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Australian Standard 1170, Part 2—1981

SAA LOADING CODE
Part 2—WIND FORCES

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

THE FOLLOWING SCIENTIFIC, INDUSTRIAL AND GOVERNMENTAL ORGANIZATIONS and departments were officially represented on the committee entrusted with the preparation of this standard:

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
CSIRO, Division of Building Research
Department of Housing and Construction
Department of Local Government, Queensland
Department of Public Works, Western Australia
Electricity Supply Association of Australia
Engineering and Water Supply Department, South Australia
Experimental Building Station
James Cook University of North Queensland
Master Builders Federation of Australia Incorporated
Monash University
National Association of Australian State Road Authorities
University of Melbourne

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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—1981

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PREFACE

This standard is the third 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 changes based on increases in the available data on wind velocities and forces, as well as to clarify some requirements.

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.

The following clauses and paragraphs have been amended or added in this edition.

2.1	Method of Determination of Wind forces
10.1	Conversion of Velocity to Dynamic Pressure
Table 2	Values of Regional Basic Design Wind Velocities (Mildura entry)
Table 4	Variation of Design Wind Velocity with Terrain and Height
12	Repeated Loading for Tropical Cyclone-prone Areas
Table B1.1) Table B1.2)	Average External Wall-pressure Coefficients for Buildings (Notes amended)
Table B2.1) Table B2.2)	External Pressure Coefficients for Roofs of Buildings
B1.5	Local Pressure Factors
B1.6	Internal Pressure
B3.2	Multiple Frames (Note added)
Appendix C	Pressure Coefficients for Some Special Shapes (Figs C2, C3, C4, C5, C6, C7)
Annex (Corrigenda)	Notes on Wind forces on Tall Buildings (Amendment in second line above Equation 13(A). Appendix 1, A3 Base Bending Moment by Gust Factor Method)

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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

b = the breadth of a structure or structural mem- 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

F_p = force on a building element

F_x = force in 'x' direction

F_y = force in 'y' direction