AWTA PRODUCT TESTING

TECHNICAL GUIDE

# Abrasion testing of Upholstery Fabrics

Upholstery fabrics are used in a wide variety of circumstances from domestic homes to heavy duty commercial environments. The expectations of each user of the fabric differ, and therefore fabrics are produced to match each of these expectations.

*Australian Standard 2687-1997 "Textiles - Upholstery fabrics for domestic and commercial use (**excluding face-coated fabrics**)"* provides a grading scheme based on the measurement of the performance of the fabrics over a range of tests, including cleanability, strength, appearance, colourfastness and abrasion resistance, and is designed to provide the consumer with a guide to likely performance when choosing a fabric.

**AS 2687 Upholstery Grades:**

1. Delicate
2. Domestic Light Duty
3. Domestic Medium Duty / Commercial Light Duty
4. Domestic Heavy Duty / Commercial Medium Duty
5. Commercial Heavy Duty

## Why is choosing the method for measurement of abrasion performance important?

Industry experience indicates that no single abrasion tester will give a reliable indication of performance in use for all types of fabric. Fabrics with a proven high performance in use can have test results that indicate a lower performance grading depending on the method of test.

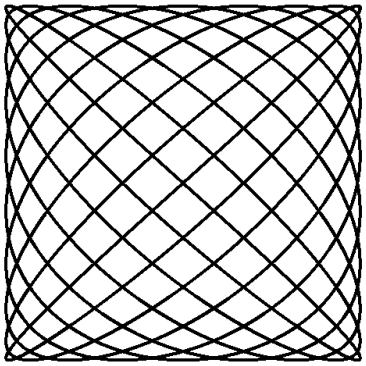
*AS 2687* observes that while either the Martindale Tester or the Wyzenbeek Tester method may be used for testing non-pile woven fabrics, it is important to note that the grades received are not necessarily comparable between the procedures.



## Test Methods:

### Martindale Abrasion Tester

For woven non-pile fabrics, the Martindale Tester is widely used in Australia and Europe. Specimens are abraded against a standard worsted wool abradant fabric in Lissajous pattern. The specimen heads freely rotate, which causes a multidirectional abrasion on the fabric. One rub is a movement to-and-fro within the pattern, with a total of 32 rubs completing the figure, making one cycle.



*Lissajous Figure*

Specimens are assessed over regular periods for any change to their physical appearance, colour change or frosting and mechanical damage.

The End Point of the test is determined by one of the following:

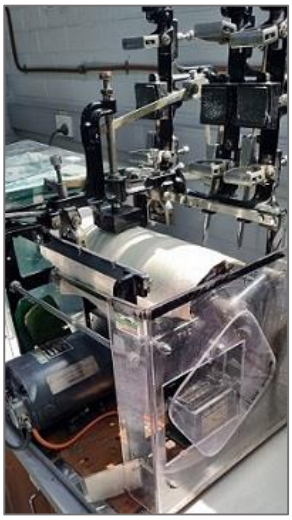
a) In woven fabrics, when two separate threads are completely broken
b) In knitted fabrics, when one thread is broken causing a hole to appear
c) In pile fabrics, when the pile is fully worn off
d) In non-woven fabrics, when the first hole resulting from wear is of a diameter equal to at least 0.5mm



| | **AS 2687 Classification – Martindale Woven fabrics – Non-pile**<br><br>**AS 2001.2.25.2** | **Rubs to end point (min)** |
|---|---|---|
| 1 | Delicate | 2,500 |
| 2 | Domestic Light Duty | 10,000 |
| 3 | Domestic Medium Duty / Commercial Light Duty | 15,000 |
| 4 | Domestic Heavy Duty / Commercial Medium Duty | 20,000 |
| 5 | Commercial Heavy Duty | 30,000 |

## Wyzenbeek Abrasion Tester

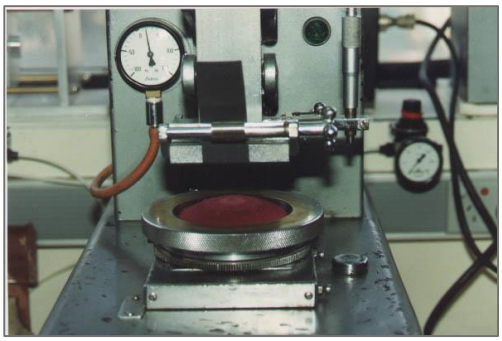
Wyzenbeek Abrasion, an Oscillatory Cylinder abrasion test method, is commonly referenced in North America for performance testing of woven upholstery. Specimens in the warp and weft direction are rubbed back and forth (double rub) over a steel wire mesh screen. Each double rub makes one cycle. Periodically the specimens are examined for any loose threads or wear to a total of 15,000 cycles.



