



# PASSIVE STACK VENTILATION USERS INSTALLATION GUIDE

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## 1. INSTALLATION

1.1 It is important to recognise that the performance of a well designed system can be ruined by bad installation. Field studies by BRE on installed PSV systems using flexible ducting have shown that some of the most common faults are as follows:

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

1.2 To enable a system to work effectively, the ducts must not have excessive bends or restrictions to flow. This is not usually a problem when rigid ducting is used, because the bends are preformed and sagging is less likely to occur. More support is needed for flexible ducting.

1.3 In all installations, upper terminals and lower grilles should be fixed in such a manner that there is no reduction in the cross-sectional area of the complete system. All ducts should be insulated where they pass through the roof and sealed with mastic (or equivalent) where they pass from one room to another.

1.4 In addition, there are installation requirements that are specific to straight ducts, to ducts with bends and to both flexible and rigid systems

### 1.5 **STRAIGHT DUCT INSTALLATION.** (Fig. 1)

#### 1.5.1 **Rigid System:**

- a. Measure the length of duct to be used carefully, to ensure that the outlet terminal will be level with, or higher than, the ridge.
- b. Use preformed pieces to make any joints to give stability to the duct.
- c. Where the duct penetrates the roof covering, seal with a traditional or prefabricated flashing.
- e. Ensure that the vent cowl (where provided) is suitably secured to the duct.

#### 1.5.2 **Flexible System:**

- a. Carefully measure the length of the duct to be used to fit between the inlet grille and the roof slope so that the duct does not sag or wrinkle. The duct material should be fully extended but should not place any strain on terminals or fittings.
- b. Use a rigid duct for that part of the duct outside of the roof to provide stability. It should start from far enough inside the roof space to give adequate support, and extend to the height of the ridge or above.
- c. Where the duct penetrates the roof covering, seal with a traditional or prefabricated flashing.
- d. The flexible ducting should be securely joined to the rigid section by means of a jubilee clip and water proof tape, ensuring that there is no restriction of cross-sectional area.
- e. Support the duct where it passes through a room or the attic by attaching it to a suitable wall or a wooden strut, in such a manner that it will not be squashed or distorted.

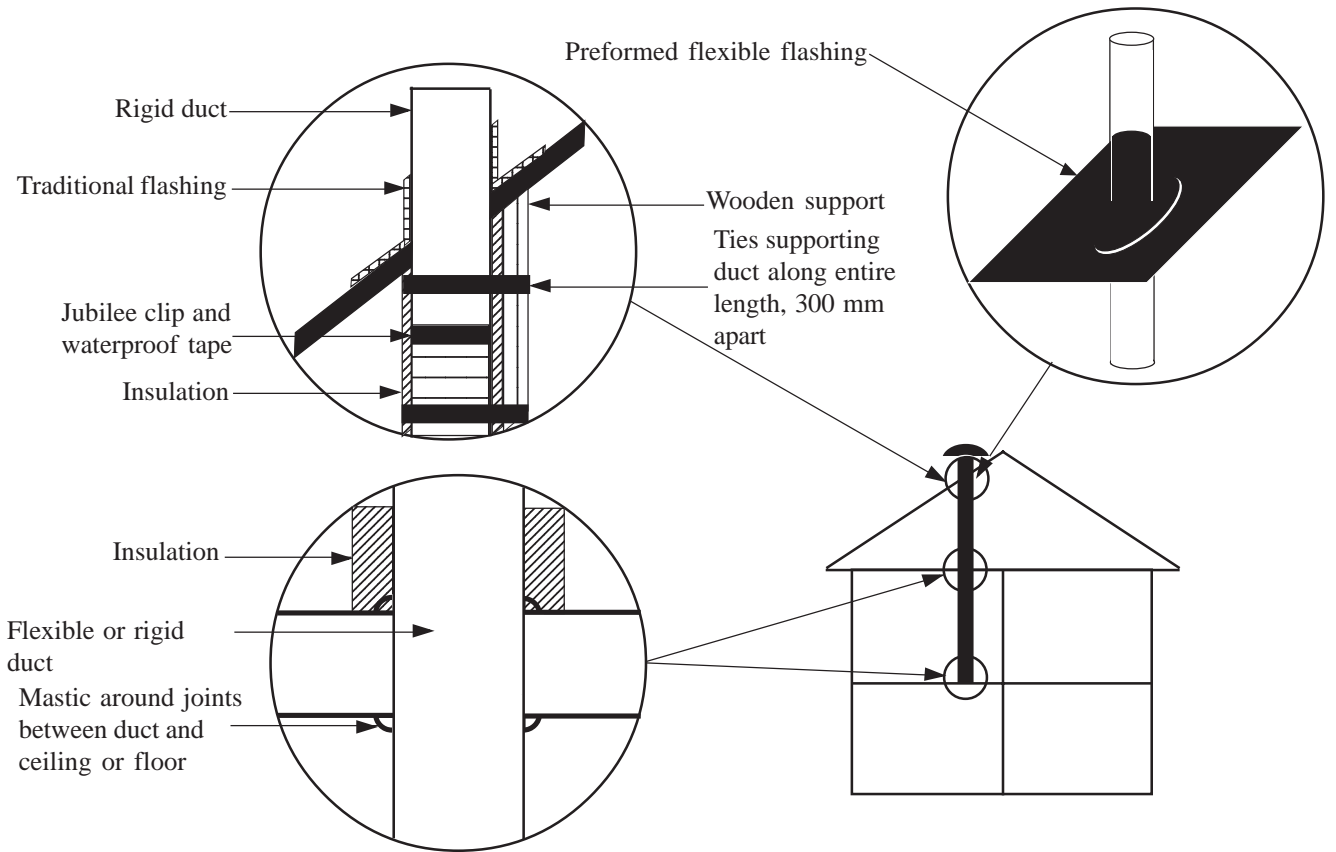
### 1.6 **INSTALLATIONS WITH BENDS:** (Fig. 2)

