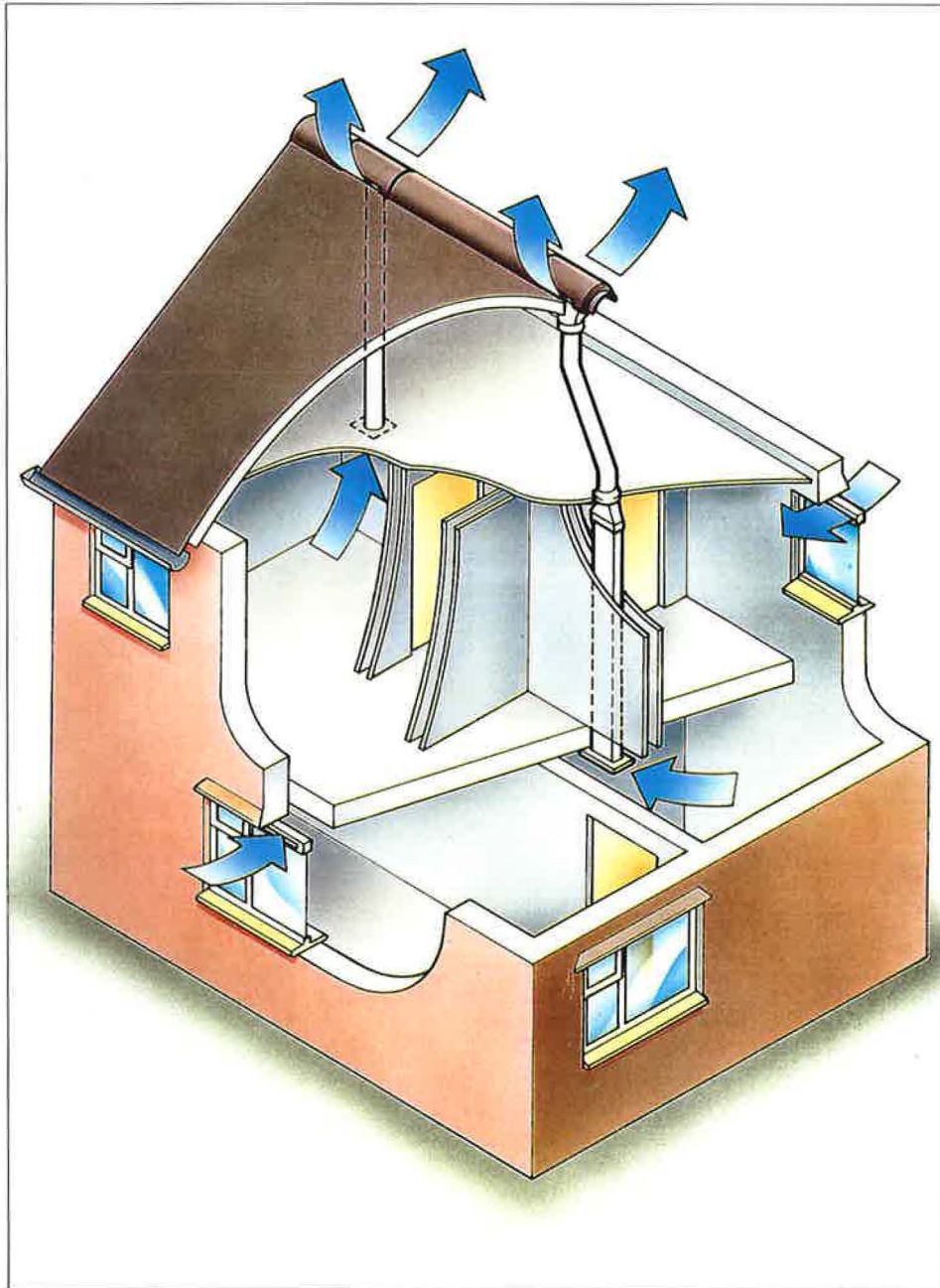


WHOLE-HOUSE NATURAL VENTILATION SYSTEMS

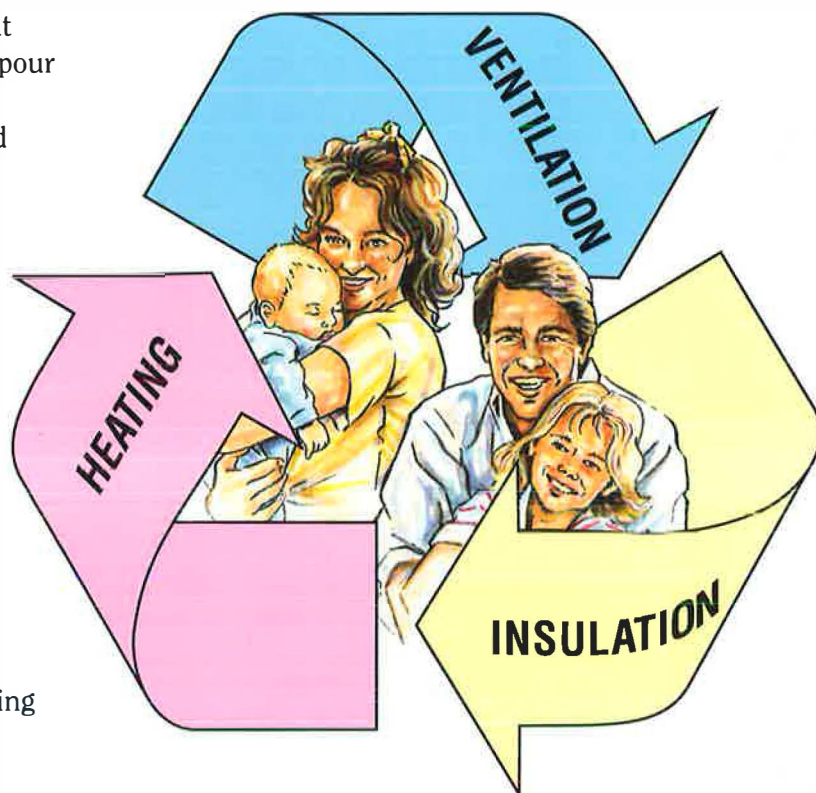


WHY VENTILATE?

The home environment should be designed for comfort and health, whilst at the same time minimising energy consumption. Such design requires a balance of three elements: heating, insulation and ventilation. All three are equally important to the indoor environment, and the well-being of the occupants.

Ventilation is needed:

- To remove moisture and combat condensation from moisture vapour generated by washing, baths, showers, washing machines and people.
- For comfort, to bring in fresh air and avoid nausea and stuffiness.
- For health, to remove pollutants such as tobacco smoke, dust mites which cause allergies, and chemicals which can be released by building materials.
- To prevent damage to the building and decoration.



Ventilation and energy savings

Ventilation is essential, but it has an energy cost. It is therefore vital to select the most energy-efficient form of ventilation.

Controlled passive stack ventilation (PSV) is recognised by the NHER energy rating software as the most energy-efficient method of ventilation available.

Passivent is a system of controlled natural ventilation which ventilates the whole house, and automatically responds to demand. Passivent PSV uses no electrical power.

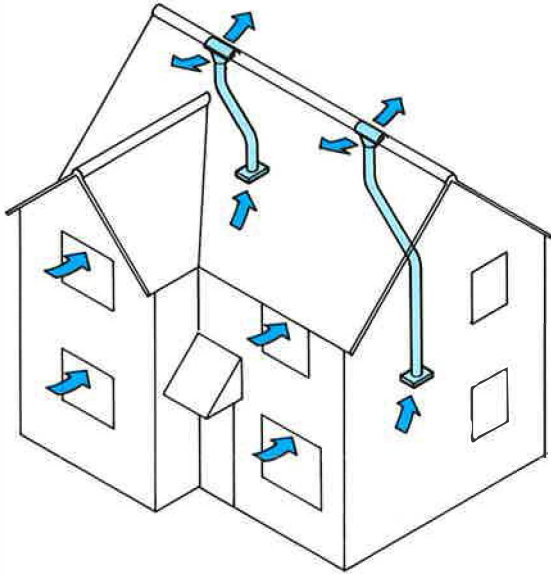
Building regulations

Passivent systems can be used to satisfy the requirements for ventilation set out in the 1995 Approved Document F1 (England and Wales) and Part K (Scotland) for all domestic and domestic-type facilities (see page 19 for more information). It also meets the requirements for security, avoiding draughts and preventing rain ingress.

