



Designation: D 6283 – 98

AMERICAN SOCIETY FOR TESTING AND MATERIALS
100 Barr Harbor Dr., West Conshohocken, PA 19428
Reprinted from the Annual Book of ASTM Standards. Copyright ASTM

Standard Test Method for Tuft Element Length of Uncoated Pile Yarn Floor Coverings¹

This standard is issued under the fixed designation D 6283; 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 covers the measurement of tuft length and pile yarn length of uncoated pile floor coverings.

1.2 Usually the tuft elements measured as directed in this test method will each be bound at only one binding site, but this test method also may be used for tuft elements bound at more than one binding site, provided that every tuft element measured is bound at the same number of binding sites.

1.3 The values stated in SI units are to be regarded as standard. The values stated in inch-pound units are provided as information only and are not exact equivalents. In case of referee decisions, the SI units shall prevail.

1.4 *This practice 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 practice to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

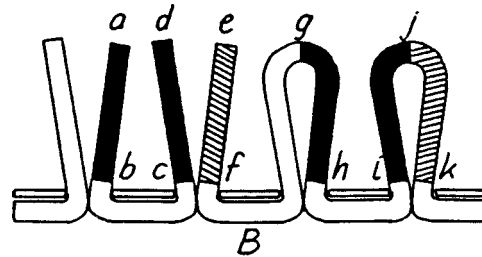
- D 76 Specification for Tensile Testing Machines for Textiles²
- D 123 Terminology Relating to Textiles²
- D 1776 Practice for Conditioning Textiles for Testing²
- D 2904 Practice for Interlaboratory Testing of a Textile Test Method that Produces Normally Distributed Data²
- D 2906 Practice for Statements on Precision and Bias for Textiles²
- D 5684 Terminology Relating to pile Yarn Floor Coverings³

3. Terminology

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

4. Summary of Test Method

4.1 The individual tuft elements of like character (cut or loop, and height) are removed from the test sample and placed,



ad = cut pile tuft element
gj = loop pile tuft element
ab, cd, ef, gh, ij, jk = tuft legs
cd, ef = cut pile tuft leg pair
ij, jk = loop pile tuft leg pair, a loop
B = one binding site

FIG. 1 Cross-Section of Tufted Pile Yarn Floor Covering

one at a time, in a grooved holder that maintains the tuft fibers in a straight line while the length of the tuft element is measured with a graduated scale and a magnifying glass.

4.2 In loop pile yarn floor covering, adjacent elements are first separated by cutting the connecting loops at the midpoint of the bend with sharp scissors before the tuft elements are withdrawn from the backing fabric.

5. Significance and Use

5.1 The determination of the tuft length of pile yarn floor covering is useful in quality and cost control during the manufacture of pile yarn floor covering. Both appearance and performance can be affected by changes in this characteristic.

5.2 In case there are disputable differences between reported test results for two or more laboratories, comparative tests should be performed to determine if there is a statistical bias between them, using competent statistical assistance. At a minimum, test samples should be used that are as homogeneous as possible, that are drawn from the material from which disputable test results were obtained, and that are assigned randomly in equal numbers to each laboratory for testing. The test results from the two laboratories should be compared using a statistical test for unpaired data, at 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 must be adjusted in consideration of the known bias.

6. Apparatus

6.1 *Grooved Specimen Holders*—The holder shall be of a length at least 10 % longer than the longest tuft element to be measured. A 100-mm (4-in.) length normally will be adequate.

¹ This test method is under the jurisdiction of ASTM Committee D-13 on Textiles and is the direct responsibility of Subcommittee D13.21 on Pile Yarn Floor Coverings.

Current edition approved June 10, 1998. Published August 1998.

² Annual Book of ASTM Standards, Vol 07.01.

³ Annual Book of ASTM Standards, Vol 07.02.



6.1.1 The grooves shall be a V-shaped cross-section with a 1.05 rad (60°) angle at the bottom. The depth of the grooves and width across the top of the grooves should accommodate a variety of yarns according to the following example:

Yarns	Groove Widths, mm (in.)
Coarse	4.6 (0.18)
Medium	3.3 (0.13)
Fine	2.0 (0.08)

6.1.2 Additional grooves of intermediate width also may be used.

6.2 *Scale*, at least 100 mm (4 in.) long, graduated in 2-mm (0.10-in.) divisions.

6.2.1 If the scale is not transparent, it shall be no thicker than 1 mm (0.04 in.).

6.3 *Cover Plate*, clear plastic to be used when nontransparent scale is used.