#### 1.6.1 **Rigid system:**

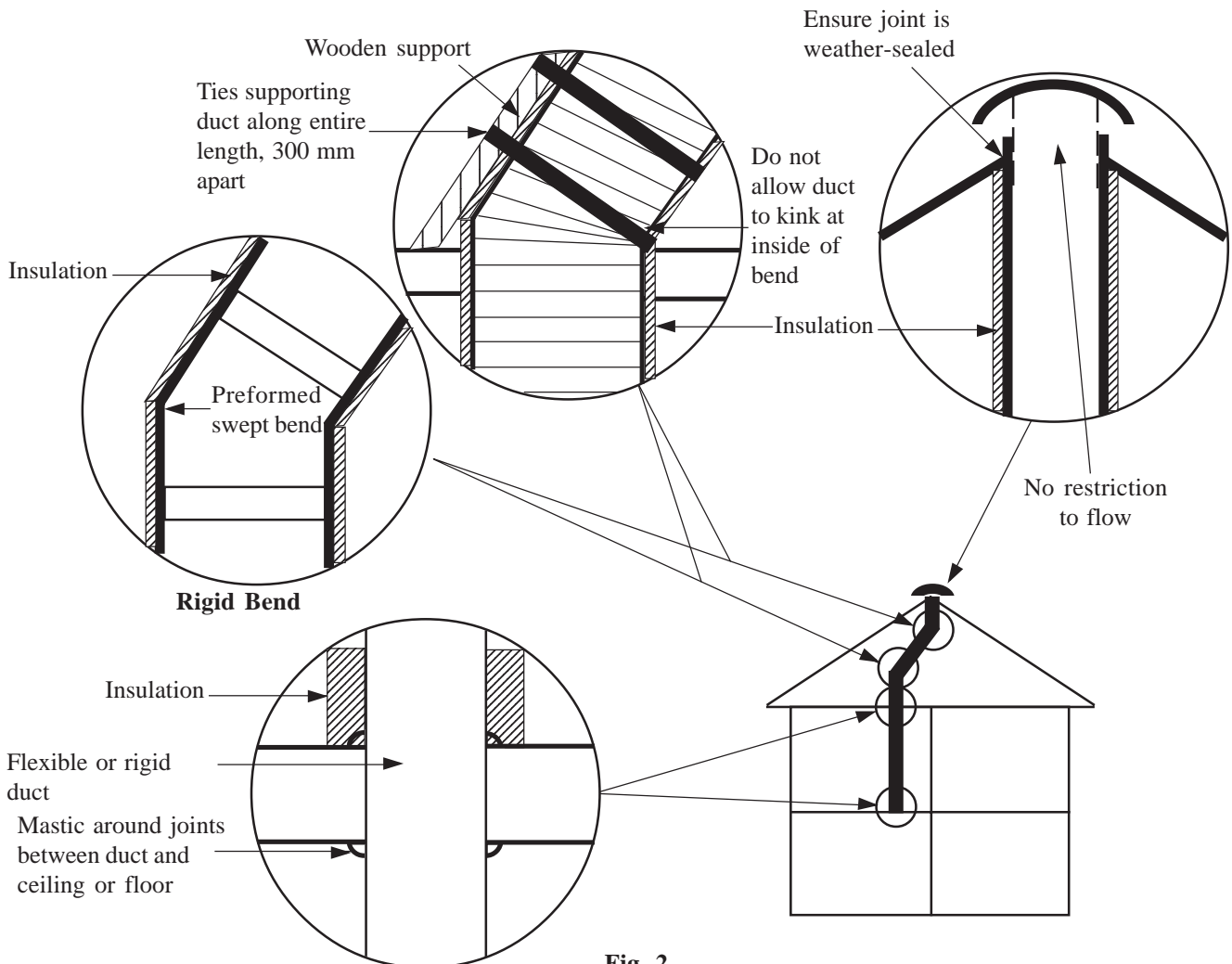
- a. Use preformed bend sections so that any angle formed with the vertical is 45° or less.
- b. Support the duct so that it does not place undue strain on the join with the ridge terminal.
- c. Ensure that the roof structure is suitably strengthened to allow for installation of the ridge terminal.