PASSIVE STACK VENTILATION (PSV)



Passivent PSV controlled passive stack ventilation operates on simple natural principles.



Stack effect

Ducts run from 'wet' rooms - kitchens, bathrooms etc - up to roof terminals. Warm moisture-laden air is extracted and rises up the ducts by the stack effect, requiring no electric fan or power source.

Fresh air

Wall or window inlets provide a flow of replacement fresh air into the building as required.

Planned air flow

The position of inlets and extracts ensures that air always moves from 'dry' rooms to 'wet' rooms, where it is extracted.

Demand control

Each 'intelligent' inlet and extract vent is automatically controlled by room humidity. The ventilation rate thereby responds to the ventilation need in individual rooms. No electrical connection or external power source is required.

ASSISTED VENTILATION (AV)



Passivent AV assisted ventilation is based on similar principles to PSV, but is designed for larger or more complex installations.

Extract

Extract vents are installed in 'wet' rooms, and connected by ducting to a low-power continuously running fan in a concealed position (eg the roof space). One fan can serve more than one dwelling, for example several flats in one block.

Fresh air

Wall or window inlets provide a flow of replacement fresh air into the building as required.

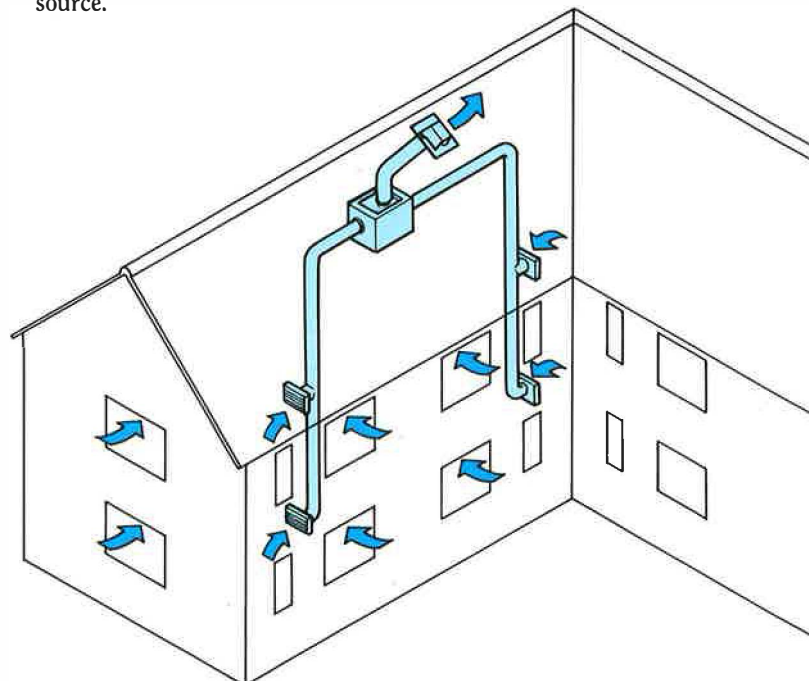
Planned air flow

The position of inlets and extracts ensures that air always moves from 'dry' rooms to 'wet' rooms, where it is extracted.

Demand control

AV systems are automatically demand controlled by humidity-sensitive inlet and extract vents, responding to the ventilation

need in individual rooms. These vents need no electrical connection or external power source.



HOW DOES IT WORK?

Demand-controlled ventilation

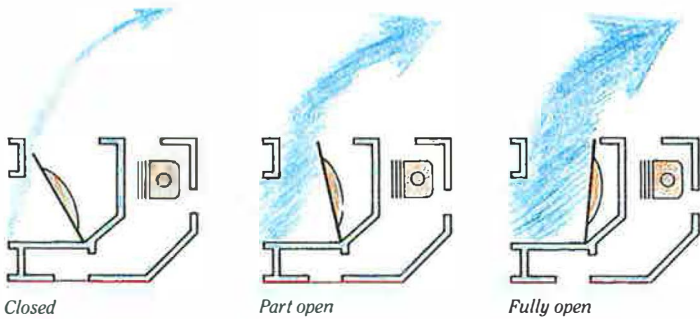
Passivent PSV provides automatic humidity-control of ventilation without using electrical power.

Inlets and extracts open and close (to a trickle) automatically to allow greater or lesser air flow depending on the humidity levels in each room.

The inlet incorporates a flap control, the extract a louvre control, which are operated by humidity sensitive nylon strips. These strips respond to humidity in the air by contracting or elongating; this is the physical basis for control of the vents without the need for electrical power.

The vent opens progressively and automatically as room air humidity increases, and closes as it decreases.

Operating range between minimum and maximum opening of the vents is 40% to 70% RH (relative humidity).



The inlet design directs incoming air upwards to avoid draughts and promote good mixing in the ceiling area, pre-warming the incoming air.

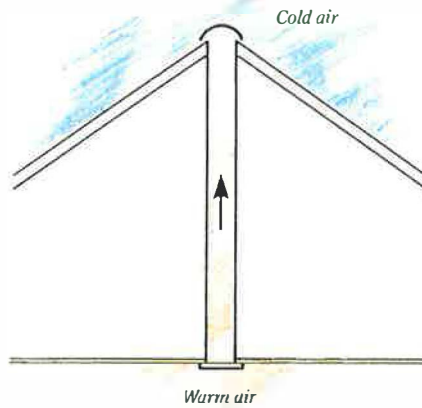
At low relative humidity each unit closes down to a trickle setting, allowing a small controlled amount of air to pass at all times.

Each unit is individually tested and calibrated under laboratory conditions. Large numbers of installed units have demonstrated trouble-free and efficient operation in actual use. Over 50 000 units are in use in the UK alone, giving trouble-free ventilation at all times.

Ventilation effect

Passive stack ventilation is driven primarily by the natural stack or convection effect by which warm air rises, entering a vertical (or near-vertical) duct, to reach the colder outside air.

The air inside a house is almost always warmer than that outside. So the warm air inside rises up the ventilation duct by a natural convection effect, carrying moisture with it.



There is an additional contribution from wind blowing across the roof which creates a suction effect at the terminal (the Venturi effect). However, this wind effect is not essential to the operation of the system, and experience shows that systems continue to function fully effectively even if there is no wind. The convection effect and Venturi effect interact according to the prevailing weather conditions.

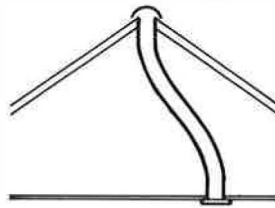
Control of air flow is maintained by response to humidity levels inside the building. When the humidity is low, the ventilation rate is minimised irrespective of external weather conditions.

SYSTEM SELECTION

Passivent PSV

Humidity controlled, for individual houses, bungalows, flats etc. New build or refurbishment.

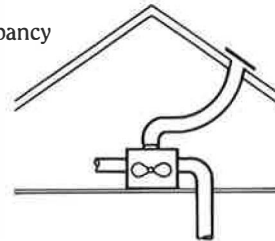
Page 8



Passivent AV

Humidity controlled, for flats and multi-occupancy premises. New build or refurbishment.

Page 12



Passivent PSV-M

Manually controlled low-cost simple system, for private or tenanted properties.

Page 16

TYPICAL APPLICATIONS

Social housing

New build: houses	Page 8
Refurbishment: houses	Page 8
New build: flats	Page 12
Refurbishment: flats	Page 12

Multi-occupancy buildings

Student accommodation	Page 12
Nursing homes	Page 12
Other applications	Page 12

Private housing

New build: houses	Page 8
New build: bungalows	Page 8
New build: flats	Page 12

Noise reduction

New build	Page 17
Refurbishment	Page 17

BENEFITS OF PASSIVENT

DEMAND CONTROL FOR COMFORT

Passivent systems provide fully automatic, demand-controlled ventilation. They respond to humidity levels, and hence to occupants' activities, giving optimum comfort conditions.

WHOLE-HOUSE VENTILATION

Passivent systems ventilate the whole-house, but respond to demand in each space individually, providing correct levels of ventilation room by room, 24 hours a day.

ENERGY EFFICIENCY

Passivent systems score higher on the NHER energy rating programme than any other form of ventilation (AIVC report). Buildings can be more energy efficient, CO₂ emissions are minimised, and occupants can enjoy lower fuel bills.

