Vent-Axia Ventilation Design Guidelines

Successful planning

Today, people are becoming increasingly aware of the problems of indoor pollution and the important contribution that well-planned ventilation makes to modern living.

Effective ventilation is now regarded as a necessity because no-one can feel their best or work efficiently in air that contains smells, smoke, moisture or excessive heat. Stale air in pubs, clubs, offices and workshops is bad for business. In the stuffy atmosphere created by lack of ventilation, colds, flu and airborne viruses will quickly spread. Vent-Axia controlled ventilation can help in all these situations and reduces lost output caused by absenteeism through illness.

Damaging condensation affects 4.5 million homes in the UK alone. This can quickly cause paintwork and wallpaper to deteriorate and encourages mould, stains and a deterioration of the property. So people are faced with the expensive cost of redecorating. Unfortunately, modern thermally efficient buildings are not designed to encourage natural ventilation. The Building Regulations are recognising this problem and, nationally, local authorities are specifying higher rates of ventilation. When installing ventilation it is most important to obtain maximum efficiency from the investment so proper planning is essential.

What size of unit and how many ?

The correct size, type and number of Vent-Axia units required for any area is determined by three factors: the room size, its use and location.

First, work out the volume of the room by multiplying length x width x height. This volume is then multiplied by the required number of air changes per hour (ACH) given in the table to give the total air movement required per hour. Select the number of fans necessary to achieve the desired volume.

The Building Regulations (Document F) require the following ventilation rates on new dwellings:

Kitchen areas: an extract rate of no less than 216m³/h 60 l/sec. For calculation purposes we recommend a minimum air change rate of 15 per hour.

Utility rooms: an extract rate of no less than 108m³/h 30 l/sec. For calculation purposes we recommend a minimum air change rate of 15 per hour.

Bathrooms: an extract rate of no less than 54m³/h 15 l/sec. For calculation purposes we recommend a minimum air change rate of 6 per hour.

WC's: an extract rate of no less than 6 l/sec. For calculation purposes we recommend a minimum air change rate of 6 per hour.

The new requirements are designed to remove steam and smells at source before they are able to migrate causing damage to colder parts of the dwelling.

This table provides suggested air changes per hour (ACH) under normal conditions based on Vent-Axia's extensive experience.

Assembly rooms	4 - 8
Bakeries	20 - 30
Banks / Building Societies	4 - 8
Bathrooms	6 - 10
Bedrooms	2 - 4
Billiard Rooms *	6 - 8
Boiler Rooms	15 - 30
Cafes and coffee bars	10 - 12
Canteens	8 - 12
Cellars	3 - 10
Changing Rooms Main area	6 - 10
Changing Rooms Shower area	15 - 20
Churches	1 - 3
Cinemas and theatres *	10 - 15
Club rooms	12 minimum
Compressor rooms	10 - 20
Conference rooms	8 - 12
Dairies	8 - 10
Dance halls	12 minimum
Dental surgeries	12 - 15
Dye works	20 - 30
Electroplating shops	10 - 12
Engine rooms	15 - 30
Entrance halls & corridors	3 - 5
Factories and workshops	8 - 10
Foundries	15 - 30
Garages	6 - 8
Glasshouses	25 - 60
Gymnasiums	6 minimum
Hairdressing salons	10 - 15
Hospitals - sterilising	15 - 25
- wards	6 - 8
Kitchens - domestic	15 - 20
# - commercial	30 minimum
Laboratories	6 - 15
Laundrettes	10 - 15
Laundries	10 - 30
Lavatories	6 - 15
Lecture theatres	5 - 8
Libraries	3 - 5
Living rooms	3 - 6
Mushroom houses	6 - 10
Offices	6 - 10
Paint shops (not cellulose)	10 - 20
Photo & X-ray darkrooms	10 - 15
Public house bars	12 minimum
Recording control rooms	15 - 25
Recording studios	10 - 12
Restaurants	8 - 12
Schoolrooms	5 - 7
Shops and supermarkets	8 - 15
Shower baths	15 - 20
Stores & warehouses	3 - 6
Squash courts	4 minimum
Swimming baths	10 - 15
Toilets	6 - 10
Utility rooms	15 - 20
Welding shops	15 - 30

* Increase by 50% where heavy smoking occurs or if the room is underground.

