogenous as possible, drawn from the same lot of material as the samples that resulted is desparate results during initial testing and randomly assigned in equal numbers to each laboratory. The test results from the laboratories involved shall be compared using a statistical test for unpaired data, a probability level chosen prior to the testing series. If a bias is found either its cause must be found and corrected, or future test results for that material must be adjusted in consideration of the known bias.

6. Apparatus

6.1 *CRI reference Scales*—A series of imaged standards containing a progressive amount of surface appearance change ranging from 5.0 (no change) to 1.0 (severe change).

6.2 *Illumination system for assessment*—Either portable of fixed lighting may be used which provides for ~150 lumens per square foot (1500 ± 100 lux) at the surface of the test specimen with the predominance of the light from directly above. Either North Sky Light or Cool White Fluorescent is satisfactory.

7. Sampling, Test Specimens, and Test Units

7.1 Test specimens consist of previously exposed specimens tested in accordance to the appropriate test method and an unexposed "control" specimen.

8. Conditioning

8.1 All specimens shall be allowed to recover at ambient room conditions, undisturbed, for a minimum of 16 hours prior to grading. The specimens shall not be stacked on top of each other.

9. Procedure

9.1 Place unexposed and exposed specimens under and perpendicular to the specified lighting such that the unexposed specimen is adjacent to the exposed portion of the exposed specimen. The specimens shall be laid in a manner as to orient the pile directions in the same direction.

9.2 Select the appropriate reference scale, which most resembles the construction of the pile yarn floor covering being assessed

9.3 Observing features such as crushing, loss of tuft definition, and matting, choose the reference scale grade, which most nearly resembles the degree of surface appearance change between the exposed and unexposed specimens.

TABLE 1 Pile Floor Covering Traffic Appearance Change Carpets Rated with Digital Scales Ranging 1-5 Graduated in 0.5 Steps

Scale	Material	Average[A] (rounded to the nearest 0.5) $\bar{x}$	Repeatability Standard Deviation, S_r	Reproducibility Standard Deviation, S_B	Repeatability Limit r	Reproducibility Limit R
CRI 1		3.0	0.2	0.3	0.6	0.9
CRI 2		2.5	0.2	0.3	0.6	0.8
CRI 3		3.0	0.2	0.3	0.5	0.9
CRI 4		2.0	0.2	0.3	0.6	0.9
CRI 5		3.5	0.3	0.4	0.7	1.1
CRI 6		1.5	0.3	0.4	0.9	1.1
CRI 7		2.0	0.2	0.3	0.6	0.8

[A]The average of laboratories' calculated averages, which have been rounded to the nearest 0.5 rating.