



Reducing Radon

Quick Guide 5

Mini sump system with low level exhaust

What you need to know

Sumps are used in properties when the ground-floor construction is solid concrete or suspended timber floor over a concrete capping.

A single sump with a fan is usually sufficient for a typical dwelling: generally it will have an influence over an area of 250 m² (about 9 m around the sump depending on subsoil permeability).

Low level systems:

- are used in locations on the building that are away from windows, doors and ventilation grilles so that exit gases cannot re-enter the building
- are more discreet, require fewer materials and are easier to construct
- can often be used where planning restrictions are in place, eg listed buildings, conservation areas or national parks

Step by step installation

The numbered steps below refer to Figure 1.

- 1** Break out or core drill a 120 mm diameter hole through the external wall just below the floor slab
- 2** Remove about a bucketful of material (volume of around 10 litres) from under the floor slab to form a sump
- 3** Install a short piece of 110 mm diameter pipe tilting down 2.5° into the sump. Seal the pipe where it exits the sump and passes through the wall (*use a waterproof sealant or similar*)

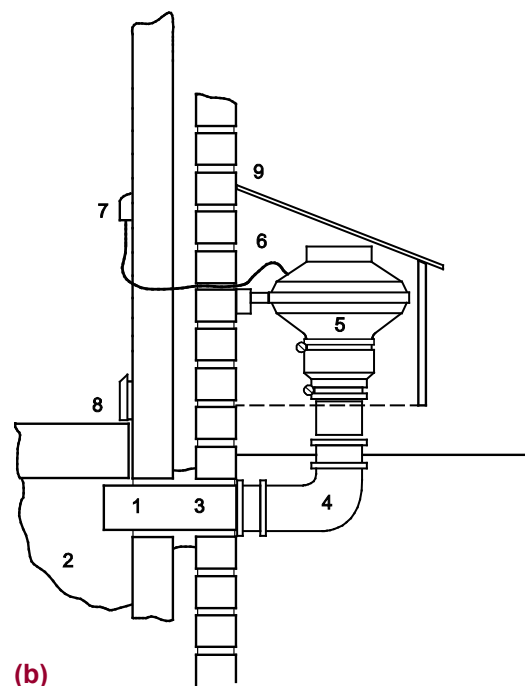
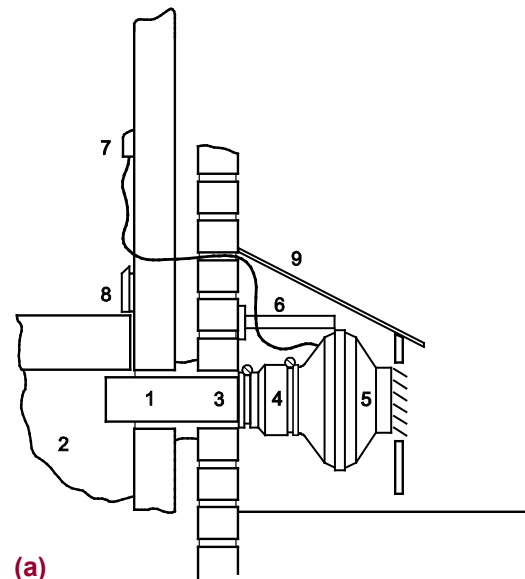


Figure 1 Mini sump system with low level exhaust mounted: (a) horizontally and (b) vertically

- 4 Attach an 87.5° short radius bend and/or short length of vertical pipe to the exit, ready for a vertically mounted fan
- 5 Attach an in-line centrifugal duct fan to the pipe from the sump using a rubber reducer coupling
- 6 Support the fan from a bracket fixed back to the building
- 7 Wire the fan back to a fused spur inside the house
- 8 If accessible, seal the joint between the floor and wall adjacent to the sump to minimise suction of air from the room
- 9 Some fans require weather protection – a wooden box can be used

Fans

Typically, fans with a 70 watt power consumption with a flow rate of around 180 m³ h⁻¹ are used, but lower powered fans (50 watt) have been used successfully.

Wiring

Fans should be wired in accordance with BS 7671:2008 as amended and satisfy Approved Document P of the Building Regulations 2010 (England and Wales). The works required for sump systems are usually limited to providing an additional fused spur to an existing ring or radial circuit.

Weather protection

Fans that are exposed to the weather should be suitably weather protected to level IP54 as classified in BS EN 60529:1992. The fan manufacturer's specification should confirm compliance with this requirement. Fans that do not comply should be protected in a weatherproof housing (Figure 2).



Figure 2 Fan located in a weatherproof housing made from concrete paving slabs

Sumps

Location

- avoid locating the sump near to an open flue appliance such as an open fire or boiler drawing air from a room to prevent the risk of flue gases being drawn into the property
- take care when breaking out to avoid damaging steel reinforcement or concealed services such as pipes or electric cables
- locate sumps away from windows and ventilation grilles

Exhaust

A low level sump system requires sufficient space around the exhaust outlet for effective gas dispersal. Generally a low level exhaust should be:

- at least 1.5 m or more from the nearest opening into the house such as doors, windows or vents
- at least 1.5 m away from other buildings or regularly used spaces such as patios
- directed to discharge away from the building

Tips

- the fan must run continuously: that is, run day and night
- there should be a good seal where pipe work joins the sump (see Figure 1)
- most sump fans are non-stalling but if a fan stalls, this could be due to lack of airflow through the subsoil. To remedy this, a hole (no more than 5 mm) can be drilled in the base of the fan casing or in the pipe work between the fan and sump (see the manufacturer's recommendations)
- new homes built in areas of high radon risk may have a standby sump located beneath the ground floor and an exhaust pipe capped off at ground level outside. The system is simply activated by removing the cap and adding a fan

REMEMBER

Do a follow-up RADON TEST to check radon levels are reduced sufficiently.

More detailed guidance on sumps is available in

BRE Good Repair Guide GRG 37 Part 3: Radon solutions in homes: radon sump systems, which can be downloaded free at www.ukradon.org or purchased in hard copy from www.brebookshop.com.

Disclaimer

This information sheet has been produced by BRE and PHE. It should be noted that BRE and PHE 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.

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