Radon in the Workplace

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What is radon?
What is radon?

- It is actually a naturally occurring radioactive gas
- Discovered in the 20th Century when chemist and physicist Ernest Rutherford verified radium emitted a gas – ‘radon’ which qualified as a new element
Where does it come from?

- Originates from uranium that occurs naturally in many rocks, soils, bricks and concrete
Where can it be found?

• The highest radon concentrations can be found in spaces that are either wholly or partially below ground, eg:
  – Basements and cellars
  – Caves and mines
  – Buildings built into an embankment
Where can it be found?

- In addition, ground floors of buildings with poor ventilation or high temperatures may also be a problem.
Legal requirements

Employers have general duties to manage radon:

- Health and Safety at Work etc. Act
- The Management of Health and Safety at Work Regulations

In addition, specific duties apply:

- Ionising Radiation Regulations
Why is radon a problem?

Radon is a problem because:

• It can’t be seen – it is colourless and odourless
• It can seep out of the ground and build up in houses and workplaces
• Levels can vary daily / seasonally:
  • Temperature differences
  • Reduced ventilation
  • Central heating
Effects of radon

As a general rule radon gas breathed in is immediately exhaled and presents little hazard

However:

• Some radon decay products may become lodged in the lungs and airways
• Long term exposure to high radon concentrations increases the risk of lung cancer
• Health studies show radon is responsible for 3-5% of all lung cancers
Putting it into context

People may panic when they hear the word ‘radioactive’

However, to put it into context:

• Radon levels are lower in the UK than many European countries
• Some workplaces have levels of 17,000 Bq m$^{-3}$
• Half of the radon associated deaths occur among the quarter of the population who are current smokers
• It is mainly lungs that are exposed to and damaged by radon. There is no consistent evidence that radon causes cancers elsewhere, or other harm
What do I need to do?
Managing radon

To comply with legislation you must:

• Identify radon affected areas
• Assess the risk of exposure to radon
• Put in place controls to manage any risk
• Inform anyone who may be affected
Assessing radon risks...

- You could pay a consultant to identify radon affected areas
Alternatively!

IDENTIFY POTENTIAL RADON AREAS

• Search **Radon UK** (from the Health Protection Agency (HPA)) to identify radon areas by postcode

• Utilise local knowledge to identify areas wholly or partially below ground

[UKradon](https://ukradon.org) - *The UK reference site on radon, from the Health Protection Agency*
Alternatively!

ASSESS THE RISK

Once potential radon areas have been identified, assess the risk by taking into account:

• The extent the area is below ground
• The room use
• How long the room is used for
• Room temperature ie is it very hot
• Ventilation sources
MEASURING RADON

- Once you have identified ‘at risk’ areas you must take radon measurements
- Purchase radon monitors from the HPA, which are hollow plastic shells containing clear plastic that records the damage caused by radon
Alternatively!

MEASURING RADON

• On receipt of the monitors, place them immediately following the instructions provided in the radon identified areas
• After 3 months, collect the monitors and return to the HPA
• Wait for the results
Alternatively!

ANALYSE THE RESULTS

• The HPA results are very easy to follow
• Cross reference them against the Ionising Radiation Regulations action level for workplaces of:

400 Bq m$^{-3}$
Alternatively!

IF A RESULT EXCEEDS THE ACTION LEVEL

• Contact the Health Protection Agency and they will advise you on what action you should take
Alternatively!

SIMPLE SOLUTIONS

• Appoint a single point of contact for radon
• Change the room use eg storage room
• Restrict access so only authorised persons can enter the area
• Set up logging systems so you know who is going into the room and for how long
• Improve ventilation eg Vent-Axia fans, make sure windows can be opened
• Control temperature eg put in place thermostats so rooms don’t get too hot, maintain equipment so it doesn’t overheat
• Ensure change of room use / modification are reported to the Appointed Person
Monitor

As with all risk assessments, they should be kept under review. The HSE recommend the following monitoring periods:

• Where significant changes are made to the fabric of a building or the work carried out in it

• Once every 10 years where radon levels were found to be significantly less than 400 Bq/m³

• Less than 10 years where radon levels were just below 400 Bq/m³

• Significantly more frequently where radon levels above 400 Bq/m³ were found and where measures were taken to reduce exposure eg engineered systems or occupancy restrictions
Still worried?

If you are still worried about radon contact:

- The Health Protection Agency
- HSE Specialist Inspector who deals with radiation issues which includes radon