COMBAT CONDENSATION AND MOULD

Assured, effective ventilation helps to combat condensation and mould growth. This brings long-term health benefits and minimises future refurbishment costs. 15% of the UK population suffers some form of allergy problem, often caused by mould and house dust mites. A household of four people can generate up to 14kg (24 pints) of moisture vapour per day (BS 5250).

CONTINUOUS GENTLE EXTRACTION

The continuous gentle extraction of Passivent systems is quiet and unobtrusive, and therefore unlikely to be tampered with by occupants. Continuous low-level ventilation is more effective in removing the lingering humidity which often results from domestic activities such as cooking, drying clothes, bathing and showering. The low extraction rate poses no threat of combustion fumes spillage (see also page 18).

AUTOMATIC BOOST EFFECT

Humidity-sensitive control provides an automatic boost effect as an integral feature, by allowing greater airflow when condensation risk is high. As the humidity level falls, the airflow is correspondingly reduced. The operating range starts at 40%RH, giving close correlation of ventilation with humidity/CO₂ levels.

IDEAL FOR DISABLED

With automatic response and no operating controls, Passivent is ideal for the disabled and elderly.

MEETS BUILDING REGULATIONS

Passivent meets all the requirements of Building Regulations Approved Document F1 (England and Wales) and Part K (Scotland) for ventilation in domestic buildings (see page 19 for more details).

SIMPLE INSTALLATION

Systems are easily installed; no electrical connections are required on Passivent PSV; a single electrical connection to the fan on Passivent AV. Once installed, no further adjustment is necessary. Passivent is ideal for refurbishment and new build projects.

UNOBTRUSIVE

Inconspicuous air inlets and ridge terminals are almost unnoticeable from outside.

MINIMAL MAINTENANCE

Simple and reliable components with few or no moving parts.

DESIGN SUPPORT

Comprehensive design expertise is available from Willan for more complex systems.



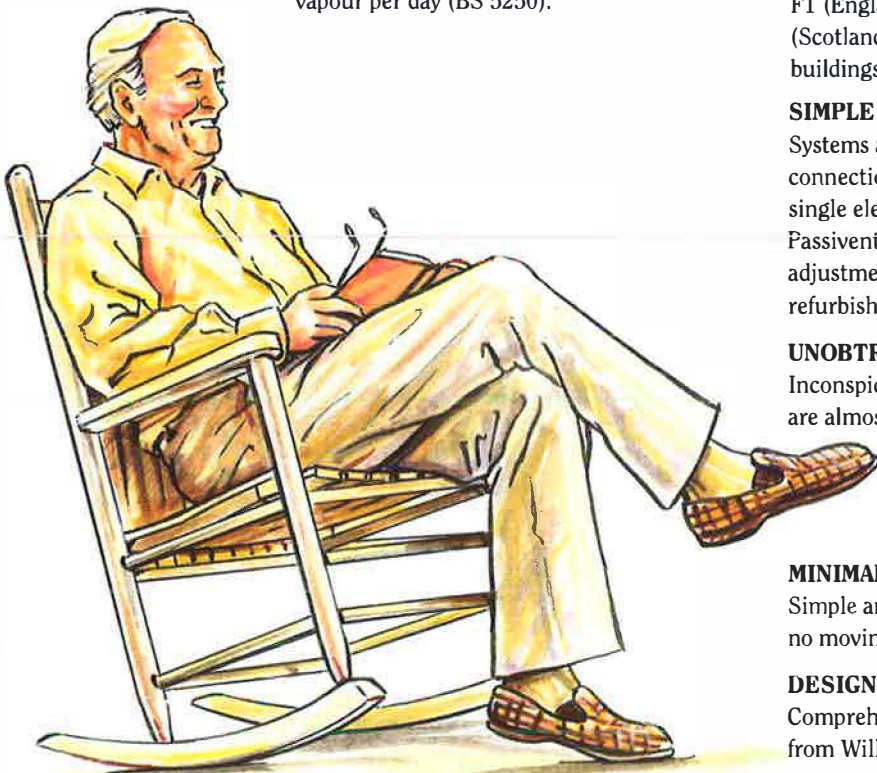
At high humidity levels the automatic extract grille opens.



At low humidity levels the automatic extract grille gradually closes.



NATIONAL HOME ENERGY RATING



BENEFITS OF PASSIVENT

UNRIVALLED EXPERIENCE

There is a vast experience with Passivent systems over many years in Europe and the UK. Many satisfied clients have reaped the benefit of improved air quality with Passivent; some of these projects are described in Passivent case studies.



MASTERCARE™ INSTALLER SCHEME

We recommend that installation is carried out by a specialist Passivent Mastercare Installer. The Mastercare scheme, operated by Willan Building Services Limited, comprises well-established and reputable companies who have been fully trained and assessed by Willan to install any Passivent system in both new build and refurbishment projects.

Mastercare provides:

- Assurance that work is carried out by trained and experienced installers.
- Quality installations.
- Compliance with relevant codes of practice.
- Competitive costs.

All Passivent Mastercare Installers hold a certificate from Willan. They are regularly monitored to ensure standards of work are maintained, and also receive full technical support from Willan Building Services.

PASSIVENT VS EXTRACT FANS

Mechanical extract ventilation fans present a number of disadvantages compared with PSV systems.

- Fans do not properly ventilate the whole house.
- Fans consume electrical energy whenever they are running.
- Many humidistat fans only start to operate at 65-70%RH.
- Timer controlled fans do not relate extraction to need; they tend to run on for long periods, causing noise disturbance and wasting energy.
- The noise disturbance to occupants and neighbours, especially at night, can lead to residents disabling fans, making them useless.
- Fans can only effectively ventilate a room when they are running.
- Duct runs from fans must be limited in length (maximum about 2 - 2.5 metres).
- Fans require regular maintenance for proper operation.
- When used with open-flued appliances, fans may cause combustion fumes to spill back into the room. This represents a serious risk to occupants (see page 18 for more details).





PASSIVENT PSV-HUMIDITY CONTROLLED

Passivent PSV provides simple automatic ventilation by means of non-electric humidity-sensitive air inlets and extracts. These monitor the humidity level in each room and adjust accordingly to provide balanced ventilation room by room. This provides greater comfort and energy savings.

Air movement depends on simple principles - the temperature difference inside and outside.

There are no mechanical parts, no electrical connections or power consumption.

Systems are suitable for most types of dwellings: detached, semi-detached and terraced houses, bungalows and flats, and for both new build and refurbishment.

The major benefit of Passivent is its effectiveness - effective ventilation provides immediate benefits to the occupants, and long-term benefits to the Housing Association in reduced maintenance and refurbishment costs. Passivent PSV is now regularly installed in Sanctuary Housing Association new build properties.



Passivent PSV has been installed in high energy rated properties. The unobtrusive ridge terminals and air inlets blend in well with the design of the properties. The sophisticated humidity sensitive inlets and extracts provide effective ventilation by modulating airflow in individual rooms.

Mr & Mrs Bennett were delighted with their new ventilation system, writing to their local authority thanking them that it significantly improved their chronic catarrh and breathing problems. Passivent PSV has been installed in much of Northavon District Council's housing stock.



Passivent PSV has been installed in many other Local Authorities including Wolverhampton Metropolitan Borough Council.

