1. **SCOPE**

1.1. **Description of Test**

This method describes the procedure for measuring the force necessary to fail part of a geotextile sample gripped in clamps and the total elongation at failure.

2. **APPARATUS AND MATERIALS**

2.1. **Equipment Required**

2.1.1. Two clamps for holding the sample. The gripping surface shall be 35 mm perpendicular and 25 mm parallel to the application of load. 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 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 100 mm in width and not less than 200 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 geotextile.
3.2. **Test Procedure**

Establish the role 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:

\[
\text{Required Speed} = \frac{\text{Trials Time-to-Break}}{\text{Trials Speed}} \times \text{Trials Speed}
\]

(maximum) \hspace{1cm} 17 seconds \hspace{1cm} (mm/min)

(minimum) \hspace{1cm} 23 seconds \hspace{1cm} (mm/min)

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

Trial Speed = 113 mm/min

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

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 that at least 10 mm of material extends beyond each clamp. Mount the prepared sample in the CBR machine (Figure 2).

Set the machine so that the breaking load is reached in 20 ± 3 seconds.

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.
If the sample breaks at the jaw or slips from the jaw, the result should be discarded.

If any fabric continually breaks at the jaw or slips, modify the jaws by padding, coating or modifying the jaw face, stating the method of modification in the report.

4. RESULTS AND CALCULATIONS

4.1. Collection of Test Results

Suggested format for laboratory recording:

GEOTEXTILE TESTING       Date

GRAB STRENGTH Type & trade name of material

Project

PRINCIPLE DIRECTION: Stronger/Weaker

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

Original Length

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.

i.e.: \( \frac{\text{Final Length} - \text{Original Length}}{\text{Original Length}} \times 100 \)

4.3. Reporting Results

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

5. ADDED INFORMATION

5.1. References

ASTM D1682-64

5.2. Figures
FIGURE 215-1-1
GRAB TEST JAW

FIGURE 215-1-2

Date: 1993 05 18
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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
Materials Standards Engineer Date

Approval Recommended by R.A. Widger ___________ _- -_
Senior Materials Engineer Date

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 _- -_