

# Come in, Number 62

A new version of the ASHRAE's *Standard 62*, which concentrates on ventilation and indoor air quality issues, has recently been released for public review. What elements have changed from the 1989 edition?

MARTIN LIDDAMENT REPORTS

Since its publication in 1989, the ASHRAE's *Standard 62: Ventilation for acceptable indoor air quality*<sup>1</sup> has undergone substantial revision, reflecting a growing concern about indoor air quality and the role that ventilation can play in securing a healthy indoor environment.

Much of the revised *Standard 62* is presented in 'code' language in an attempt to simplify its implementation. Explanatory and informative sections are also included to provide background information. The ultimate intention is for these additional notes to be published separately in the form of a users' manual.

The objectives of *Standard 62* are to:

- define the role and requirements of ventilation, source management and air cleaning in providing acceptable indoor air quality in occupied spaces;
- specify methods for determining minimum ventilation rates;
- specify system design, operational and maintenance requirements for various types of spaces.

Since there is potential for a wide diversity in pollutant sources, contaminant types and population susceptibility to pollutants, it is stressed that compliance with *Standard 62* does not ensure acceptable indoor air quality for everyone.

Instead, the minimum rates specified are aimed at providing satisfactory dilution of 'odour and sensory irritants' for 80% of occupants. Smoking is no longer implicitly included in the ventilation allowances, although guidance on providing additional ventilation to minimise odour from tobacco smoke is presented as an appendix.

## Ventilation in non-residential buildings

Although this Standard deals with the needs of both residential and non-residential buildings – and with both mechanical and natural ventilation systems – the majority of the text is devoted to the provision of mechanical ventilation in non-residential buildings.

A fundamental development has been to consider, separately, pollutants generated by occupants and those generated by the space itself (ie from materials and furnishings, etc). In buildings in which no 'unusual' pollutant is

present, ventilation rates are largely based on the perception of air quality (odour and irritants) by 'acclimatised' or 'adapted' occupants. Higher ventilation rates are recommended if there is a need to satisfy 'visitors' or 'unadapted' people to a space.

Various methods are presented for determining the design rate of minimum ventilation, including the simple systems procedure, the prescriptive procedure and the analytical procedure.

The simple systems approach refers to the provision of outdoor air directly to individual zones or spaces, without air recirculation between zones, while the prescriptive approach is aimed at more complex ventilation configurations. These two procedures are essentially similar, and involve calculating the minimum amount of outdoor air that must be supplied according to such factors as building type, floor area, occupancy pattern and ventilation effectiveness.

In either case, a minimum design ventilation rate is determined, based on typical pollutant emissions. The procedure begins by identifying a minimum outdoor air requirement from a set of data tables. These values are then modified by performing a series of quite complex calculations.

Essentially, if the minimum outdoor air value is found to be less than 7.5 l/s for each occupant, then the value must either be increased to 7.5 l/s or the deficit must be supported using filtered, recirculated air.

The analytical procedure is based on the direct calculation of the dilution and removal needs of each of the pollutants present, and is aimed at buildings with particular pollutant loads or spaces that require a specific level of purity. Ventilation rates for health and comfort are individually assessed and the greater of the two values is applied.

Further reductions in overall ventilation rate are achievable by applying 'demand control' and 'lead time' ventilation. These are aimed at transiently occupied buildings and specify the conditions under which CO<sub>2</sub> sensors (CO for parking garages) may be used, and the operation of ventilation systems prior to expected occupancy.

Other important developments include specifications for the location of air intakes/

outlets, filtration requirements, air intake control for vav systems and the classification of indoor air according to pollutant loading. Further requirements cover documentation, commissioning and maintenance.

## Natural ventilation

Natural ventilation is permitted in locations that are not subject to unusually high indoor source strengths. Requirements cover the minimum amount of operable area (4% of the net occupiable floor area), the maximum distance from wall and roof openings (8 m) and the requirements covering ventilation through adjoining rooms.

Provision is also made for engineered systems which specifically use the driving forces of natural ventilation.

In terms of the requirements for residential buildings, specifications are given for mechanical exhaust from kitchens, bathrooms and toilets, and for the provision of outdoor air to living spaces. Allowable techniques are mechanical, demonstrated and natural ventilation.

Demonstrated ventilation relies on a balance between infiltration and mechanical systems, while natural ventilation relies on the use of operable and permanently open vents amounting to no less than 4% of the net occupiable floor area. Requirements are also presented to prevent the spillage of fumes from combustion appliances.

The new draft of *Standard 62* reflects the considerable effort that has been made by the Ventilation Standards Committee to address indoor air quality issues and to quantify the ventilation measures needed to secure an acceptable indoor climate. The rationale and problems experienced in tackling this task are clearly reflected in the main text and its 15 supporting appendices.

Much valuable guidance is given on many key issues, especially in relation to the siting of air inlets and outlets, and ventilation design, documentation, commissioning and maintenance.

A possible concern is the complexity of calculations needed to evaluate ventilation rates. As currently drafted, the potential for misinterpretation, error and endless litigation must be high.

As an alternative, perhaps, it may be worth considering a 'non-calculation' procedure which explicitly prescribes ventilation rates and permissible allowances for filtered, recirculated air. It would then be possible to offer the various calculation methods as an alternative.

Martin Liddament is head of the Air Infiltration and Ventilation Centre.

## Reference

<sup>1</sup>ASHRAE, "*Standard 62: Ventilation for acceptable indoor air quality*", ASHRAE, 1996. Copies of this Standard are available from ASHRAE Customer Services on (tel) +1 404 636 8400, (fax) +1 404 321 5478. It may also be down-loaded from the Internet at ASHRAE's site [ftp.ashrae.org](http://ftp.ashrae.org) in the Standard directory. The file name is 62DRAFT.EXE. Any comments on "*Standard 62: Ventilation for acceptable indoor air quality*" should be returned to the ASHRAE by 12 December 1996.