



Reducing Radon

Quick Guide 6

Internal mini sump system

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 sump located in a more central position is potentially more effective for radon reduction.

The system will be less conspicuous as pipe work etc will be hidden within the building.

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 floor slab close to a wall, and excavate about a bucketful of material (volume of around 10 litres) from under the floor slab to form a sump
- 2** Install a short piece of 110 mm diameter pipe into the sump and seal it to the concrete floor slab (**use a waterproof sealant or similar**) to eliminate airflow from the house into the sump
- 3** Continue the pipe run into the roof space. Pipe work routed through occupied rooms can be boxed in. Avoid too many bends in the pipe work to minimise noise

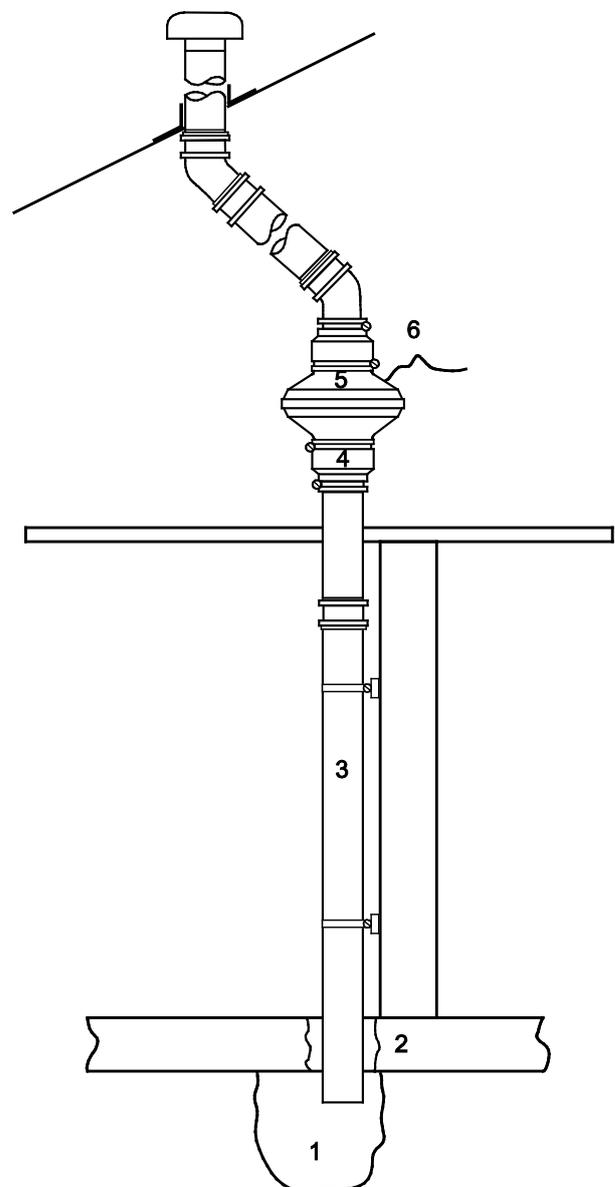


Figure 1 Internal mini sump system

- 4 Attach an in-line centrifugal duct fan to the pipe using a rubber reducer coupling. Support the fan from a bracket fixed back to the building
- 5 Use a rubber reducer coupling to join the top of the fan to further pipe work taken through the roof. Seal the pipe where it penetrates the roof. Finish approximately 600 mm above the roof with a mushroom cowl
- 6 Wire the fan back to a fused spur inside the house

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.

Sumps

Location

The sump and pipe work can be boxed in and located in a corner of a room. In bungalows they can be within an existing cupboard. Consider the pipe work route through a multistorey building: the position of walls and cupboards may not align from floor to floor.

Tips

- take care to avoid damaging steel reinforcement or concealed services such as pipes or electricity cables
- it is important to locate an internal sump system fan close to the exhaust outlet to ensure all internal pipe work is under suction. This limits the possibility of radon entering the building through damaged pipe work
- it is good practice to avoid locating sumps under rooms that have an open fire or boiler flue to prevent the small risk of flue gases being drawn into the room

Exhaust

The exhaust should be positioned at least 1.5 m away from roof windows. Exhaust exits are often fitted with a cowl:

- cowls are used to prevent rainwater reaching the fan
- airflow out of the cowl can sometimes cause a noise issue

- cowls are required for systems where the exhaust outlet is immediately above a fan located in a roof space

Tips

- the fan must run continuously: that is, run day and night
- a good seal around pipe work at the sump exit maximises suction from the sump
- most sump fans are non-stalling but occasionally they do. This is due to impermeable soil that may restrict airflow. To fix this: drill a small hole (no more than 5 mm) in the base of the fan casing or in the pipe between the fan and the sump (see manufacturer's recommendation)
- notify Building Control if the sump is installed under a kitchen, bathroom or shower room

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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