



Designation: D 6540 – 00

Standard Test Method for Accelerated Soiling of Pile Yarn Floor Covering¹

This standard is issued under the fixed designation D 6540; 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 describes the equipment, and the test method for assessing the propensity of pile yarn floor coverings to soiling in the absence of abrasive wear and texture changes, using a standard synthetic soil composition.

1.2 This test method is applicable for use in testing unused pile yarn floor covering of all types. It is not applicable for use in testing used pile yarn floor covering.

1.3 This test method can be used to compare the soiling propensity of two or more carpets; or it can be used to soil carpets as a preliminary step to other test procedures.

1.4 The values stated in SI units are to be regarded as the standard. The inch-pound units given in parenthesis are for information only.

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 ASTM Standards:

D 123 Terminology Relating to Textiles²

D 1776 Practice for Conditioning Textile Testing²

D 2906 Statements on Precision and Bias for Textiles²

D 5684 Terminology Relating to Pile Yarn Floor Coverings³

2.2 ASTM Adjunct:

TEX-PAC⁴

2.3 AATCC Test Method:

Evaluation Procedure 1 – Gray Scale for Color Change⁵

2.4 ISO Standards:

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 Yarn Floor Coverings.

Current edition approved April 10, 2000. Published July 2000.

² Annual Book of ASTM Standards, Vol 07.01.

³ Annual Book of ASTM Standards, Vol 07.02.

⁴ The PC program on floppy disks for analyzing Committee D13 interlaboratory data are available from ASTM. Request ADJ D2904.

⁵ Available from American Association of Textile Chemists and Colorists, PO Box 12215, Research Triangle Park, NC 27709.

105–J01 Textile—Tests for colour fastness—Part J01: Measurement of Colour and Colour Differences⁶

3. Terminology

3.1 *Definitions*—For definitions of pile yarn floor covering related terms used in this standard, Refer to Terminology D 5684. For definitions of other textile terms used in this standard, Refer to Terminology D 123.

4. Summary of Test Method

4.1 The carpet test specimens are secured to a backing sheet that is mounted inside the drum with the pile surface exposed, and are subjected to an accelerated soiling process. The degree of soiling is measured or assessed by comparing the change in color between soiled and original pile yarn floor covering, using a measurement device or visually matching the differences on the light-dark axis of Jumbo Gray Scales.

NOTE 1—Differentiation between test samples is significantly reduced when Jumbo Gray Scales are used.

5. Significance and Use

5.1 This test method may be used to soil test specimens in the absence of abrasive wear and texture changes under controlled conditions using a standard synthetic soil, or as a preliminary step to other procedures.

5.2 This test method will provide a uniformly soiled test specimen to evaluate, is reproducible (see section 11), and is economical for Testing Laboratories.

5.3 This test method has been found to give results similar to the actual floor service soiling, but its use is recommended only as a screening test method and not as a replacement for floor testing.

5.4 The acceptance criteria of this test method shall be set by mutual agreement between the purchaser and supplier.

6. Apparatus and Materials

6.1 Hexapod Tumble Tester

⁶ Available from American National Standards Institute, 11 West 42nd Street, 18th Floor, New York, NY 10036.

6.1.1 *Drum*—Constructed of molded PVC and is capped by a lid that is secured. The drum base and lid have a locating groove to hold the specimen backing sheet flat to the inner wall of the drum. The drum dimensions are:

Internal Diameter	305 ± 1 mm	(12 ± 0.04 in.)
Wall Thickness	8 mm approx.	(0.03 in. approx.)
Internal Depth	200 ± 1 mm	(7.9 ± 0.04 in.)

6.1.2 *Driving System*—Cradles the drum on rollers and keeps the axis of the drum level, rotates at 0.6 ± 0.03 r/s (35 ± 2 rpm). The driving system reverses every 15 min with approximately one minute stationary time.

6.2 *Specimen Backing Sheet*—is a polyethylene sheet 950 by 215 by 2 mm (37.4 by 8.5 by 0.08 in.)

6.3 *Tape*—double sided pressure sensitive adhesive, 50 mm (2.0 in.) width.

6.4 *Cleaning Frame*—A rectangular frame 1000 by 300 mm (39.4 by 11.8 in.) with a central rectangular aperture 940 by 200 mm (37.0 by 7.9 in.) to receive the test specimen, of material similar in construction to the test specimen and mounted on a backing sheet.

6.5 *Vacuum Cleaner*—upright type, with a rotating brush and beater bar, unless this type of apparatus is not recommended by the manufacturer of the pile floor covering under test, in that case the appropriate recommended device should be used.

