

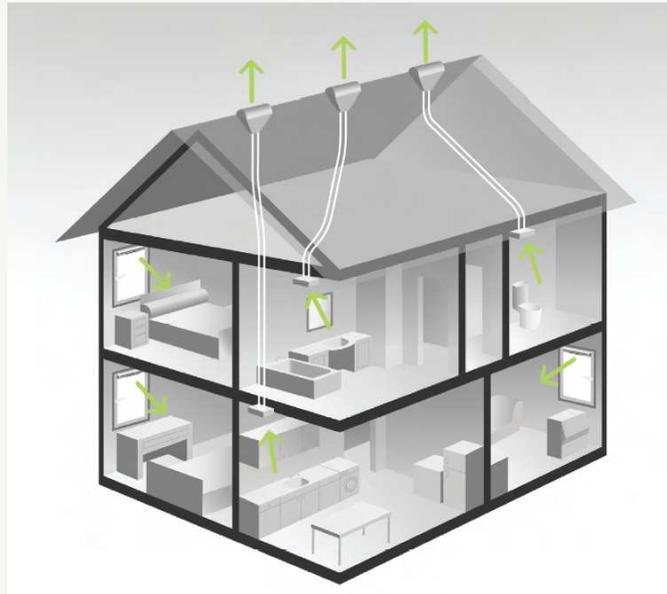
PSV—Passive Stack Ventilation Installation Guide



Installation

Suitable installation of PSV (Passive Stack Ventilation) can be assumed if the following guidance is followed, (along with that given in the BRE:IP13-94). As PSV systems rely on natural forces, it is essential that the system is correctly installed to ensure effective performance.

The illustration below shows a typical PSV installation schematic; however if specific plans have been provided please follow them.



Each wet room (kitchen, bathroom, WC, utility room etc.) must have an individual duct run from grille extract to exhaust termination as shown, and ducts must not be collated into one termination.

The layout shown will be suitable for installation in dwellings up to four storeys, and details the positioning required when using a ridge ventilators. Although this is the preferred method, tile or stack ventilators can also be substituted and installed in accordance with the method shown further in this guidance.

To avoid cross-flow between stacks it is good practice to ensure that there is a minimum distance of 1m between exhaust terminations (in accordance with BS5540).

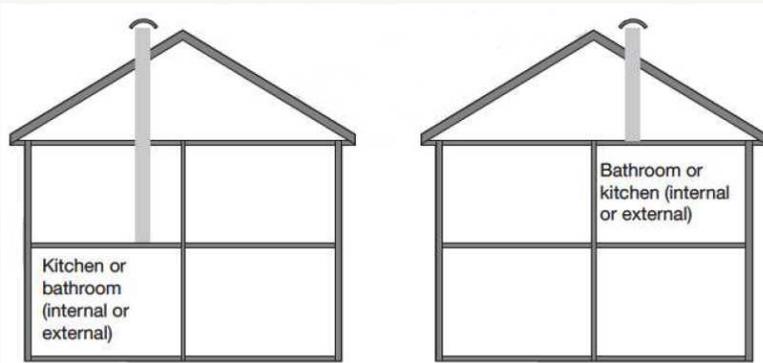
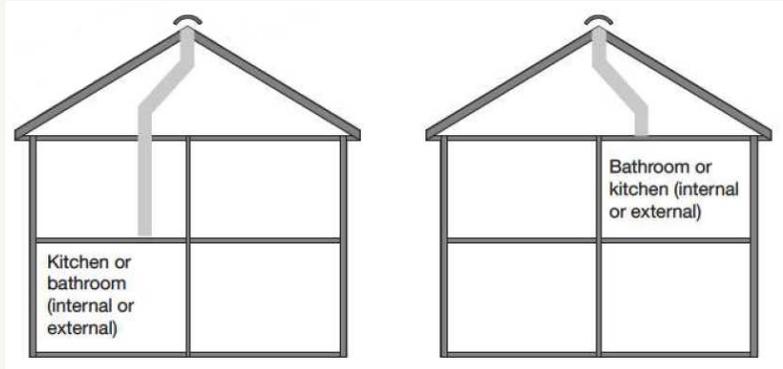
In instances where a neighbouring dwelling/structure is a greater height, >50%, then the dwelling needs to be situated at least five times the height away for PSV systems to perform effectively. If this is not feasible PSV systems should not be installed.

Please note that PSV also requires substantial background ventilation through the use of air inlets.

Installation - Terminations

PSV systems can be installed with either ridge, tile or stack ventilators for exhaust termination. Installation will differ between each variant, and below details the requirement for each. Although in each situation, as previously stated, the minimum distance between terminations is 1m (BS5540). It must be ensured that any termination chosen has a free space of at least that of the duct's cross sectional area. Terminations also need to prevent ingress of large insects and birds, whilst preventing and moisture running down the duct into the dwelling.