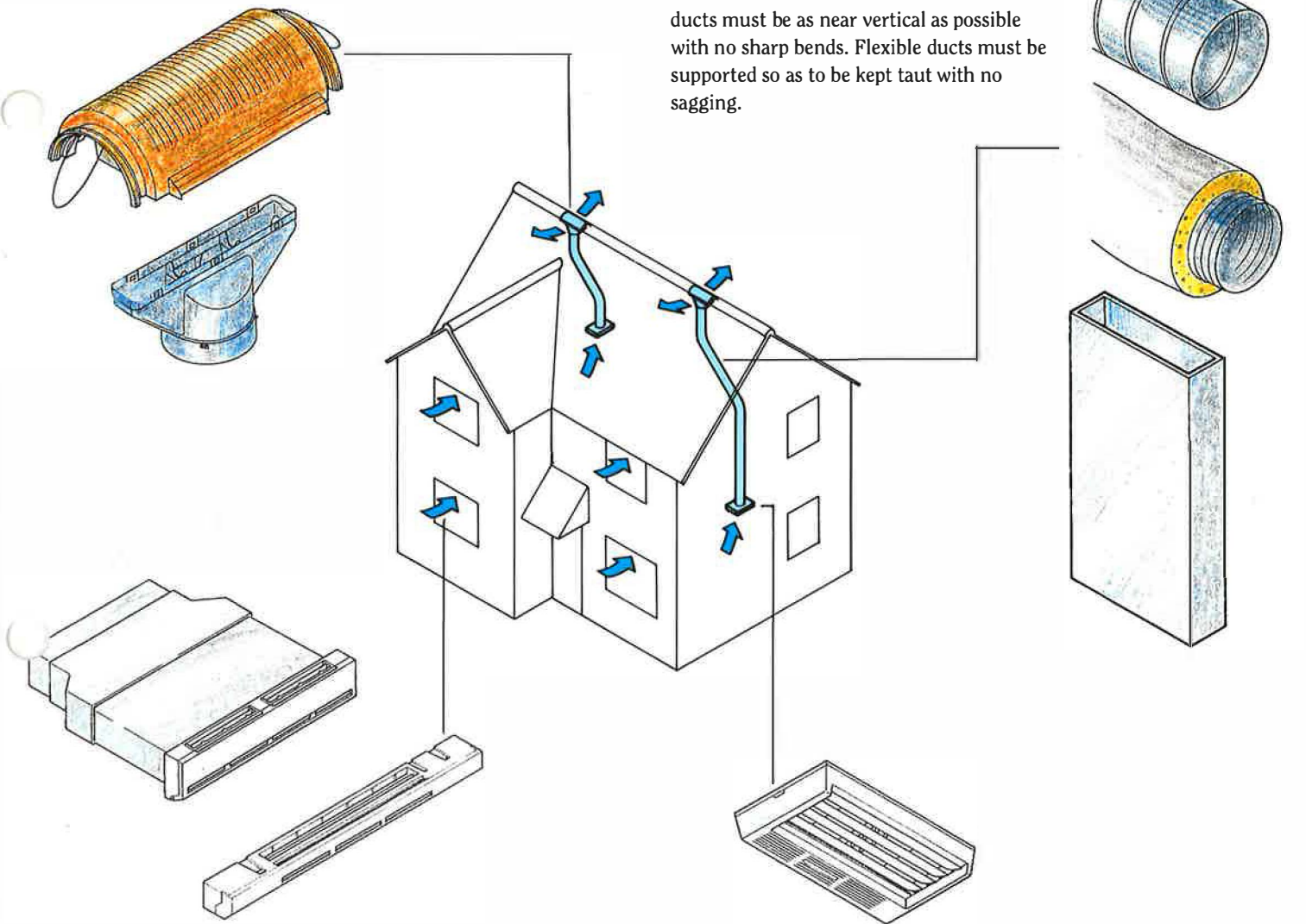
PASSIVENT PSV SYSTEM

RIDGE TERMINALS

Stale, moist air is removed from the house and exhausted through the ridge terminals. A ridge terminal must be provided for each duct rise, ie one for the kitchen, one for the bathroom etc. Ridge terminals are available to match most manufacturers' ridge tiles and so blend into the roofline, making them almost indistinguishable from ground level.

DUCTWORK

Ductwork within the heated envelope of the house (eg running through the first floor) is uninsulated. Ducts are normally sited in a fitted wardrobe or airing cupboard, or can be discreetly positioned in a corner. Flat Channel Ducting can be fitted within stud partition walls. Duct runs in the roof space are insulated to avoid the risk of condensation within the ductwork. All ducts must be as near vertical as possible with no sharp bends. Flexible ducts must be supported so as to be kept taut with no sagging.



AIR INLETS

Fresh air is introduced into the house through unobtrusive wall or window inlets. The inlets are non-electric and adjust automatically depending on the humidity level within each room, allowing the correct level of ventilation. The external airbrick grille blends into the surrounding brick area inconspicuously.

AIR EXTRACTS

Stale, moist air is extracted from 'wet' rooms (kitchen, bathroom, utility) at the non-electric passive extracts. The louvres automatically open and close depending on the humidity level within the room, allowing the correct level of ventilation.

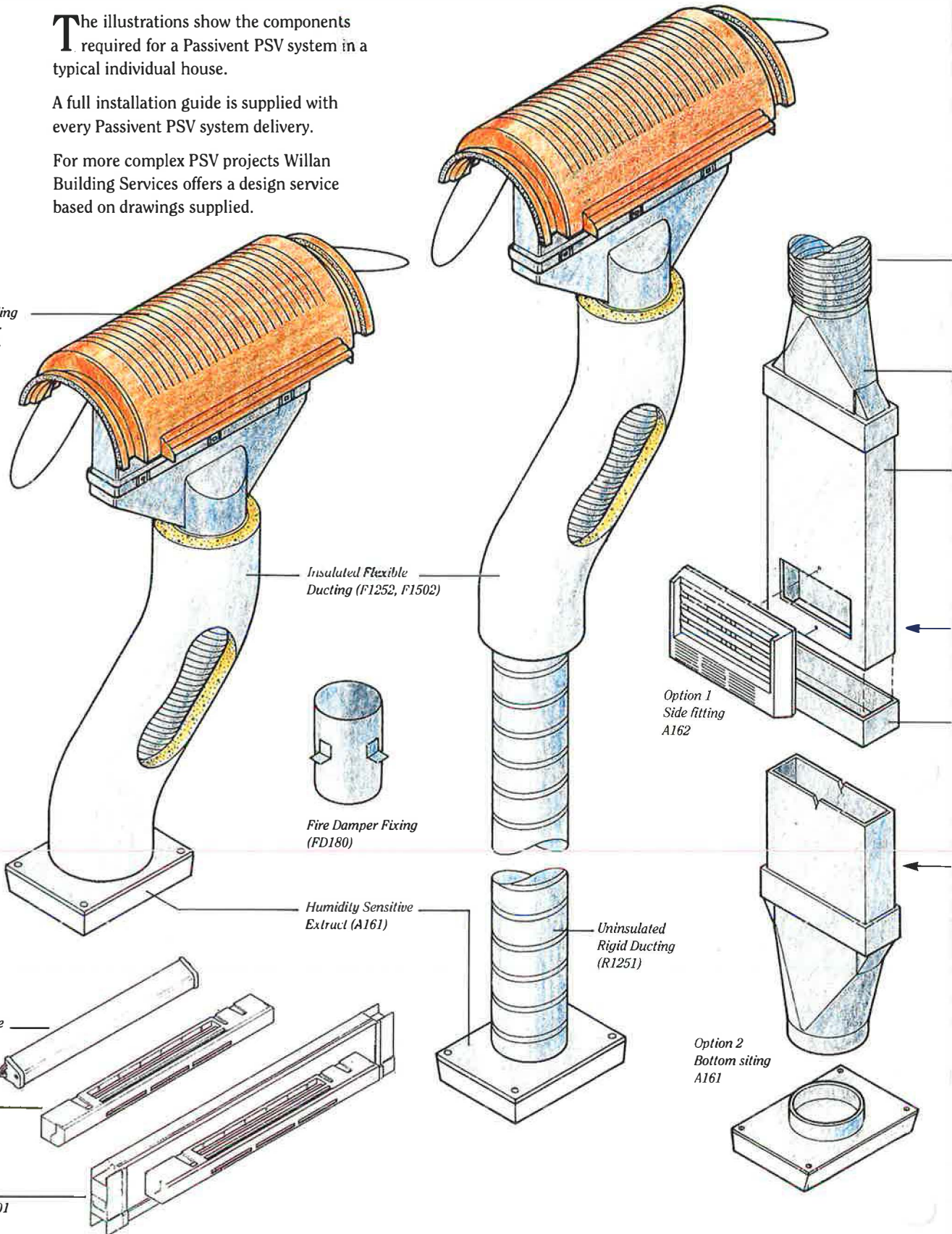
**PASSIVENT PSV-
COMPONENTS AND INSTALLATION**

The illustrations show the components required for a Passivent PSV system in a typical individual house.

A full installation guide is supplied with every Passivent PSV system delivery.

For more complex PSV projects Willan Building Services offers a design service based on drawings supplied.

Ridge Terminal (PRT 15,25,35,45,46) including Ridge Pipe Adaptor for connecting to circular ducting



Insulated Flexible Ducting (F1252, F1502)

Fire Damper Fixing (FD180)

Humidity Sensitive Extract (A161)

Uninsulated Rigid Ducting (R1251)

Option 1 Side fitting A162

Option 2 Bottom siting A161

External Canopy Grille (PVCG4)

Humidity Sensitive Window Inlet (A101) fitted to window head

Overglass Vent Bar (PVOG) fitted with A101

PASSIVENT PSV- COMPONENTS AND INSTALLATION

ROOF TERMINALS

Ridge terminals are normally used for PSV systems. Where the house layout does not permit the use of a ridge terminal, a Tile/Slate Terminal (TT9) can be used sited within three tile/slate courses from the ridge.

