



The use of ventilation and airconditioning in buildings

Part 2: Mechanical ventilation in buildings



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- Air Conditioning and Mechanical Contractors Association
 - Australasian Fire and Emergency Service Authorities Council
 - Australian Building Codes Board
 - Australian Industry Group
 - Australian Institute of Refrigeration Air Conditioning and Heating
 - Chartered Institute of Building Services Engineers
 - Climate Control Companies Association
 - Consumer Electronic Suppliers Association
 - Department of Health and Human Services, Tasmania
 - Engineers Australia
 - Facility Management Association of Australia
 - Fire Protection Association Australia
 - Institute of Refrigeration Heating and Air Conditioning Engineers of New Zealand
 - Plastics and Chemical Industries Association
 - Plumbing Industry Commission
 - Property Council of Australia
-

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Australian Standard[®]

**The use of ventilation and
airconditioning in buildings**

**Part 2: Mechanical ventilation in
buildings**

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PREFACE

This Standard was prepared by Standards Australia Committee ME-062, Ventilation and Air Conditioning, to supersede AS 1668.2—2002, *The use of ventilation and airconditioning in buildings, Part 2: Ventilation design for indoor air contaminant control (excluding requirements for the health aspects of tobacco smoke exposure)*.

This Standard incorporates Amendment No. 1 (October 2013) and Amendment No. 2 (December 2016). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

The objective of this Standard is to provide users with minimum design parameters and guidelines for determining ventilation rates for general application in buildings.

This Standard has been prepared for reference in the *National Construction Code (NCC)*.

In accordance with the philosophy of adopting a complementary approach to building regulations, the main technical change to the Standard is the update of AS 1668.2—2002 to reflect current technology and approaches for ventilation as well as the relocation of natural ventilation content to the new Standard AS 1668.4, *The use of ventilation and airconditioning in buildings, Part 4: Natural ventilation of buildings*. Within that approach, the structure of the Standard has been revised to include a new prescribed approach to car park ventilation and the use of ‘borrowed’ ventilation for multi-use compartments. The main technical changes are summarized as follows:

- (a) A simplified methodology for multi-use enclosures using mass flow proportioning.
- (b) Minimum outdoor airflow rates have been normalized in line with the removal of all references to ‘environmental tobacco smoke’.
- (c) Requirements for natural ventilation systems have been excluded.
- (d) Outdoor airflow rate calculations have been presented using the concept of ‘effective outdoor airflow’.
- (e) Requirements for kitchen exhaust hood design have been rationalized and expanded to cover additional scenarios and reflect recent changes in hood technology and application.
- (f) Equations used for calculation of total airflow rates in car parks have been presented as ‘simple’ and ‘detailed’ procedures.
- (g) Alternative air distribution methods for car parks have been included.

In the preparation of this Standard, consideration was given to a number of international and national Standards, design guides, technical papers, manuals and other publications.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

Statements expressed in mandatory terms in notes to Tables are deemed to be requirements of this Standard.

This Standard incorporates a Commentary on some clauses. The Commentary is set directly following the relevant clause and is designated by ‘C’ preceding the clause number and printed in italics in a panel. The Commentary is for information only and does not need to be followed for compliance with the Standard.

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FOREWORD

This Standard sets permissible ventilation rates having consideration to health and ventilation amenity. The specified ventilation rates are intended to maintain general contaminants (e.g. body odours, volatile organic compounds and the like) at concentrations below exposures that have the potential to cause adverse health effects to a majority of occupants.

Requirements for the design of natural ventilation systems have been excluded from this document and have been relocated in the new Standard AS 1668.4, *The use of ventilation and airconditioning in buildings, Part 4: Natural ventilation of buildings*. Where possible, this Standard is prescriptive based and calculations are presented as ‘simple’ and ‘detailed’ procedures.

Ventilation rates specified may not ensure that specific contaminants (e.g. fumes from unflued gas-fired devices and other fumes) are maintained at concentrations below exposures that have the potential to cause adverse health effects. When specific contaminants are present, alternative or additional control measures, other than dilution, may need to be implemented to achieve an equivalent level of health and amenity.

A simple method of calculating ventilation rates to meet the requirements is included. The method is based on a default multiple enclosure factor with a design check step to verify that the underlying assumptions are incorporated.

The sections on kitchen exhaust and car park ventilation have been revised in line with the general performance philosophy and updated to reflect ventilation systems available to the market.

It is recognized that this Standard is likely to be used for occupational health and community health purposes; thus, its provisions have been designed, to the extent possible, to community health criteria promulgated by peak health bodies. Implicit in this recognition is the possibility that the provisions of the Standard may, at least in part, be excessively conservative when applied in an occupational health context. The Standard has used a two-part approach to the setting of ventilation rates for health purposes, which comprises a general approach and a more specific approach where particular information is available.

The principal health basis of the ventilation requirements of this Standard are based on enclosures in which smoking does not occur. This represents acceptance that ventilation rates long in use in Australia for health purposes remain valid in circumstances where available information does not allow a more specific or scientific approach. Where there is reasonably predictable pollutant generation information and an authoritative community health exposure limit, then that information has been used to set ventilation rates.

STANDARDS AUSTRALIA

Australian Standard

The use of ventilation and airconditioning in buildings

Part 2: Mechanical ventilation in buildings

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out design requirements for mechanical air-handling systems that ventilate buildings and car parks (see Note 1), and requirements for ventilation based on the need to control odours, particulates and specific gases (e.g. CO, NO_x, CO₂, VOCs).

This Standard does not include requirements—

- (a) associated with comfort (e.g. temperature, humidity, air movement or noise);
- (b) for the maintenance of ventilation and air-handling systems;
- (c) for natural ventilation systems, apart from natural make-up or relief to mechanical systems (see Note 1);
- (d) for the elimination of condensation;
- (e) for the provision of ventilation to ensure the safe operation of gas appliances; and
- (f) for safety aspects associated with fire and smoke.

NOTES:

- 1 Requirements for natural ventilation of buildings (including car parks) are covered by AS 1668.4 and the NCC.
- 2 Road tunnels and other non-building related applications are outside the scope of this Standard.
- 3 Fire and smoke control aspects of air-handling systems are covered in AS/NZS 1668.1 and AS 1668.3.
- 4 Requirements for system design in respect of microbial control are given in AS/NZS 3666.1.
- 5 Air-handling systems should be designed, constructed and installed so that their use does not give rise to a noise or vibration nuisance. For guidance on noise and vibration control, see AS 1055.1 and AS 2107.
- 6 Information on thermal comfort conditions is given in ISO 7730 and ASHRAE 55.
- 7 This Standard covers the design of ventilation systems for industrial processes.
- 8 Requirements for ventilation in relation to the safe operation of gas appliances are covered in AS/NZS 5601.1.

1.2 APPLICATION

1.2.1 General

This Standard is intended for use by regulatory authorities, building services designers, architects, equipment manufacturers and suppliers, installers, managers, owners and operating staff responsible for designing and administering, air-handling systems.

CI.2.1 *It is intended that this Standard be applied to new buildings at the design stage. Its application to some existing buildings may be inappropriate and, in such instances, alternative designs and solutions may be necessary.*