AS 4055—2012

Australian Standard®

Wind loads for housing

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The following are represented on Committee BD-099:

- Australian Building Codes Board
- Australian Window Association
- Concrete Masonry Association of Australia
- Cyclone Testing Station
- Engineers Australia
- Forest and Wood Products Australia
- Housing Industry Association
- Master Builders Association
- Roofing Tile Association of Australia
- Think Brick Australia

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PREFACE

This Standard was prepared by the Standards Australia Committee BD-099, Wind loads for housing to supersede AS 4055—2006.

This Standard will be referenced in the National Construction Code (NCC) 2013 edition, thereby superseding in part the previous edition, AS 4055—2006, which will be withdrawn 12 months from the date of publication of this edition.

The objective of this Standard is to provide designers, builders and manufacturers of building products that are affected by wind loading with a range of wind speed classes that can be used to design and specify such products for use in housing that are within the limitations in this Standard.

This revision aims to improve modelling of topographic effects and also to harmonize with recent changes to AS/NZS 1170.2:2011, including Amendments No.1 and No. 2. This edition differs from the previous edition as follows:

(a) The Scope of the Standard has been revised to include the limitation to Class 1 and Class 10 buildings as defined by the NCC. This has always been the intention of this Standard as reflected in the definition of 'house', but the limitation is more obvious when presented in the Scope.

(b) Table 2.1 presenting wind speeds for each wind classification has been split into a Non-Cyclonic regions table and a Cyclonic regions table for clarification. The wind speeds for each wind classification remain unchanged.

(c) Table 2.2 presenting the Wind Classification for sites has been changed to include a new Topographic Class T0 and to harmonize with changes adopted by AS/NZS 1170.2, terrain category multipliers.

(d) Definitions for terrain categories have been revised to be compatible with those in AS/NZS 1170.2:2011 (as amended). The revised definitions are intended to clarify the differences between the categories. International research has shown that the wind speeds over water are appropriate for Terrain Category 1 multipliers, so AS/NZS 1170.2 has included water bodies in Terrain Category 1 for all wind regions. In the case of wind blowing over large bodies of water, including seas and oceans, shoaling waves can introduce a near-shore roughness that means this water can be considered as Terrain Category 1.5. This change has followed through to this Standard. Terrain Category 4 is not applicable to this Standard as in Terrain Category 4, a house is embedded within the Terrain Category 4 roughness and its wind force evaluation may require special techniques.

(e) The calculation of topographic class had previously used the average of the maximum and minimum slope on a topographic feature to determine an average slope. While the average slope characterized a conical hill well, it significantly underestimated the slope of a ridge or escarpment. The maximum slope is now used to characterize the topographic feature. This will better represent the slope of a ridge or escarpment without significantly changing the characterization of a conical hill. This change was recommended as a result of observation of significantly higher levels of wind damage on ridges and escarpments in cyclonic and non-cyclonic wind storms.

(f) In AS/NZS 1170.2:2011, the topographic multiplier for flat land applies to hill slopes of less than 1:20 and this revision introduces a new Topographic Class T0 to represent slopes from 0 to 1:20. This Class has a topographic multiplier of 1.0. The topographic multiplier for T1 has been changed to 1.1 and includes wind for slopes from 1:20 to 1:10. Hill slopes have also been expressed in degrees.

(g) Shielding classifications have been harmonized with those in AS/NZS 1170.2 as appropriate for houses. For Regions A and B, large trees and heavily wooded areas can offer shielding and have been explicitly included, whereas in Regions C and D, the long duration of the wind event means that trees will be denuded before the arrival of the peak gust.

(h) Shielding classifications are linked to the topographic classes. AS/NZS 1170.2:2011 also links shielding with topography by allowing shielding only on slopes of less than 1:5. This has also been incorporated into this Standard by allowing full shielding only for those topographic classes with slopes of less than 1:5. This change in both Standards are based on wind-field models of hills and damage surveys following cyclonic and non-cyclonic wind events.

(j) Houses in the first row adjacent to wide, open areas are classed as 'Not Shielded', the second row from wide open areas is classed as 'Partial Shielding' and subsequent rows as 'Full Shielding' where there are sufficient houses.

(k) Pressure zones on roofs and walls have been defined, named and illustrated on diagrams. Edge and corner zones are subject to higher pressures due to the local pressure factors defined in AS/NZS 1170.2. An additional zone on the windward corners of low slope roofs allows for the RC1 zone introduced to AS/NZS 1170.2:2011 based on recent international research.

(l) The combination factor (K_c) from AS/NZS 1170.2:2011 has been applied to all pressures for walls and roofs. This has reduced some of the design pressures in the Standard.

(m) A more detailed commentary has been added (Appendix A) to clarify the relationship of this Standard to AS/NZS 1170.2 and to give background to some of the clauses.

(n) The example of topographic classes (Appendix B) has been changed to reflect the changes to definition of topographic classes.

(o) The example of terrain categories and shielding (Appendix C) has been changed to reflect the changes to definition of terrain categories and Shielding.

(p) In checking Tables 5.2 to 5.11 some minor discrepancies were found between values in the previous edition and those calculated from the formulae in Appendix A. These discrepancies were corrected and while there may be small differences in racking forces between this document and AS 1684, this will not affect the use of AS 1684.

(q) References to the differential pressures on photovoltaic solar panels in AS/NZS 1170.2 were included.

The term 'informative' has been used in this Standard to define the application of the Appendix to which it applies. An 'informative' appendix is only for information and guidance.

Notes to the text contain information and guidance. They are not an integral part of the Standard.

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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies site wind speed classes for determining design wind speeds and wind loads for NCC buildings Classes 1 and 10 within the geometric limits given in Clause 1.2. The classes are for use in the design of housing and for design, manufacturing and specifying of building products and systems used for housing.

Wind loads for houses not complying with the geometric limits given in Clause 1.2 are outside the scope of this Standard.

NOTES:

1 Commentary on the clauses of this Standard is given in Appendix A.

2 A worked example for the determination of topography is given in Appendix B.

3 Worked examples for the determination of terrain category and shielding class are given in Appendix C.

4 A worked example for racking forces is given in Appendix D.

5 Where houses do not comply with the geometric and other limitations of this Standard, use AS/NZS 1170.2.

1.2 LIMITATIONS

For the purpose of this Standard, the following conditions (geometric limits) shall apply (see Figure 1.1):

(a) The distance from ground level to the underside of eaves shall not exceed 6.0 m. The distance from ground level to the highest point of the roof, not including chimneys, shall not exceed 8.5 m.

(b) The width (W) including roofed verandas, excluding eaves, shall not exceed 16.0 m, and the length (L) shall not exceed five times the width.

(c) The roof pitch shall not exceed 35°.

The tables in Section 5 are based on floor to ceiling height of 2.4 m and a floor depth of 0.3 m (floor level down to ceiling below).

If wind loads on houses are determined using this Standard, design parameters shall be derived from this Standard only. Where wind loads on buildings are determined using AS/NZS 1170.2, design parameters in that Standard only must be used.

NOTE: Clause 3.2.3 in this Standard refers to pressures on solar panels given in AS/NZS 1170.2. These parameters are referenced in this Standard.

1.3 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard:

AS/NZS
1170 Structural design actions
1170.2 Part 2: Wind actions

ABCB
NCC National Construction Code