

**YARN PULL-OUT STRENGTH OF WOVEN FABRICS****Application**

This method is used to determine the pull-out strength of one or more adjacent yarns from woven fabric constructions. This gives an indication of the effectiveness of resin backcoatings or foam lamination in locking the yarns of the fabric construction.

**Apparatus Required****Tensile Testing Machine**

Constant rate of extension machine with autographic load recording device. Test speed to be 125 mm/minute.

Specimen clamps to be a minimum of 50 mm wide.

**Sharp Bladed Knife or Scalpel****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.

**Procedure****Method A**

This method is for testing the pull-out strength of single warp or weft yarns.

1. Three test specimens, each 300 x 50 mm in size are cut from different areas of the sample for each fabric direction. The longer dimension of the specimen must be parallel to the warp or weft yarns of the fabric.
2. Unravel the shorter yarns from one end of each test specimen for a length of 40 mm (see Figure 1).

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Page 1 of 3

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3. Select the warp (or weft) yarn along the centre of the specimen for testing the pull-out strength. Cut through this yarn 200 mm from the edge of the unravelled yarns.
4. Clamp the unravelled end of the test yarn in the upper jaws of the tensile test machine. Clamp the other end of the fabric in the lower jaws (see Figure 1). Initial jaw separation to be 220 mm.
5. Start the tensile tester and pull out the yarn at 125 mm/minute.

#### **Evaluation**

Report the initial peak load in Newtons required to pull out the test yarn.

#### **Method B**

This method is for testing the pull-out strength of two or more adjacent yarns which follow the same path through the fabric weave pattern.

1. & 2. Same as Method A.
3. Select a group of 2 or more warp (or weft) yarns which follow the same path through the centre of the test specimen. Cut through each of these test yarns at 200 mm from the edge by the unravelled yarns (see Figure 1).
4. Clamp the unravelled ends of the selected test yarns in the upper jaws of the tensile test machine and the other end of the fabric in the lower jaws (see Figure 1). Initial jaw separation to be 220 mm.
5. Start the tensile tester and pull out the group of yarns at 125 mm/minute.

#### **Evaluation**

Report the initial peak load in Newtons required to pull out the test yarns and the number of yarns in the group.

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.