iPSV™
INTELLIGENT PASSIVE STACK VENTILATION: DOMESTIC SYSTEMS
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Passivent iPSV™ - intelligent passive stack ventilation - is the most sustainable and environmentally-friendly domestic ventilation strategy available.

It provides numerous ‘green’ benefits compared with mechanical ventilation heat recovery (MVHR) or other mechanical systems.

- **Meets current building regulations**
  Confirmed by BBA certification

- **Equals or betters the performance of mechanical systems including heat recovery**
  Demand controlled - ventilation rate as required
  Reduces heat loss
  Performs effectively even in airtight buildings
  Meets moisture criteria as specified within regulations

- **Uses no power**
  Saves energy
  Cuts CO₂ emissions
  Silent operation
  Can’t be turned off

- **Lasts the life of the building**
  Virtually no maintenance throughout its life
  No replacement components needed

- **Low lifetime cost**
  Low capital cost because there is no fan or heat recovery unit
  No replacement unit costs
  Virtually no running costs because no power used and no maintenance.

- **Experience and authority**
  Backed by Passivent’s unrivalled experience and proven track record
  Benefits are substantiated by independent, authoritative technical studies and assessments.

Passivent iPSV™ is the most sustainable and environmentally-friendly domestic ventilation strategy available.
Building Regulations recognition
Efficient and effective ventilation is mandatory under building regulations for modern airtight dwellings and to meet the increasingly important need for energy conservation.

Passivent’s iPSV™ solution allows the most up-to-date ventilation requirements to be met with ease.

True values of PSV performance are now recognised and substantiated by the latest versions of the authoritative documents:

- Approved Document F1 2010 for ventilation.
- Approved Document L1A 2010 for conservation of fuel and power in new dwellings.
- BBA certification for Passivent iPSV.
- Passivent iPSV can also be used to satisfy the requirements of the relevant building regulations in Scotland and Northern Ireland, as stated in the BBA certificate.

Ventilation performance
The update of Building Regulations Approved Document F1 Means of Ventilation in October 2010 now recognises the performance of Passive Stack Ventilation in airtight buildings down to 0m³/hr/m² air leakage rate.

The Institute of Energy and Sustainable Development at De Montfort University has conducted studies into the performance of Passivent iPSV which demonstrate that the system provides sufficient ventilation even under challenging or non-optimum conditions.

These studies provide independent proof of the performance of the PSV system which led to its acceptance in Approved Document F1.

Meeting Building Regulations
Meeting building regulations requirements for ventilation rates can be difficult in practice. The BBA approved iPSV system allows building regulations to be met with ease.

To meet building regulations it is required to show that the dwelling provides levels of ventilation as specified within Approved Document F1. The levels are determined to ensure that the moisture content and air quality within the dwelling are below the criteria specified.

The BBA certificate provides proof that iPSV meets the requirements for moisture content as specified within Appendix A, and ensures adequate air quality.

SAP 2009 software update
Alongside the building regulations updates, SAP calculation software has been updated. SAP 2009 takes into consideration the performance of passive stack systems in airtight buildings. The SAP software makes allowances for heat loss, use of supplementary heating systems and power usage. Combined, this gives a complete view of the performance of the system.

Securely based on research, these latest updates to building regulations and SAP software show the real performance of PSV in ventilating even the most airtight of properties.

In summer months
When external temperatures are higher, the PSV stack effect is reduced. Passivent iPSV has been shown to work effectively even in these conditions.

The IESD study, conducted between 1st April and 30th September, showed that the average ventilation rate was 12.1 litres per second, meeting regulations. It also showed the lowest average levels of relative humidity.

In wet rooms with no external wall or window
Passivent iPSV ventilates through ceiling extracts via ducting to the roof, so access to an external wall or window is not needed.

The IESD study, conducted between 1st April and 30th September, which showed that the average ventilation rate was 12.1 litres per second was modelled on an internal wet room with no windows, with a designed air tightness of 3m³/hr/m².
Technical background

Ventilation of a dwelling

Required to meet the Building Regulations Part F (Approved Document F1).

