Proctor Group

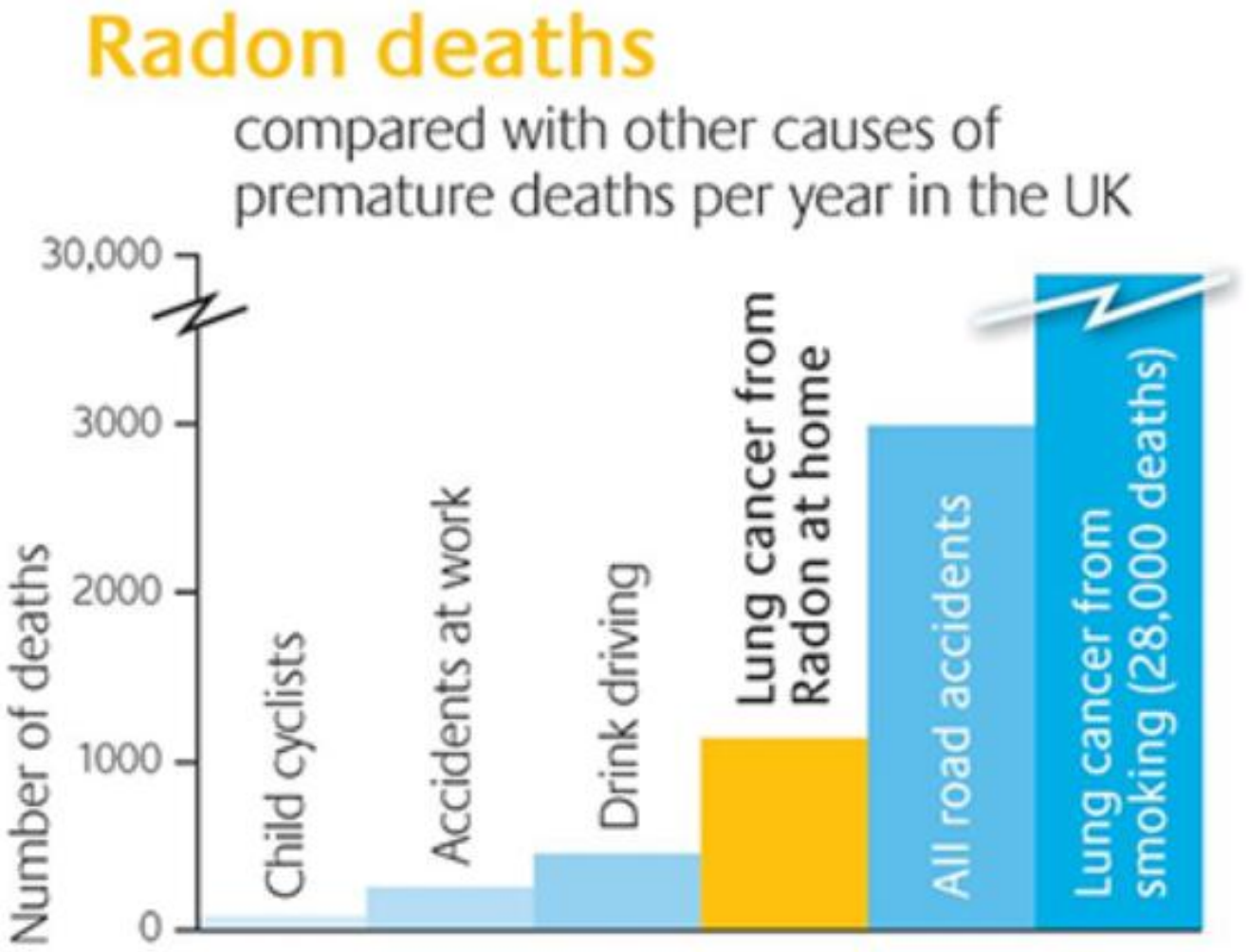
Radon