\# Some commercial kitchens may require higher ventilation rates, based on cooking equipment in use.

The total extract airflow rate during normal operation of a continuous mechanical ventilator eg. MultiVent etc, should be between 0.5 and 0.7 ACH. This is based on the whole dwelling volume, with provision to increase the inlet volume, as required, in moisture generation areas.

Siting the unit correctly and safely

In rooms containing fuel burning appliances, care should be taken to ensure that air replacement is adequate for both the fan and the fuel burning appliance.

Wiring should be carried out in accordance with current IEE regulations (UK) or the appropriate Standards in your country.

Always check that the supply voltage, fuse rating and wiring are correct and that installation is in accordance with the instructions provided with the product.

Bathrooms

Vent-Axia recommends that mains voltage fans be sited out of reach of a person using a fixed bath or shower. Ensure that mains fans and controls are sited well away from all sources of water spray. We recommend that electrical products of this kind be installed in accordance with mandatory regulations and their official guidance documents.

Safety Extra Low Voltage (SELV) fans are available for installation within bath or shower rooms in accordance with relevant wiring regulations. The mains transformer control unit with SELV output must be sited away from any source of water spray and out of reach of a person using a fixed bath or shower.

Ducted applications

Ducts passing through an unheated roof void should be insulated to minimize condensate formation and must include a condensation trap and means of running off condensate.

Vertical ducts should be fitted with a condensation trap and a weather proof cowl of sufficient free area for the air volume. Horizontal ducts should fall away from the fan unit.

General

Ventilation units should be placed as high as possible in the window or wall near any local smells and steam but not directly above eye level grills, cookers or direct sources of heat in excess of +40°C. Do not site in areas containing excessive levels of grease without suitable filters.

In large rooms the extract points should be positioned correctly to obtain even ventilation in all areas. A short circuit of airflow will be avoided by siting units as far away as practicable from the main source of air replacement.

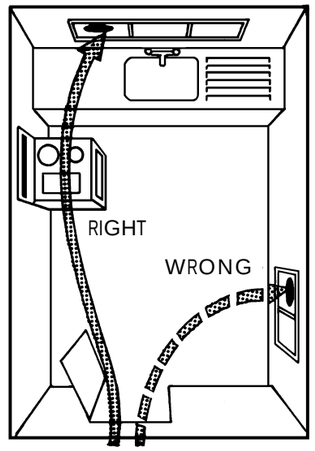
Maintenance

Site the fan so that it is accessible for regular periodic cleaning and servicing. Make sure that grilles, motor cooling ports and impellers are able to function freely in accordance with guarantee requirements.

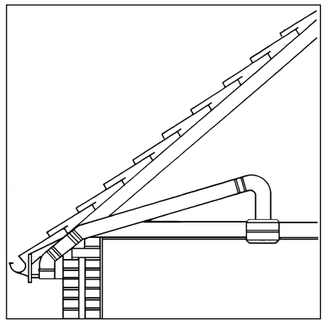
Electrical equipment should be isolated before carrying out any maintenance or cleaning. All fans should be regularly cleaned and checked, (every month or so, dependent on usage). Bearings should be oiled where appropriate twice a year, unless stated otherwise.

SELV fan installation

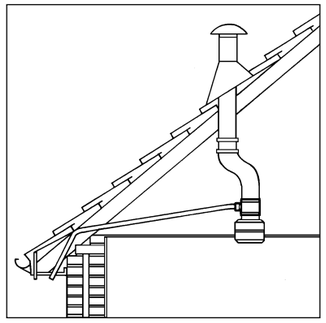
KITCHEN APPLICATIONS



DUCTED APPLICATIONS THROUGH ROOF VOIDS



HORIZONTAL DUCT



VERTICAL DUCT

Ensure pipes have a vertical overlap.

