

Australian Standard™

Methods for testing flexible cellular polyurethane

Method 7: Determination of tear resistance

PREFACE

This Standard was prepared by the Standards Australia Committee PL/36, Flexible Polyurethane, to supersede AS 2282.7 — 1991.

During the preparation of this revision cognizance was taken of ISO 8067:1989, *Flexible cellular polymeric materials — Determination of tear strength*.

METHOD

1 SCOPE This Standard sets out a method for determining the tear resistance of flexible cellular polyurethane.

2 REFERENCE DOCUMENTS The following documents are referred to in this Standard:

AS

2193 Methods for calibration and grading of force-measuring systems of testing machines

2282 Methods for testing flexible cellular polyurethane

2282.1 Method 1: Sampling and conditioning of test specimens

2282.2 Method 2: Measurement of dimensions of test specimens

3 PRINCIPLE The resistance to tear is determined as the force required to propagate a tear in a pre-cut test piece.

4 APPARATUS The following apparatus is required:

- (a) A power-driven testing machine capable of measuring the test force to an accuracy of 2 percent, in accordance with the requirements for Grade B machines in AS 2193. It shall be fitted with suitable grips for holding the test piece and applying a uniform pressure on the gripping surface.

It shall be equipped with an indicator that will remain at the point of maximum force or will record the point of maximum force at rupture of the test piece. The machine shall be adjusted to operate at a constant jaw separation speed from 50 mm/min to 500 mm/min.

- (b) Means of cutting and measuring the thickness of the rectangular test piece, accurate to 0.2 mm.

5 SAMPLE PREPARATION Three test pieces shall be prepared from each sample as follows:

- (a) Test pieces 150 mm long shall be cut with dies or a sharp knife, to the shape shown in Figure 1, from a sample sheet previously cut to a 25 ± 1.5 mm thick. A cut 40 mm long shall be made in one end of the test piece, as shown in Figure 1. The thickness of the test piece (direction A-B) shall be determined to an accuracy of ± 0.2 mm, in accordance with AS 2282.2.
- (b) Test pieces taken from moulded samples shall be free from skin voids and densification lines. The test piece shall be cut either parallel to, or across the direction of, the cell 'rise' and shall be so specified.

6 PROCEDURE The procedure shall be as follows:

- (a) After conditioning in accordance with AS 2282.1, insert each test piece symmetrically in the jaws of the testing machine, as shown in Figure 2, with one tab on each side of the cut test piece.
- (b) Operate the machine at the specified rate until at least a 50 mm length is torn. During tearing, assistance to the direction of tear may be given by sharp knife or razor blade. Record the maximum force reached for each test piece.
- (c) Determine the mean maximum force for three test pieces. If any individual value deviates more than 20 percent from the mean of the three values, prepare and test two additional test pieces and determine the mean of all five tests.

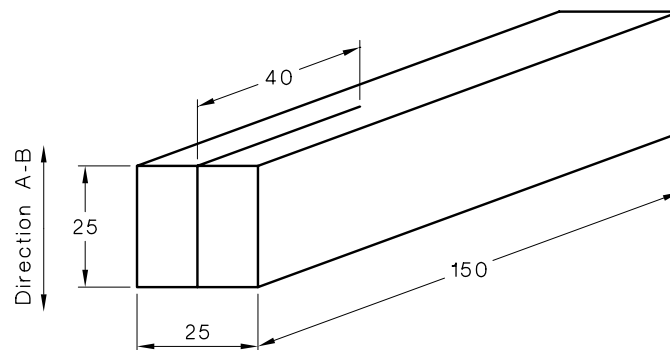


FIGURE 1 TEST PIECE FOR TEAR RESISTANCE

- (d) Calculate the tear resistance (σ_t) of each test piece, in newtons per metre, from the following equation:

$$\sigma_t = \frac{F}{d} \times 10^3$$

where

F = maximum force, in newtons

d = average thickness (direction A-B) of the test piece, in millimetres