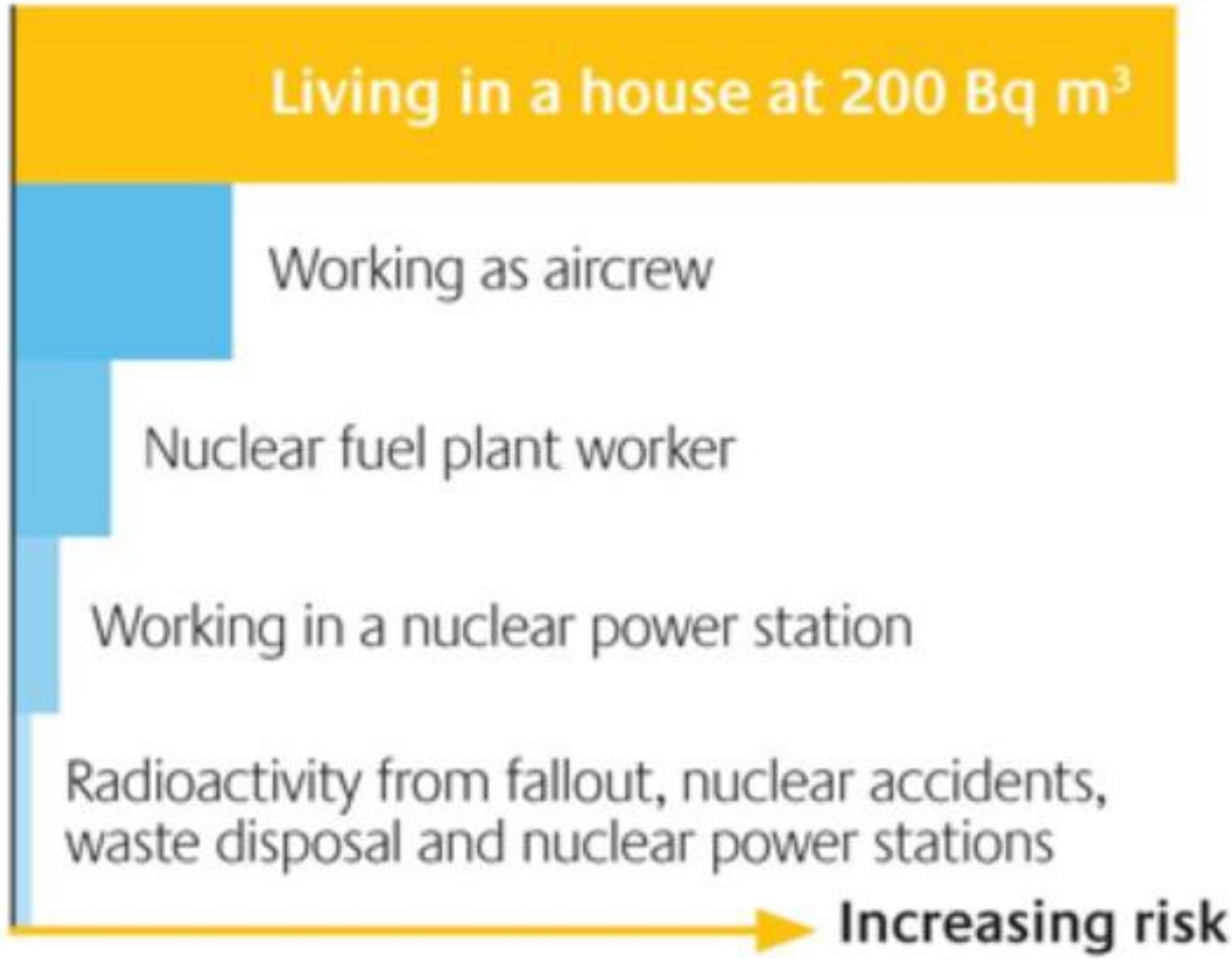
Protecting against Radon in new build

What is Radon?

