Australian Standard®

Methods of testing sheet roof and wall cladding

Method 4: Resistance to impact (sandbag)—Sheet roof materials

1 SCOPE

This Standard sets out a method for determining the resistance to impact of sheet roof materials. The test is intended to simulate the accidental falling of a person onto a plastic building sheet incorporated into a roof structure.

2 REFERENCED DOCUMENT

The following documents are referred to in this Standard:

AS
1562 Design and installation of sheet roof and wall cladding
1562.3 Part 3: Plastic

3567 Textiles—Cloth, duck—Cotton and polyester/cotton

3 PRINCIPLE

A sandbag is dropped from a height of 2.5 m onto a supported test specimen of building sheet to determine its resistance to impact.

4 APPARATUS

4.1 Sandbag

A bag made from polyester/cotton core-spun duck complying with the requirements for Grade CS 420 (420 g/m^2) of AS 3567.

The sandbag shall have the following properties:

(a) Cylindrical shape of diameter 300 ±50 mm and height 700 ±50 mm with stitching on the inside.

(b) One end stitched to a circular base and the open end fitted with a hem and cord so that it can be drawn closed.

(c) Filled with dry sand to provide a mass of 25 ±0.2 kg.

(d) Rope attached to the top.

4.2 Pulley

A pulley attached to a suitable support, so that the bag may be raised 2.5 ±0.01 m above the test specimen, using a rope to which the cord of the sandbag is tied.

4.3 Measuring stick

A measuring stick of 2.5 ±0.01 m, to check the height of drop from the top of the test specimen to the bottom of the sandbag.

5 TEST MODELS AND SPECIMEN

5.1 General

The test specimen shall be incorporated in a full-scale model of a portion of the roof that replicates the supports and fixings of the cladding sheets in the 'as built' condition.

5.2 Transversely supported sheets

This Clause applies to sheets that are intended to be supported primarily by structural members spanning in a direction perpendicular to the length of the sheets.

The model shall consist of at least three adjoining sheets of the product under test, arranged side by side, with the test specimen being the centre sheet. The model shall incorporate four transverse structural members (such as purlins, studs or battens) in contact with the sheets (see Figure 1). The sheets shall not project beyond any end-supporting members by more than the maximum unsupported overhang specified in Table 1 for the corresponding product type.

The support condition of the transverse members shall represent typical construction practice, and the type, frequency and installation of the sheet fixings shall be in strict accordance with the product manufacturer's recommendations. Clearance holes shall be incorporated if these are normally specified for the product under test.

If the fixing at the edge of a sheet, at which the cladding is discontinuous, is intended to be different from the fixing at edges where sheets adjoin one another, the edge sheet tests are required on a model incorporating at least two adjoining sheets, one of which is supported and fixed as an edge sheet.

TABLE 1

MAXIMUM UNSUPPORTED OVERHANG

Product type	Maximum unsupported overhang, mm
GRP	150
PVC	50
Polycarbonate	50

5.3 Longitudinally supported sheets

This Clause applies to any sheets intended to be primarily supported by structural members spanning in a direction other than perpendicular to the length of the sheets (typical examples include rafter-supported sheets and framed sheets).

The model shall consist of representative samples of the sheets arranged, supported and fixed in accordance with the product manufacturer's recommendations for a typical site application. If more than two sheets can be fixed together in an application, the model shall comprise a minimum of three adjoining sheets, arranged side by side, with the test specimen being the central sheet (see Figure 2). If the fixing system cannot be properly represented by a three-sheet model, a five-sheet model shall be used with the test specimen being the central sheet.

For framed sheets, if it is to be considered that adjoining frames provide additional stiffness to the sheet, then the test model shall consist of nine frames arranged in a 3 by 3 grid, with the test specimen being supported by the central frame.

Test specimens may be of any length but the length of all sheets in the model shall be the same. However, if the length of the test specimen is less than 2.5 m and each end is transversely supported, the maximum permissible installed sheet length shall be not greater than the length of the prototype test specimen that has passed the relevant test.

The support condition of the structural members shall represent typical construction practice, and the type, frequency and installation of the sheet fixings shall be in strict accordance with the product manufacturer's recommendations. Clearance holes shall be incorporated if these are normally specified for the product under test.

If the fixing at the edge of a sheet at which the cladding is discontinuous, is intended to be different from the fixing at edges where sheets adjoin one another, then edge sheet tests are required on a model incorporating at least two adjoining sheets, one of which is supported and fixed as an edge sheet.

6 PROCEDURE

6.1 General

For a series of tests on a particular product, the length of sheets shall be the same throughout. Test procedures for transversely and longitudinally supported sheets are set out in Clauses 6.2 and 6.3 respectively.

6.2 Transversely supported sheets

6.2.1 *General*

For transversely supported sheets, the test procedure shall be as follows:

(a) Continuous cladding (normal sheets), as set out in Clause 6.2.2.

(b) Discontinuous cladding (edge sheets), as set out in Clause 6.2.3.

6.2.2 *Continuous cladding (normal sheets)*

For sheets used in continuous cladding, the procedure shall be as follows:

(a) Roll the sandbag to loosen the sand.

(b) Position the sandbag and pulley above the test specimen to that the centre of the base of the sandbag will strike the end span of the test specimen, in the centre of its width and 300 ±50 mm from the end transverse support (see position 1 on Figure 1).

(c) Check the impact position by lowering the sandbag to rest gently on the test specimen.

(d) Raise the sandbag to its drop height of 2.5 ±0.01 m using the pulley rope, holding it temporarily in that position to check the height with the measuring stick.

(e) Release the pulley rope so that the sandbag falls freely to impact on the test specimen.

(f) Record the effects on the impact and assess them against the failure criteria for resistance to impact specified in AS 1562.3.

(g) After assessment, if the specimen is considered to have failed the test, repeat Steps (a) to (f), except that for Step (b), reposition the sandbag and pulley so that the point of impact will be located in the middle span and 300 mm from an internal transverse support (see position 2 in Figure 1).