

Australian Standard[®]

Windows—Methods of test

Method 2: Deflection test

1 SCOPE This Standard sets out a method for determining an aspect of the performance of windows designed for installation in all classes of buildings. It addresses the deflection/span ratio of the window test sample under wind load.

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

AS

2047 Windows in buildings

2047.1 Part 1: Specification for materials and performance

2047.2 Part 2: Code of practice—Construction, installation and maintenance

4420 Windows—Methods of test

4420.1 Method 1: Test sample, preparation for test, and test sequence

3 DEFINITIONS For the purpose of this Standard the definitions in AS 2047, Parts 1 and 2, apply.

4 PRINCIPLE A sample unit is fitted as one face of a pressure chamber, sealed at its perimeter, then subjected to positive and negative test pressures to measure the displacement and to determine the deflection/span ratio.

5 APPARATUS The following apparatus is required:

- (a) *Pressure chamber*—of a size to fit the test sample window.
- (b) *Centrifugal fan*—with controls to pressurize the test sample.
- (c) *Displacement measuring device*—capable of measuring deflection to an accuracy of ± 0.25 mm.
- (d) *Fluid or electronic manometer*—capable of measuring air pressure to an accuracy better than $\pm 2\%$ of design wind pressure.

6 PROCEDURE

6.1 Test pressure The minimum test pressure shall be in accordance with AS 2047.1.

6.2 Location of displacement measuring devices Displacement readings shall be taken on the test sample at nominated framing member locations that would represent actual structural movement. These shall be at least at the ends and mid-span of the framing members.

The framework to support the displacement measuring devices shall be rigidly fixed, independent of the test sample.

Before tests are commenced, the location of all displacement measuring devices shall be agreed between the client and the test laboratory.

6.3 Test procedure The test procedure and loading sequence shall be as follows:

- (a) The test sample shall be operative and pre-loaded as described in AS 4420.1.
- (b) The pre-load pressure shall be removed and the zero position of the displacement measuring devices recorded.
- (c) Differential pressures in the same direction shall then be applied across the test sample in not less than four approximately equal increments until the test pressure is reached. The pressure shall be held for at least 1 min at each pressure increment, and the readings of the displacement measuring devices recorded before the pressure is increased.
- (d) The differential pressure shall be removed and after 2 min the zero displacement readings shall be taken.
- (e) The direction of the air pump or test sample shall be reversed and Steps (a) to (d) shall be repeated using the opposite test loading.

7 CALCULATION OF DISPLACEMENT/SPAN RATIO Where a structural member of the test sample is effectively supported at its ends only, its mid-span displacement and resultant displacement/span ratio under load shall be calculated as follows:

- (a) The mid-span deflection (d) of each member is given by the following equation:

$$d = D_m - D_e \quad \dots 7(1)$$

where

D_m = maximum displacement of member (generally at mid-span)

D_e = average of net end displacements

- (b) The resultant deflection/span ratio is given by the following equation:

$$\text{Deflection/span ratio} = 1 : \frac{S}{d} \quad \dots 7(2)$$

where

S = span of member between points of support (measuring devices)

d = mid-span deflection as described in Item 7(a).

8 TEST REPORT The following information shall be reported:

- (a) Reference to this Standard, i.e. AS 4420.2.
- (b) The name of the laboratory, authority or organization that conducted the test.
- (c) The name of the client, sample manufacturer and installer, as appropriate.
- (d) An identification and detailed description of the test sample.
- (e) Dated drawings of the test sample showing modifications, if any.
- (f) Location of all displacement measuring devices.
- (g) Spans of relevant members.
- (h) Displacements and mid-span deflections.
- (i) Resultant deflection/span ratio which will deem to pass -1% of the recorded result.
- (j) Date on which the test was carried out.
- (k) Statement of compliance of the test sample with AS 2047.1.

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