#### 1.6.2 **Flexible system:**

- a. Cut ducting to approximately 300 mm longer than the distance between the inlet grille and the outlet terminal to provide enough material to make smooth bends for connection to the terminals.
- b. Where there is a straight section of duct, (i.e. passing through an upstairs room), support it by attaching it to a suitable wall or a wooden strut so that it will not be squashed or distorted. In the attic, because the duct bends, it should be supported on a wooden strut that is fixed securely at both ends. The duct should be allowed to curve gently at each end to attach the inlet grille and ridge terminal.



**Fig. 1**  
Installation details of straight systems



**Fig. 2**  
Installation details of systems with bends

## 2. TERMINALS AND DUCTING

### 2.1 OUTLET TERMINALS.

2.1.1 For duct systems that terminate on the ridge of the roof, ridge terminals with appropriate adaptors are suitable. If the alternative configuration with the duct extended above the roof is used flue or soil pipe terminals should be used. Wind tunnel tests carried out by BRE on various terminal types have shown that those least adversely affected by wind are the 'H' pot terminal and the multivane type that revolves with the wind. Further guidance on these and other suitable terminals are given by BRE<sup>7</sup>.

2.1.2 The outlet terminal should have a free area of not less than the duct cross-sectional area and should be designed so that rain is not likely to enter the duct and run down into the dwelling. The terminal should neither incorporate a flow restrictor nor require a flow restrictor in the duct for fitting. All outlet terminals should be so designed that they do not allow ingress of insects or birds, and should incorporate a condensation cap to allow runoff of any condensate to the roof.

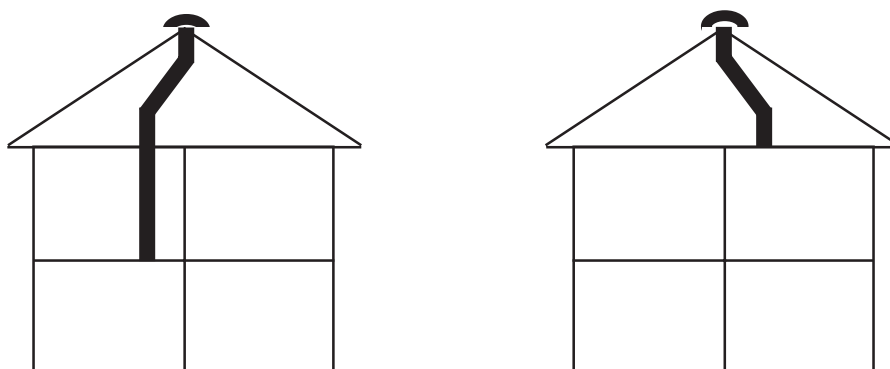
### 2.2 INLET GRILLES.

