STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

METHODS FOR TESTING FLEXIBLE CELLULAR POLYURETHANE

AS 2282.13
DETERMINATION OF SOLVENT SWELLING OF FLEXIBLE CELLULAR POLYURETHANE

1 SCOPE. This standard sets out a method for determining the amount of swelling that may occur when flexible cellular polyurethane is in contact with solvents.

2 PRINCIPLE. The tendency of flexible cellular polyurethane to swell when in contact with solvents is assessed by measuring the temporary and permanent percentage volume swelling of the material in perchloroethylene under specified conditions.

3 REAGENT. The reagent shall be perchloroethylene complying with AS K105. Fresh solvent shall be used for each test piece.

NOTE: Precautions governing the use of toxic solvents should be observed throughout the test.

4 TEST PIECE. The test piece shall be a disc of 100 mm nominal diameter and of thickness not exceeding 13 mm. The dimensions of the disc shall be determined in accordance with AS 2282.2.

One test piece shall be tested.

5 PROCEDURE. The procedure shall be as follows:

(a) Place the test piece in a dish measuring approximately 300 mm × 200 mm containing perchloroethylene to a depth of 25 mm to 30 mm.

(b) After 5 min, submerge the test piece in the solvent by covering it with a 200 mm square of wire gauze. Allow the test piece to remain in contact with the solvent for a total period of 30 min.

NOTES:

1. A suitable mesh for the wire gauze used throughout these operations is 250 μm.
2. If so desired, legs may be formed in the wire gauze by bending a 13 mm strip on two opposite sides to 90 degrees.

(c) Remove the wire gauze and lift the test piece out of the solvent by means of a flat wire gauze scoop, consisting of a 180 mm square of wire gauze fitted with a wire frame and handle.

(d) Secure the scoop at an angle of 45 degrees and allow the test piece to drain for 5 min.

(e) Cover the test piece with a 150 mm square of 6.5 mm plate glass. Invert the glass, test piece and scoop and then remove the scoop.

(f) Immediately measure the diameter and thickness of the test piece and the glass plate in accordance with AS 2282.2.

(g) Allow the test piece to stand at room temperature for not less than 24 h or until such time as it is completely free from solvent. Measure the final diameter and thickness in accordance with AS 2282.2.

6 CALCULATIONS.

6.1 Temporary Swelling. The diameter and thickness of the soaked test piece shall be obtained from the measurements made in Clause 5(f) and the temporary swelling shall be calculated by the following formula:

$$\text{Temporary swelling, percent} = \frac{d_2^2 \times (t_2 - t_4) - d_1^2 \times t_1}{d_1^2 \times t_2} \times 100$$