Ventilation strategy is also a factor in meeting Part L for conservation of fuel and power (Approved Document L1A for new dwellings).

Standard Assessment Procedure

SAP is used to assess the energy performance of dwellings. SAP calculations are performed by approved software and trained assessors.

SAP indicators include the Dwelling Emission Rate (DER), ie the rate of emission of CO₂ in relation to floor area (kg/m² per year). Approved Document L1A places limits on permissible DER.

Air permeability

Based on air leakage volume rate per hour per m² of envelope area at a pressure differential of 50Pa, and is used in establishing DER. A rate of 2 to 4m³/h/m² would currently be regarded as 'good'.

Code for Sustainable Homes

(DCLG) Homes are rated from Code level 1 to 6 based on a range of criteria including energy use and CO₂ emissions, with minimum standards for each code level. These include percentage improvements to DERs over the regulations as calculated by SAP.

Background ventilation

The independent BBA testing and certification of Passivent IPSVTM shows that only one background ventilator per habitable room is needed to comply with Building Regulations, by meeting the criteria for performance-based ventilation given in Approved Document F Appendix A.

Conventional passive stack systems need several vents in each room to provide the necessary levels of background ventilation, requiring multiple penetrations which are impractical and unsightly.

Thus IPSV complies with building regulations, preserves the aesthetics of habitable rooms, and manages moisture levels and air quality. For more details see page 11.

No energy use - no CO₂ emissions

IPSV needs no input of power, so there are no CO₂ emissions as a result of ventilating a property. This cannot be said for any other ventilation strategy.

Demand controlled

Passivent IPSV is intelligent: extracts open and close in response to humidity levels in ‘wet’ rooms, so ventilation rate is matched to demand. When the need for ventilation reduces, the ventilation rate reduces in-line. Heat is conserved by avoiding unnecessary ventilation, so the use of energy for heating is reduced.

A more than comparable solution

IPSV performance is comparable with or better than other ventilation strategies when assessed through SAP with air leakage rates to zero, and up to Code Level 6 under the Code for Sustainable Homes.

Combining technologies

By combining IPSV with other green passive technologies for waste heat recovery, SAP scores can be reduced dramatically against similar priced ventilation strategies. The same outlay gives better performance, see page 6.

Lifetime cost savings

No moving parts ensures that there is no potential for breakdown and no regular maintenance is required. The comparison between lifetime costs of IPSV and MVHR (mechanical ventilation with heat recovery) systems shows substantial savings for the building owner over the life of the building with IPSV, see pages 6 and 8.

Unrivalled experience and a proven record

Passivent has unrivalled experience over many years in the design and installation of natural and energy-efficient ventilation systems - over 30,000 systems have been installed over the last 15 years.
SAVINGS WITH PSV

Installed cost / energy savings
When designing and building dwellings, Standard Assessment Procedure (SAP) software is used to calculate the performance of the building by its energy usage and carbon emissions. Using iPSVTM can provide a SAP score or Dwelling Emission Rate (DER) which is comparable with or even better than mechanical ventilation systems including MVHR (mechanical ventilation with heat recovery).

The initial cost of a PSV system is dramatically lower than other strategies such as MVHR systems. By using iPSV you can achieve similar, or even better scores.

The table below shows that iPSV and MVHR systems give virtually the same DER at a typical air leakage rate of 5m³/hr/m², but the PSV installed cost gives a saving of £1410 (70% reduction) compared with MVHR.

**Typical installed cost comparison**

<table>
<thead>
<tr>
<th>System</th>
<th>Installed cost £</th>
<th>DER @ 5m³/hr/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSV</td>
<td>590</td>
<td>26.68</td>
</tr>
<tr>
<td>MVHR</td>
<td>2000</td>
<td>26.70</td>
</tr>
</tbody>
</table>

**COMBINED SOLUTIONS**

**PSV cost trade-off**
As an alternative strategy, a PSV combined solution costing approximately the same as an MVHR system can give a significantly lower SAP score.

