



association  
for contract  
textiles

## Abrasion ACT Voluntary Performance Guidelines Test Method Descriptions

ACT Voluntary Performance Guidelines make fabric specification easier. The Guidelines address Flammability and four aspects of fabric durability—Wet & Dry Crocking, Colorfastness to Light, Physical Properties, and Abrasion. This document focuses on Abrasion.

To give architects, designers, and end-users a vast amount of performance information in a succinct visual way, ACT developed icons to indicate that a fabric meets or exceeds guideline requirements. Look for these Registered Certification Marks on ACT Member Company sampling to assure that the fabrics you specify perform up to contract standards and pass all applicable testing.

All ACT Voluntary Performance Guidelines cover woven and coated fabrics for indoor use. “Woven Fabrics” consist of two sets of yarns, warp and filling, formed by weaving, which is the process of interlacing these sets of yarns. “Coated Fabrics” typically include a fabric or similar substrate with one or more layers of a film-forming polymer such as vinyl or polyurethane on the wear surface of the fabric.

Test methods used in the Guidelines measure fabric performance under standard laboratory conditions. All Abrasion test methods presented here are intended to represent the most current version. Note: Individual ACT Member product information may represent a different version of a test method depending on the date the product was introduced to market.

**Important:** These tests represent minimum requirements, which are subject to change without notice and may not reflect requirements or laws in all locations. See information and disclaimer on page 4.

### Abrasion



Low Traffic /  
Private Spaces –  
Woven Upholstery Fabrics

The surface wear of a fabric caused by friction.

#### ACT GUIDELINES

##### Low Traffic / Private Spaces – Woven Upholstery Fabrics

ASTM D4157 (ACT approved #10 Cotton Duck)  
15,000 double rubs Wyzenbeek method

ASTM D4966 (12 KPa pressure)  
20,000 cycles Martindale method



High Traffic /  
Public Spaces –  
Woven Upholstery Fabrics

##### High Traffic / Public Spaces – Woven Upholstery Fabrics

ASTM D4157 (ACT approved #10 Cotton Duck)  
30,000 double rubs Wyzenbeek method

ASTM D4966 (12 KPa pressure)  
40,000 cycles Martindale method

High Traffic /  
Public Spaces –  
Coated Upholstery Fabrics

##### High Traffic / Public Spaces – Coated Upholstery Fabrics

ASTM D4157 (ACT approved #10 Cotton Duck or Wire Screen)  
50,000 double rubs Wyzenbeek method

##### Print Retention – Applicable for Printed Coated Upholstery Fabrics

ASTM D3389 (modified to evaluate visual determination of print loss), Rating of 3 or higher\*  
H-18 Wheel, 250 grams, 250 cycles Taber Tester method  
\*Using the ACT photographic scale of approved replicas

#### Disclaimer:

*Wyzenbeek test results are not necessarily a reliable indicator of fabric lifespan. Comparative laboratory testing results on the same textiles frequently differ and testing methods do not necessarily correlate well with the variables encountered in actual use by the end-user. Licensees using the ACT performance certification marks and publishing test results in excess of 100,000 double rubs are required, at a minimum, to provide in their sampling, marketing materials and Website, the following statement:*

Multiple factors affect fabric durability and appearance retention, including end-user application and proper maintenance. Wyzenbeek results above 100,000 double rubs have not been shown to be a reliable indicator of increased fabric lifespan.



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End use examples of heavy-duty installations where upholstery fabrics rated at 30,000 double rubs should be appropriate are single shift corporate, hotel rooms/suites, conference rooms and dining area usage.

ACT acknowledges that there are constant traffic/demanding spaces that may require higher levels of abrasion resistance. End use examples that may require higher than 30,000 double rubs include: 24-hour transportation terminals, 24-hour telemarketing, 24-hour healthcare emergency rooms, 24-hour casino gambling areas, and such public gathering places as theatres, stadiums, lecture halls and fast food restaurants.

The Wyzenbeek and Martindale tests are the two methods commonly used to predict wearability. Actual performance is determined by many factors such as fiber content, weaves, finishes, furniture design, maintenance, cleaning, and usage. Durability of an upholstery fabric is a complex interaction (combination) of performance tests that, in addition to abrasion, include seam slippage, pilling, tensile strength, and usage.

*Notes:*

*ACT studies indicate that results of multiple abrasion tests performed on some woven fabric structures may vary significantly – as much as 60 percent or more.*

*There is no correlation between Wyzenbeek and Martindale results.*

*For more information please refer to abrasion white papers on the ACT website:  
<http://www.contracttextiles.org/index.php?page=research>*

#### **TEST METHODS**

##### **ASTM D4157\* Oscillatory Cylinder (Wyzenbeek)**

The ASTM D4157 is a test of the American Society of Testing and Materials. A Wyzenbeek machine is used for this test allowing samples of the test fabric to be pulled tight in a frame and held stationary with 3 pounds force of pressure and 4 pounds force of tension. Individual test specimens cut from the warp and weft direction are then rubbed back and forth using an ACT approved #10 cotton duck fabric\*\* as the abrasant. For woven fabrics, the number of double rub cycles achieved before two yarn breaks occur, or “noticeable wear” is observed, is recorded as the fabric’s abrasion rating. For coated fabrics, the number of double rub cycles achieved before “noticeable wear” is observed is recorded as the fabric’s abrasion rating.

\* For complete technical details about ASTM D4157: <http://www.astm.org>

\*\* Note: Wire screen abrasant may be used for testing coated fabrics, as well as fabrics woven with low-melting fibers such as olefin.

##### **ASTM D4966\* Martindale**

The ASTM D4966 is a test method of the American Society of Testing and Materials (ASTM). This is an oscillating test. Fabric samples are mounted flat and rubbed in an elliptical motion using a piece of worsted wool cloth as the abrasant and with 12 kPa of pressure. The number of cycles (movements) that the fabric can endure before fabric shows objectionable change in appearance (yarn breaks, pilling, holes) is counted. Number of cycles determines (movements) abrasion rating.

\* For complete technical details about ASTM D4966: <http://www.astm.org>

##### **ASTM D3389\* Taber Tester (Print Retention)**

A specimen is abraded using rotary rubbing action under controlled conditions of 250 grams head weight pressure and H18 abrasive wheel action. The test specimen, mounted on a turntable platform, turns on a vertical axis, against the sliding rotation of two abrading wheels for 250 revolutions. One abrading wheel rubs the specimen outward toward the periphery and the other, inward toward the center. The resulting abrasion marks form a circular pattern of crossed arcs over an area of approximately 30 cm<sup>2</sup>. Print retention is evaluated by using the ACT Coated Fabric Print Retention Scale.

\* For complete technical details about ASTM D3389: <http://www.astm.org>



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