Vent-Axia

Condensation Control

What is condensation ?

There is always some moisture in the air, even though we cannot see it. When that moisture is allowed to accumulate in a dwelling, the atmosphere becomes saturated and condensation occurs which can eventually result in damage to the structure of the building and its contents. This leads to expensive repairs and maintenance plus associated discomfort to the occupants. The point at which moist air may begin to cause deterioration is 70% Relative Humidity (RH).

The problems condensation can cause

The British Isles have a naturally humid environment. A humidity map will show the regions which are regularly at, or in excess, of 70% RH. An estimated 4.5 million British homes suffer from the damaging effects of condensation.

Therefore we need to take extra measures in this country to prevent the expensive consequences of condensation such as rotting window frames, peeling wallpaper, mould growth, damp and eventually, rotting of the building fabric itself.

Condensation is aggravated by a reduction in natural ventilation so common in today's sealed and insulated buildings which incorporate replacement windows, draught proofing and fitted carpets, etc.

If the moist air is unable to escape, it will condense on cooler surfaces and migrate to colder parts of the dwelling. Problems often start in the kitchen or bathroom, where moisture is generated by cooking, washing, drying clothes, showers and bathing.

Not only does moist air cause problems to the fabric of the building but also to air quality and health. People who suffer from asthma or any other bronchial problems can have their condition aggravated by a moist environment.

The microscopic droppings of the house dust mite can cause asthma, rhinitis, bronchial and other allergic problems. Constant wholehouse ventilation can reduce the relative humidity to below 70%, which inhibits the ideal living and breeding conditions of the house dust mite.

How to control condensation

The results of condensation in a building can be reduced by a combination of measures: heating, correct insulation and properly sited ventilation. Controlled mechanical ventilation however, removes moisture laden air at source before it can condense, creating background level ventilation throughout the dwelling.

Meeting the Regulations

The Building Regulations for the United Kingdom require mechanical ventilation in all moisture generating areas to remove humid air and odours from shower rooms, bathrooms, toilets kitchens and utility rooms.

The regulations are to ensure that humidity is removed at source before it is able to migrate causing damage to colder parts of the dwelling. Vent-Axia manufacture a range of domestic fans for kitchens, utility rooms, bathrooms, toilets and shower rooms designed to meet the Building Regulations and help keep condensation under control.

Best Practice

Vent-Axia can also supply a range of humidity controllers specifically designed for kitchens and bathrooms to maintain a totally automatic, condensation controlled environment. Humidity controllers can either be mounted separately or contained within the fan, the latter being convenient and easy to install.

Safety Extra Low Voltage fans (SELV)

VA100, Solo, Solo Plus, LuminAir and LoWatt. Designed for areas where a fan has to be fitted over a bath or within a shower room, the Vent-Axia Safety Extra Low Voltage fans can be installed within the spray area of a bath or shower.

Control is by EN60 742 (BS 3535) mains safety isolating transformer unit with SELV output, which is sited away from any source of spray and out of reach of a person using a fixed bath or shower. Available with the option of an adjustable humidity controller.

To comply with low voltage directives, Vent-Axia SELV units have been independently tested in accordance with UK and European Safety Extra Low Voltage (SELV) requirements, and have as a result been granted BEAB or GS approval based on CENELEC harmonised standards. The SELV 12 versions of the VA100, Solo and LuminAir fans are certified as meeting the requirement of IPX7 (BS EN60529).

BEAB Approved

Vent-Axia

Bathroom Regulations

IEE regulations for bathrooms

Bathrooms are defined as areas of increased electrical hazard. According to the Requirements for Electrical Installations, IEE Wiring Regulations Sixteenth Edition, it is necessary to fit ventilation products that meet a minimum of IPX4 in zones 1 and 2 of a bathroom. This means that when installed and connected electrically, the product should prevent the ingress of water splashing and remain electrically safe in use.