By combining iPSV with other green passive technologies the DER can be significantly reduced compared to an MVHR system, at no extra installed cost.

Moreover the passive solution has no running or maintenance costs whereas for MVHR these cost are substantial.

**Combined solutions**
A combined solution uses a PSV system plus Flue Gas Heat Recovery (FGHR) and Waste Water Heat Recovery (WWHR) technologies. These align very well with PSV because they are also non-mechanical, silent in operation, require no maintenance and last the life of the dwelling.

FGHR systems recover heat from boiler exhaust gases (approximately £500 installed cost).

WWHR systems recover heat from waste water from shower, bath etc (approximately £650 installed cost).

In the example below, for less initial outlay than a standard MVHR system, a PSV combined solution achieves a lower DER.

**Combined solution comparison**

<table>
<thead>
<tr>
<th>System</th>
<th>Installed cost £</th>
<th>DER @ 5m³/hr/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSV combined</td>
<td>1,965</td>
<td>25.97</td>
</tr>
<tr>
<td>(PSV + GS + SS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MVHR</td>
<td>2,000</td>
<td>26.70</td>
</tr>
</tbody>
</table>

**Renewables - further savings**
In order to reach higher Code Levels, renewable energy sources such as photovoltaics or solar thermal are often seen as a way of achieving target rates.

The combined solution of iPSV plus Flue Gas and Waste Water Heat recovery technologies helps to achieve a lower DER, reducing the requirement for renewables and creating a lower cost installation that still reaches the required Code Level.

**Lifetime cost**
The lifetime cost of a PSV Combined ventilation system is much lower than for mechanical heat recovery (MVHR).

The PSV combined solution requires no replacement components over the life of a dwelling, whereas a mechanical heat recovery unit requires replacement approximately every 10 years.

**Lifetime costs for a typical dwelling**

<table>
<thead>
<tr>
<th></th>
<th>Total cost over 30 years £</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSV Combined</td>
<td>1,995</td>
</tr>
<tr>
<td>(PSV + GS + SS)</td>
<td></td>
</tr>
<tr>
<td>MVHR</td>
<td>12,020</td>
</tr>
</tbody>
</table>

**Notes**

DER (Dwelling Emission Rate) is calculated for typical air leakage rate of 5m³/hr/m².

MVHR data assumes a heat recovery unit with SFP 0.5 and efficiency 88%.
INTELLIGENT PASSIVE STACK VENTILATION: DOMESTIC SYSTEMS

CARBON DIOXIDE AND ENERGY SAVINGS

**Passivent iPSV™ vs standard PSV**
Both Passivent iPSV and standard PSV use no electricity to operate, thus providing energy savings compared with all mechanical systems.

*Annual electrical consumption (kWh) of various ventilation solutions*

<table>
<thead>
<tr>
<th></th>
<th>Standard PSN</th>
<th>Passivent iPSV™</th>
<th>Continuous Mechanical Extract</th>
<th>Continuous Mechanical Extract with heat recovery</th>
<th>Extract Fans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>125</td>
<td>172</td>
<td>359</td>
</tr>
</tbody>
</table>

Passivent iPSV also provides significant energy savings compared with standard PSV when heat loss through ventilation is taken into consideration.

A standard PSV system is extracting all the time. As a result, house heating is constantly required in cold weather to replace the heat lost in extracted air.

Passivent iPSV only extracts air when ventilation is required - ie when relative humidity is high. This results in up to 40% saving in heating, and reduces CO₂ emissions due to ventilation over the year.

Source: BRE study 1997.

**Passivent iPSV™ vs all other systems**
For typical houses, research carried out by the Institute of Energy and Sustainable Development shows that Passivent iPSV gives the lowest CO₂ emissions resulting from gas and electricity use compared with other available ventilation systems.

iPSV reduces unnecessary heat loss due to ventilation, thus saving on gas use for heating, and reducing carbon emissions.

Since iPSV uses no electrical power, it also gives savings in electricity use compared with fans or mechanical extract systems.

