



Hook Fastener Resistance

1 Scope

Note: Nothing in this standard supersedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This procedure determines the resistance of interior materials to hook fastener abrasion. Hook fasteners on customers' clothing, have small hooks or barbs that may damage the surface of interior materials as customers enter and exit the vehicle and jounce/squirm on the seat. Hook fasteners are commonly used to fasten pockets or flaps on clothing and while in the open position, the hooks can come in direct contact with interior materials.

1.2 Foreword. Not applicable.

1.3 Applicability. This procedure is applicable to interior materials.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ISO 12947-1

2.2 GM Standards/Specifications.

GMW3221

3 Resources

3.1 Facilities. Not applicable.

3.2 Equipment.

3.2.1 Martindale Abrasion Wear Tester according to ISO 12947-1.

3.3 Test Vehicle/Test Piece.

3.3.1 Aplix No. 800 Hook, Black, 50 mm, Plain Backing, P/N: A800R0050H008. Available from: Test Fabrics, 415 Delaware Avenue, P.O. Box 26, West Pittston, PA 18643 USA. Phone: (570) 603-0432.

Test Fabrics Email: testfabric@aol.com

Test Fabrics Internet website: www.testfabrics.com

3.3.2 Woven wool felt pads with a diameter of 140.0 mm and a tolerance of + 5.0 mm. The wool felt pads shall be certified in accordance with ISO 12947-1.

3.3.3 Foam pads made from polyurethane with a diameter of 38.0 mm and a tolerance of + 5.0 mm. Store the foam in a dark area and maintain a temperature of $23 \pm 5^{\circ}\text{C}$. The foam pads must be certified in accordance with ISO 12947-1.

3.4 Test Time. Not applicable.

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Not applicable.

4 Procedure

A sample of material is mounted on an abrading table over a wool felt pad and tightly retained by a ring. A hook type fastener material is mounted over a foam pad and tightly retained by a ring. The material is exposed to a specified number of cycles (Lissajous figure) when in contact with hook type fastening material. After the prescribed number of cycles, the material is evaluated for damage from abrasion.

4.1 Preparation. Prior to testing, condition all test specimens for a minimum of 24 h to the requirements of GMW3221 Code A. Cut all test specimens to 140 mm in diameter with a tolerance of +0.5 mm.

4.2 Conditions.

4.2.1 Environmental Conditions. Not applicable.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.3 Instructions.

4.3.1 Mount specimen over a woven wool felt pad. Center the specimen and tightly clamp with the retaining ring.

4.3.2 Mount hook fastener material in holder over a foam pad. Center the hook fastener material and tighten by hand. Never compress hook fastener material when installing it in the holder. Pressure on the hook material can flatten the barbs. Damage to the hook fastener material from

compression may affect the consistency of the test results.

4.3.3 Ensure that the Martindale Abrasion Tester is configured to run the abrasion test. All drive rollers shall be set to allow a Lissajous figure to be produced during testing.

4.3.4 Slowly lower the holder guide plate over the drive rollers while simultaneously inserting the spindle (with the specimen holder containing the hook fastener material attached).

4.3.5 Attach standard 12 kPa weight to the spindle.

4.3.6 Set the machine to complete the desired number of cycles and run the test continuously.

4.3.7 As samples may show relaxation over time, samples shall be evaluated within ten (10) minutes of test completion.

4.3.8 Only perform this test using one station on the Martindale. An attempt to use multiple stations may overload the equipment and it will not operate.

4.3.9 The hook fastening material may become clogged with fibers and should be replaced after each test.

4.3.10 Ensure there is no contact between the sample holder, spindle guide, or weights. Examples of possible equipment modifications are listed in Appendix A.

5 Data

5.1 Calculations.

Table 1: Rating Scale

Rating	Change
10	No change
8	Slight Change. Slight filament damage (slightly fuzzy), only detectable upon close visual examination.
6	Moderate Change. Noticeable change from original. Filament damage and pulled out fibers.
4	Significant Change. Objectionable change (very fuzzy).
2	Highly Objectionable Change. Bearding, Change of Design Intent, etc.
1	Severe Change. Destructive abrasion that wears through the surface.

