



Standard Test Method for Wet and Dry Yarn-on-Yarn Abrasion Resistance¹

This standard is issued under the fixed designation D6611; 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 describes the measurement of abrasion resistance properties for manufactured fiber yarns in dry and wet conditions.

1.2 This test method applies to manufactured yarns used in rope making.

1.3 The values stated in SI units are to be regarded as standard. The values given in parentheses are provided for information only.

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:*²

[D123 Terminology Relating to Textiles](#)

[D1776 Practice for Conditioning and Testing Textiles](#)

[D2904 Practice for Interlaboratory Testing of a Textile Test Method that Produces Normally Distributed Data \(Withdrawn 2008\)](#)³

[D3412 Test Method for Coefficient of Friction, Yarn to Yarn](#)

[D6477 Terminology Relating to Tire Cord, Bead Wire, Hose Reinforcing Wire, and Fabrics](#)

3. Terminology

3.1 The following terms are relevant to this standard: abrasion, apex angle, applied tension, cycles to failure (CTF), dry, rope, wet.

3.2 For terminology related to industrial fibers and metallic reinforcements, see Terminology [D6477](#).

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

4. Summary of Test Method

4.1 A length of yarn is interwrapped in contact with itself between three pulleys that are positioned in a defined geometry to produce a specific intersection angle. A weight is attached to one end of the yarn to apply a prescribed tension. The other end is drawn back and forth through a defined stroke at a defined speed until the yarn fails due to abrasion upon itself within the interwrapped region. The yarn abrasion test can be conducted in either the dry state or the wet state.

5. Significance and Use

5.1 This test method is intended for testing dry and wet abrasion resistance of manufactured fiber yarns. This test method is especially useful for ropes intended for use in the marine environment. The test method has been used with yarns having linear densities ranging from 70 to 300 tex, but may be used with yarns outside these ranges.

5.2 Yarn to yarn friction is known to have a significant influence on abrasion resistance. To determine the coefficient of friction, use Test Method [D3412](#).

5.3 Limited interlaboratory correlation testing has been conducted to date. Single-laboratory testing, in accordance with ASTM practices, has now been conducted. Test results should be used with caution.

5.4 This test method is intended to provide additional data for specific applications such as mentioned in [5.1](#) and is not intended for quality control or test reports.

5.5 If there are differences of practical significance 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. As a minimum the test samples used should be as homogeneous as possible, be drawn from the material from which the disparate test results were obtained, and be randomly assigned in equal numbers to each laboratory for testing. Other materials with established test values may be used for this purpose. The test results from the two or more laboratories should be compared

¹ This test method is under the jurisdiction of ASTM Committee [D13](#) on Textiles and is the direct responsibility of Subcommittee [D13.19](#) on Industrial Fibers and Metallic Reinforcements.

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.