6.4 *Magnifying Glass*, 2× to 5×, mounted above the holder to permit centering the glass immediately above the cut ends of the tuft to avoid parallax in reading the scale.

6.5 *Scissors*, with sharp points.

7. Sampling

7.1 The basic sampling unit of uncoated pile yarn floor covering is a production roll.

7.2 *Lot Sample*—As a lot sample for acceptance testing, take at random the number of rolls, or pieces, of pile yarn floor covering as directed in an applicable material specification or other agreement between the purchaser and the supplier. Consider the rolls, or pieces, of pile yarn floor covering to be the primary sampling units. In the absence of such agreement, take one roll or piece from the lot to be tested.

NOTE 1—An agreement between the purchaser and supplier requires taking into account the variability between rolls or pieces of pile yarn floor covering and between specimens from a roll or pieces of pile yarn floor covering to provide a sampling plan with a meaningful producer's risk, consumer's risk, acceptable quality level, and limiting quality level.

7.3 *Test Sample*—The test sample shall consist of a full width section of pile yarn floor covering cut from one end of each roll in the lot sample and shall be at least 100 mm (4 in.) longer than the specimens required for the tests being conducted. Do not cut any laboratory sample from the seam end of the production roll.

7.4 *Test Sample Area*—The test sample area(s) is designated on the laboratory sample as follows.

7.4.1 For laboratory samples 3000 mm (120 in.) wide or wider, designate three test sample areas, one from each edge portion, no nearer to the edge than 5 % of the pile yarn floor covering width and one from the center portion.

7.4.2 For laboratory samples less than 3000 mm (120 in.) and at least 1500 mm (60 in.) wide, designate two test sample areas, one from each edge portion no nearer to the edge than 5 % of the pile yarn floor covering width.

7.4.3 For laboratory samples less than 1500 mm (60 in.) wide, or when a full width is not available, designate one test sample area that includes the entire piece except no nearer to either edge than 5 % of the width of the pile yarn floor covering width.

7.5 *Test Specimens*—For each like characteristic, cut pile, loop pile, and each tuft height of interest randomly select ten

test specimens from the laboratory sample as directed in Section 9. A test specimen is one tuft element.

7.5.1 A test result is the average of the measurements made on a set of ten test specimens for a given characteristic. For test sample areas described in 7.4.1, three sets of ten measurements are averaged to represent the laboratory sample. For the test sample area described in 7.4.3, one set of ten measurements is averaged to represent the laboratory sample.

8. Conditioning

8.1 Bring the test sample to moisture equilibrium for testing in standard atmosphere for testing textiles approaching equilibrium from the dry side without heat. Determine that moisture equilibrium for testing has been attained as directed in Practice D 1776.

9. Tuft Element Selection

9.1 For each characteristic of interest, select at random ten test specimens from each test sample area as described in 9.2-9.4.

9.2 For laboratory samples having three sample test areas, select at random four tuft elements from the middle test sample area and three tuft elements from each of the two edge test sample areas.

9.3 For laboratory samples having two sample test areas, select at random five tuft elements from each edge test sample area.

9.4 For laboratory samples having one sample test area, select at random ten tuft elements from the test sample piece.

10. Procedure

10.1 Select the groove appropriate to the tuft element yarn.

NOTE 2—The groove width is of appropriate yarn size if the bend in the middle of the tuft element is removed substantially when the cover plate is placed over the yarn in the groove. The groove is too small if the fibers of the tuft element spread beyond the edge of the groove and hold the cover plate above the holder surface. A deflection of the tuft element from straightness of as much as 1 mm (0.04 in.) will not significantly affect the measured tuft length.

10.2 Place the extended tuft element in the groove.

10.3 If clear graduated scale is used, cover the groove with the graduations directly over the yarn in the groove and align the zero of the scale with one end of the tuft element.

10.3.1 If the tuft element is not cut squarely, visually select a location midway between the extremes of the cut.

10.4 If a nontransparent scale is used, place the scale along one edge of the groove and the clear cover plate above the groove abutting the scale. Align the zero of the scale with one end of the test specimen (see 10.3.1).

10.5 Center the magnifying glass immediately above one end of the tuft element to avoid parallax, and read the scale at the end of the tuft element to the nearest 0.5 mm (0.02 in.).

10.6 Record the length of the tuft element.

10.7 Test the remaining tuft elements.

11. Calculation

11.1 Average the lengths for each group of ten tuft elements of like character in each laboratory sampling unit to the nearest 0.25 mm (0.01 in.).