# Positive pressurisation

## How does it work?

A pressurising fan unit, usually located within the roofspace, is used to blow filtered fresh air into the dwelling, which results in reduced radon entry due to a pressure effect and dilution of radon within the dwelling due to increased ventilation.

## When to use positive pressurisation

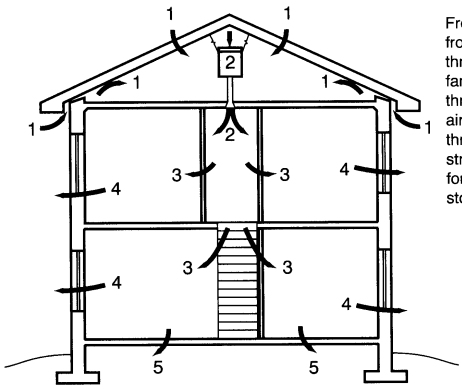
It is most likely to be successful in dwellings with radon levels up to 700 Bq/m$^3$ and which happen to be relatively airtight. Determining whether a dwelling is airtight is not easy, reliable test methods are available but are likely to prove expensive in comparison to the cost of the positive pressurisation unit. Unfortunately, airtightness cannot be reliably assessed by visual inspection. Even so it is still worth considering the following clues which combine to suggest whether a dwelling is relatively airtight:

- it suffers from condensation and mould even though the dwelling is fairly warm,
- odours linger rather than disperse, and
- the occupants do not have problems with cold draughts.

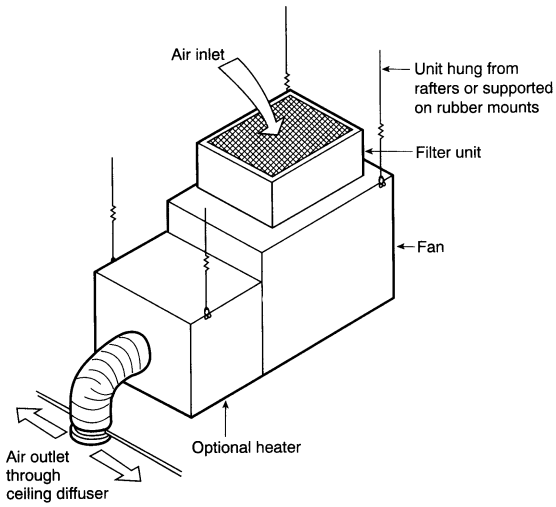
The way in which a house is heated may also have a bearing on householder acceptance of positive pressurisation systems. There have been complaints that systems result in draughts or cold areas in houses which do not have full central heating.

## Specification

A typical positive pressurisation system comprises a fan with optional heater connected to a ceiling diffuser by flexible ducting.




Idealised view of how a house pressurising fan works




A typical positive pressurisation system

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To minimise potential noise problems fan units are usually provided with anti-vibration mounts, and to ensure clean air is blown into the house the air intake will be fitted with a filter.

For an average size house a single unit should be adequate. The unit should generally supply air at a rate of between 0.5 and 1 air change per hour. For example, if the total volume of the house is, say 250 $m^3$ the fan air flow rate should be between 125 $m^3/h$ and 250 $m^3/h$. You can have greater air flows than this but it would result in greater heat loss and could cause draughts so is not recommended.

## Installation

Systems are usually sold as complete units ready to install. In most dwellings installation involves cutting a hole, typically 150mm in diameter, in the ceiling of a hallway or stairway area. The unit is then mounted on ceiling joists or suspended from rafters in the roof space. The unit will need to be wired back to a fused spur. Fans should be wired in accordance with BS 7671: 2001 as amended, Requirements for Electrical Installations, the IEE Wiring Regulations.

## Other points to consider

Care should be taken in locating the ceiling diffuser to avoid possible problems with cold draughts, and noise. The diffuser should not direct air straight at a nearby wall. If possible it should be positioned so that air travels across the ceiling for a distance of 1m or more before striking a wall. Care will be needed in locating the system so as to avoid fixtures and fittings in the roof space, e.g. water pipes, water tanks, flues and structural timbers.

It may be very difficult to find a suitable location for the fan unit and diffuser in dwellings with no roof space, e.g. those with flat roofs, rooms open to the roof. Some manufacturers produce special systems to overcome such problems.

For the system to work properly air blown down into the house must be replaced by air from outside the house. In most houses this will not be a problem as the roof will be adequately ventilated. However in some cases additional vents may need to be provided.

Although it is suggested that positive pressurisation is only appropriate for use in average sized dwellings with radon levels up to 700 $Bq/m^3$, larger dwellings and dwellings with higher radon levels have been successfully treated with positive pressurisation. In some cases this has involved the use of more than one unit. For further guidance seek advice.

## Suppliers of systems

A list of companies known to supply suitable fans is available from BRE.

## Further information

More detailed guidance is available in BRE Report BR281 *Positive pressurisation: a BRE guide to radon remedial measures in existing dwellings* and Good Building Guide 26 *Minimising noise from domestic fan systems and fan-assisted radon mitigation systems* obtainable from BRE Bookshop, BRE Garston, Watford, WD25 9XX, telephone 01923 664262, e-mail bookshop@bre.co.uk, or visit www.BREbookshop.com

- **for further practical advice about work to reduce radon levels**
- **for a list of companies known to supply suitable fans**

**Contact BRE Radon Hotline 01923 664707 www.bre.co.uk/radon**

**Disclaimer**

It should be noted that BRE cannot guarantee that the measures described on this sheet will reduce the radon level in your home, however similar measures have regularly proven successful elsewhere in the UK.

Prepared for The Department for Environment, Food and Rural Affairs.
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## Other useful contacts

Defra 020 7082 8498
www.defra.gov.uk/environment/radioactivity/radon

NRPB 0800 614529 www.nrpb.org/radon

The Radon Council 01932 221212 www.radonhotline.org

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