

Your guide to a successful fan installation

We take the air that surrounds us for granted and yet small changes in for example - air purity, temperature, humidity and velocity - can effect our performance and at worst make us ill. Designing a ventilation system can in most cases be easily achieved by following the step by step approach described below. However, if the space or the activity is unusual, call in the experts - Xpelair who will be happy to advise and assist in proposing the most appropriate scheme.

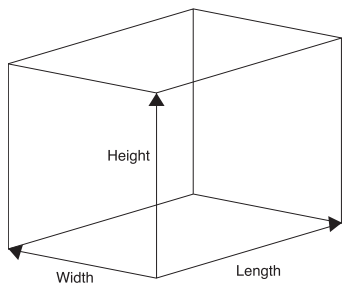
Choosing a Ventilation Solution

The type of system chosen will be dependant on the application and building layout. A ventilation system requires as even a flow of air across an area as possible. The most cost effective method of achieving this is by extract ventilation with appropriate air replacement provision.

In the leisure industry input ventilation is preferred with air escaping from the premises through doors and other available openings. Many schemes use both extract and intake fans which are often connected to a single control system. For fully automatic operation, a range of sensors are available which will switch On immediately when required but only when necessary for energy efficiency.

1. Calculate room volume

Take measurements in metres.



Multiply:

Length x Width x Height = Room m^3 .

Example:

A domestic kitchen 3m x 2.5m x 2.4m = 18 m^3

2. Calculate performance requirement

Multiply room volume by the number of air changes appropriate to the room type from the guide table opposite.

Example continued: Recommended Air Changes Per Hour for domestic kitchens is 10 to 15. 18 m^3 x 10 ACH - 180 m^3/h , 18 m^3 x 15 ACH = 270 m^3/h .

Therefore a fan with an extract performance between 180-270 m^3 is appropriate. NOTE: it is always better to pick a fan at the higher end of the range rather than risk unsatisfactory ventilation.

3. Select your fans from the product extract performance table opposite

Example continued: selection might be a GX6 product: 266 m^3/h , DX400 or CF40: 245 m^3/h , Kitchen canopy: 350 m^3/h .

Further Considerations

Window, wall, ceiling or roof?

For effective operation the extract point should be as far away from the source of air replacement - usually the door, and as close to the source of condensation or smells as possible.

This usually determines the type of fan (window, wall etc.) If the room has no opening windows then a model fitted with an overrun timer will meet the requirements of the building regulations.

For automatic control choose from the convenience of an optional Xpelair humidity or PIR sensor.

Air Replacement

A tight fitting door can prevent a fan from receiving adequate air replacement. A suitable gap between the underside of the door and the floor finish is usually adequate for toilets and bathrooms although Xpelair Slimline privacy air transfer grilles are available. For larger extract volumes air replacement should be carefully considered particularly in tightly sealed properties.

Fuel Burning Appliances

Where a fuel appliance is fitted with a non balanced flue, adequate air replacement must be provided to prevent fumes being drawn down the flue when the fan is operating at its maximum performance. Refer to Building Regulations for specific requirements. Exhaust air must not be discharged into a flue used for exhausting fumes from applications supplied with energy other than electricity.

Intake fans or air replacement grilles should be sited well away from the flue to ensure that gases are not reintroduced into the building. See Building Regulations.

Splash Areas

An electrical product in a bathroom or showerroom must be situated in accordance with IEE zoning requirements. For additional safety Xpelair LoVolt SELV products operating at 12 volts should be considered.

General

When determining the method of ventilation and flow rates the requirements of all authorities concerned must be observed.

Air change requirements

Situation	Air changes per hour
Assembly Rooms*	6 - 10
Bakeries*	20 - 30
Banks/Building Societies*	6
Banquet Halls*	10 - 15
Bathrooms	6 - 8
Bedrooms	2 - 4
Billiard Rooms	6 - 8
Boiler Rooms*	15 - 30
Cafés and Coffee Bars*	10 - 15
Canteens*	8 - 12
Cellars	3 - 10
Churches	1 - 3
Cinemas and Theatres*	6 - 10
Club Rooms	8 - 10
Compressor Rooms	10 - 20
Conference Rooms*	6 - 10
Dairies	8 - 10
Dance Halls	12
Dye Works	20 - 30
Electroplating Shops	10 - 12
Engine Rooms*	15 - 30
Entrance Halls, Corridors	3 - 5
Factories and Workshops	6 - 10
Foundries	15 - 30
Garages*	6 - 10
Glass houses*	45 - 60
Gymnasiums	6
Hairdressing Salons	10 - 15
Hospitals - Sterilising Wards*	DHSS Guidance
Hotel Bars	6 - 10
Kitchens - Hotel or Industrial*	30 - 40
Kitchens - Domestic	10 - 15
Laboratories*	4 - 15
Launderettes	10 - 15
Laundries*	10 - 15
Lecture Theatres*	6 - 10
Libraries*	3 - 4
Living Rooms	4 - 6
Mushroom Houses	6 - 10
Offices*	4 - 6
Photo and X-ray Darkrooms*	6 - 8
Public House Bars	12 - 15
Recording Studios	10 - 12
Restaurants*	10 - 15
Schoolrooms*	8.3 l/s/Person
Shops and Supermarkets	8 - 10
Shower/Bathrooms	15 - 20
Stores and Warehouses	3 - 6
Squash Courts	4 - 6
Toilets (Public)*	5 min / 6 l/s/Pan
Toilets (Domestic)	6 - 10
Utility Rooms	15 - 20
Welding Shops	15 - 30