Terminals are available to match most tile manufacturers' colours and profiles.

DUCTING

A separate 125mm duct is required for each extract. Uninsulated Flexible or Rigid Ducting (F1251 or R1251) may be used only within the heated parts of the house. Insulated Flexible Ducting (F1252) must be used in unheated spaces, including the roof space, to prevent condensation forming within the duct and running back into the building.

Ductwork should take the shortest route with the minimum number of bends and offsets. Any offsets must be within 45° of vertical. All flexible ducting must be kept as taut as possible and be supported throughout. All connections must be sealed with tape and clamped.

AIR EXTRACTS

One extract is required in the kitchen, and one in the bathroom (and also utility room, separate wc where necessary). Site extracts within 1m of cooker (where applicable) but not directly above it, away from doors or windows and direct sources of dry heat. Extracts should preferably be in the ceiling, but an A162 can be located on a wall, at least 1.8m above floor level, connected to Flat Channel Ducting. Passive extract grilles may also be needed in a utility room and separate wc if applicable.

AIR INLETS

Wall or window inlets are required in each habitable room: living room, dining room, bedrooms, and should be minimum 1.8m above floor level.

Humidity Sensitive Window Inlet (A101) with trickle facility, fitted to a slot in the window head.

Overglass Vent Bar (PVOG), supplied fitted with Humidity Sensitive Window Inlet (A101) and installed above the glass within the window frame.

External Canopy Grille (PVC4) provides weather and insect protection for window inlets.

FLAT CHANNEL DUCTING

Designed for snug fitting into corners, or within the voids of stud partition walls (size 204 x 60mm). Not for use in the roof space. The circular adaptor allows connection to circular ducting. All connections must be taped.

Humidity Sensitive Extract (A162) without spigot must be used with flat channel ducting.

AIR TRANSFER GRILLES

Air transfer grilles provide for internal air transfer from 'dry' to 'wet' areas, but they should not be necessary unless the average gap around internal doors is less than 2mm.

FIRE DAMPER

Fire Damper Fixing (FD180) comprises a Fire Damper fitted in a metal backplate for siting directly behind a ceiling extract. It may be required where a duct passes through a fire separating floor, and provides a minimum of 1 hour fire resistance, tested to BS 476: Part 8.

Specification clauses

Provide ventilation complying with Building Regulations Approved Document F1 (England and Wales) and Part K (Scotland) by means of a whole-house passive stack ventilation (PSV) system. The system shall comprise humidity-sensitive wall/window inlet vents operating between 40% and 70% relative humidity sited in rooms as required; humidity-sensitive ceiling extracts sited in kitchen, bathroom and utility room; each extract to be ducted separately to roof terminals matching and forming an integral part of the ridge.

Roof terminal to provide a nett free area of 12 3000mm² and condensation groove in line with the BRE guidelines IP 13/94 and must provide insect protection and weather protection.

The system to be Passivent PSV system supplied by Willan Building services Limited, 2 Brooklands Road, Sale, Cheshire M33 3SS, Tel: 0161 962 7113, Fax: 0161 969 5346. Layout and installation must comply with any design recommendations supplied.

Installation to be in accordance with the manufacturer's instructions by a Passivent Mastercare trained installer holding a current certificate.

— Circular Uninsulated Flexible or Rigid Ducting (F1251, R1251)

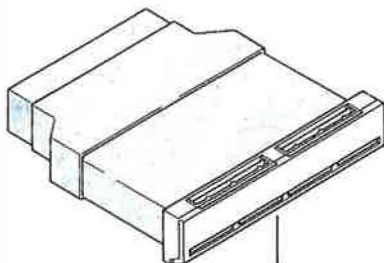
— Circular Adaptor (FCA6) with Circular Connector (FCA4)

— Flat Channel Ducting (FCD1)

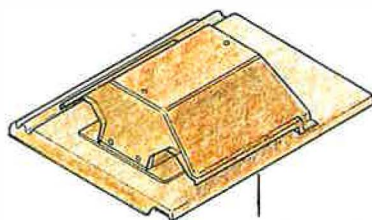
— Option 1; where stud wall on ground and 1st floor align, site vent on wall.

— Stop End (FCA2)

— Option 2; where stud wall on 1st floor does not follow on ground floor, terminate and site extract on kitchen ceiling.



Humidity Sensitive Wall Inlet (A111) with external airbrick grille (PV250)



Tile/Slate Terminal (TT9)
* Patent Pending

PASSIVENT AV-ASSISTED VENTILATION



Passivent AV follows the same basic principles as Passivent PSV, but the extraction is driven by a single low-wattage continuously-running fan, providing extraction for a whole dwelling, for a number of flats, or for several rooms in multi-occupancy premises.

This makes the system suitable for larger domestic premises, and allows, for example, several flats to be served by one fan and one system, reducing running costs and energy consumption per dwelling still further.

Like Passivent PSV, the AV system comprises humidity sensitive inlets sited as required, eg in bedrooms and living rooms, with humidity sensitive extracts sited in 'wet' rooms, eg kitchens and bathrooms. This means that, although the fan runs continuously, the ventilation rate in each of these rooms is regulated to provide the exact ventilation requirements throughout the dwelling.

The fan is the only component requiring a power supply. It is specially designed for efficient extraction of low volumes of air along lengthy ducts; conventional ducted fans cannot do this efficiently.

Passivent AV is suitable for both new build and refurbishment applications.



NEW BUILD NURSING HOME

New build nursing home in Hertfordshire for Quantum Care by Castle Construction.



REFURBISHMENT OF FLATS

Refurbishment of flats in Bristol by Quattro Design.



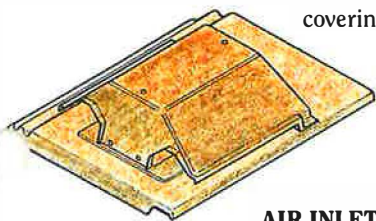
NEW BUILD PRIVATE FLATS

New build private flats in Banbury by Roman Homes

PASSIVENT AV SYSTEM

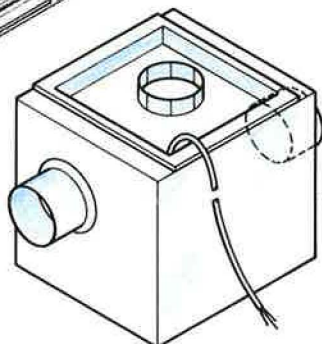
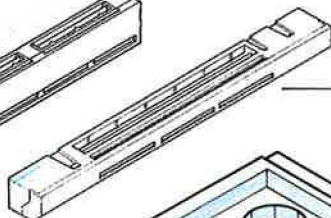
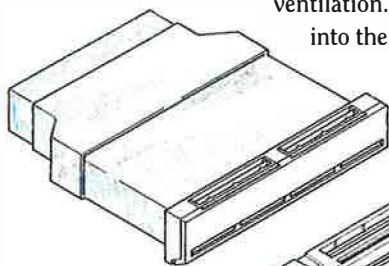
TERMINALS

Stale, moist air is removed from the dwelling and exhausted through tile/slate roof terminals or wall terminals. Tile/slate terminals are available in five standard house colours (red, grey, terracotta, brown, red streak), and in profiles to match most common tile profiles. Also to match tile manufacturers' colours or existing roof coverings to special order.



AIR INLETS

Fresh air is introduced into the house through wall or window inlets. These are non-electric and adjust automatically depending on the humidity level within each room, allowing the correct level of ventilation. Inlets are unobtrusive and blend into the building design.

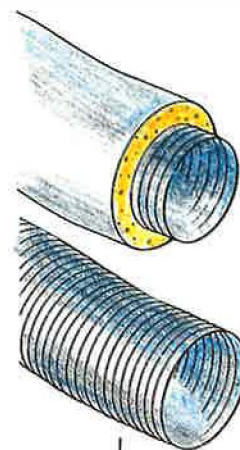


CONTINUOUSLY RUNNING FAN

A single low-power fan (40W or 80W) provides the extraction for one large dwelling or several flats, or several rooms in multi-occupancy premises. Normally installed in the roof space and suspended, or mounted on a polystyrene base, to reduce the possibility of noise transfer. Fan pressure level is virtually constant over a large air flow range, so it operates efficiently whether vents are fully open or virtually closed. Minimal maintenance; occasional cleaning if needed.