**Ventilation systems comparison**
Annual CO₂ production from a typical dwelling using various ventilation solutions

Combined annual CO₂ emissions from gas and electricity (all uses)

**Annual carbon emissions (kg CO₂) from a dwelling using various ventilation solutions**

<table>
<thead>
<tr>
<th></th>
<th>Gas</th>
<th>Electricity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passivent iPSV™</td>
<td>486</td>
<td>73</td>
</tr>
<tr>
<td>Continuous Mechanical Extract with heat recovery</td>
<td>506</td>
<td>73</td>
</tr>
<tr>
<td>Standard PSV</td>
<td>708</td>
<td></td>
</tr>
<tr>
<td>Extract Fans</td>
<td>642</td>
<td>151</td>
</tr>
<tr>
<td>Continuous Mechanical Extract</td>
<td>771</td>
<td>53</td>
</tr>
</tbody>
</table>

0 100 200 300 400 500 600 700 800 900 1000

Annual carbon emissions (kg CO₂)
LONG TERM COST SAVINGS

Lifetime savings
Passivent iPSV™ provides significant savings in equipment replacement costs over the life of the system.

A passive stack ventilation system will last the planned life of a dwelling (source: Energy Saving Trust and BBA). This is because there are no electrical components requiring maintenance and replacement.

With all other ventilation systems, electrical fans are used, which have finite motor lives and will require periodic replacement. Replacements cost money. They also require energy to manufacture, so there is an additional carbon emission factor.

Energy costs of replacements
Each time a replacement fan unit is required, energy costs are incurred for manufacturing (high due to production processes), transport to warehouse and then to site, energy for warehousing, installation energy (including installer travel), and disposal of the expired fan unit. All this energy use will add to carbon emissions every time a fan is replaced.

iPSV has none of these energy costs as it lasts the life of the building. Energy cost for replacements is zero.

Cumulative costs over 30 years life
All cost figures are in £ at current prices

<table>
<thead>
<tr>
<th></th>
<th>iPSV</th>
<th>MVHR</th>
<th>Extract fans</th>
<th>MEV</th>
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</thead>
<tbody>
<tr>
<td><strong>Initial costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parts</td>
<td>300</td>
<td>1500</td>
<td>90</td>
<td>625</td>
</tr>
<tr>
<td>Background vents</td>
<td>45</td>
<td>0</td>
<td>140</td>
<td>40</td>
</tr>
<tr>
<td>Installation</td>
<td>245</td>
<td>500</td>
<td>270</td>
<td>400</td>
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<tr>
<td><strong>Total initial costs</strong></td>
<td>£590</td>
<td>£2000</td>
<td>£500</td>
<td>£1065</td>
</tr>
<tr>
<td><strong>Replacement costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fan motor life</td>
<td>n/a</td>
<td>10 years</td>
<td>5 years</td>
<td>5 years</td>
</tr>
<tr>
<td>Replacements required</td>
<td>0</td>
<td>3 no</td>
<td>6 no</td>
<td>6 no</td>
</tr>
<tr>
<td>Replacement unit cost</td>
<td>0</td>
<td>1000</td>
<td>90</td>
<td>250</td>
</tr>
<tr>
<td>Installation cost</td>
<td>0</td>
<td>225</td>
<td>270</td>
<td>200</td>
</tr>
<tr>
<td><strong>Total replacement costs</strong></td>
<td>0</td>
<td>£3675</td>
<td>£2160</td>
<td>£2700</td>
</tr>
<tr>
<td><strong>Maintenance costs</strong></td>
<td></td>
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<td>Service cost</td>
<td>0</td>
<td>150</td>
<td>0</td>
<td>100</td>
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<tr>
<td>Number of services</td>
<td>0</td>
<td>30 no</td>
<td>0</td>
<td>30 no</td>
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<tr>
<td><strong>Total maintenance costs</strong></td>
<td>0</td>
<td>£4500</td>
<td>0</td>
<td>£3000</td>
</tr>
<tr>
<td><strong>Cumulative cost over 30 years</strong></td>
<td>£590</td>
<td>£10,175</td>
<td>£2660</td>
<td>£6765</td>
</tr>
</tbody>
</table>

**Savings with iPSV** 94% 78% 91%
HOW PASSIVE STACK VENTILATION WORKS

Passive stack ventilation
Passive stack ventilation (PSV) is a whole-house system which ventilates all the rooms in a property effectively, using the concept of planned air routes to ensure a fresh, healthy indoor environment.