*Taken from CIBSE Guide, with their kind permission

Product Extract Performance

Product	Extract Performance (m ³ /h)	
	min	max
DX180, DX200 & CF20	36	108
LVDX200 & LVCF20	36	108
DX100 & XX100		76
LV100		85
SL100 & SL150	67	218
CT100 & CT100+	62	169
XIL & XXS	46	133
BriteX LoVolt & Turbo	56	74
XIM	77	845
GX6, GXC6 & GXC9	83	549
DX400 & CF40	61	250
Nouvelle Cuisine	200	851
CX10 & CMF	63	329
Xvent	18	493
Xcell 270	110	290
Xcell 300 & 400	100	400
EverDri	43	259
XRH150	12	31
GX6, GX9 & GX12	266	1614
WX6, WX9 & WX12	246	1715
PX6, PX9 & PX12	246	1712
RX6, RX9 & RX12	206	1100
ChefX	400	2800

Product	Extract Performance (m ³ /s)	
	min	max
XPMA/XPMS	0.68	3.35
XSCA	0.61	3.61
XRMA	0.61	2.95
XMV	0.53	2.47
XDRA Twin	0.07	1.05
XID	0.08	0.46
XIDP	0.07	0.38
XSFA	0.07	1.05
XDFA Twin	0.07	1.05

Airflow Performance

Product	Airflow (m ³ /h)	
	min	max
Digitemp	350	390
WH30, WH60, WHP30 & DCH3000A	115	311
ScreenHeat & PlinthHeat	110	250
SweepFan	8761	13959
Electrostatic Air Cleaners	400	2000
DigiPure	763	3276

Product	Airflow (m ³ /s)	
	min	max
SuperBlowers & ManCoolers	0.86	3.06



Bathroom Zoning

Bath/shower rooms are areas of increased electrical hazard.

When fitting ventilation products in Zones 1 and 2 of a bath/shower room, an ingress protection rating of at least IPX4 is required, in accordance with the requirements of the IEE Wiring Regulations (16th Edition) BS 7671:2001. The following guide will assist specifiers and installers with the selection and positioning of suitable electrical products in this area. If in doubt consult the standard.

Extract from BS7671:2001

601-02 Classification of Zones

601-02-01 These requirements are based on the dimensions of four zones: **Zone 0, Zone 1, Zone 2 and Zone 3**. The zones are determined taking account of walls, doors, fixed partitions, ceilings and floors, where these effectively limit the extent of a zone. Figures 601A and 601B are examples of the zones.

Zone 0 - is the interior of the bath tub or shower basin.

In a location containing a shower without a basin, Zone 0 is limited by the floor and by the plane 0.05m above the floor. In this case:

1. Where the shower head is demountable and able to be moved around in use Zone 0 is limited by the vertical plane(s) at a radius of 1.2m horizontally from the water outlet at the wall, or:
2. Where the shower head is not demountable, Zone 0 is limited by the vertical plane(s) at a radius of 0.60m from the shower head.

Note: Electrical appliances will require an Ingress Protection IPX7 rating, which means the product must be capable of temporary immersion in water.

Zone 1 - is limited by:

1. The upper plane of Zone 0 and the horizontal plane 2.25m above the floor, and
- 2a. By the vertical plane(s) circumscribing the bath tub or shower basin and includes the space below the bath tub or shower basin where that space is accessible without the use of a tool, or
- 2b. For a shower without a basin and with a demountable shower head able to move around in use, the vertical plane(s) at a radius of 1.2m from the water outlet at the wall, or
- 2c. For a shower without a basin and with a shower head which is not demountable, the vertical plane(s) at a radius 0.60m from the shower head.

