Radon Gas in the Workplace: Information For Employers

What is radon?

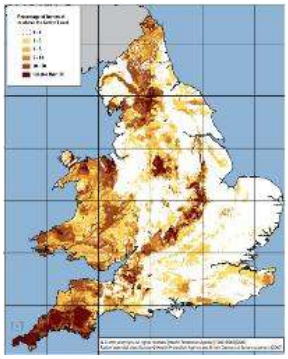
Radon is a naturally occurring radioactive gas that can affect properties of all types, ages, locations and uses. The gas is formed when uranium in the soil and rocks beneath us decays. When it permeates the ground into open air, it is quickly diluted to low concentrations, however if it rises into a building, it can become trapped and build to dangerous concentrations.

What risks are associated with radon exposure?

When concentration of the gas is high, the radioactive decay products are inhaled and some are deposited in the lungs, where they continue to emit radiation. Each year in the UK over 2000 people die from lung cancer, developed as a direct result of exposure to radon. The gas accounts for the second greatest number of lung cancer cases in the UK, second only to smoking.

Research into occupational cancers carried out at Imperial College, London estimates that approximately 370 lung cancer deaths each year are attributable to radon exposure specifically received whilst at work.

Where is radon found?



Properties that lie in certain areas of the UK are more likely to contain high levels of radon, due to the underlying geology and varying amounts of uranium present. Many people mistakenly believe that radon is only of real concern in the South West, however the latest set of indicative maps published by the Health Protection Agency (HPA) show that radon can be found nationwide. Areas where it has been estimated that more than 1% of properties will contain high levels of radon are classed as radon Affected Areas.

Buildings with basements are also more susceptible to high levels of radon accumulating, as there is a larger surface area in contact with the soil through which the gas can permeate. The HPA recently advised that any property with a basement, regardless of whether it is located in an Affected Area or not, will have an increased probability of containing high radon concentrations.

How does radon get inside a building?

Some radon will passively infiltrate into the building, for example through cracks in the foundations and gaps around service pipes. Evidence has also been found to demonstrate that radon can also pass through certain materials, even those which provide an adequate barrier to water penetration.

The main mechanism through which radon enters a property, however, is advection. This is the movement of the gas from the soil to the lowest point of pressure, which is usually inside the building. This means that the gas is literally being sucked from the ground into the building, and the greater this pressure difference is, the faster the rate at which the gas is drawn inside is.

How do I know if there is radon in a building?

Radon is odourless, colourless and tasteless. To assess the level of radon in an existing building, a specialist detector must be placed in the property before being sent to a laboratory for analysis. Radon detectors are small and discreet, and the whole process including laboratory analysis is inexpensive. As radon levels fluctuate according to seasonal and occupational variances (e.g. amount

of ventilation through opening windows), a three month period is required to take such inconsistencies into account. The result is given in a unit called becquerels and expressed as becquerels per cubic metre of air (bq/m^3).

The number of detectors required depends upon the size, layout and usage of the building, and propertECO can advise on this.

Do I need to test for radon?

Employers with premises that contain basement workspaces or that are situated in Affected Areas have a duty to conduct a radon test. Under the Management of Health and Safety at Work Regulations 1999, employers must assess all hazards. The risk of high levels of radon being found in a property situated in an Affected Area or with a basement is significant, so a test must be conducted, as this is the only way to know whether the employees' health is at risk.

The Health & Safety Executive can and do enforce radon testing in commercial properties, and have a team of Radiation Inspectors who visit workplaces to ensure that a radon risk assessment has been completed. Enforcement duties for some sectors have been delegated to Local Authority Environmental Health Officers.

In Ireland, prosecutions have been brought against employers who failed to carry out the required radon risk assessments.

What do radon test results mean?

The Government has set guideline maximum radon levels that are acceptable inside buildings. These are referred to as Action Levels, as they are the point at which it is advised (or required, in the case of commercial buildings) that action is taken to lower the concentration.

If the test results show that the radon level in any part of the building exceeds a maximum level of 400 Bq/m^3 (Bequerels per cubic metre of air) the Ionising Radiations Regulations 1999 (IRR99) apply. Under IRR99, an employer is required to take advice from a Radiation Protection Advisor (RPA) as to who may use which parts of the building and for how long, monitor usage times, potentially display warning signs and so forth. Where very high levels are found, a building may have to be closed.

Alternatively, the employer can appoint a specialist contractor to carry out remedial works, such as installing a radon sump or utilising air management techniques to lower the radon concentration in the building. Radon testing must then be repeated to confirm that the levels have fallen below 400 Bq/m^3, and IRR99 will no longer apply. This is the preferred and by far the most sensible approach to adopt if high radon levels are found in a workplace. The cost of remediation will depend upon the size and design of the building and the level of radon inside, however building managers are often pleasantly surprised at how inexpensive the works are.

For reference, IRR99 also applies to places of work which are considered radioactive, including nuclear power stations, chemical plants or hospital x-ray departments. A commercial building with over 400 bq/m^3 of radon is also considered to be a radioactive place of work.

Information compiled by propertECO, national specialists in radon gas testing and management.

For further information on radon gas or to order a radon test kit, please contact Head Office on 01225 787929 or email info@properteco.co.uk

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