The passive stack effect
Passive stack ventilation (PSV) is driven primarily by the natural stack or convection effect by which warm air rises. Warm moisture-laden air from within a house rises up ducting by natural convection. It travels through the ducting to a roof terminal where it is vented to the outside.

Wind blowing across the roof provides additional suction (the venturi effect).

PSV whole-house system
The siting of inlets and extracts ensures that air always moves from dry rooms to wet rooms, so that the whole house is ventilated effectively.

Moisture-laden air is extracted at source directly from wet rooms (kitchens, bathrooms etc).

The air passes through ducting to roof terminals where it is vented to the outside.

No fans are required so no power is used.
Passivent intelligent PSV
Passivent have pioneered an intelligent version of PSV (iPSV) which responds automatically on demand, i.e., when the level of humidity in a room requires ventilation.

Standard PSV systems have extract grilles which are open continuously and extract even when humidity is at a low level - when high levels of ventilation are not required. This causes unnecessary heat loss.

**Intelligent PSV**
Passivent iPSV™ is controlled by ‘intelligent’ air inlets and extracts. These respond automatically to changes in relative humidity, thereby modulating the ventilation rate in each room to meet the varying need. Ventilation levels are matched to demand.

- When room humidity is low, the ventilation rate is minimised, irrespective of external weather conditions, preventing unnecessary heat loss.
- When room humidity is high, the ventilation rate increases, removing moisture rapidly when need is greatest.
- The airflow rate responds continuously to demand, so maximising ventilation effectiveness and minimising heat loss through loss of warm indoor air.
- Ventilation responds to humidity in individual rooms, so further increasing effectiveness and minimising heat loss.
- This method of control uses no electrical power.

**Extracts and inlets**
Both extract grilles and air inlets use non-electrical humidity-sensitive control. Nylon strands in each unit expand or contract in response to humidity levels. This automatically regulates the size of the air opening and varies the ventilation rate accordingly.
BACKGROUND VENTILATION

Building regulations
Background ventilation is required in conjunction with an iPSV™ system to provide whole-dwelling ventilation complying with Building Regulations Approved Document F1.

Passivent window and wall vents provide controllable ventilation at a relatively low level to meet the regulatory requirements.

Passivent iPSV requires only one background ventilator per habitable room to meet the regulations, as shown by BBA testing and certification.

In contrast a standard PSV system would require several ventilators per habitable room, needing multiple unsightly wall/window penetrations. The example below, based on Approved Document F worked example C shows this.

Features and benefits
- Passivent have a comprehensive range of window vents (Tricklevents) and wall vents (Fresh) to meet most requirements.
- Controllable, secure and designed to avoid draughts.
- Automatic humidity-controlled options to ensure the whole ventilation strategy needs no user input.
- Acoustic vents provide good sound insulation for noisy locations, and are available as part of a BBA approved system.
- Colour co-ordination: many Passivent window vents can be supplied in any RAL colour to match windows.

Passivent background ventilation units

<table>
<thead>
<tr>
<th>Through-frame vents</th>
<th>Free area mm²</th>
<th>Equivalent area mm²</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultra Vent and Grille</td>
<td>4000</td>
<td>2800</td>
<td>Slim profile</td>
</tr>
<tr>
<td>Frame Vent and Canopy Grille</td>
<td>4000</td>
<td>3120</td>
<td>Manual opening, 3 positions</td>
</tr>
<tr>
<td>Energy Saver Vent and Canopy Grille</td>
<td>4000</td>
<td>2760</td>
<td>Humidity-sensitive</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wall vents</th>
<th>Free area mm²</th>
<th>Equivalent area mm²</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh 80</td>
<td>4000</td>
<td>2220</td>
<td>Round vent, pull cord</td>
</tr>
<tr>
<td>Fresh 90</td>
<td>6000</td>
<td>2630</td>
<td>Aesthetic vent, slide control</td>
</tr>
<tr>
<td>Fresh 100</td>
<td>6000</td>
<td>3200</td>
<td>Round vent, pull cord</td>
</tr>
<tr>
<td>Fresh 99H</td>
<td>6000</td>
<td>3350</td>
<td>Square vent, pull cord</td>
</tr>
</tbody>
</table>

