



Standard Test Methods for Yarn Crimp and Yarn Take-up in Woven Fabrics¹

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1. Scope

1.1 This test method covers the determination of the relationship between the length of a piece of fabric and the length of the yarn in the fabric by measurement of the yarn crimp and yarn take-up.

1.2 This test method applies to woven fabrics.

1.3 The values stated in either SI or inch-pound units are to be regarded separately as standard. Within the text, the inch-pound units are shown in parentheses. The values stated in each system are not exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the specification.

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 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 and Testing Textiles²

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

3. Terminology

3.1 *Definitions:*

3.1.1 *bench marks, n*—marks placed on a specimen to define gage length, that is, the portion of the specimen that will be evaluated in a specific test.

3.1.2 *yarn crimp, n*—in fabric, the undulations or waviness in a yarn due to interactions with other yarns.

3.1.2.1 *Discussion*—Yarn crimp in a fabric is the difference in the measured distance between two points on a yarn as it lies in the fabric, and the same two points when the yarn has been

removed from the fabric and straightened under a specified tension, expressed as a percent based on the in-fabric distance.

3.1.3 *yarn take-up, n*—in fabric, the additional length of yarn used to make a given length of fabric.

3.1.4 Yarn take-up in a fabric is the measured distance between two points on a yarn as it lies in a fabric and the same two points when the yarn has been removed from the fabric and straightened under a specified tension, expressed as a percent based on the straightened out-of-fabric distance.

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

4. Summary of Test Method

4.1 Bench marks are placed on a length of a yarn as it lies in a woven fabric. The distance between the bench marks is measured. The yarn is removed from the fabric, straightened by applying suitable tension, and the distance between the bench marks is remeasured. Yarn crimp is the change in length expressed as a percent and based on the in-fabric distance. Yarn take-up is the change in length expressed as a percent and based on the out-of-fabric distance.

5. Significance and Use

5.1 The relationship of the length of a piece of fabric and the length of yarn in the fabric can be determined accurately only by measuring the length of yarn entering the loom and the length of fabric made from that particular length of yarn. In most cases, however, the determination must of necessity be made on a woven fabric by measuring the length of yarn removed from a measured length of fabric, thus introducing certain variations that will influence the accuracy of the test. Yarn removed from the woven fabric contains undulations or waves that have been introduced by the weaving process. Heat, moisture, and mechanical shrinkage on subsequent finishing operations may accentuate these undulations, and in all probability, increase the force to pull them out and straighten the yarn. In order to accurately measure the length of the yarn after the removal of the crimp, these undulations must be pulled out without elongating the yarn. In some cases, the minimum force necessary to straighten the yarn will cause a certain amount of the elongation to take place, thus increasing the length of the yarn. Also, stresses imposed upon the yarn during the weaving process may have been sufficient to stretch the yarn beyond its elastic limit, again increasing its length. It is recognized that determination made by measuring length of yarn removed from

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² *Annual Book of ASTM Standards*, Vol 7.01.