Note: Electrical appliances should be either IPX4 rated or Safety Extra Low Voltage.

Zone 2 - is limited by:

1. The vertical plane(s) external to zone 1 and parallel vertical plane(s) 0.60m external to Zone 1, and
2. The floor and the horizontal plane 2.25m above the floor.

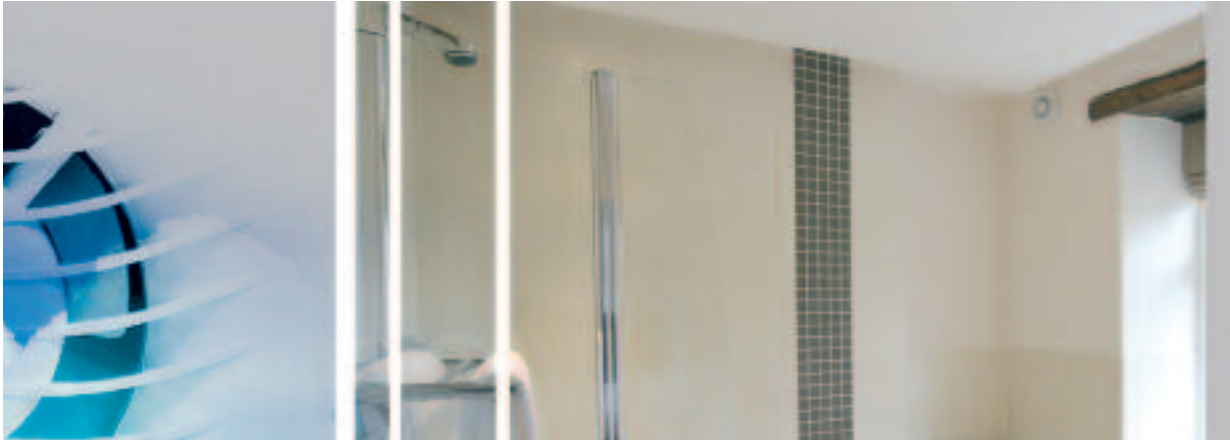
In addition, where the ceiling height exceeds 2.25m above the floor, the space above zone 1 up to the ceiling or a height of 3.0m above the floor whichever is lower, is Zone 2

Note: Most electrical installations fall within this Zone. Electrical appliances should be either IPX4 rated or Safety Extra Low Voltage.

Zone 3 - is limited by:

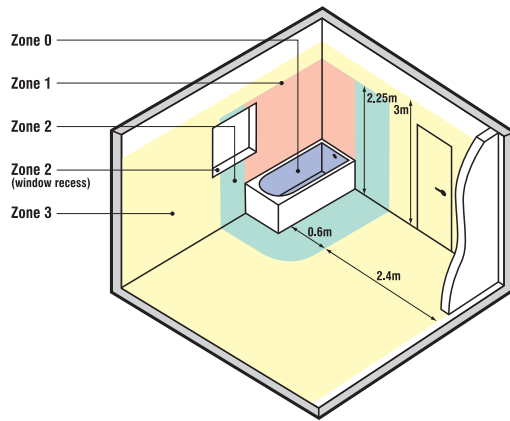
1. The vertical plane(s) external to Zone 2 and parallel vertical plane(s) 2.4m external to Zone 2, and
2. The floor and the horizontal plane 2.25m above the floor.

In addition, where the ceiling height exceeds 2.25m above the floor, the space above Zone 2 up to the ceiling or a height of 3.0m above the floor whichever is lower, is Zone 3.