Passivent iPSV requires only one trickle vent per habitable room compared to four as detailed above.

Ventilation area is defined by building regulations in term of ‘equivalent area’ (England and Wales) or ‘free area’ (remainder of UK and Ireland).

‘Free area’ is simply the size of the ventilation aperture.

‘Equivalent area’ provides a measure of the actual airflow performance of the vent and is determined by the method of BS EN 13141-1:2004.
Passivent iPSV™ systems

A complete Passivent iPSV™ system comprises:

- Humidity-sensitive extracts in each wet room (e.g., kitchen, bathroom, utility) connected to ducting and a roof terminal
- Humidity-sensitive air inlets in each dry room (e.g., living and dining rooms, bedrooms).

Components

Extracts are normally ceiling mounted but wall extracts are also available.

Terminals are ideally sited on the ridge, but tile terminals are also available.

Inlets may be window mounted or through-wall.

For ease of installation, flexible ducting is generally used in roof spaces whilst rigid ducting is used within the living space.

Rigid ducting is circular, or flat channel for running within stud partitions etc.

Ducts in roof spaces and other unheated voids must be insulated; insulated ducting is available for this purpose.

Typical systems

Typical systems suiting most applications are shown.

Where these are not suitable alternative configurations can be supplied.

Extension ducting is available for properties over two storeys.
Air inlets for dry rooms
Humidity-sensitive air inlets (window or wall) form a part of the IPSV system, providing fresh air in response to demand.

Background ventilation, provided by manually-controlled window or wall vents, is also required.

Features and benefits
- Automatic humidity control
- Efficient in operation
- Protection: inlets are designed to provide security, adjustability, avoidance of discomfort due to cold draughts and prevention of rain ingress.
- Can be adjusted to provide background trickle ventilation even when closed.
- Acoustic wall inlets are available providing good sound insulation for noisy locations.
- Window inlets can be supplied coated in any RAL colour to match windows.

Component codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A161</td>
<td>Humidity-sensitive extract</td>
</tr>
<tr>
<td>F12513</td>
<td>Uninsulated flexible ducting, 3.0m</td>
</tr>
<tr>
<td>F12524</td>
<td>Insulated flexible ducting, 4.0m</td>
</tr>
<tr>
<td>FCA3</td>
<td>Flat channel straight connector</td>
</tr>
<tr>
<td>FCA4</td>
<td>Flat channel circular connector</td>
</tr>
<tr>
<td>FCA6</td>
<td>Flat channel circular adaptor</td>
</tr>
<tr>
<td>FCA10</td>
<td>Flat channel elbow connector</td>
</tr>
<tr>
<td>FCA11</td>
<td>Round pipe</td>
</tr>
<tr>
<td>FCD1</td>
<td>Flat channel ducting, 1.5m</td>
</tr>
<tr>
<td>MC01</td>
<td>Sleeve coupling, male 125mm</td>
</tr>
<tr>
<td>PRT</td>
<td>Ridge terminal</td>
</tr>
<tr>
<td>TT9</td>
<td>Tile terminal</td>
</tr>
<tr>
<td>TT7</td>
<td>In-Line tile/slate terminal</td>
</tr>
<tr>
<td>X332</td>
<td>Speed clamp</td>
</tr>
</tbody>
</table>

First floor (bathroom, shower room etc)

Ceiling extract, ridge terminal

PRT

X332

F12524

X332

A161

Ceiling extract, In-Line tile/slate terminal. Not suitable for kitchens

TT7

X332

F12524

X332

A161

Fresh 99H
Humidity-sensitive wall inlet

A101+PVCG4
Humidity-sensitive window inlet plus external canopy grille

A111+PV250
Humidity-sensitive wall inlet plus airbrick and telescopic sleeve

Fresh 99HD
Humidity-sensitive wall inlet

Acoustic humidity-sensitive wall inlet plus airbrick and acoustic telescopic sleeve
**SYSTEMS AND COMPONENTS**

**Air extracts**

A161 Humidity sensitive extract
Normally ceiling-mounted. Wall-mounted option available.

