

Australian/New Zealand Standard™

**Masonry units, segmental pavers and flags—
Methods of test****Method 17: Determining initial rate of absorption
(suction)**

This Standard incorporates Amendment No. 1 (August 2004). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

1 SCOPE

This Standard sets out the method for determining the initial rate of absorption (suction) of masonry units.

NOTES:

- 1 The initial rate of absorption (IRA) is the amount of water absorbed in 1 min through the bed face of the unit. It is a measure of the 'suction' of the unit, and in experienced hands is an important factor in the design of mortars that will bond strongly with the units. It is not an absolute measure of bond strength; the significance of the actual figures varies widely with such factors as the type of unit and the materials and methods of manufacture.
- 2 This method might not be practicable for large units.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS/NZS

4456	Masonry units, segmental pavers and flags—Methods of test
4456.0	Part 0: General introduction and list of methods
4456.1	Method 1: Sampling for testing
4456.2	Method 2: Assessment of mean and standard deviation

3 PRINCIPLE

A masonry unit is oven-dried, then cooled and placed with its bed face in contact with water for a short period. From the increase in weight from water absorption, the initial rate of absorption is calculated.

4 APPARATUS

The following is required:

- (a) A well-ventilated drying oven with a cubic capacity not less than 3 times the total volume of the specimens being dried, and capable of maintaining a temperature of $110 \pm 8^\circ\text{C}$.
- (b) A water tank or tray representing an area of water of not less than 0.25 m^2 and containing two bars of corrosion-resistant material not more than 6 mm in width and arranged to support the bed face of test specimens parallel to and 3 mm beneath the water surface (see Figure 1).

- (c) A means of controlling the water level in the tank so that the water level above the bars remains at 3 ± 1 mm throughout the test.
- (d) A balance by means of which the mass of an individual specimen can be determined to an accuracy of 1 g.
- (e) A timing device, capable of being read to the nearest second.
- (f) A rule that can be read to an accuracy of 1 mm over the dimensions of the units being tested.

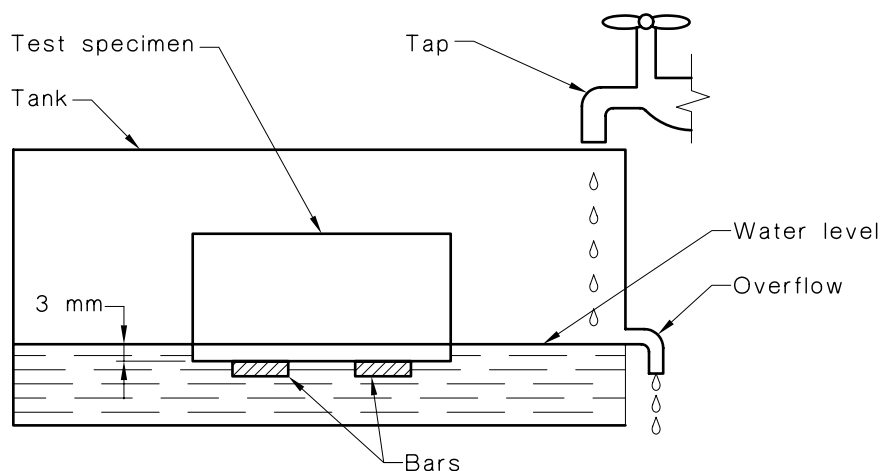


FIGURE 1 TYPICAL WATER TANK FOR INITIAL RATE OF ABSORPTION (SUCTION)

5 PREPARATION OF TEST SPECIMENS

5.1 General

Specimens accumulated from continuous sampling shall be deemed to meet the requirements of this method, provided that the number of specimens accumulated is at least 10. For assessment of an individual lot, 10 units shall be selected in accordance with AS/NZS 4456.1.

5.2 Preparation for large units

If required, large units may be cut to a suitable size for testing provided the bed surface of the unit is left undisturbed.

5.3 Pre-conditioning

Ten of the specimens shall be dried to constant mass in the ventilated drying oven at $110 \pm 8^\circ\text{C}$, after which they shall be kept dry and cooled rapidly to room temperature. For materials adversely affected by temperatures of $110 \pm 8^\circ\text{C}$, lower temperatures may be used. Where lower temperatures are used, they shall be reported. For dimension stone, a temperature of $65 \pm 3^\circ\text{C}$ is appropriate. When each specimen is cool its mass (m_1) shall be determined to the nearest gram.

6 PROCEDURE

The procedure for each specimen shall be as follows:

- (a) Place the bed surface of the dry specimen on the bars with any frogs or indentations uppermost for a period of 60 ± 1 s, measured from the time the specimen makes contact with the water. During this time keep the water level at 3 ± 1 mm above the bars.

- (b) Remove the specimen from the water. Immediately wipe it with a damp cloth and determine its mass (m_2) to the nearest gram. Complete the weighing within 1 min of the removal of the specimen from the water tank.

7 CALCULATION OF RESULTS

7.1 Initial rates of absorption

The initial rate of absorption for each specimen shall be calculated from the following equations:

For solid or cored units:

$$IRA_{\text{gross}} = \frac{1000(m_2 - m_1)}{A_{\text{gross}}} \quad \dots (1)$$

For hollow units:

$$IRA_{\text{net}} = \frac{1000(m_2 - m_1)}{A_{\text{net}}} \quad \dots (2)$$

where

IRA	= initial rate of absorption, in kilograms per square metre per minute
m_1	= mass of specimen oven dry, in grams
m_2	= mass of specimen after 1 min absorption, in grams
A_{gross}	= gross area of the bed, based on work size dimensions, in square millimetres
A_{net}	= net area of the bed, based on work size dimensions, in square millimetres.

NOTES:

- 1 Traditionally, the gross area has been used to measure the initial rate of absorption for solid and cored units.
- 2 The net area is calculated by deducting the area of cores or perforations from the gross work size area for hollow units.
- 3 Dimensions of cores may be obtained by direct measurement of the unit or from work size dimensions.
- 4 Depending on the method of manufacture, the IRA of the two bedding surfaces may differ.

8 RECORDING

The following information shall be recorded:

- (a) Reference to this test method, i.e., AS/NZS 4456.17.
- (b) Description of the marking, location and identification of the lot.
- (c) Sample and specimen identification.
- (d) Date of sample and test.
- (e) Work size dimensions of the bed face, in millimetres.
- (f) Mass of each oven-dried specimen, to the nearest gram.
- (g) Mass of each specimen after 1 min absorption, to the nearest gram.
- (h) Gross and net initial rates of absorption of each specimen, in kilograms per square metre per minute.