



Reducing Radon

Quick Guide 4

Mini sump system with high 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).

A high level exhaust is often used to disperse extracted gas away from the house.

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*)
- 4** Attach an 87.5° short radius bend and 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

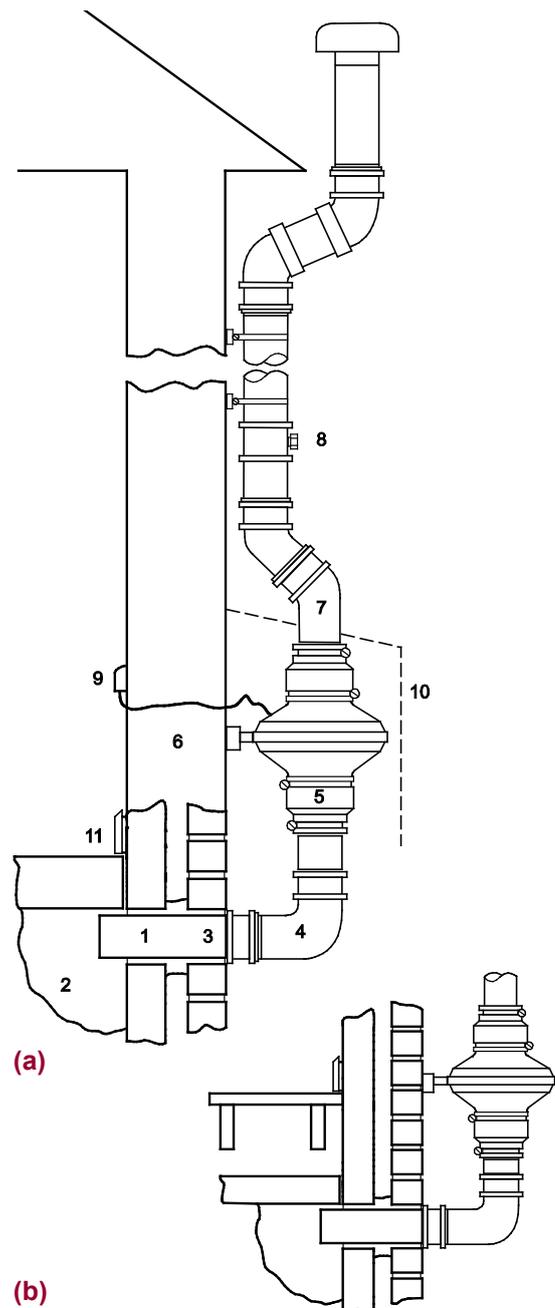


Figure 1 Mini sump system with high level exhaust: (a) under a solid floor and (b) under a suspended floor

- 6 Support the fan with a bracket fixed to the building
- 7 Use a rubber reducer coupling to join the top of the fan to the pipe work above. The pipe work can include bends to accommodate the fan and to allow for pipe work above the eaves
- 8 To prevent damage to the fan, include a condensate drain just above the fan
- 9 Wire the fan back to a fused spur inside the house
- 10 Some fans require weather protection – a wooden box can be used
- 11 If accessible, seal the joint between the floor and wall adjacent to the sump to minimise suction of air from the room

Fans

Typically, fans with a 70 watt power consumption and 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 positioned outside 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.

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 pipe

A high level exhaust pipe should end above the level of the eaves to disperse radon away from the building. High level exhaust exits are often fitted with a cowl:

- cowls prevent rainwater reaching the fan
- a cowl may not be required if a condensate drain is fitted above the fan (see point 8 in the installation guide) as airflow past a cowl can sometimes cause a noise issue

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 activated by removing the cap and adding a fan and pipe work

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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