1. **SCOPE**

1.1. **Description of Test**

This method describes the procedure for determining the force necessary to fail an entire geotextile sample and the elongation at failure.

2. **APPARATUS AND MATERIALS**

2.1. **Equipment Required**

2.1.1. Two clamps capable of gripping a sample along its entire width (up to 160 mm). The gripping surface shall be an integral part of the rigid frame (Figure 1). The clamping surface shall be hinged or movable and able to apply enough pressure (utilizing a steel pin if necessary) to prevent the sample from slipping during testing.

2.1.2. Tensile Testing Machine (CBR machine).

2.1.3. Stop watch.

3. **PROCEDURE**

3.1. **Sample Preparation**

Select 1 m² sample of fabric from a roll and mark its direction of weave (stronger in the direction of the roll).

To minimize handling problems, samples should not be folded in any way.

Two sets of eight samples should be taken, one set for longitudinal (stronger principle direction) and one for transverse (weaker principle direction). Each sample shall be cut 150 mm in width and not less than 300 mm in length. No samples are to be taken adjacent to each other and are not to be taken within 20 cm of the edge of the finished textile. The long dimension must be accurately parallel to the direction for which the breaking load is required.
3.2. **Test Procedure**

Establish the rate of extension of the CBR machine by measuring its distance of travel at a set speed for a one minute period of travel at a set speed for a one minute period (trial speed). Using three samples, obtain the average "Time-to-Break" and calculate the required speed that will lie within the following limits:

\[
\text{Required Speed} = \frac{\text{Trial Time-to-Break} \times \text{Trial Speed}}{\text{(maximum)}} = \frac{17 \text{ seconds}}{\text{(mm/min)}}
\]

\[
\text{Required Speed} = \frac{\text{Trial Time-to-Break} \times \text{Trial Speed}}{\text{(minimum)}} = \frac{23 \text{ seconds}}{\text{(mm/min)}}
\]

i.e. Trial Time-to-Break = 10.2 secs

\[
\text{Trial Speed} = 113 \text{ mm/min}
\]

\[
\text{Required Speed (Max)} = \frac{10.2 \times 113}{17} = 67.8 \text{ mm/min}
\]

\[
\text{Required Speed (Min)} = \frac{10.2 \times 113}{23} = 50.1 \text{ mm/min}
\]

Refer to the CBR machine extension rate chart and note the number on the control that corresponds with the calculated "Required Speed." If a chart is not available, trial and error measurements will have to be made at various speeds to establish the rate of extension for each number on the control.

Secure the sample centrally and so that the distance between the clamps is 75mm ± 1 mm for all tests. Make sure that the clamps are parallel to the weave and to each other. The steel pin must be snugly in place against the top portion of the joint before the clamps are fully tightened. Mount the prepared sample in the CBR machine (Figure 2). Mark across the sample at the front edge of each jaw to observe slippage.

Operate the machine and record the breaking load, elongation at failure and actual Time-to-Break for the first three samples.

Note: unless some type of strain gauge is used, when the fabric has failed, return the CBR controls to "Hold" position in order to measure the final length.

If the average Time-to-Break lies within the 20 ± 3 seconds, break the remaining samples under the same conditions until at least five results are obtained. Discard any results that do not fall in the Time-to-Break limits and re-adjust the machine speed when necessary. Clamping too tight will produce breaking at the front of the jaws; clamps too loose-breaking will occur at the back of the jaws at the pin. If the break occurs in the jaws or at
Standard Test Procedures Manual

Section: GEOTEXTILES & GEOGRIDS
Subject: WIDE STRIP TEST

any one edge, if the break is not uniform as evidenced by jaw marks or angular displacement of either pin, discard the test and break another sample.

Total uniform slippage as measured from the mark to the jaw edge is to be subtracted from the measurement of total elongation before calculations proceed.

4. RESULTS AND CALCULATIONS

4.1. Collection of Test Results

Suggested format for laboratory recording:

GEOTEXTILE TESTING Date ____________

STRIP TEST Type & trade name of material ____________

Project ____________

Principle Direction: Stronger/Weaker

Sample No. 1 2 3 4 5 6 7 8 Ave.

Original Length

Slippage

Final Length

Force (N)
1 lb = 4.448 N

Time

Percent Elongation

4.2. Calculations

Breaking load is read directly from the testing equipment.
Elongation is expressed as the percentage increase in length, based upon the initial gauge length.

\[
\text{i.e.: } \frac{\text{Final Length} - \text{Original Length}}{\text{Original Length}} \times 100
\]

4.3. **Reporting Results**

Report average results in both directions for every type of fabric tested.

5. **ADDED INFORMATION**

5.1. **References**


5.2. **General**

There are two types of normal failure in woven fabric.

a) Localized individual strand tensile failure, followed by progressive failure of strands on either side of the initially failed strand.

b) Tearing failure across all or part of the fabric strip usually on a diagonal line and of the form normally associated with shear failure for materials in tension.

5.3. **Figures**
APPROVAL SHEET

New __ Revision X __ Date of Previous Document 86-05-01

Effective Date: __ - __

Description of Revision (Reason for Revision):
- Format of test procedure updated.

Review/Implementation Process:

Reviewed by the Materials Section of the Technical Standards and Policies
Branch.

Other Manuals/Policies Affected:
- Nil

Follow Up/Training Required:
- Nil

Comments/Concerns/Implications (Budget/Environment/Stakeholders):

Prepared and Recommended by D. MacLeod ____________ 93-05-18
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Approval Recommended by R.A. Widger ____________ - -
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Approval Recommended by A.R. Gerbrandt ____________ - -
Dir., Technical Standards & Policies Br. Date

Approved by D.G. Metz ____________ - -
Assistant Deputy Minister, Infrastructure Date
Electronic File Updated Update Mailed - -