**Terminals**
There is a range of terminals to suit pitched and flat roofs.

Ridge terminals are usually recommended where possible, but tile terminals can be used instead where necessary.

**Ridge terminals**

**Ducting**

F12513M flexible uninsulated ducting

F12524M flexible insulated ducting

R1251 rigid uninsulated ducting

FCD1 flat channel ducting

**Tile/slate terminals**

**In-Line terminals**

**Benefits**
AA fire rated as standard.
Can be matched to most tile manufacturer profiles.
Can be colour matched to any RAL colour.
Unobtrusive - Smallest design available for airflow capacity.
Condensation trap feature prevents condensation running back down duct.
Passivent Limited offers a design service for iPSV™ systems based on building drawing supplied.

**Design points**
Main design points are given below. The layout shown is schematic and actual installations may differ in detail. Designs should also follow the guidance given in Approved document F1 Table 5.2b.

**Design guides**
A number of independently produced guidance documents make recommendations for the installation of PSV or intelligent PSV.

Published by BRE, Housing Corporation and Hastoe Housing Association

Best practice guidelines state:
- Design for long life (at least 60 years and preferably more).
- Do not install ultra-high-tech equipment that offers only marginal energy savings in use.
- Avoid systems with high maintenance requirements or which need frequent replacement.
- Avoid systems which rely heavily on user regulation to achieve energy savings (e.g., use intelligent self-regulating passive stack ventilation rather than user-controlled systems).

Passivent iPSV™ meets all these criteria.

**Specification clause**
Ventilation to be provided by means of a BBA certified whole-house intelligent passive stack ventilation system complying with:
- Building Regulations (England and Wales) Approved Document F*
- Building (Scotland) Regulations Technical Handbook Domestic Section 3*
- Building Regulations (Northern Ireland Technical Booklet K*
- Building Regulations (Republic of Ireland) Technical Guidance Documents Part F*

The ventilation system to be Passivent iPSV™ whole-house system covered by BBA certificate 96/3273, supplied by Passivent Limited, 2 Brooklands Road, Sale, Cheshire M33 3SS, telephone: 0161 905 5700, fax: 0161 969 5346, email: technical@passivent.com. Design and layout of the system to be in accordance with the manufacturer’s recommendations. Installation to be in accordance with the manufacturer’s instructions and any other design recommendations supplied, and to be carried out by a Passivent Mastercare trained installer holding a current Mastercare certificate.

*Select as appropriate
Mastercare™ Installer scheme
We recommend that installation is carried out by a specialist Passivent Mastercare Installer. The Mastercare scheme, operated by Passivent Limited, comprises well-established and reputable companies who have been fully trained and assessed by Passivent Limited 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 who are familiar with the systems.
- Quality installations.
- Compliance with relevant codes of practice.
- Competitive cost.

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

Quality assurance
Passivent products are designed, developed and manufactured under a BS EN ISO 9001 quality management system, giving an independently audited assurance that the products will fulfil their intended purpose.

Environment
Passivent conducts all business processes under a BS EN ISO 14001 environmental management system, giving an assurance that all activities are carried out having minimal impact on the environment.

Other products
Passivent market a range of other ventilation solutions for domestic buildings including:
- Hybrid: intelligent hybrid ventilation
- MEV: intelligent mechanical extract ventilation
- Intellivent: decentralised mechanical extract ventilation
- HR: intelligent heat recovery ventilation
- Background ventilation: full range of wall and window vents
- Acoustic ventilation