

Australian/New Zealand Standard™

**Masonry units, segmental pavers and flags—
Methods of test****Method 18: Determining tensile strength of
masonry units and segmental pavers**

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 tensile strength (indirect splitting strength) of masonry units and segmental pavers of most types, sizes and materials. It describes the preparation of the specimens, the conditioning required before testing, the apparatus, the method of test, the method of calculation and the contents of the test report.

The test may not be suitable for very highly perforated units.

NOTE: This test is for determining the inherent tensile strength of the material, rather than for use in quality control testing.

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 DEFINITIONS

For the purpose of this Standard, the definitions given in AS/NZS 4456.0 apply.

4 PREPARATION OF SPECIMENS

The areas on both bed faces where the splitting load is applied shall be sufficiently flat to achieve an equal load distribution in the section to be split. In almost all cases no preparation will be required. When preparation is required it shall be limited to local grinding in the areas where the splitting rollers touch the specimen. In special cases where the weakest vertical cross-section is nearer than half the height from the end, further cutting or grinding may be necessary, as illustrated in Figure 1.

Units having perforations or any other variations in section shall be prepared so that the section tested is as near symmetrical from top to bottom as is reasonable.

If the units have intentionally manufactured frogs, indented printing, cavities, perforations, internal or external holes, these shall be left in place, i.e., the grinding process shall not significantly alter the contact area of the tested faces. Fillers shall not be used.

NOTE: If the inherent tensile strength for the material is to be determined (as distinct from the tensile strength of the unit), a representative specimen may be sawn from a solid section of the unit.

5 NUMBER OF SPECIMENS

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.

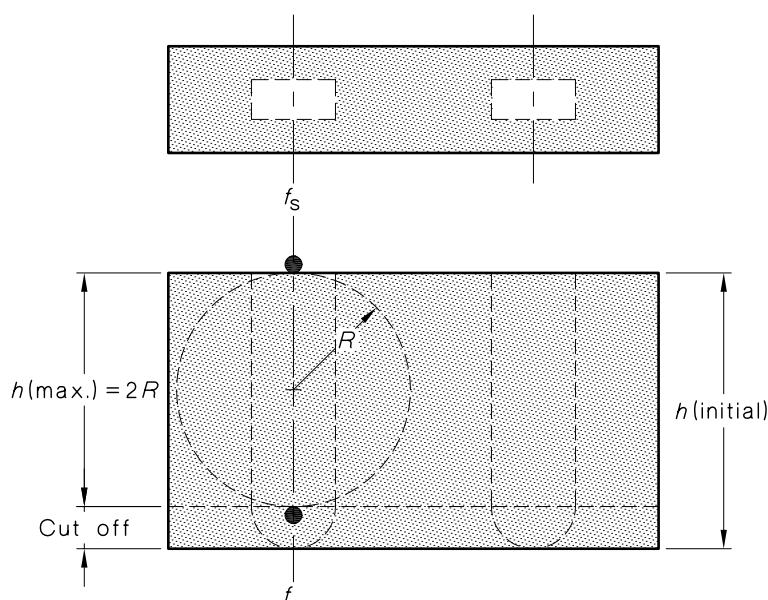


FIGURE 1 PREPARATION OF TALL PERFORATED UNITS

6 APPARATUS

The testing apparatus shall be equipped with two splitting rollers, of 25–40 mm diameter, with hardened faces of at least Vickers 600. The roller that normally will bear on the upper surface of the specimen shall be fitted with a seating in the form of a pivot, the centre of which coincides with the centre of the hydraulic ram cylinder and the centre of the bearing line of the roller. The movable portion of the pivoted roller shall be held on its seat but shall be free to rotate around the centre of the machine platen, and free to tilt in the direction perpendicular to the longitudinal centre of the roller. The other roller shall be seated on a rigid bearing block in the centre of the machine platen with the longitudinal centre of the roller perpendicular to the direction of the load. The stiffness of the roller-seatings shall be sufficient to ensure an equal load distribution on the specimen along the length of the roller. The splitting rollers shall be at least as wide as, and preferably wider than, the section of the unit to be split. The bearing surfaces of the rollers shall not depart from a parallel by more than 0.5 mm at their ends. For compliance testing, a testing machine that complies with the requirements for Grade A or Grade B machines given in AS 2193.

7 PROCEDURE

The procedure shall be as follows:

- Measure the height (h) and width (b) of the specimen at the splitting locations, to the nearest millimetre. For face-shell bedded units take the width as the sum of the widths of the two face-shells at mid-height of the unit. For samples with an ambient density of less than 1000 kg/m^3 , determine the moisture content in accordance with AS/NZS 4456.8.
- Locate the specimen between the two splitting rollers. Carefully align the cross-section to be split with the plane in the longitudinal centre of the two rollers and the central axis of the test machine. Do not use interlays between rollers and specimen.
- Apply the load at the section for which the strength is required. Apply the load not closer than half the height (h) (i.e., the distance between the faces of the loading rollers) from the edge of the specimen. Each cross-section tested on a single unit should be at least $1 H$ apart (see Figure 2). If the chosen cross-section is too near the edge to comply with this requirement, adjust the height by further grinding. Preferably, split one specimen on three different cross-sections in order to gather information on the homogeneity of the individual units. Multi-splitting is, however, permissible only when a unit or specimen is solid or when the cross-sections to be split are nominally equal in size, shape and structure.
- Apply the load without shock and increase the load continuously at such a rate that the failure load is reached within 1 to 3 min. Observe the maximum load (F_s) carried by the specimen, to the nearest newton.

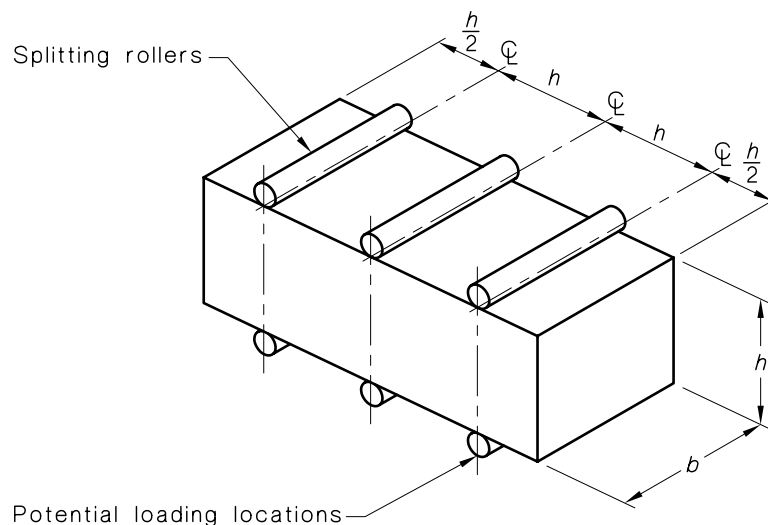


FIGURE 2 GEOMETRY OF SPLITTING TEST