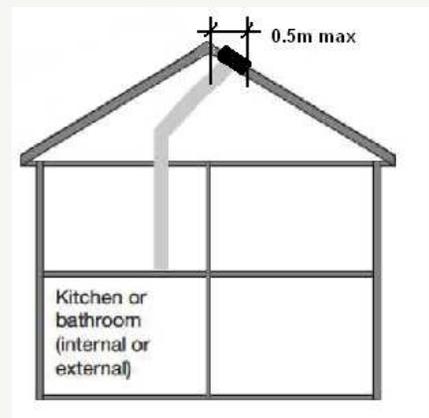
Ridge terminations do not require too much attention to placement, as they can be situated at anywhere along the ridge which allows suitable duct installation, and are fitted at least 1m apart.



Stack terminations can be installed, if either ridge or tile termination cannot be used. Stack terminations need to protrude to at least the height of the ridge, and be weather-proofed with a suitable cowl.

Tile Terminations can be installed, if either ridge or stack terminations cannot be used. These terminations need to penetrate no more than 0.5m away from the ridge line.. If terminations are placed below this level they will not be within the region of negative pressure required for PSV operation.

It is also advisable to ensure the positioning of a tile ventilator is on the leeward side of the roof to prevent the negative effect, of wind blowing into the dwelling.

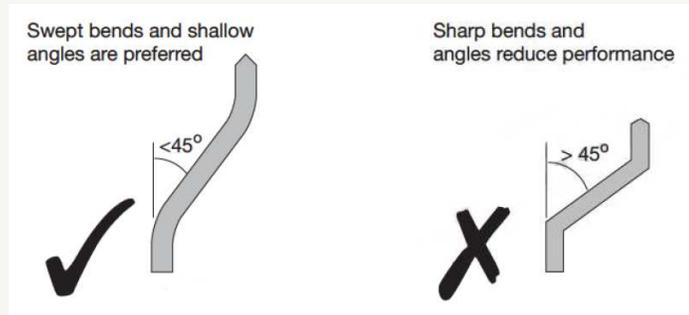


Leeward – the direction in which the prevailing wind is blowing.

Windward – the direction from which the prevailing wind is coming.

Installation - Ducting

Ducting must be installed competently to ensure minimum air resistance within components. To ensure this, ducts must be installed as near to vertical as construction allows, with a maximum duct angle of 45° . All bends in a passive stack installation must be sweeping in nature and no more than two bends on any vertical riser. Installation should be carried out in accordance with the diagram below:

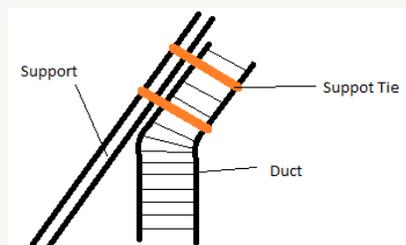


Ducting installed within cold areas (such as loft spaces) must be insulated with a minimum of 25mm of material with a thermal conductivity of 0.04W/m.k . If using stack ventilators which are non insulated beyond roof level, a condensation trap must be installed.



Where ducting is installed in a warm area it need not be insulated, and can be of rigid construction (preferred) or flexible should it be necessary, as both provide similar pressure drops at low airflows.

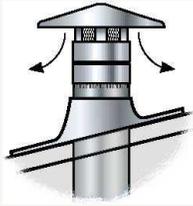
When ducting is installed it must be appropriately supported, with particular care taken over flexible ducts where there should be no more than 300mm between support ties. It is also preferable to use preformed moulded bends rather than bending the flexible duct; however if bends are supported correctly then this will be sufficient.



In each wet room the recommended duct size is 125mm diameter in all partitions, to comply with the Approved Document: F (Means of Ventilation) 2010. This means the minimum cross sectional area is $12,000\text{mm}^2$. As an alternative, ducts with an equivalent cross sectional area may be installed i.e. $204\times 60\text{mm}$ flat duct.

Installation - Ducting (Continued)

To prevent performance loss when installing ducting, consideration needs to be given to the type of duct used, rigid or flexible. When using rigid ducting, all joints must be accurately cut to the required length to allow airtight fixings, and joints to be lapped with tape or a mastic seal. Care needs to be taken to ensure the height of the stack is correct, whether connecting to an internal spigot of ridge or tile ventilator, or cut so it falls in line with ridge level if using a stack ventilator. As with flexible duct, it is recommended to support duct at intervals no greater than 300mm.



