

FLEX TEST FOR AUTOMOTIVE SEAT FABRIC MATERIALS**Application**

This procedure is used to determine the resistance to flexing of automotive trim materials.

Scope

A sample mounted in a cylindrical shape is flexed in cycles consisting of alternate compression by a load applied along the axis of the cylinder and return to the position at start of compression.

Apparatus Required**Flexing Machine**

A "W" Flex Tester or equivalent device which will flex the cylindrical shaped sample 1/2 inch along its vertical axis at a rate of 450 cycles/minute.

Plugs

1 inch diameter metal plugs approximately 1 3/4 inches long are inserted in each end of the cylindrical test specimens. The projecting ends of the plugs have holes for attachment to the flex testing machine.

Clamps

Hose clamps 5/8 x 1 1/32 inch I.D. are required for clamping the specimen to the plugs.

Holding Jig

A small jig for accurately spacing the metal plugs, etc. while mounting the sample may be of some assistance. The spacing may also be accomplished with the assembly in position on the flex tester.

Conditioning and Test Conditions

All test values indicated herein are based on material conditioned in a controlled atmosphere of 23 +/- 2 °C and 50 +/- 5 % relative humidity for not less than 24 h prior to testing and tested under the same conditions unless otherwise specified.

Date	Action	Revisions
2001 08 22	Revised	Editorial – no technical change A. Cockman
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Procedure

1. Cut four 3 x 5 inch test specimens with two samples having the long dimension parallel to the warp and two samples with the long dimension parallel to the filling. These specimens shall not be cut any closer than 6 inches from the selvage edges.
2. Fold down 1 inch at each end of the long direction of the sample and form into a cylindrical shape, face side out, with long direction parallel to the length of the cylinder (see attached sketch showing mounted assembly).
3. Slip a loosened hose clamp over one end of the test specimen and insert a metal plug 1 inch inside the sample. Do the same for the other end.
4. Tighten the loose clamps around the specimen and plugs. The openings of the clamps shall be over the joint in the cylindrical specimen to prevent wrinkling. The metal plugs shall be positioned so that 3/4 inch length of the specimen is left between the plugs free for flexing.
5. Place the mounted sample in its proper position on the flex tester between the fixed and movable plates opened to their fullest extent, both plugs being seated evenly together on threaded studs to avoid stretching or distortion of the specimen. Fasten the plug by means of wing nuts.
6. Start the machine and flex the test specimen for the number of cycles required by the material engineering specification. Each cycle consists of a downward compression stroke of 1/2 inch and return to the original position.
7. After completion of the flex cycle, the specimens are removed and tensile tests are conducted on them as described in ASTM D 39, Grab Method, modified as follows: The specimen shall be tested at a rate of jaw separation of 5 inches/minute and an initial jaw separation of 1 1/2 inch.
8. Measure the tensile strength of an original unflexed 3 x 5 inch specimen.
9. Measure the tensile strength of the flexed sample.
10. Compute the percent loss of tensile strength as follows:

$$\% \text{ Loss} = \frac{\text{Original Unflexed Tensile} - \text{Flexed Tensile}}{\text{Original Unflexed Tensile}}$$

or directly in pounds as required by the engineering specification.

Chemicals, materials, parts, and equipment referenced in this document must be used and handled properly. Each party is responsible for determining proper use and handling in its facilities.