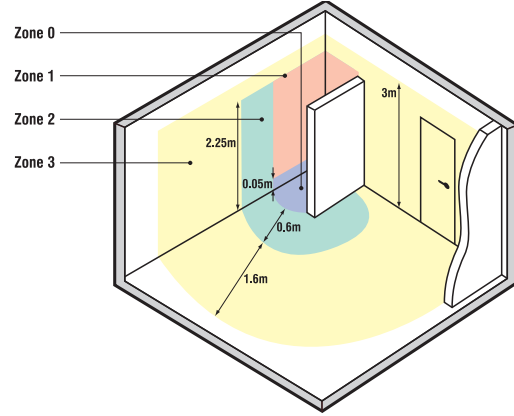


Typical Examples of Zoning

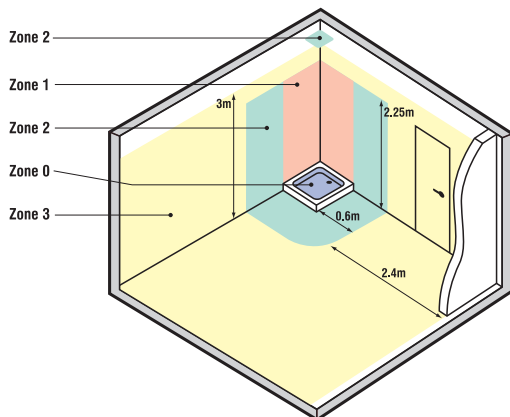
Bath only



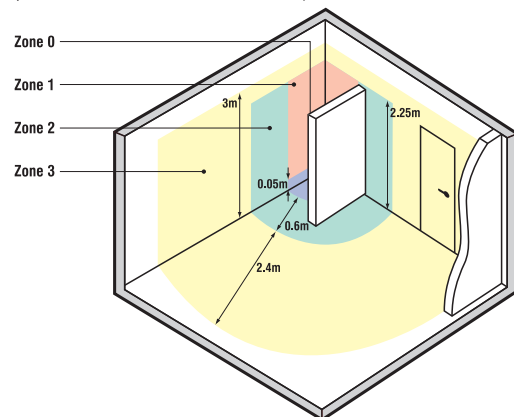
Shower without Tray (with permanently fixed partition - fixed water outlet not demountable)




Shower with Tray



Shower without Tray (with permanently fixed partition - water outlet demountable)





Service and Design Solutions

When buying Xpelair products, you already know that they will be of the highest quality and will provide many years of trouble-free operation.

However, for peace of mind, Xpelair's after sales service is second to none. Products are covered by a **full parts and labour guarantee** from the date of purchase, so should the product become faulty within the guarantee period, it will be repaired by our **dedicated service engineers, totally free of charge**. As market leader, Xpelair prides itself on engineering excellence and the range of services offered to customers.

Application Design

A **free design service** is available to customers wishing to use Xpelair products in their building projects. Design work can be carried out from scaled architect's plans (1:500 min) construction and insulation data of the property, ventilation requirements etc. should be supplied with any request for design work.

- Consultation to select the optimum design and product specification of the job
- Designs that meet both building and health & safety regulations where required
- Sizing and selection of products to your own or national specification requirements
- Estimated operating and equipment costs

Tel: 01782 385779
Fax: 01782 385893

Technical Services

Our Technical Services Call Centre is staffed by a team trained in diagnosing and rectifying potential concerns over the phone, whether or not the product you have purchased is in guarantee. If for any reason they are unable to solve the problem by phone, they will brief an engineer, prior to the visit, to ensure that wherever possible, the problem is fixed first time. The team also provide advice on application, installation and operation, ensuring that the customer receives the full benefit from purchasing an Xpelair product.

Tel: 08709 000430
Fax: 08709 000530

Spares

Regular maintenance and servicing of Xpelair products is recommended to ensure the longevity of your Xpelair product. From time to time it may be necessary to replace components to extend the life of the product.

Xpelair provide a wide range of spare parts covering current and previous products, making maintenance simple and effective.

Tel: 08700 102829

Export

Xpelair is a great British brand in every sense of the word but for many years it has been a world leader in the ventilation and air quality markets with sales in excess of fifty countries world-wide. Xpelair has achieved this by taking into consideration global market requirements and ensuring products are developed to meet these needs, as well as developing products for specific countries and regions, taking into consideration approvals, electrical supply and climate.

Tel: +44(0)1733 456 737
Fax: +44(0)1733 456 727

AC - Alternating current

ach - Air changes per hour. The number of times the volume of air in a room needs to be changed in one hour depending on the activity in that space. Normally given as a range e.g. 15-20 ach based on the level of usage.

Amps FLC - Full Load Current. Current at normal fan/motor running speed.

Amps SC - Starting Current. This is higher than amps FLC. Controllers and starters need to be sized accordingly.

Axial - Propeller Fan. Draws air from behind the blade to the front. Ideal for low pressure applications and expelling directly to the outside.

Building Regulations Documents - Documents approved by the Secretary of State as guidance to meeting the Building Regulations 1991. Part F: ventilation to the living space; Part C: the structure; and Part J: provision of air for fuel burning appliances; Part L: improvement to energy efficiency and reduction of CO₂ emissions.

CENELEC - European Committee for Electrical Standardisation

Centrifugal - Also known as radial fans Used where a high total pressure is required. Ideal for longer ducting runs.

Condensation - In Buildings. Small water droplets forming where air with high RH has contact with a cold surface (e.g. a mirror).

Conversion factor - Used to convert from one set of units to another e.g. 1 l/s x 3.6 = m³/h.

dB(A) - Unit of sound measurement based on pressure measurements taken at 8 octave bands. Sound diminishes as distances from the sound source increase.