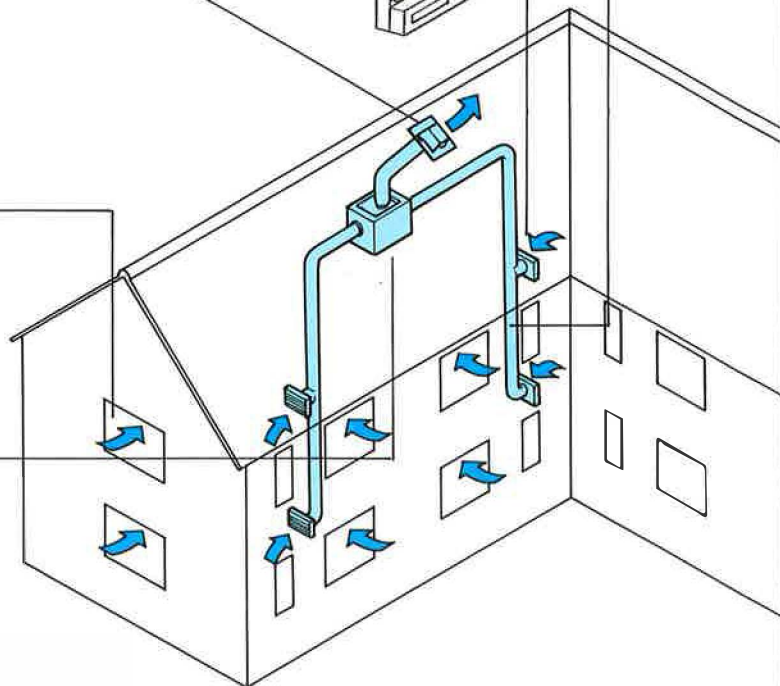
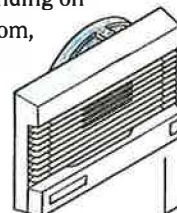
DUCTWORK

Ductwork within the heated envelope of the house (eg running through the first floor) is uninsulated. Ducts are normally sited in a fitted wardrobe or airing cupboard, or can also be positioned discreetly in a corner. Flat Channel Ducting can be fitted within stud partition walls. Duct runs in the roof space must be insulated to avoid the risk of condensation within the ductwork.



AIR EXTRACTS

Stale, moist air is extracted from 'wet' rooms (eg kitchen, bathroom, utility) at the non-electric passive extracts. The louvres automatically open and close depending on the humidity level within the room, allowing the correct level of ventilation.



FIRE PROTECTION

If ducts pass through fire separating floors or walls, the integrity of fire protection must be maintained by installing a Passivent fire damper, operated by fusible link, in the ductwork. Consultation with the local fire officer or building control officer is advisable.



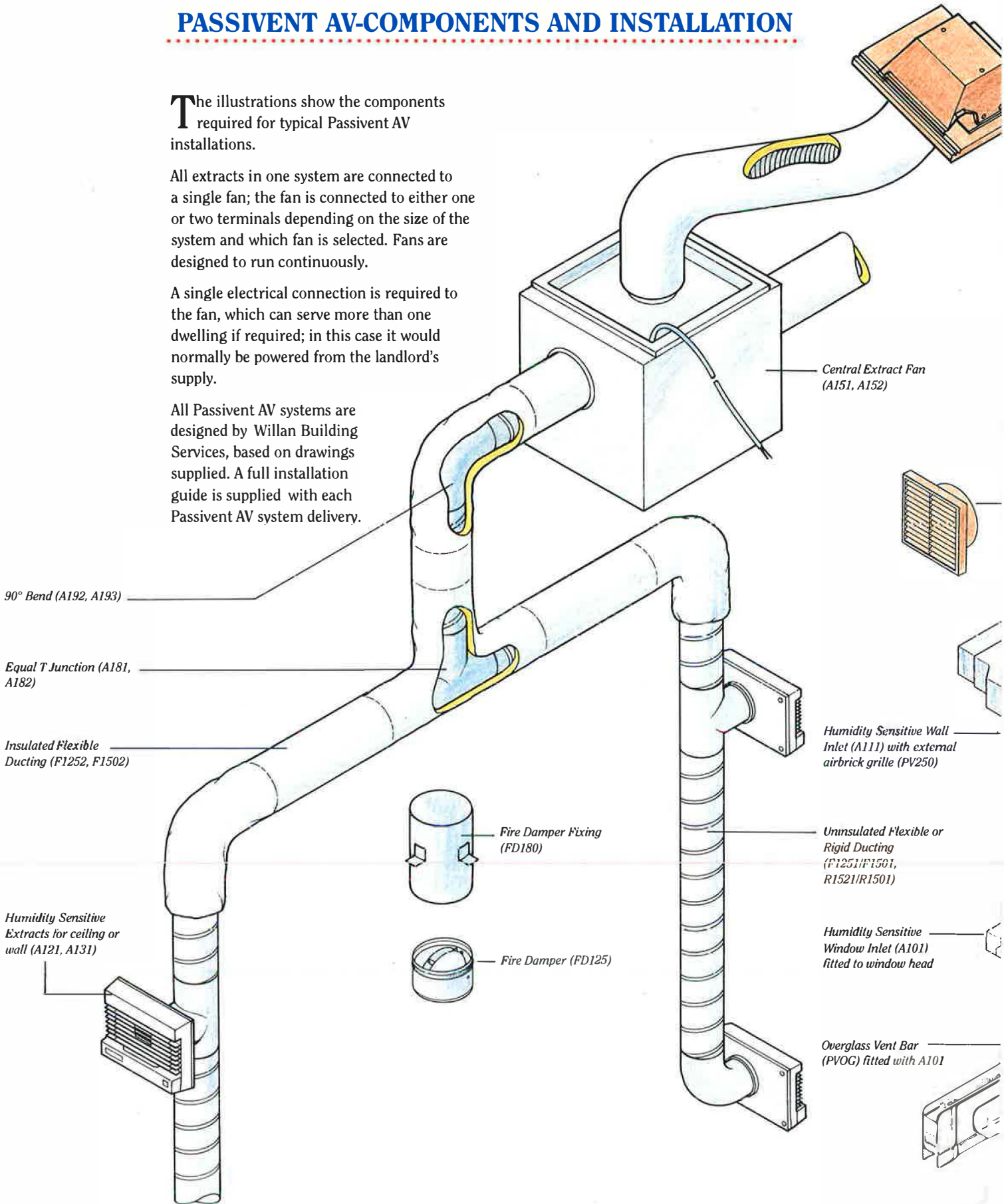
PASSIVENT AV-COMPONENTS AND INSTALLATION

The illustrations show the components required for typical Passivent AV installations.

All extracts in one system are connected to a single fan; the fan is connected to either one or two terminals depending on the size of the system and which fan is selected. Fans are designed to run continuously.

A single electrical connection is required to the fan, which can serve more than one dwelling if required; in this case it would normally be powered from the landlord's supply.

All Passivent AV systems are designed by Willan Building Services, based on drawings supplied. A full installation guide is supplied with each Passivent AV system delivery.



PASSIVENT AV-COMPONENTS AND INSTALLATION

TERMINALS

Ducts from the fan may terminate in the roof slope or in a wall (eg a gable end wall). Tile/Slate Roof Terminals (TT13) fit into the tiling on the roof slope, and are available to match most tile manufacturers' colours and profiles.

Wall Terminals, steel (WT150/80) or plastic (PWT150/33).

EXTRACT FANS

Central Extract Fan A151: 240V 40W, airflow up to 300m³/h. Two 125mm diameter inlets, single 150mm diameter outlet; can be adjusted to suit the ductwork layout.

Central Extract Fan A152: 240V 80W, airflow up to 500m³/h. Two 150mm diameter inlets, two 150mm diameter outlets.

DUCTING

Ducts can be run horizontally as well as vertically; 90° bends and junctions are permissible. All flexible ducting must be fully supported and kept as taut as possible. Uninsulated ducting may be used only within the heated parts of the building. Insulated flexible ducting must be used in unheated spaces, including the roof space, to prevent condensation forming within the duct and running back into the building. All ducting is available in 125mm and 150mm internal diameter. All connections must be sealed with tape and clamped.

