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.

Designation: D5252 – 24

Standard Practice for the Operation of the Hexapod Tumble Drum Tester[1]

This standard is issued under the fixed designation D5252; 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 practice describes the equipment and operation of the hexapod tumble drum tester for testing pile floor covering to produce changes in appearance and color due to changes in surface structure by mechanical action tester.

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

1.3 This practice may be used by mutual agreement between the purchaser and supplier to set purchasing specifications.

1.4 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.

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

1.6 *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. Referenced Documents

2.1 *ASTM Standards:*[2]

D123 Terminology Relating to Textiles

D1776/D1776M Practice for Conditioning and Testing Textiles

D5684 Terminology Relating to Pile Floor Coverings

3. Terminology

3.1 For all terminology related to Pile Floor Coverings, D13.21, see Terminology D5684.

3.1.1 The following terms are relevant to this standard: carpet, finished, finished pile yarn floor covering, floor covering, lengthwise direction, pile, pile lay, pile yarn floor covering, pitch, practice, primary backing, secondary backing, textile floor covering, texture, tufted fabric.

3.2 For all other terminology related to textiles see Terminology D123.

4. Summary of Practice

4.1 The specimen is secured to a backing sheet that is mounted inside the rotatable drum with the pile surface exposed. A metal hexapod, with six polyurethane studs, rolls randomly on the pile surface inside the rotating drum for a specified number of revolutions.

5. Significance and Use

5.1 This equipment may be used to bring about the changes in appearance and texture on the surface of pile floor covering caused by mechanical action.

6. Apparatus, Materials, and Reagent

6.1 *Hexapod Tumble Tester*

6.1.1 *Drum*—Constructed of Nylon or other polymer material and capped by a lid that is secured by a latching device. The drum base and lid have a locating groove to hold the specimen backing sheet flat to the inner wall of the drum. A photograph of a typical drum is shown in Fig. 1 and Fig. 2. The drum dimensions are:

Internal Diameter	12 in. ± 0.18 in.	(302 mm ± 5 mm)
Wall Thickness	0.3 in. approx.	(8 mm approx.)
Internal Depth	8.2 in. ± 0.02 in.	(207 mm ± 5 mm)

6.1.2 *Driving System,* cradles the drum on rollers and keeps the axis of the drum level, and rotates the drum at 35rpm ± 2 rpm (3.6 rad/s ± 0.2 rad/s). The driving direction reverses after approximately 500 revolutions. After the 500 rotations the unit will stop and stand stationary for approximately 5 s to 15 s, then begin rotating in the opposite direction. After 2000 rotations the unit will stop and wait for the operator to restart the unit.

[1] This practice 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.

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FIG. 1 Typical Front View of Drum Cover

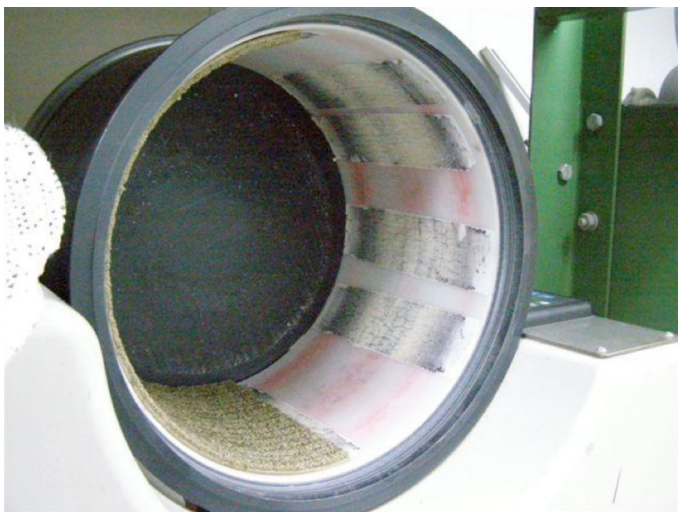

FIG. 2 Typical Inside of Drum without Cover

6.1.3 *Hexapod Tumbler*—There are two types of Hexapod Tumblers: the 2.8 lb (1270 g) or the 8.4 lb (3810 g) as specified below. The selection of which depends on the end use of the pile floor covering.

NOTE 1—The 2.8 lb Residential Hexapod Tumbler is recommended for residential pile floor covering test applications and the 8.4 lb Commercial Hexapod Tumbler is recommended for commercial pile floor covering applications.

6.1.3.1 *8.4 lb Commercial Hexapod Tumber*—Comprised of a steel (or other suitable material) 2.0 in. ± 0.04 in. (50 mm ± 1 mm) cube with 1 in. (25 mm) thick plates welded to each side. The outside corners are welded such that when the studs are fitted and the hexapod placed on a flat surface, no metal touches the flat surface. The total length of any axis, not including hexapod feet, should be 3.8 in. ± 0.08 in. (96 mm ± 2 mm). Replaceable tumbler feet (see 6.1.3.3) are screwed centrally into each face. The specified total mass of Commercial Hexapod Tumbler with six feet installed is 8.4 lb ± 0.2 lb (3810 g ± 90 g). A photograph of a typical 8.4 lb Commercial Hexapod Tumbler is shown in Fig. 3.

FIG. 3 8.4 lb Commercial Hexapod Tumbler

6.1.3.2 *2.8 lb Light Residential Hexapod Tumbler*—Comprised of aluminum (or other suitable material) 2.00 in. ± 0.04 in. (50 mm ± 1 mm) cube with 25 mm (1 in.) thick plates welded to each side. The outside corners are welded such that when the studs are fitted and the hexapod placed on a flat surface, no metal touches the flat surface. Alternatively, the ball may be milled from a solid block if the construction meets the specification. The total length of any axis, not including hexapod studs, should be 3.8 ± 0.08 in. (96 ± 2 mm). Replaceable tumbler feet are screwed centrally in each face. The specified total mass of the Residential Hexapod Tumbler with six feet installed is 2.8 lb ± 0.13 lb (1270 g ± 60 g). A photograph of a typical 2.8 lb Residential Hexapod Tumbler is shown in Fig. 4.

6.1.3.3 *Hexapod Tumbler Feet Specifications (see Fig. 5)*—Tumbler Feet parameters are:

FIG. 4 2.8 lb Residential Hexapod Tumbler

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