5.1.1 This rating scale is a general one for any material that may be tested for hook fastener material resistance. See applicable material specification to determine if there is a more specific rating scale. Unless otherwise specified, the rating scale in the material specification shall be used to evaluate wear.

5.2 Interpretation of Results. Not applicable.

5.3 Test Documentation. Compare the tested specimen to the rating scale (Table 1) with the aid of the photographic standards (Figure A1). Report the appropriate rating.

5.3.1 Intermediate ratings are allowed. For example, if the test specimen results are between a rating of "10" and "8", a rating of "9" may be specified.

6 Safety

This standard may involve hazardous materials, operations, and equipment. This standard does not propose to address all the safety problems 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.

7 Notes

7.1 Glossary. Not applicable.

7.2 Acronyms, Abbreviations, and Symbols. Not applicable.

8 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:

Test to GMW15651

9 Release and Revisions

9.1 Release. This standard originated in July 2007. It was first approved by Textiles GSSLT in February 2009. It was first published in February 2009.

Appendix A

**Rating 6: Moderate Change****Rating 4: Significant Change****Rating 2: Highly Objectionable Change****Figure A1: Photographic Standards for Rating Scale (6, 4, and 2)**

Example of Modifications to Nu-Martindale 864 Test Equipment



Figure A2: Model Nu-Martindale 864 Abrasion and Pilling Tester

Note: When conducting the Hook Fastener test using the Nu-Martindale 864, users may notice contact between the sample holder and the spindle guide as shown in Figure A3.



Figure A3: Contact Between Sample Holder and Spindle Guide

Note: To address this issue, remove the guide bezel from the guide plate (top). There are three screws holding the bezel to the guide plate. Flip the bezel upside down and insert it from the bottom through the hole so that it is now "upside down" from the normal position. Attach the bezel using the screws from the bottom of the guide plate as shown in Figure A4.

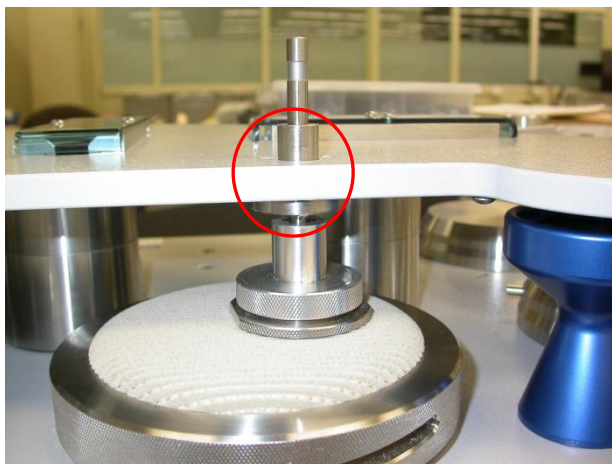


Figure A4: Weight Attached to Spindle

Note: The equipment setup is complete when the standard 12 kPa weight is attached to the spindle.

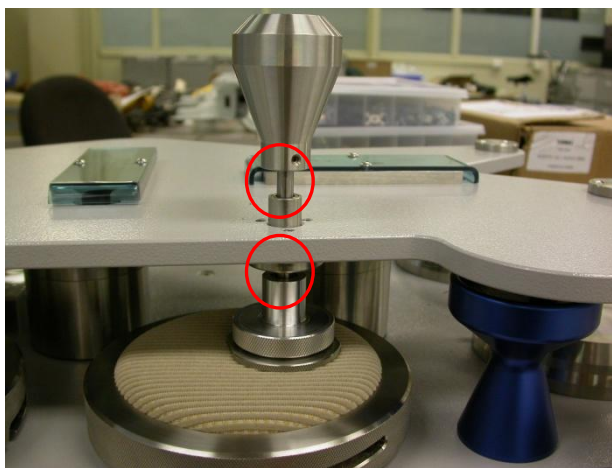


Figure A5: Complete Setup with No Contact Between Sample Holder, Spindle Guide and Weight