DUCT ACCESSORIES

All accessories installed within unheated spaces must be fully insulated with 25mm insulation. 90° Bend 125mm or 150mm (A192, A193). Equal T Junction 125mm or 150mm (A181, A182). Reducing T Junction 125mm branch, 150mm main (A188). Staggered Cross Piece 125mm branches, 150mm main (A185). Reducer 125/150mm (A175). Male Sleeve Coupling 125mm or 150mm (A171, A172). Female Sleeve Coupling 125mm or 150mm (A173, A174).

AIR EXTRACTS

One extract is required in each 'wet' room: kitchen, bathroom, and also utility room, separate wc where necessary. Site extract within 1m of cooker (where applicable) but not directly above it, away from doors or windows and direct sources of dry heat. Wall extracts must be 1.8m min above floor level.

Humidity Sensitive Extracts:

A121 extraction rate 8 - 65m³/h, generally for bathrooms. A131 extraction rate 15 - 75m³/h, generally for kitchens. Constant Volume WC Extract (A141) for separate WC room only. Can be set for 15, 30, 45 or 60m³/h extraction rate. Humidity Sensitive Extract (A133) with Boost Control (A132) provides boosted extraction of 140m³/h for 20 minutes. No mains electrical connection is required.

AIR INLETS

Wall or window air inlets are located in all habitable rooms, (living room, bedroom etc.). Minimum height 1.8m above floor level. Humidity Sensitive Wall Inlet (A111) with external airbrick grille (PV250). Humidity Sensitive Window Inlet (A101), fitted to a slot in the window head. Overglass Vent Bar (PVOG), supplied fitted with Humidity Sensitive Window Inlet (A101) and installed above the glass within the window frame. External Canopy Grille (PVCG4) provides weather and insect protection for window inlets.

FLAT CHANNEL DUCTING

Designed for straight runs fitting snugly into corners, or within the voids of stud partition walls (see page 11). Used with A121 or A131 Extract and Circular Adaptor FCA6.

FIRE DAMPERS

Fire Damper (FD125) may be required where a duct passes through a fire separating floor or wall. It provides a minimum of 1 hour fire resistance, tested to BS 476: Part 8. Installed within a short length of rigid ducting (or see below).

Fire Damper Fixing (FD180) comprises a Fire Damper fitted in a metal backplate for siting directly behind a ceiling extract.

Fire Damper Assembly (FDA125, FDA150) comprises a Fire Damper ready-fitted in a 400mm length of 125mm or 150mm rigid ducting.

AIR TRANSFER GRILLES

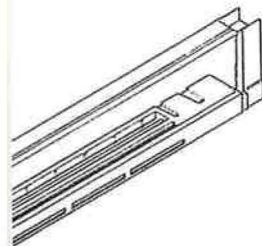
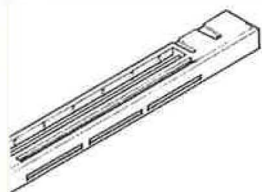
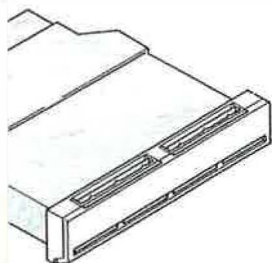
Air transfer grilles provide for internal air transfer from 'dry' to 'wet' areas, but they should not be necessary unless the average gap around internal doors is less than 2mm.

Specification clauses

Provide ventilation in accordance with Building Regulations Approved Document F1 (England and Wales) and Part K (Scotland) by means of humidity-sensitive whole-house ventilation system. The system shall comprise: Humidity-sensitive wall/window inlets sited in rooms as required. Wall inlet to incorporate adaptor and inconspicuous airbrick grille. Humidity-sensitive ceiling extracts sited in kitchen and bathroom ducted to a continuously running low-power fan in the roof space, and from the fan to roof or wall terminal. Roof terminal to provide insect protection and weather protection. All ducting in roof space to be fully insulated with 25mm insulation. The system to be Passivent AV system supplied by Willan Building services Limited, 2 Brooklands Road, Sale, Cheshire M33 3SS, Tel: 0161 962 7113, Fax: 0161 969 5346. Layout and installation must comply with any design recommendations supplied. Installation to be in accordance with the manufacturer's instructions by a Passivent Mastercare trained installer holding a current certificate.

Tile/Slate Roof Terminal (TT13)

Wall Terminals, steel (WT150/80) or plastic (PWT150/33)



PASSIVENT PSV-M - MANUALLY CONTROLLED

Passivent PSV-M is a manually-controlled passive stack ventilation system.

This system operates on the passive stack effect described on page 4. It differs from the PSV and AV Systems in that the inlets and extracts do not give automatic humidity-sensitive control. However, the system is still largely self-regulating in that airflow is accelerated when the temperature difference between inside and outside is greater, ie during cold weather when condensation risk is greater.

Passivent PSV-M systems represent a lower capital cost and can be designed to meet the requirements of most projects.

COMPONENTS

- Ridge terminal (PRT 15, 25, 35, 45, 46)
- Tile/Slate Roof Terminal (TT9)

Air inlets

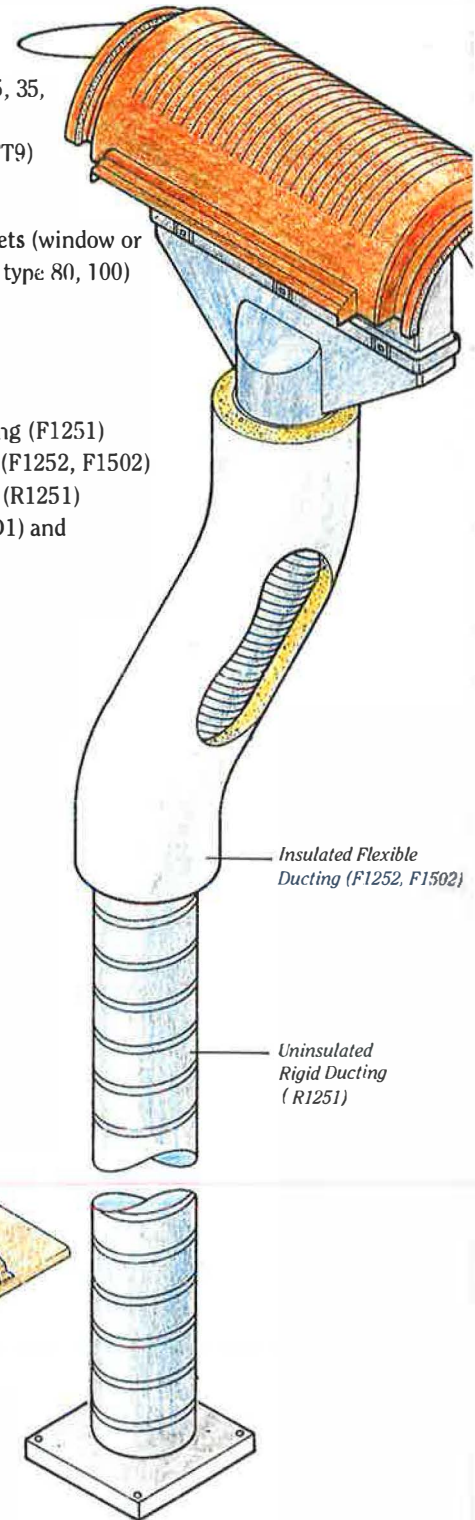
Manually controlled air inlets (window or wall PVFV4, PVCG4; Fresh type 80, 100)

Air extracts

Ceiling Extract (CE125)

Ducting

- Uninsulated Flexible Ducting (F1251)
- Insulated Flexible Ducting (F1252, F1502)
- Uninsulated Rigid Ducting (R1251)
- Flat Channel Ducting (FCD1) and accessories



HOUSING ASSOCIATION, NEW BUILD

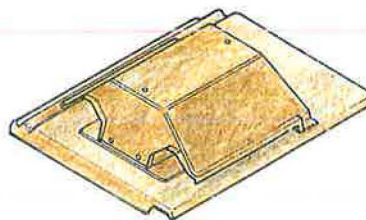


Housing Associations have fitted many Passivent PSV-M systems. (Recent project at Hartlepool, Three Rivers Housing Association)

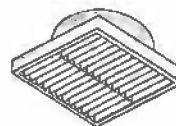
HOUSING REFURBISHMENT



Passivent PSV-M systems have also been installed by Warrington Borough Council in their refurbishment programme.