| | **AS 2687 Classification – Wyzenbeek Woven fabrics – Non-pile** | **No appreciable wear at cycles (min)** |
|---|---|---|
| | **ASTM D3597** | |
| 1 | Delicate | N/A |
| 2 | Domestic Light Duty | 3,000 |
| 3 | Domestic Medium Duty / Commercial Light Duty | 9,000 |
| 4 | Domestic Heavy Duty / Commercial Medium Duty | 12,000 |
| 5 | Commercial Heavy Duty | 15,000 |

## Stoll Abrasion Tester

Knitted and non-woven non-pile fabrics are tested in accordance with AS 2687, Appendix B using the Stoll Abrasion Tester, using P400 abrasive paper to rub the surface multidirectionally. The end point is determined when one thread is broken in a knitted fabric, or a hole appears in a non-woven fabric.



| | **AS 2687 Classification Knitted & Non-woven fabrics - non-pile** | **Minimum rubs to end point** |
|---|---|---|
| | **AS 2687, Appendix B** | |
| 1 | Delicate | N/A |
| 2 | Domestic Light Duty | 1,000 |
| 3 | Domestic Medium Duty / Commercial Light Duty | 2,000 |
| 4 | Domestic Heavy Duty / Commercial Medium Duty | 2,000 |
| 5 | Commercial Heavy Duty | 4,000 |

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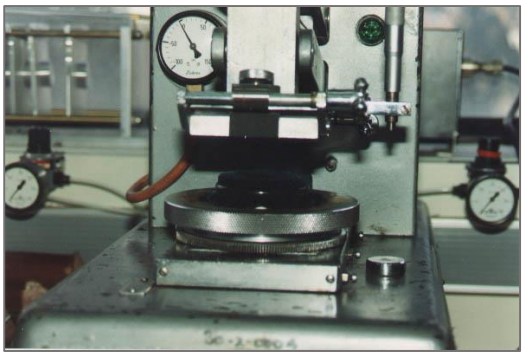
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## Stoll Abrasion Tester with Frosting attachment

AS 2687 specifies that pile fabrics, woven, knitted and non-woven are tested in accordance with Appendix A, using the Stoll Abrasion Tester with a frosting attachment head. The method is applicable to pile fabrics such as velvet, velveteen, corduroy, knitted velour, knitted pile and flocked fabrics. It is NOT applicable to fabrics which have a short nap or a non-woven pile or pile surface less than 1mm in height for which other methods are more suitable.
Criteria for the evaluation of abrasion resistance are:

1. Loss of pile height sufficient to expose the fabric backing,
2. Loss of pile fibre sufficient to expose the fabric backing,
3. Rupture of loops in loop-pile fabrics and
4. Loss of pile tufts.

**AS 2687 Classification**
**Woven, Knitted and Non-woven Pile fabrics**



| Knit & non-woven fabrics Minimum rubs to end point | | | | | Woven fabrics Minimum rubs to end point | | |
|---|---|---|---|---|---|---|---|
| **100% pile cover** | **<100% ≥70% pile cover** | **<70% ≥40% pile cover** | | | **100% pile cover** | **<100% ≥70% pile cover** | **<70% ≥40% pile cover** |
| N/A | N/A | N/A | 1 | Delicate | N/A | N/A | N/A |
| 1000 | 1000 | 1000 | 2 | Domestic Light Duty | 1000 | 1,000 | 500 |
| 1,500 | 1,500 | 1,500 | 3 | Domestic Medium Duty / Commercial Light Duty | 1,500 | 1,500 | 750 |
| 1,500 | 1,500 | 1,500 | 4 | Domestic Heavy Duty / Commercial Medium Duty | 1,500 | 1,500 | 750 |
| 2,000 | 2,000 | 2,000 | 5 | Commercial Heavy Duty | 2,500 | 2,500 | N/A |

## CONTACT US:

AWTA Product Testing have experienced textile technologists, who have many years of experience dealing with upholstery abrasion testing and laboratory fabric trouble shooting. Please contact us for further assistance in the selection of the best abrasion test for your product and correct test method allocation.

Phone: 9371 2400 or Email: producttesting@awta.com.au for further information.