2.2.1 If the PSV system is to work effectively as an extract system, there must be an inlet supplying air to the rooms it serves. This can be achieved by using controllable, purpose-provided ventilators, (i.e. trickle ventilators) of 4000 to 8000 mm<sup>2</sup> in area in all habitable including those which contain the PSV system. If AERECO humidity ventilators are used in the rooms containing the PSV system, the controllable ventilators can be excluded

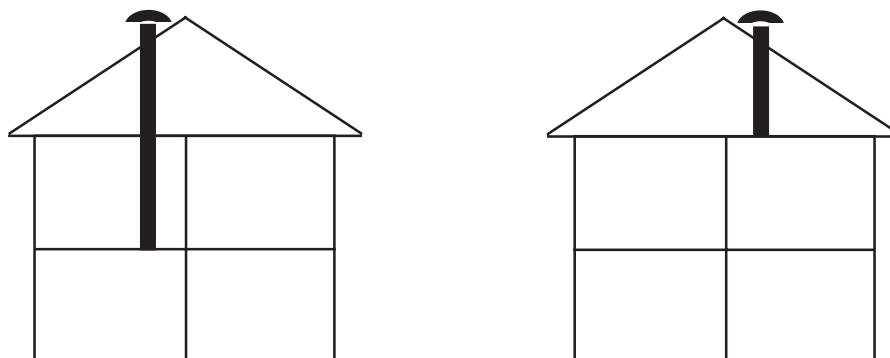
2.2.2 In the case of Johnson & Starley AERECO PAE humidity controlled inlet grilles, it is recommended that the controls are set to start opening the grille when the relative humidity rises to 40%.

### 2.3 DUCT INSULATION.

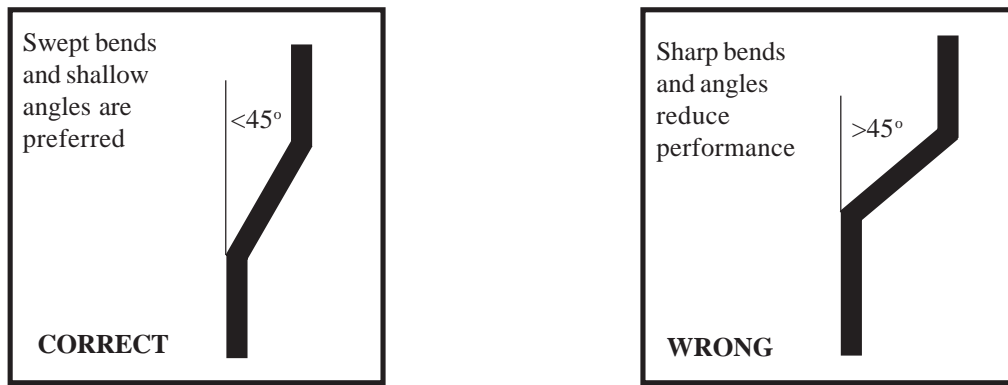
2.3.1 Ducting in the loft, or other unheated spaces, should be insulated with material of at least 25mm and having a thermal conductivity of 0.04W/mK. Where the duct extends above roof level, as in Fig. \*\*, the section above the roof should also be insulated. This helps to maintain the stack effect and reduces the risk of condensation forming inside the ducting and running back down into the dwelling.