Tile/Slate Terminal (TT9)



Ceiling Extract (CE125)

PASSIVENT ACOUSTIC ACCESSORIES

Ridge Terminal (PRT 15,25,35,45,46) including Ridge Pipe Adaptor for connecting to circular ducting

NOISE REDUCTION

In particularly noisy areas it may be necessary to install a sound-insulated Passivent system to minimise the level of noise transfer into the building from outside.

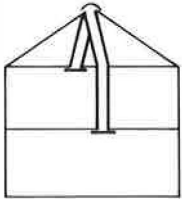
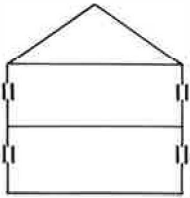
Depending on local planning requirements, this should normally only be necessary in severely exposed areas, eg adjacent to major roads, railways or airports. Usually the problem can be tackled satisfactorily by fitting noise attenuating vents on those apertures facing the noise source.

Both Passivent PSV and Passivent AV can be supplied in sound-insulated form, at two levels:

Primary level involves the use of acoustic inlets, eg wall inlets can be provided with acoustic wall sleeves, minimising the transfer of noise through them.

Secondary level includes the additional provision of acoustically insulated ductwork, minimising the transfer of noise down the ducting from the roof terminal.

The system can be individually designed to help meet the noise reduction targets set by the client or local authority.



ACOUSTIC SYSTEMS

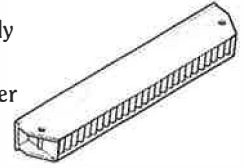


Mercian Housing Association has recently installed acoustically treated Passivent PSV and Passivent AV Systems in Walsall.

ACOUSTIC COMPONENTS

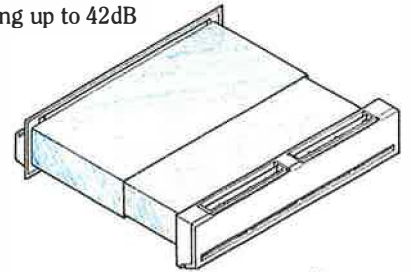
Acoustic window air inlet

PVA2 Acoustic vent baffle fitted externally giving up to 39dB sound reduction when used in conjunction with appropriate inner vent.

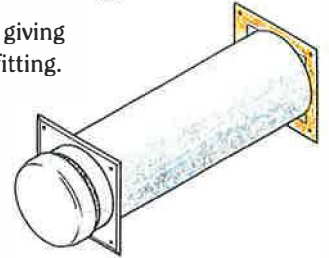


Acoustic wall air inlets

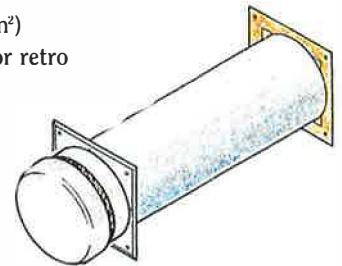
A11dB Humidity sensitive wall inlet with integral acoustic material giving up to 42dB sound reduction.



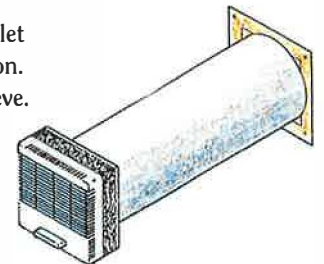
Type 80dB Fresh wall inlet (4000mm²) giving 50dB sound reduction. Ideal for retro fitting. 140mm diameter circular sleeve.



Type 100dB Fresh wall inlet (6000mm²) giving 42dB sound reduction. Ideal for retro fitting. 140mm circular sleeve.



Type 99HdB Humidity sensitive wall inlet (6000mm²) giving 45dB sound reduction. Easily retro fitted. 140mm circular sleeve.



Acoustic wall cowl: external weather and noise protection cowl for Type 99HdB giving overall sound reduction of 47dB.

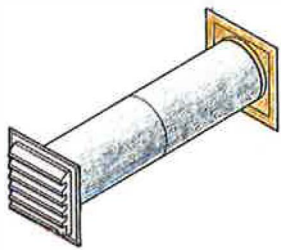


PASSIVENT COMBUSTION AIR SUPPLY

PROVISION OF COMBUSTION AIR

In addition to PSV, spaces containing open-flued (non room-sealed) heating appliances burning gas, solid fuel or oil, must have a permanent ventilation opening to provide sufficient combustion air, as required by Approved Document J1/2/3.

Combustion air vents should have a permanent opening and be draught-free to discourage occupants from blocking them. Willan offer a range of vents for this purpose; more information is given in a separate brochure.



Passivent Combustion Air Inlet Fresh Type 16 through-wall vent. 5750mm² opening, for gas appliances up to 19kW input.

HEALTH AND SAFETY

Approved Document F1 (1.8) states that mechanical extract ventilation (ie using powered fans) can cause spillage of flue gases from open-flued appliances even if the fan is not in the same room as the appliance, and even if a combustion air vent is provided as above. Such spillage is dangerous to occupants and therefore special precautions and tests may be necessary. Passivent PSV systems provide continuous extraction at a rate which ensures spillage does not present a hazard.

ENERGY AND THE ENVIRONMENT

The Government is committed to a reduction in emission of greenhouse gases to combat global warming. Over a quarter of the CO₂ generated in the UK comes from housing, so greater energy efficiency in homes can contribute significantly to reduction in CO₂ emissions.

The adoption of energy-efficient measures for heating and ventilating houses is therefore vital. Controlled passive stack ventilation (or PSV) is recognised by NHER as the most energy-efficient method available.

The National Home Energy Rating (NHER), developed by the independent National Energy Foundation, is a comprehensive way of measuring the energy efficiency of houses, taking into account all relevant factors including ventilation. It incorporates the Government's Standard Assessment Procedure for energy rating (SAP), and is supported by the NHBC. Willan Building Services is a member of the NHER scheme and has an accredited assessor.



NATIONAL HOME ENERGY RATING

BUILDING REGULATIONS

Approved Document F1 (England & Wales) and Part K (Scotland)

Building Regulations Approved Document F1 1995 edition gives requirements for ventilation of domestic buildings (which include dwelling houses, flats, student accommodation and residential homes). All rooms require provision for rapid ventilation (eg an opening window). There are also specific requirements in different types of room for background ventilation and extract ventilation.

PSV

The requirement for extract ventilation can be satisfied by "Passive stack ventilation provided in accordance with BRE Information Paper 13/94 or with appropriate third party certification such as a BBA Certificate..."

Alternative (AV)

As an alternative approach, "... the requirement will be satisfied by following the relevant recommendations of: ... BS 5720: 1979 Code of practice for mechanical ventilation and air-conditioning in buildings. The relevant clauses are 2.3.2.1, 2.3.3.1, 2.5.2.9, 3.1.1.1, 3.1.1.3 and 3.2.6; or ... BS 5250: 1989 Code of practice for the control of condensation in buildings. The relevant clauses are 6, 7, 8, 9.1, 9.8, 9.9.1 to 9.9.3 and Appendix C..."

Passivent AV systems meet these requirements.

Roof Terminals

Two Passivent Slate/Tile Terminals with a T Junction sited above a single stack achieve the extract performance of Ridge Terminals described in IP13/94 - Source BRE.

REFERENCES

The Building Regulations 1991 (amended 1994).

Approved Document F1 'Means of ventilation', effective from 1 July 1995.

Building Regulations (Scotland) Approved Document K 1997 for Ventilation of Buildings.

Approved Document J1/2/3 'Heat producing appliances' 1990, amended 1992.

BS 5250:1989 'Code of practice: the control of condensation in buildings'.

BS 5720:1979 'Code of practice for mechanical ventilation and air conditioning in buildings'.

BRE Information Paper IP 13/94 'Passive stack ventilation in dwellings'.

FURTHER INFORMATION

Other products

Willan Building Services market a range of other ventilation products including:

Passivent Natural Ventilation for non-domestic buildings

Passivent High-Capacity Ventilation Terminals

Passivent Tricklevents

Passivent Fresh wall ventilators

Kingfisher Ventilation Louvres

Kingfisher Solar Shading Systems

Kingfisher Continuous Rooflights

Glidevale roof ventilation products

Glidevale underfloor, through and cavity wall vents

Glidevale and Passivent combustion air vents as well as a range of other building components.

WILLAN

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Willan Building Services Ltd maintains a policy of continuous development and reserves the right to amend product specifications without notice.