When ridged duct penetrates the roof clad, it needs to be sealed appropriately using a flashing membrane to ensure water tightness and must be sealed to the cowl. Consult the appropriate manufacturers instructions.

Flexible duct must be cut to an appropriate length so that when connecting between the duct stack/extract grille and exhaust termination it is taught and does not sag. However care must be taken to ensure the duct is not so taught that it pulls excessively on fixings, as this can cause them to fail. It is recommended to cut the ducting 300mm longer than the required length to ensure this does not happen.

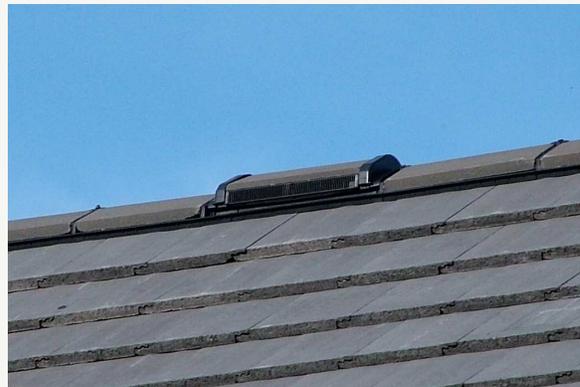


Duct which passes through a floor level must again be appropriately supported, and it is recommended that these are also mastic sealed when passing through ceilings and floors.



When connecting flexible duct to solid components jubilee/speed clamps should be used to ensure tight fixings which are free from movement. This is also recommended when attaching duct to exhaust and extract terminations.

Examples of good installation:



Installation - How not to install ducting

It is often found that the sole reason for PSV system not performing effectively is due to improper installation, as opposed to component failure. Systems which have been installed using flexible ducting are most likely to be subject to this.

As taken from the BRE study IP:1394, the findings of bad installation were:

- The ducting is too long (ie longer than necessary to join the exhaust grille to the roof terminal) causing the duct to have too many bends.
- The ducting is not properly supported causing it to sag or become detached.
- The supports are too tight around the duct causing restrictions to the air-flow.



The above demonstrates a good example of how not to install. The flexible insulated duct should have been cut to the correct length so that it does not protrude through the ceiling. The flat duct would then be hidden within the partition wall, or lay flat against the partition. This would allow a shallow boxing to be formed around. Finally the Round to flat duct converters should be hidden in between joists in the floor and loft, so to create a shallower protrusion.

Examples of bad installation:

It is good practice to support the duct at 300mm centres, although in the below example by taping the joint it has crushed the duct; the internal bore will then be off shape, adding increased and unnecessary pressure. In this instance it is wise to use a solid coupler to join the duct together, which will then become a fixing support.



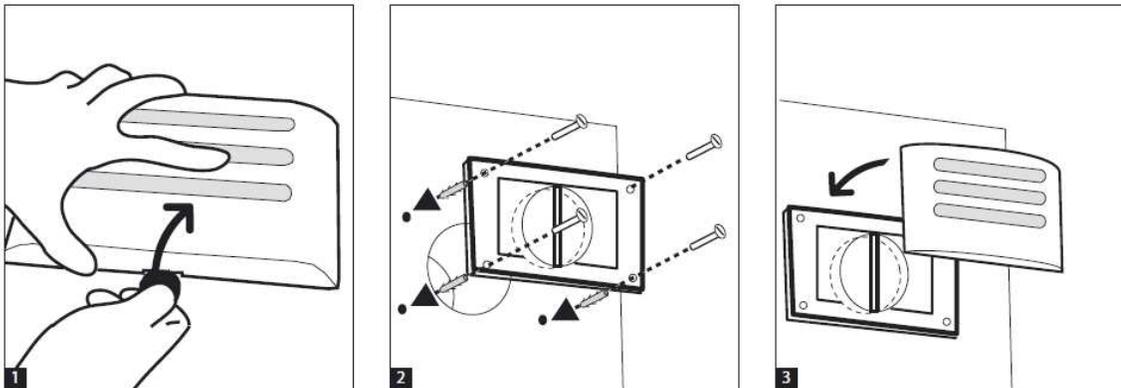
Installation - Extract terminals

Extract terminals must be installed so that connection to the duct stack does not present any excess resistance. This can be done by using a jubilee/speed clamp. It is recommended that grilles are automatically controllable and set to open when the relative humidity reaches 40%. Aereco's GHN range grilles operate between 30 and 65% relative humidity and modulate the airflow accordingly.

It is also required that the maximum opening surface area is at least the cross sectional area of the duct stack.



The grille should be fixed to its location as follows:



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Siskin Parkway East
Middlemarch Business Park
Coventry
CV3 4SU

tel : 024 7630 7736
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email : info@aereco.co.uk
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