

3.6 VENTILATED CEILINGS AND PROPRIETARY KITCHEN EXHAUST EQUIPMENT (HOOD TYPES 5 AND 7)

Ventilated ceilings or proprietary kitchen exhaust hoods not covered under Clauses 3.4 and 3.5 shall be designed to a proven and tested Standard. The basis for these designs is to lower energy costs by reducing exhaust air requirements and, consequently, they generally require more detailed calculation methods.

NOTES:

- 1 The acceptable measure of performance of the equipment (ventilated ceiling or exhaust hood) is to capture and contain all effluent without spillage.
- 2 Typical Standards and/or guidelines include the following:
 - (a) The German guideline VDI 2052, *Ventilation equipment for kitchens*.
 - (b) The German Standard DIN 18869, *Equipment for Commercial Kitchens—Components for Ventilation (all parts)*.

3.7 AIR FROM ENCLOSURES HAVING EXHAUST AIR REQUIREMENTS

3.7.1 General requirements

Air from an enclosure ventilated by a required general or local exhaust system shall not be recycled to other enclosures of different use.

3.7.2 Air pressures

The air pressure of enclosures served by a required general exhaust system shall be less than that of adjacent enclosures not served by required exhaust systems, during normal operation of the system.

NOTE: This may be evidenced by net airflow from the higher pressure to the lower pressure combined with no significant transfer of air into the high-pressure area.

C3.7.2 Where it is expected that a negative pressure will exist in an enclosure relative to outside, it is not recommended that open-flued gas appliances be installed. Refer to AS 5601.1.

3.8 REPLENISHMENT OF EXHAUST AIR

3.8.1 Source

The air exhausted from enclosures shall be replenished by outdoor air, transfer air or by make-up air of an acceptable quality from an adjacent enclosure. Make-up air shall not be drawn from an enclosure ventilated by a required exhaust system or from an adjacent car park. Make-up air from an enclosure ventilated by a required exhaust system is permitted for unoccupied enclosures (see Note 1). Where make-up air or transfer air is not available, a supply air ventilation system shall be permitted. Where the make-up air is drawn from outside the building, the intake shall comply with Clause 2.3.

NOTES:

- 1 For example, make-up air from a car park is permitted for a garbage room exhaust system.
- 2 Make-up air from an enclosure served by a non-required exhaust system in conjunction with a mechanical supply or natural ventilation system is not prohibited.
- 3 The use of openable windows for natural ventilation and/or make-up air for exhaust systems, subject to certain conditions, may meet the requirements of regulatory authorities. New buildings have well-sealed facades and occupants often keep windows closed for reasons of security, particularly in apartment buildings. These factors lead to the following risks:
 - (a) Make-up air drawn through gaps and service penetrations does not meet requirements of Clause 2.3.
 - (b) Restricted make-up air paths reduce exhaust airflow rates.
 - (c) Inadequate supply or exhaust ventilation reduces the amenity of the indoor environment.

Where designers of ventilation and air-conditioning systems are aware that these risks will be present, allowance should be made for make-up air paths complying with Clause 2.3. Acceptable methods include—

- (i) permanent natural ventilation openings meeting the requirements of this Standard; or
- (ii) a supply ventilation system in accordance with this Standard (whether untreated, tempered or air-conditioned).

C3.8.1 *The increasing implementation of energy-saving building facades via owner's choice or government regulation has created buildings that are more impervious or airtight than in previous years. Improved airtightness means that the de facto natural ventilation (leakiness) of older style construction no longer provides an easy make-up airflow path for exhaust systems. A further factor affecting building airtightness is a generally heightened concern in the community for security of the home. Ventilation via open windows only occurs when the occupants are at home and, even then, many occupants close all windows at night for reasons of security or to save air-conditioning energy consumption during hot or cold weather.*

These factors, applying mainly to sole occupancy units in apartment buildings, mean that day-long natural ventilation with outdoor air is significantly reduced and make-up air for exhaust systems is no longer drawn from open windows and doorways, but from gaps in door and window frames, structural cracks and imperfect sealing of service penetrations. Problems that arise are from such factors are the following:

- (a) *Sources of make-up airflow not meeting the requirements of Clause 2.3 to avoid contamination of outdoor air.*
- (b) *At those few points where air can leak into the building, localized deposits of dust and staining occur where make-up air enters at high velocity through narrow gaps and cracks.*
- (c) *Significant pressure losses in the make-up airflow path lead to reduced exhaust ventilation for many hours each day when the apartment is locked.*
- (d) *Insufficient natural ventilation with outdoor air prevents dilution of odours and increases the risk of mould growth on cool surfaces where moisture can condense.*

Designers of exhaust ventilation systems in apartment buildings are advised to provide paths for make-up airflow via paths complying with Clause 2.3. This is of particular importance for enclosures containing open-flued gas heating appliances. Designers of apartment buildings where air-conditioning systems are to be installed (or may be installed in the future) should consider whether the regulatory allowance for natural ventilation via openable windows will be sufficient for adequate ventilation. In both cases, permanent natural ventilation, ducted outdoor air ventilation or even a tempered mechanical supply ventilation system may be required to fulfil the objective of this Standard and/or local regulations.

3.8.2 Amount

Where the enclosure adjacent to the exhaust enclosures (and from which make-up air is being drawn) is itself served by supply ventilation systems, the outdoor airflow rate to these supply ventilation systems shall be increased, as necessary, to accommodate the amount of make-up air required for the exhaust ventilation system.