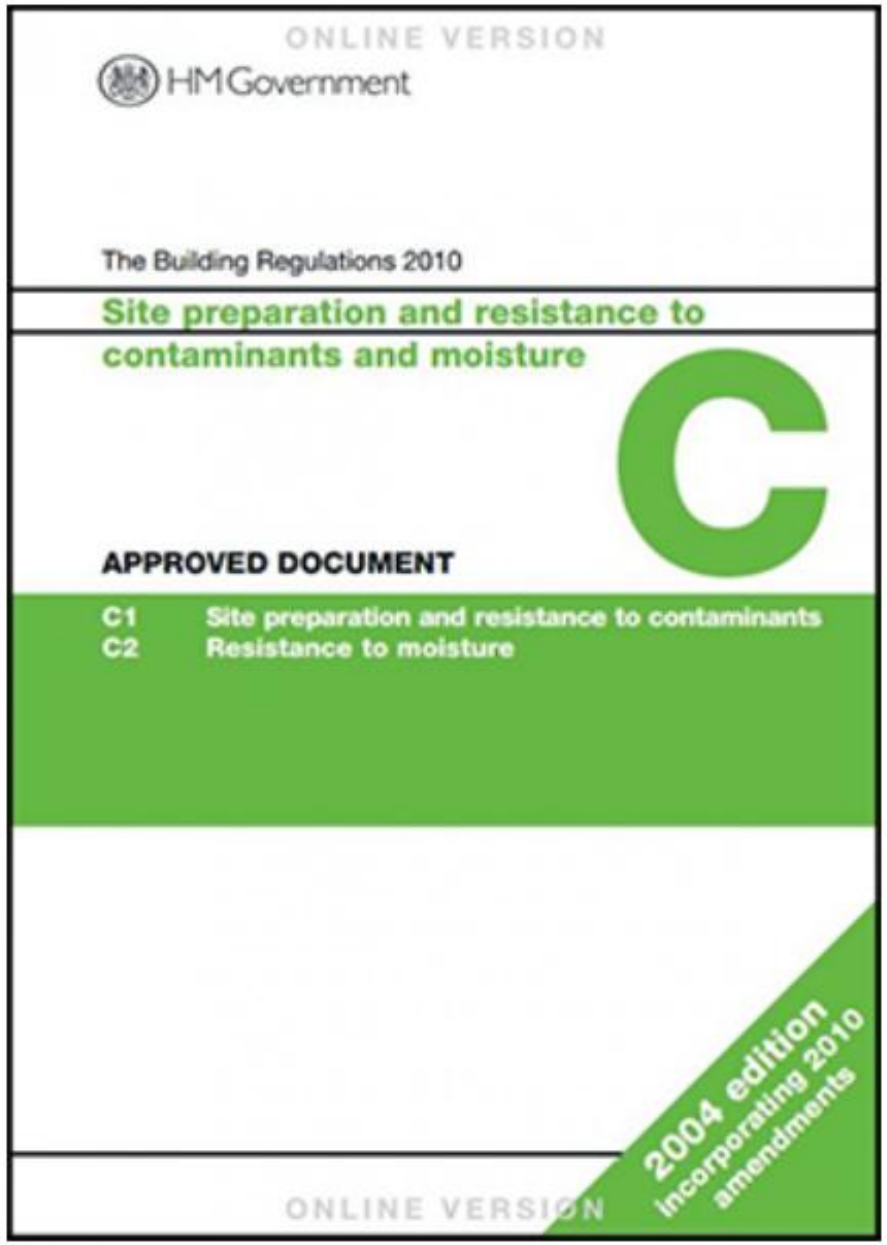
- Naturally occurring
- Radioactive
- Colourless
- Odourless
- Tasteless
- 2nd largest cause of lung cancer

