GM	WORLDWIDE ENGINEERING STANDARDS	Test Procedure	GMW3211

Resistance to Stretch and Set

1 Introduction

Note: Nothing in this standard supercedes 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 standard is used to determine the stretch and set properties of textiles, leather, supported vinyl, and carpe, when subjected to specific static tensile stresses.

1.2 Applicability. This standard applies to textiles, leather, supported vinyl and carpet**.**

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW3221

3 Resources

3.1 Facilities.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.2 Equipment.

3.2.1 A test device consisting of an upper stationary clamp and a lower clamp, the clamping portions of which are at least 80 mm wide. The lower clamp can accommodate the addition of weights and can be lowered slowly at a fixed speed until the required weight is suspended. At the completion of the test, the suspended weight can be removed, again at a fixed speed.

3.2.2 Weights. Two (2) sets of additional weights. One (1) set shall yield a total load of 100 N when combined with the weight of the lower jaw. The other set shall yield a total load of 50 N when combined with the weight of the lower jaw. (Use 50 N loads only if the test specimen's elongation exceeds the limits of the equipment.)

3.2.3 Linear Scale. Linear scale having an accuracy of 0.5 mm, used to measure the distance between the clamps when required.

3.2.4 Cutting dies or shears for preparation of test specimens**.**

3.2.5 Apparatus for conditioning to the appropriate requirements as described in GMW3221 Code A, unless otherwise specified in the relevant materials specification**.**

3.3 Test Vehicle/Test Piece. At least three (3) test specimens from both machines and across machine directions, 250 mm ± 5 mm × 50 mm ± 2 mm shall be prepared.

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3.4 Test Time.

Calendar time:	2 days
Test hours:	1.5 hours
Coordination hours:	2 hours

3.5 Test Required Information. The amount of stretch of a test specimen is measured after a prescribed tensile load is applied for a specified period of time. After the tensile load has been removed and the specimen allowed to recover for a prescribed time period the amount of set is then measured.

3.6 Personnel/Skills. Personnel trained in accordance with the laboratory accreditation and Standard Operating Procedure requirements.

4 Procedure

4.1 Preparation.

4.1.1 Test Sample Preparation. The amount of stretch of a test specimen is measured after a prescribed tensile load is applied for a specified period of time. After the tensile load has been removed and the specimen allowed to recover for a prescribed time period the amount of set is then measured.

4.1.2 Draw two (2) sets of two (2) thin, clearly visible lines equidistant from the center and parallel to the short dimensions of the test specimens. One (1) set shall be 100 mm ± 1 mm apart and the other 150 mm ± 1 mm apart.

4.2 Conditions. Unless otherwise specified in the relevant material specification, conditioning shall be performed according to GMW3221 Code A.

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 Stretch.

4.3.1.1 Measure the initial distance between the innermost reference lines to an accuracy of ± 0.5 mm. (L_0).

4.3.1.2 Grip one end of the test specimen in the upper jaw at the line nearest one end of the test specimen.

4.3.1.3 At the lower end (150 mm from the upper jaw), grip the test specimen in the lower jaw and gradually (≤ 500 mm/minute) lower it until it is entirely suspended from the test specimen.

Note: The total downward force applied to the test specimen after the lower jaw is entirely suspended shall be 100 N. (A total downward force of 50 N shall be used for test specimens whose elongation exceeds the limits of the equipment when a 100 N force is applied.)

4.3.1.4 After 5 minutes ± 0.25 minutes, the distance between the innermost reference lines shall be measured to the nearest 0.5 mm. (L_1).

4.3.2 Set.

4.3.2.1 Immediately after 4.3.1.4, remove the weights from the lower jaw and then remove the test specimen from the lower and upper jaws.

4.3.2.2 Place the test specimen on a flat horizontal surface for 10 minutes ± 0.25 minutes at standard conditions.

4.3.2.3 Measure the distance between the innermost reference lines to the nearest 0.5 mm (L_2).

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