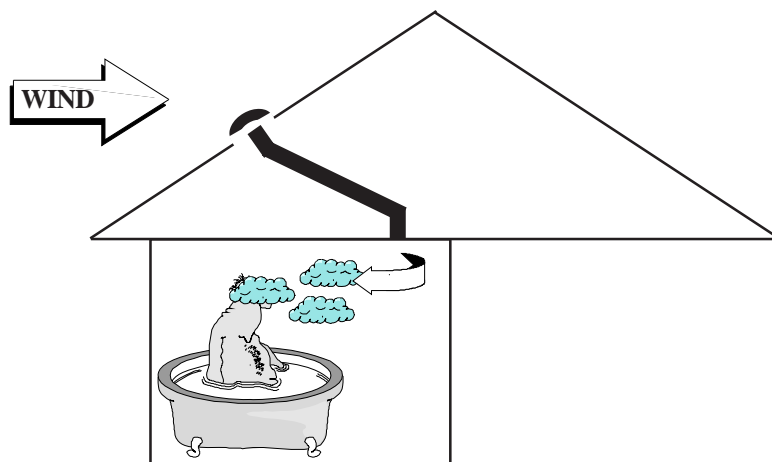
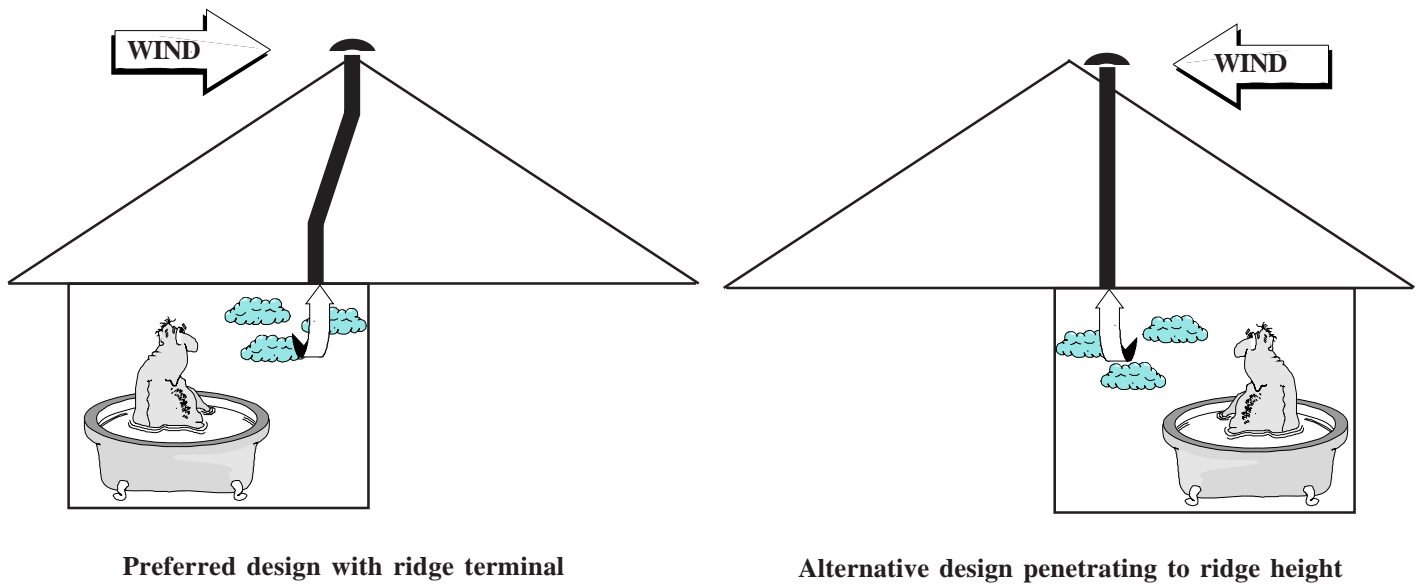
**Fig. 3a**  
Kitchen and bathroom ducts with ridge terminals



**Fig. 3b**  
Kitchen and bathroom ducts penetrating roof with terminals at ridge height



**Fig. 4**  
**Suitable and unsuitable bends for passive stack ducting**



**Bad design with tile terminal- should not be used**  
**Fig. 5**  
**Examples of good and bad design of passive stack ventilation**

**Johnson and Starley prides itself on its ability to supply spare parts quickly and efficiently. If your service engineer indicates a problem in obtaining a spare part, advise him to contact Johnson and Starley Spares Department at the address below.**

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