DC Motor - Direct current motor. DC motors used in Xpelair fan products have an electronics interface which allows them to be connected to a normal ac supply. DC motors consume less electrical power, run cooler and therefore have an extended life expectancy.

Document F - Refers to approved Document F 'Means of Ventilation' in domestic and non-domestic building. F1: means of ventilation.

Document L - Refers to Approved Document L 'Conservation of fuel and power'. Compliance reduces the levels of natural air change.

FID - Free air discharge. Performance without any system resistance.

Filter classes -

Coarse filter	EU1 - EU4
Fine filter	EU5 - EU9
Absolute filter	EU10 - EU14

G.S.M. - Galvanised sheet metal

House Dust Mite Genus
Dermatophagoides - skin eater.
Species: pteronyssinus.
Arachnids about 0.2 - 0.3mm long.
Habitat: bedrooms and family rooms where shed skin flakes and warm moist conditions are present. Because they are heavily contaminated with faecal pellets, dust mites are identified as allergenic material linked to asthmatic eczema, hayfever and other allergic conditions.

IEE Regulations - Publication of the Institute of Electrical Engineers. Also known as BS 7671. A safe and best practice document used throughout the electrical installation industry.

IP Rating - Classification of degrees of protection for an electrical product developed by CENELEC. First digit describes degree of protection from solids, the second from liquids. Examples: IP44
1st digit: protected against solid objects over 1mm. 2nd digit: protected against sprays from all directions. IPX7 1st digit not tested or not relevant. 2nd digit: protected against the effects of temporary immersion between 15cm and 1m of water.

l/s litres per second - Measurement of volume flow.

LoVolt - Term used to describe SELV 12V product.

m³/h Cubic metres per hour - Measurement of volume flow rate

m³/s Cubic metres per second - Measurement of volume flow rate

MEV - Mechanical extract ventilation. A central extract unit drawing air from several extract points and discharging through a single outlet.

Micron - Measurement equal to one millionth of a metre or one thousandth of a millimetre.

Mixed Flow - Radial impeller with a static pressure increase over an axial blade design. Ideal for short duct runs or direct extraction of air in exposed areas.

Motor Insulation Class - (B or F) Motor insulation system classification indicating the maximum motor working temperature for normal motor-life expectancy.

m/s - metres per second. Air velocity or speed.

MVHR - Mechanical ventilation with heat recovery.

Pa - Unit of pressure (Pascal) for measuring system resistance or static pressure. 1 Pa = 0.10mm H₂O.

PVS - Positive ventilation system

Often referred to as positive pressure ventilation. Pressurises a building driving air out through gaps in the building envelope.

RH - Relative humidity. The ratio of the amount of water in the air at that temperature. Expressed as a % RH. UK outside humidity levels are regularly between 60-70%RH. Indoors with heating and appropriate ventilation a level of between 60 - 40% is most comfortable. See also Condensation.

r.p.m. - Revolutions per minute

Sensor Control - Fan switch activated by a change in selected ambient condition e.g. humidity, temperature etc.

SELV - Safety Extra Low Voltage
Often referred to as separated low voltage. Used to describe fans operating under 50V (usually 12V).

Temperature - Shown in this publication in degrees Centigrade (or Celsius). Ideal target temperatures for ventilation design are:
Summer: between 19 and 24°C
Winter: between 18 and 23°C

Thermal Overload Protection - A safety component designed to interrupt the current to a motor before the windings exceed their design operating temperature. Types: One shot - acts like a fuse and cannot be reset. Self-resetting - reconnects the current when the temperature returns to an acceptable level. Manual reset - usually fitted to industrial fans and is a requirement for inline duct fans; requires manual resetting.

Transformer Control - Provides a number of fixed voltage output to vary the speed of speed controllable fan motors. Available in single phase and 3 phase.

UV stabilised - Additive or treatment designed to counter the deteriorating effects of ultraviolet radiation from strong sunlight.

VOC - Volatile Organic Compound
An organic chemical. Used in a wide range of products: paints, varnishes, solvents, wax, disinfectants, cosmetics, aerosol sprays, insect repellents, air fresheners, dry cleaned clothing, degreasers and fuels. Can cause health effects from irritation to toxic.

Watt - Unit of power equal to one Joule per second. Power ratings of products are quoted in Watts. One kW is 1000W e.g. 1.2 kW = 1200W.

Xcell - Heat recovery cell made of thin membrane polymeric or non-ferrous materials. Allows two separated currents of air to pass through the cell, giving up extracted heat to the incoming fresh air flow, whilst reducing its relative humidity.