1200 deaths annually

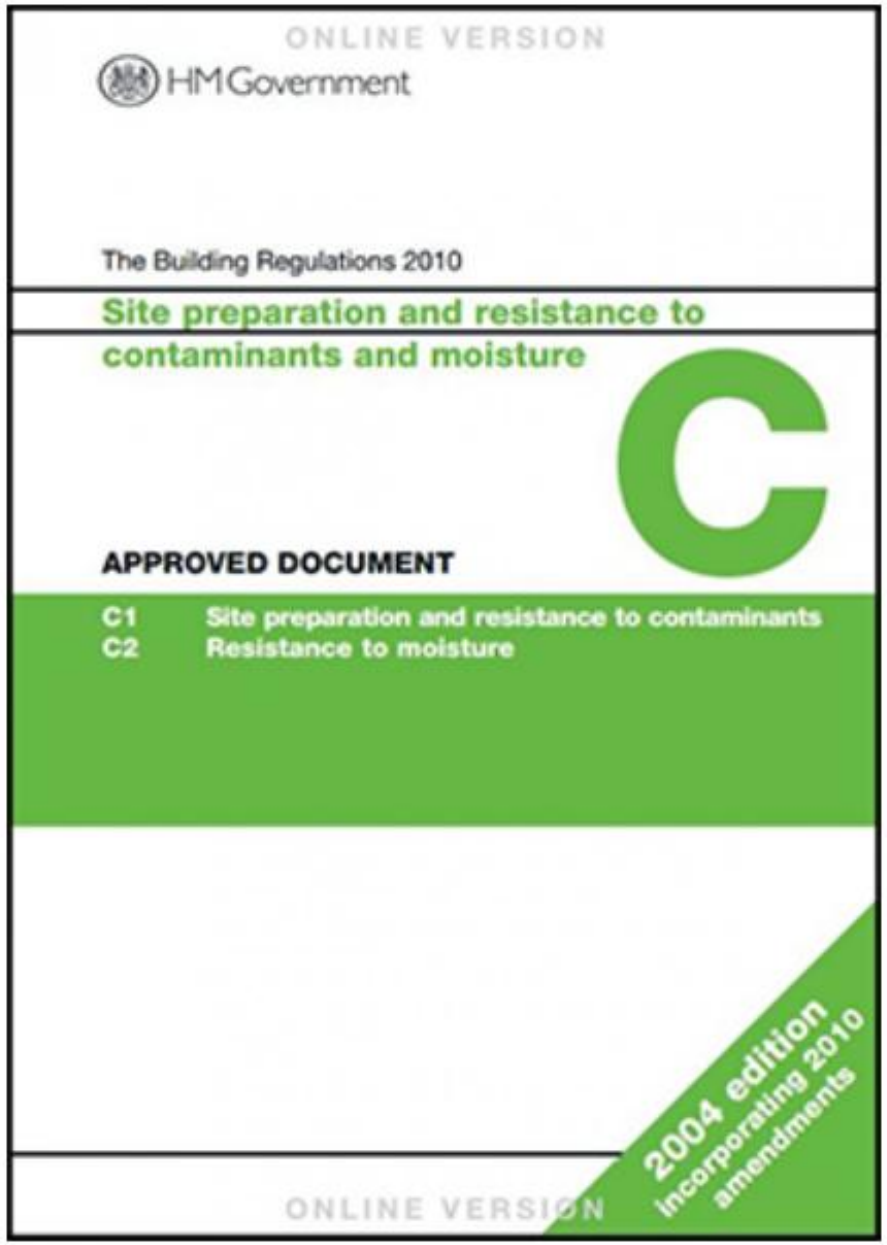



Living in a house at 200 Bq m3
Working as aircrew
Nuclear fuel plant worker
Working in a nuclear power station
Radioactivity from fallout, nuclear accidents, waste disposal and nuclear power stations
Increasing risk

A thimble full of radon released into the O2 would cause the entire venue to be above the UK action level


ONLINE VERSION
HM Government
The Building Regulations 2010
Site preparation and resistance to contaminants and moisture
C
APPROVED DOCUMENT
C1 Site preparation and resistance to contaminants
C2 Resistance to moisture
2004 edition
incorporating 2010 amendments
ONLINE VERSION


