



Designation: D6774 – 22

Standard Test Method for Crimp and Shrinkage Properties for Textured Yarns Using a Dynamic Textured Yarn Tester¹

This standard is issued under the fixed designation D6774; 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 determination of crimp contraction, residual fiber shrinkage and their variability of all types of filament yarns (partially oriented yarn (POY), fully oriented yarn (FOY), flat yarns, textured and bulked continuous filament (BCF) carpet yarns) using an automated tester.

NOTE 1—For another method of testing crimp in textured yarns, refer to Test Method [D4031](#).

1.1.1 This method may also be used for non-textured yarns.

1.2 This test method is limited to crimped, multi-filament yarns ranging from 22.0 dtex to 890 dtex (15 denier to 800 denier) and for BCF yarns from 890 dtex to 4200 dtex (800 denier to 3800 denier).

1.3 The values stated in SI units are to be regarded as standard. Inch-pound units in parentheses after SI units are provided for information only and are not considered standard.

1.4 *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.*

1.5 *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](#)

[D2258 Practice for Sampling Yarn for Testing](#)

[D4031 Test Method for Bulk Properties of Textured Yarns](#)

[D4849 Terminology Related to Yarns and Fibers](#)

3. Terminology

3.1 For definitions of textile terms in this test method, refer to Terminology [D4849](#). For other textile terms used in this test method, refer to Terminology [D123](#).

4. Summary of Test Method

4.1 The specimen passes through a pretension device to remove crimp. The specimen then passes, at a constant speed, around an input roller, to a calibrated sensor which maintains a specific tension.

4.1.1 Subsequently, the specimen passes through a heating element, at a low tension, where the specimen shrinks and again is crimped.

4.1.2 The crimped specimen then goes to an intermediate roll, at a low tension.

4.1.3 The specimen then travels to a second sensor, which maintains a tension equal to the pretension applied, to remove developed crimp.

4.2 Residual fiber shrinkage, crimp developed, and maximum total contraction are calculated by the computer software using speeds of the input, intermediate and output rolls.

5. Significance and Use

5.1 Test Method D6774, for determining maximum total contraction, crimp, and residual fiber shrinkage in textured filament yarns is suitable 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, use the samples for such a comparative tests that are as homogeneous as possible, drawn from the same lot of material as the samples that resulted in disparate results during initial testing and randomly assigned in equal numbers to each laboratory. The test results from the laboratories involved should be compared using a statistical test for unpaired data, a probability level chosen prior to the testing

¹ This test method is under the jurisdiction of ASTM Committee [D13](#) on Textiles and is the direct responsibility of Subcommittee [D13.58](#) on Yarns and Fibers.

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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.

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 The properties and their variability as measured by this method relate to bulk appearance, stretch and recovery of fabrics and dyeability of yarns.

5.3 For some yarns, elapsed time between processing and testing has a marked effect on the results, of this test, especially during the first 72 h. The effect is caused by stress decay which is known to be minimal beyond the seventh day and after which time the yarn remains relatively stable. Therefore, specimens should only be compared if tested after the same elapsed time. Samples can be tested at-line, thus having little to no elapsed time between processing and testing.

6. Apparatus

6.1 *Textured Yarn Tester*³, equipped with the following:

6.1.1 *Non-contact Heater Tube*, with a temperature range from 100 °C to 205 °C (with an accuracy of ± 1 °C), for filament yarns 22.0 dtex to 890 dtex (15 denier to 800 denier):

or

6.1.1.1 *Non-contact Heater Tube*, with a temperature range from 185 °C to 250 °C (with an accuracy of ± 1 °C), for textile and BCF yarns 890 dtex to 4200 dtex (800 denier to 3800 denier).

6.1.2 *Pretension Device*

³ The sole source of supply of the Textured Yarn Apparatus known to the committee is Lawson-Hemphill, Inc., 1658 G.A.R. Highway, Suite 5, Swansea, MA 02777, USA. If you are aware of alternative suppliers, please provide information to ASTM headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend.

6.1.2.1 For filament yarns 22.0 dtex to 890 dtex (15 denier to 800 denier), to control the tension within a range of 5 g to 25 g, with an accuracy of ± 3 %: or

6.1.2.2 For textile and BCF yarns 890 dtex to 4200 dtex (800 denier to 3800 denier), to controls the tension within a range of 10 g to 250 g, with an accuracy of ± 3 %.

6.1.3 *Sensor Assemblies*, for Zones 1 and 2 (see Fig. 1).

6.1.3.1 *Fine Yarn Sensors*, 22.0 dtex to 890 dtex (15 denier to 800 denier).

6.1.3.2 *Heavy Yarn Sensors*, 890 dtex to 4200 dtex (800 denier to 3800 denier).

6.1.4 *Computer, Software and Printer*.

6.2 *Static Eliminator*, optional if necessary.

NOTE 2—A static eliminator is used when the static level in the yarn is great enough to cause the filaments to flare out and cause snagging of the filaments on components of the tester.

6.3 *Automatic Package Changer*, for high volume production testing, optional.

6.4 *Tensiometer*.

7. Sampling

7.1 *Lot Sample*—For acceptance testing, take a lot sample of shipping containers as directed in an applicable specification, or as agreed upon between the purchaser and supplier. In the absence of an applicable specification or agreement, take a lot sample as directed in Practice D2258.

NOTE 3—An adequate specification or other agreement between the purchaser and the supplier requires taking into account the variability between shipping units, between packages or ends within a shipping unit, and between specimens from a single package to provide a sampling plan with a meaningful producer's risk, consumer's risk, acceptable quality level and limiting quality level.

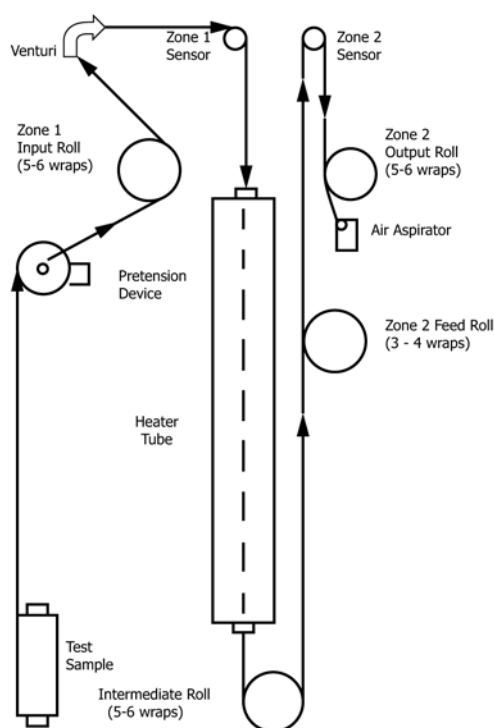


FIG. 1 Diagram of the Yarn Thread Path through the Textured Yarn Tester