6.6 *Mixing Container*—a wide mouth container such as a Standard Mill jar.

6.7 *Polymer Pellets*—polyamide polymer pellets having a maximum size of 7 ± 2 mm (0.27 ± 0.08 in.)

6.8 *Chrome Alloy Steel Balls (Ball Bearings)*—with a 9.5 ± 0.02 mm (0.37 ± 0.01 in.) diameter.

6.9 *Standard Soiling Compound*⁷—A soiling compound, such as AATCC synthetic soil formula, which is compatible with the equipment.

6.10 *Control Pile Yarn Floor Covering*—an internal standard light colored carpet of known specifications used as a reference for each test evaluation.

6.11 *Color Measurement Equipment*—A color measurement device with a 50 ± 0.5 mm (2.0 ± 0.2 in.) aperture, capable of measuring the color of pile yarn floor covering and expressing the results in Delta E (dE) or Delta L (dL).

6.12 *Jumbo Gray Scales*—standard gray scales used to visibly assess change in color of pile yarn floor covering as per AATCC Procedure 1.

6.13 *Template*—to be the same size as the test specimen with 3 holes of the same dimensions as the measuring head of the color measuring device. See Fig. 1.

6.14 *Magnet*—capable of attracting and holding several chrome alloy steel balls at one time.

7. Sampling, and Preparation of Soiled Pellets, Sampling, and Test Specimens

7.1 Preparation of Soiled Polyamide Polymer Pellets

7.1.1 Place 3.0 g of the standard soiling compound (see section 6.9) and 1000 g of polyamide polymer pellets (see

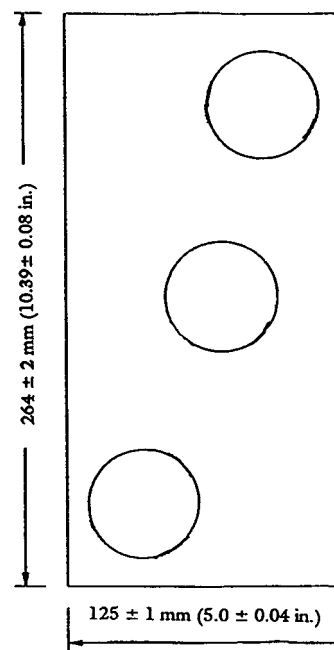


FIG. 1 Example of a Suitable Template for Color Measurement

section 6.7.ute) in the mixing container. Secure the lid and place the mixing container on the driving system for 10 minutes, reverse direction and continue for an additional 10 min, for a total of 20 min to ensure a homogeneous mixture of the soil and polyamide polymer pellets.

NOTE 2—To simulate particular use areas, it may be necessary to adjust the type and/or quantity of soiling compound and document the change in the written report.

NOTE 3—If large quantities of soiled pellets are prepared, that is more than 2000 g, they shall be kept in an airtight container to ensure no loss of moisture from the mixture occurs, and the supply shall not be allowed to dwindle below 25 % of the original quantity.

NOTE 4—This Test Method was developed using AATCC synthetic soiling compound and if another soiling compound is used the amount of soil used to prepare the soiled polymer pellets must be adjusted.

7.2 Ensure the inside of the drum and chrome alloy steel balls are clean.

7.3 Size of Test Specimens

7.3.1 Cut a minimum of two test specimens per pile yarn floor covering, measuring a minimum of 125 ± 1 mm (5.0 ± 0.04 in.) in the direction of manufacture by 205 ± 2 mm (8.00 ± 0.08 in.) wide. Mark an arrow in the direction of the pile lay on the back of the test specimen. All test specimens shall be conditioned (clause 8.1), flat singly, and with use-surface uppermost, for a minimum of 24 h.

7.4 Specimen Attachment

7.4.1 To the specimen backing sheet (see section 6.2) attach double sided pressure sensitive adhesive tape (see section 6.3) at each edge, across the ends and at each junction of the test specimen. Mount the test specimens and internal standard carpet with the use surface uppermost, allowing a 5 ± 1 mm (0.20 ± 0.04 in.) gap at each end and 8 ± 1 mm (0.31 ± 0.04 in.) between test specimens to allow for the test specimen to remain attached when the specimen backing sheet is curved to fit the internal circumference of the drum.

⁷ Prepared soils are available from Textile Innovations Corporation, P.O. Box 8, Windsor NC 27983. Telephone 252-794-9703