Designation: D 5647 – 01

Standard Guide for Measuring Hairiness of Yarns by the Photo-Electric Apparatus[1]

This standard is issued under the fixed designation D 5647; 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 guide covers the determination of the hairiness of most filament and spun yarn using a photo-electric sensor apparatus. It is not intended for use on novelty yarns.

1.2 This guide shows the values in SI units. "SI units" is the technically correct name for a system of metric units known as the International System of Units.

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:*

D 123 Terminology Relating to Textile Materials[2]

D 1776 Practice for Conditioning Testing Textiles[2]

D 2258 Practice for Sampling Yarn for Testing[2]

3. Terminology

3.1 *Definitions:*

3.1.1 *broken filament*, *n—in multifilament yarn*, breaks in one or more filaments. (See also *stripback, skinback.*)

3.1.2 *frayed*, *adj—in textiles*, a worn condition characterized by damaged yarn surfaces, projecting yarn ends, hairiness, etc.

3.1.3 *fuzzy*, *adj*—characterized by a hairy appearance due to broken fibers or filaments. (Syn., hairy.)

3.1.4 *hair*, *n*—natural animal fiber other than sheep's wool or silk.

3.1.5 *hairiness*, *n—of yarns*, an overall condition characterized by filaments or fibers protruding from the yarn surface and uniformly distributed along the length of the yarn.

3.1.6 *loopy*, *adj*—a descriptive term for yarns having random sized loops of fibers or filaments protruding from the yarn surface.

3.1.6.1 *Discussion*—Loopiness may or may not be desirable depending on the yarn's end-use.

3.2 For definitions of other textile terms used in this guide, refer to Terminology D 123.

4. Summary of Guide

4.1 A yarn is passed through a photo-electric device containing a light beam that is interrupted by the occurrence of protruding fibers or filaments. By the use of a digital volt meter or computer interface, the number of protruding fibers or filaments of a specific length along a specified surface length of yarn are counted and reported as hairiness.

5. Significance and Use

5.1 The photo-electric method for measuring the hairiness of yarns is not recommended for acceptance testing of commercial shipments since experience has shown that results obtained from machines produced by one manufacturer cannot usually be verified by machines produced by another manufacturer. This guide is intended to increase the awareness of the user to available techniques for measuring hairiness. In some cases the purchaser and the supplier may have to test a commercial shipment of one or more specific materials by the best available guide though it has not been recommended for acceptance testing of commercial shipments.

5.1.1 If there are differences of practical significance between reported test results for two laboratories (or more), comparative tests should be performed to determine if there is a statistical bias between them, using competent statistical assistance. As a minimum, test samples that are as homogenous as possible, drawn from the material from which the disparate test results were obtained, and randomly assigned in equal numbers to each laboratory for testing. The test results from the two laboratorie 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 for that material must be adjusted in consideration of the known bias.

5.2 There may be a distinct difference in testing speed and tension devices of machines supplied by different manufacturers that may give differences in reported test results.

[1] This guide is under the jurisdiction of ASTM Committee D-13 on Textiles and is the direct responsibility of Subcommittee D13.58 on Yarn Test Methods, General.

Current edition approved Sept. 10, 2001. Published November 2001. Originally published as D 5647–95. Last previous edition as D 5647–95.

[2] *Annual Book of ASTM Standards*, Vol 07.01.