bre
Radon
Guidance on protective measures for new buildings
Chris Scivyer
ihs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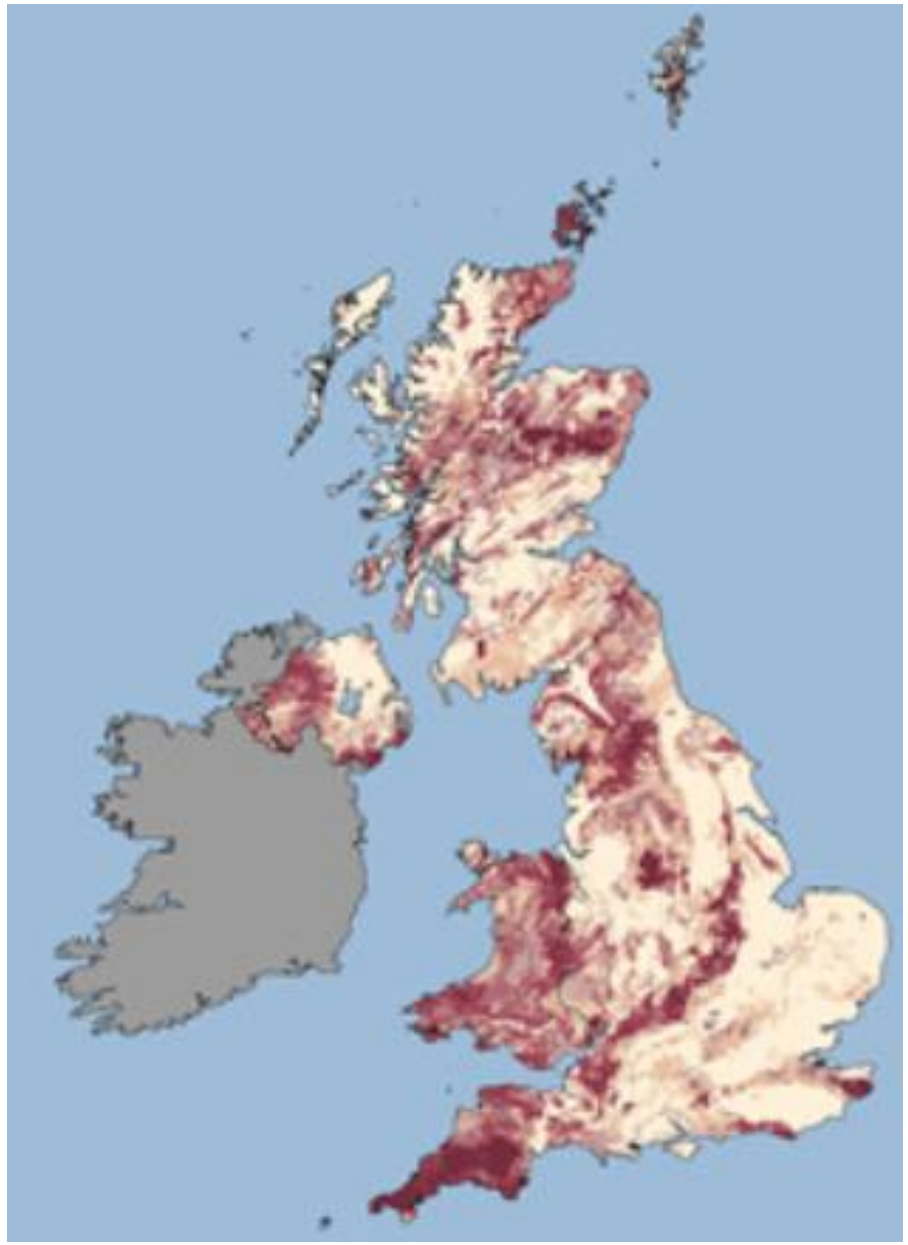
bre
IHS

New updated
BR211 2023 (May)

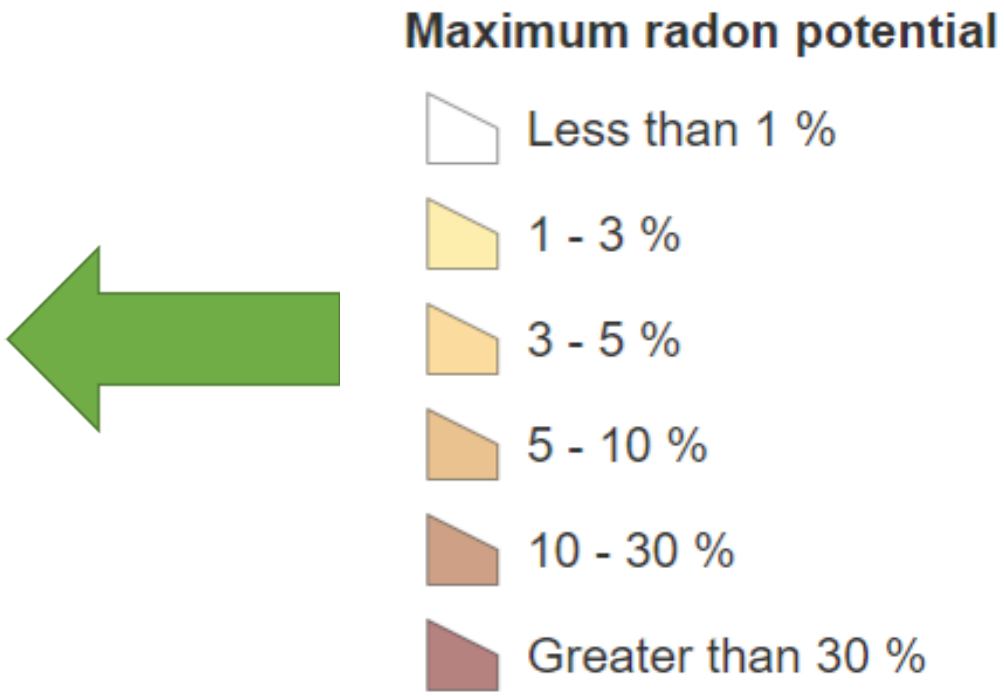


Maximum radon potential

- Less than 1 %
- 1 - 3 %
- 3 - 5 %
- 5 - 10 %
- 10 - 30 %
- Greater than 30 %

Buildings at or above the “Action Level”

