6 IEQ 6.4 VENTILATION

6.4.4 LOCALISED VENTILATION

EXCLUSIONS
Item b) is excluded for residential buildings.

OBJECTIVE
Prevent exposure of building occupants to concentrated indoor sources of pollutants.

CREDITS ATTAINABLE
2

PRE-REQUISITES
Compliance with CAP 123J Building (Ventilating Systems) Regulations

CREDIT REQUIREMENT
a) Source control

1 credit for the provision of an adequate ventilation system for rooms/areas where significant indoor pollution sources are generated.

b) Local exhaust

1 credit for the provision of a system of local exhaust of premises undergoing fit-out and redecoration.

ASSESSMENT
a) Source control

The Client shall provide evidence in the form of a report prepared by a suitably qualified person detailing the design criteria that has been adopted and details of the ventilation system designs providing local exhaust where concentrated pollutant sources are likely to be present. The report shall provide details of tests and the results demonstrating that the design performance is achieved. Where the design ventilation rate specified is lower than that specified in a recognised international or national standard the client shall demonstrate through appropriate testing that there is 99% isolation between areas with concentrated pollutant sources and occupied areas.

b) Local exhaust

The report shall provide technical details to demonstrate how the ventilation system design(s) may be temporarily adapted so that air from any areas undergoing fit out or renovation can be exhausted to the outside without re-circulation or entrainment to occupied areas. The ventilation provisions shall be adequate to exhaust to outside air any material off-gassing, combustion products, excess moisture, etc., and the exhaust is discharged such that it does not re-enter the premises or enter adjacent premises under typical wind conditions. Compliance may be demonstrated by conducting appropriate tests in a sample of units. Where it can be demonstrated that source control measures can meet the performance requirements the credit(s) shall be awarded.

BACKGROUND
Concentrated pollution sources are best managed at source. The provision of localised ventilation, segregated from the general ventilation, is an appropriate strategy. In commercial and similar premises sources such as photocopying equipment, smoking lounges, etc. should be provided with dedicated exhaust systems. It is also appropriate to provide a system that allows for localised exhaust of premises during fit-out and redecoration, to avoid entrainment to occupied areas. It could be part of the fixed ventilation system, or a simple approach that allows temporary exhaust provisions. In other buildings local exhaust is intended to remove contaminants from specific rooms such as kitchens, in which concentrated sources are expected.
DOMESTIC KITCHENS

PNAP 278 [1] specifies performance based criteria for kitchen ventilation as an alternative means of satisfying Building (Planning) Regulations (B(P)Reg.) 30, 31 and 32. These criteria are 1.5 Ach under natural ventilation, plus 5 Ach from mechanical means i.e. these values are by definition the minimum legal requirement. Whilst these are performance based alternatives to the prescriptive criteria they are considered worthy of credit. It should be noted that specifying higher values may result in negatively pressurising the building and causing other IAQ problems with in flow of air from other spaces.

Elsewhere, ASHRAE 62.2 [2] states that kitchen fans are mandatory as this standard considers that windows do not provide sufficient ventilation, although this standard specifically applies to low rise residential units (3 storeys or less above grade) and wind conditions may not be as favourable for ventilation as in the case of high rise buildings. The basic requirement is that a vented cooker hood can exhaust 100 cfm (approx 50 l/s). An alternative approach is that ventilation (either continuous or intermittent) of 5 Ach be achieved.

COMMERCIAL KITCHENS

In commercial kitchens a mechanical ventilation rate of 20 Ach may be appropriate [3] for the cooking styles found in Hong Kong.

BATHROOMS AND TOILETS

The Building Authority will give favourable consideration to an application for modification of Building (Planning) Regulation 36 in respect of bathrooms and lavatories in domestic buildings [4] where the following criteria are met:

• the room is part of a unit of accommodation for domestic use;
• the room is of a reasonable size; and
• the modification to be granted is unlikely to result in standards of public health and safety being compromised.

Upon the grant of a modification of the Regulation, the Building Authority will impose the following conditions:

• mechanical ventilation producing 5 air changes per hour (Ach) is in operation at any time when the room is in use. The change of air shall be with the outside of the building and to achieve this, the use of ventilation ducting is acceptable;
• there is permanent ventilation to the ‘open air’, the ‘external air’ or with another room which is provided with a window meeting the area requirement for the combined windows. The permanent ventilation may be in the form of an air duct, an aperture in a wall or a door suitably located and permanently open or protected with louvers having a minimum size of 1/20 of the floor area of the room; and
• the requirements of Building (Planning) Regulation 35A and PNAP 82 [5] regarding water heaters are complied with, where applicable.

Where mechanical ventilation in the form of extractor fan is provided in bathrooms and lavatories, care should be taken to ensure that plumbing

seals are intact and operate according to the design intent [6]. In addition, consideration should be given to the quality and quantity of air intake, air-flow path and fan capacity. The Environmental Health Team of the World Health Organisation (WHO) has advised that the optimum flow rate for bathroom ventilation is 2 cfm/sq ft (10.2 l s⁻¹ m⁻²). WHO is of the view that a larger flow rate does not add much on the comfort side and has the hidden risk of building up negative pressure in the room. It is recommended to provide an opening to bathrooms and lavatories for air relief, such as an undercut to the door or an opening with louver at the door or wall, in order to minimise the build-up of negative pressure in case an extractor fan is provided for ventilation.

**UTILITY AND LAUNDRY ROOMS**

ASHRAE 62.2 makes no requirement for mechanical ventilation although it stipulates an opening not less than 4% of the room floor area nor less than 0.15 m². However it does stipulate that clothes dryers must be directly exhausted to outside.

**REFUSE AREAS**

Exhaust from refuse storage areas and material recovery centres (RS & MRC) should follow the principles of PNAP 98 [7]. In the cases where a centralised ventilation system is adopted, a single air purifier may be installed prior to the air being exhausted to the atmosphere. If there are no odour problems then a mechanical fan and filter can be used. The main exhaust outlet for a centralised system should be located at roof level away from other buildings. If the building is surrounded by taller buildings then the air may be exhausted at the main RS & RMC location.

The noise level of the system should conform to the Technical Memorandum published under the Noise Control Ordinance (Cap 400). Fire dampers should be provided if the system has exhaust grilles and ducting at each floor.

**DOMESTIC GARAGES**

ASHRAE 62.2 states that for low rise residential buildings where air handlers or return ducts are in an attached garage the ductwork should be tested for air tightness. A ductwork air leakage test conforming to test procedure DW 143 [8] or similar authority should be performed.

**CHIMNEYS AND FLUES**

The siting and height of chimneys and flues should follow PNAP 45 [9]. In particular, chimneys and flues should be situated so that products of combustion cannot enter windows, ventilation openings, supply air intakes.