

Australian Standard™

Methods for testing flexible cellular polyurethane

Method 16: Determination of ash content

PREFACE

This Standard was prepared by the Standards Australia Committee PL/36, Flexible Polyurethane, to supersede AS 2282.16 — 1991.

METHOD

1 SCOPE This Standard provides a method for determining the ash content of flexible cellular polyurethane material using an electrothermal radiant heater.

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

AS

2282 Methods for testing flexible cellular polyurethane

2282.1 Method 1: Sampling and conditioning of test specimen

3 PRINCIPLE A known mass of the sample is heated in air to $700 \pm 30^\circ\text{C}$ for a period of 90 min, or until constant in mass. The percentage of ash is calculated from the mass of the residue remaining after incineration.

4 APPARATUS

4.1 Electrothermal radiant heater—suitable for heating test tubes, beakers, and crucibles to a temperature of $700 \pm 30^\circ\text{C}$ in the laboratory environment.

NOTE: The 400 W 'Electric Bunsen' and power controller supplied by FSE Pty Ltd is a suitable heater.

4.2 Crucible—a cylindrical crucible of silica, of minimum dimensions 57 mm diameter $\times$ 37 mm deep.

4.3 Pipe clay triangle—suitable for supporting the crucible.

4.4 Thermocouple—a surface probe capable of measuring temperatures in the range $0\text{--}1200 \pm 2^\circ\text{C}$.

4.5 Desiccator

4.6 Analytical balance—capable of weighing to 0.1 mg.

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4.7 Laboratory fume cupboard—capable of producing an air flow rate of 0.02 to 0.2 m/s in the vicinity of the test crucible (see Clauses 7(a) and 7(b)).

5 TEST SPECIMEN At least two test specimens are required, each having dimensions of 35 ± 1 mm $\times$ 35 ± 1 mm $\times$ 35 ± 1 mm, and being cut from a sample of material of uniform density. The specimens shall have straight cut edges and be free from dust.

6 CONDITIONING The test specimens shall be conditioned in accordance with AS 2282.1.

7 PROCEDURE The procedure shall be as follows:

- (a) Weigh a clean, dry, empty crucible to the nearest 0.1 mg (m_1). Place the test specimen in the crucible and determine the mass of the sample and the crucible by reweighing to the nearest 0.1 mg (m_2).
- (b) Adjust the airflow through the fume hood to achieve an air flow of 0.02 to 0.2 m/s in the vicinity of the test crucible.
- (c) Set up the radiant heater in the fume hood and, using the thermocouple, establish that the surface temperature of the heater is $700 \pm 30^\circ\text{C}$, at the point where the centre of the base of the crucible will reside.
- (d) Mount the pipe clay triangle on top of the radiant heater and place the crucible containing the test specimen onto the triangle. Heat the crucible for a period of 20 min or until the test specimen has decomposed in the crucible.

WARNING: ENSURE THAT FUMES DO NOT ESCAPE FROM THE FUME HOOD INTO THE LABORATORY. THE PRODUCTS OF THERMAL DECOMPOSITION OF POLYURETHANE FOAM ARE TOXIC.

- (e) Remove the triangle and place the crucible in the heater. Ensure that there is good contact between the base of the crucible and the heater. Continue heating until a constant mass of the crucible and residue is achieved.

NOTE: The total heating time generally required to achieve constant mass has been found to be approximately 90 min.

- (f) When constant mass is achieved, remove the crucible from the radiant heater and allow it to cool on a thick metal plate for at least 10 min; transfer the crucible into a desiccator until it attains room temperature.
- (g) Weigh the crucible and contents to the nearest 0.1 mg (m_3).
- (h) Repeat the procedure for the second specimen.

8 CALCULATION OF RESULTS The percentage of ash, remaining after incineration of the test specimen, shall be calculated from the following equation:

$$A_{\text{ad}} = \frac{m_3 - m_1}{m_2 - m_1} \times 100$$

where

A_{ad} = ash in the air-dry sample, in percent

m_3 = mass of crucible plus ash, in grams

m_2 = mass of crucible plus sample, in grams

m_1 = mass of crucible, in grams