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Australian Standard 1170, Part 2—1983

SAA LOADING CODE Part 2—WIND FORCES



STANDARDS ASSOCIATION OF AUSTRALIA
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The following interests are represented on Committee BD/6:

Association of Consulting Engineers Australia
Australian Clay Brick Association
Australian Council of Local Government Associations
Australian Federation of Construction Contractors
Australian Institute of Steel Construction Ltd
Bureau of Meteorology
Bureau of Steel Manufacturers of Australia
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This standard was issued in the form of draft amendment to AS 1170, Part 2—1981 for comment as DR 82055.

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AMENDMENT No 1

to

**AS 1170, Part 2—1983
SAA LOADING CODE
PART 2—WIND FORCES**

REVISED TEXT

SUMMARY: Clause 7.2, Table 4, Clause 10.3.1, Figs. B1 and B2 and Tables B1.1, B1.2 and B4 of Appendix B, paragraphs D2 and D3 and Fig. D2 of Appendix D, and Annex.

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AUSTRALIAN STANDARD

MINIMUM DESIGN LOADS ON STRUCTURES

known as the

SAA LOADING CODE

Part 2 — WIND FORCES

AS 1170, Part 2—1983

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PREFACE

This standard is the fourth edition of AS 1170, Part 2, and was prepared by the Association's Committee on Loading on Structures.

This edition is being published prior to the preparation of the code in 'limit state' format, and is being issued to incorporate some changes which are the result of recent advances in the knowledge of wind forces on buildings. The principal changes from the 1981 edition are:

- (a) Additional provisions are now included for calculation of forces on complete buildings (see Clause 10.2.2).
- (b) Reduction factors for roofs are changed (see Table 5.3).
- (c) Appendix B has been amended to include more recent information.
- (d) Appendix D has been amended to include a detailed procedure for calculation of wind velocities for certain conditions.

As a result of the above, a number of editorial and consequential changes have been made in this standard.

The committee responsible for this standard has, in response to requests from Australian engineers and designers, adopted every available method and all current information to reduce the design wind loads to the maximum extent consistent with safety. The design wind loads prescribed in this standard are the minimum for the general case. There will be circumstances arising in particular cases, which will result in additional forces and previously this may have been taken care of by the larger forces which were presented in the earlier editions as a minimum, but this is no longer the case.

Designers must therefore be alert to recognize the conditions to which their particular structure is exposed and to all the provisions and additional notes in this standard. Examples would include exposure on an escarpment or to wind funnelling and the effects of shielding particularly in Terrain Category 3.

The committee continues to be aware that as more data become available the content of this standard must be reviewed, updated and changed.

The standard includes, as an annex, notes in the form of extracts from a paper presented by Assoc. Professor B.J. Vickery at a conference held in Sydney in 1973. It is emphasized that these notes are for information only and do not form part of the standard. Acknowledgement is made to Assoc. Professor Vickery and to Professor H.J. Cowan, Head of the School of Architectural Science, University of Sydney, for permission to reproduce these extracts from this paper.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
MINIMUM DESIGN LOADS ON STRUCTURES

PART 2 — WIND FORCES

1 SCOPE. This standard sets out rules for the determination of wind forces to be used in structural design in general.

2 APPLICATION.

2.1 Methods of Determination of Wind Forces. The wind forces on a structure or part of a structure shall be determined by one or more of the following:

- (a) The applicable clauses of this standard.
- (b) Reliable references used consistently with the clauses of this standard.
- (c) Wind-tunnel or similar tests together with applicable clauses of this standard.
- (d) Wind-tunnel or similar tests alone.
- (e) Reliable data on wind speed and directionality.

NOTE: Available records on wind speed and directionality are currently being analysed for some fifty locations in Australia, with a view to incorporation in this standard.

2.2 Wind-tunnel or Similar Determinations. Where—

- (a) properly conducted wind-tunnel tests, or similar tests employing a fluid other than air, have been done on a specific structure; or
- (b) references to such tests on a similar structure are used;

the forces accordingly determined shall be used instead of those determined through the provisions of this standard otherwise applicable.

2.3 Conduct of Wind-tunnel Tests. Wind-tunnel tests for the purposes of determining mean loads and pressures, and similar tests employing fluids other than air, shall be considered properly conducted only if—

- (a) the natural wind has been modelled to take account of variation of wind speed with height; and
- (b) tests on curved shapes are conducted with due regard to the effects of Reynolds numbers.

2.4 Conduct of Tests for Fluctuating Loads and Pressures. Tests for the purpose of determining fluctuating loads and pressures shall be considered properly conducted only if Clauses 2.3(a) and 2.3(b) are met and in addition the natural wind has been modelled to account for the scale and intensity of the longitudinal component of turbulence.

2.5 Conduct of Tests for Dynamic Response. Tests for the purpose of determining the dynamic response of a structure shall be considered properly conducted only if Clauses 2.3(a), 2.3(b) and 2.4 are met and in addition the model is scaled with due regard to mass, length, stiffness and damping.

3 NOTATION. Unless a contrary intention appears, the notation used in this standard shall have the following meanings with respect to the structure, or member, or condition to which a clause is applied:

A = an area of a structure or part of a structure, being—

- (a) when used in conjunction with a lift or drag coefficient, C_L or C_D , the projected area normal to the wind stream; and
- (b) when used in conjunction with a pressure coefficient, C_p , the surface area on which the pressure can act

A_z = an area at height z

a = a dimension used in defining areas affected by increase of local pressures calculated as the height to ridge or $0.2b$ or $0.2d$, whichever is the least

b = the breadth of a structure or structural member normal to the wind stream

C_D = the drag coefficient for a structure or shape
= $\frac{F_D}{Aq_z}$

C_L = the lift coefficient for a structure or shape
= $\frac{F_L}{Aq_z}$

C_p = a pressure coefficient

C_{pi} = an internal-pressure coefficient

C_x = force coefficient for 'x' direction
= $\frac{F_x}{Aq_z}$

C_y = force coefficient for 'y' direction
= $\frac{F_y}{Aq_z}$

d = the depth or distance to which the plan or cross-section of a structure or shape extends parallel to the wind stream, or a diameter

e = a spacing ratio

F = the total wind force exerted on a structure

F_D = the drag force acting in the direction of the wind

F_L = the lift force acting at 90 degrees to the direction of the wind