Vent-Axia SELV fans are IPX7, which makes them the safest option available, and with a SELV supply offers complete peace of mind. Vent-Axia offers a range of IPX4 fans which also meets the regulations. A competent electrician should install the product to ensure the integrity of IPX4 is maintained around cable entries etc.

Classification of zones

Zone 0: The interior of the bath or shower tray.

Zone 1: The exterior of the bath or shower tray to a height of 2.25 metres above the floor.

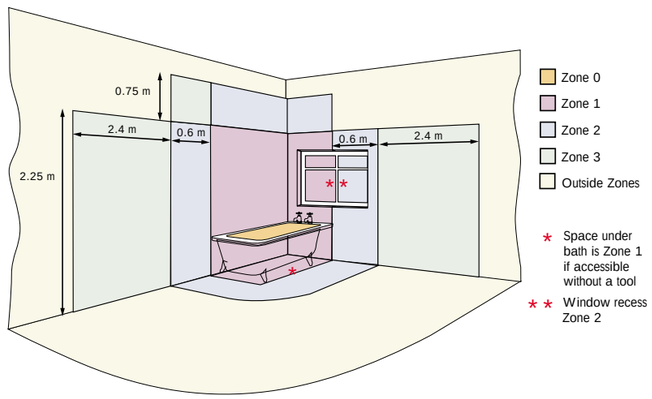
Zone 2: Extends to 0.60 metres beyond Zone 1 to a height of 2.25 metres above the floor.

Zone 3. Extends to 2.4 metres beyond Zone 2 to a height of 2.25 metres above the floor.

For full information please refer to BS 7671 2001.

Vent-Axia still recommends that any fans installed within Zones 1 and 2 should be SELV (Safety Extra Low Voltage)

Guide to siting equipment in a location containing a bath



NOTES:

(i) This guide applies only to a typical domestic bathroom. It is not intended to replace Section 601 of BS 7671.

(ii) Reference should be made to Section 601 for details of any installation in a location containng a bathr or a shower.

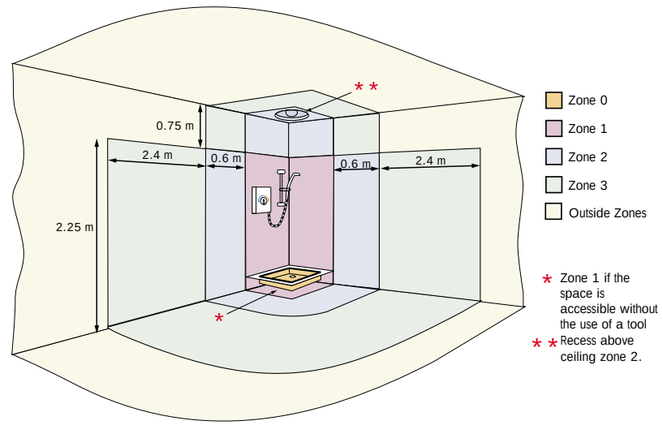
(iii) Local supplementary bonding is required to connect together the terminal of the protective conductor of each circuit supplying Class I and Class II equipment in zones 1,2 or 3, and extraneous-conductive-parts in these zones.

(iv) All equipment to be suitable for the zone where it is installed.

(v) LV socket-outlets not permitted, except for a shaver supply unit.

(v) Except for shavers, portable LV equipment is not permitted.

Guide to siting equipment in a location containing a shower



NOTES:

(i) This guide applies to a domestic shower room containing a shower basin but withut a permanently fixed partition. Reference should be made to BS 7671, inlcuding the particular requirements given in Section 601.

(ii) Local supplementary bonding is required to connect together the terminal of the protective conductor of each circuit supplying Class I and Class II equipment in zones 1,2 or 3, and extraneous-conductive-parts in these zones.

(iii) All equipment to be suitable for the zone where it is installed.

(iv) LV socket-outlets not permitted, except for a shaver supply unit.

(v) Except for shavers, portable LV equipment is not permitted.

Diagrams courtesy of the NICEIC

Vent-Axia