

STIFFNESS OF FABRICS**Application**

This procedure is used to determine the stiffness of textile fabrics. The stiffness is expressed as the bending modulus and is calculated from the dimensions of the specimen and the degree to which it bends under its own weight.

Apparatus Required**Stiffness Tester**

Shirley Stiffness Tester

Variable Angle Model:

Source: Thwing-Albert Instrument Co.
Pennsylvania Street & Pulaski Avenue
Philadelphia 44, PA

Fixed Angle Model:

Source: Shirley Developments Ltd.
40 King Street West
Manchester 3, England

Thickness Gage

Randall Stickney or equivalent to be able to give a 41 kPa load on the specimen.

Source: Randall & Stickney
Waltham, MA

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 09 24	Revised	Editorial – no technical change A. Cockman
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Procedure

Fabric Weight

Determine the weight of the fabric (W) in g/m² according to FLTM BN 106-01.

Fabric Thickness

Determine the thickness (g) in mils as an average of five readings across the fabric as follows:

1. Cut 25 x 150 mm samples from different areas of the fabric to be tested. Two specimens shall be cut with the long direction parallel to the warp and two with the long direction parallel to the fill.
2. Adjust the thickness tester by zeroing gage.
3. Use a 10.3 mm diameter pressure foot and a 354 g load or equivalent combination to give 41 kPa on the fabric.

Note: For three dimensional patterned materials (such as rib fabric) it may be necessary to determine the fabric thickness by using a smaller pressure foot to penetrate the pattern design of the material. In this respect, the thickness should be measured in an area where bending will take place in both warp and fill directions. An average should be taken of the individual thicknesses in the warp direction and in the fill direction. Thus it is possible to have a different thickness for each direction.

4. Lower the pressure foot to rest upon the sample without impact. At this point the thickness may be noted.

Bending Modulus

A. Variable Angle Method

1. Determine the deflection angle (A) of the samples tested for thickness using the Shirley Stiffness Tester. Four readings are taken on each sample – two on each end; one with the face side up and the other with the face side down as follows:
 - (a) With the platform in a horizontal position, place the test specimen on it and in the grip. Adjust the specimen to the length (L) of overhang in centimetres to give a deflection of approximately 20 - 40 angular degrees.