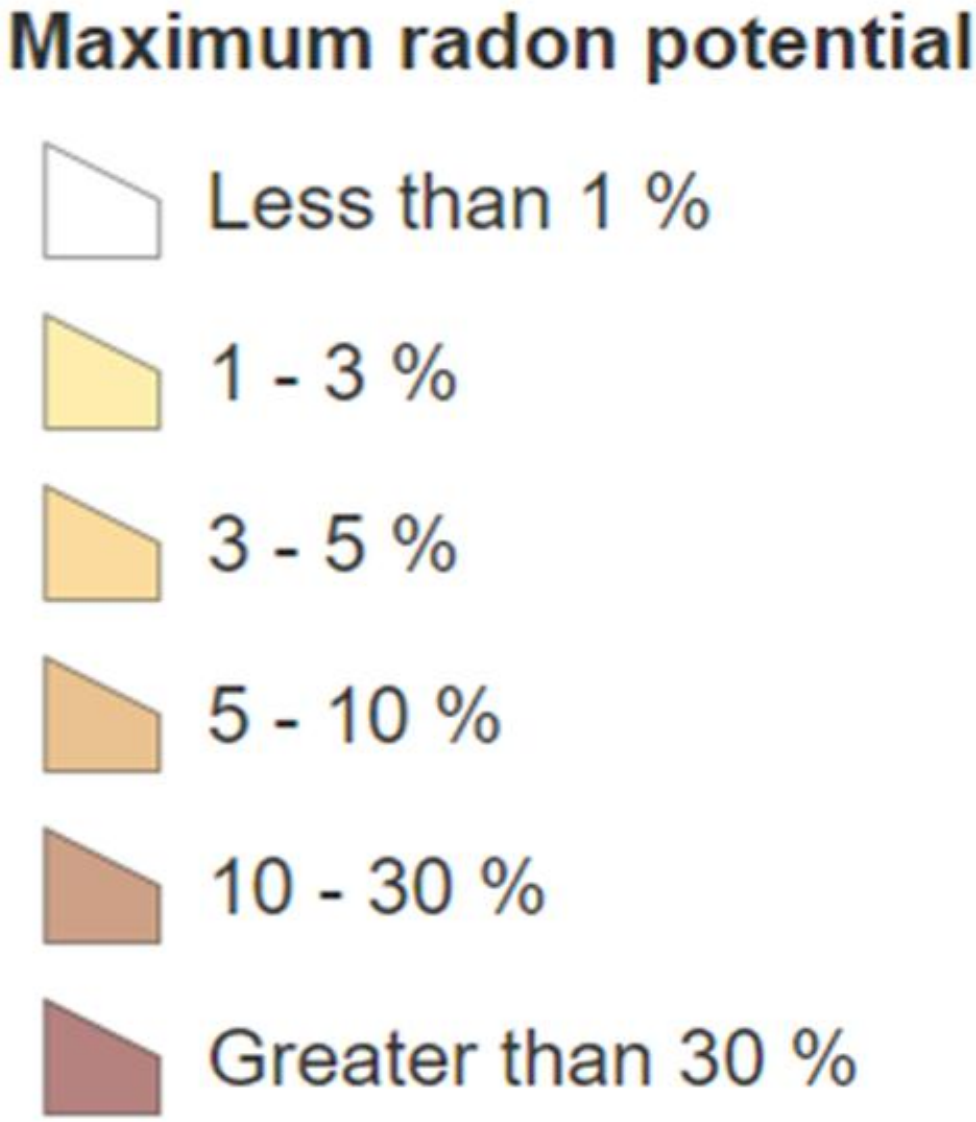
Residential: 200bq/m³
Commercial: 300bq/m³



No Protective Measures:
Standard damp-proofing is sufficient

Basic Protection:
Radon membrane across the footprint of the building including bridging any cavities

Full protection:
Radon membrane across the footprint of the building including bridging any cavities
Plus…
A ventilated void or radon sump



Radon membranes

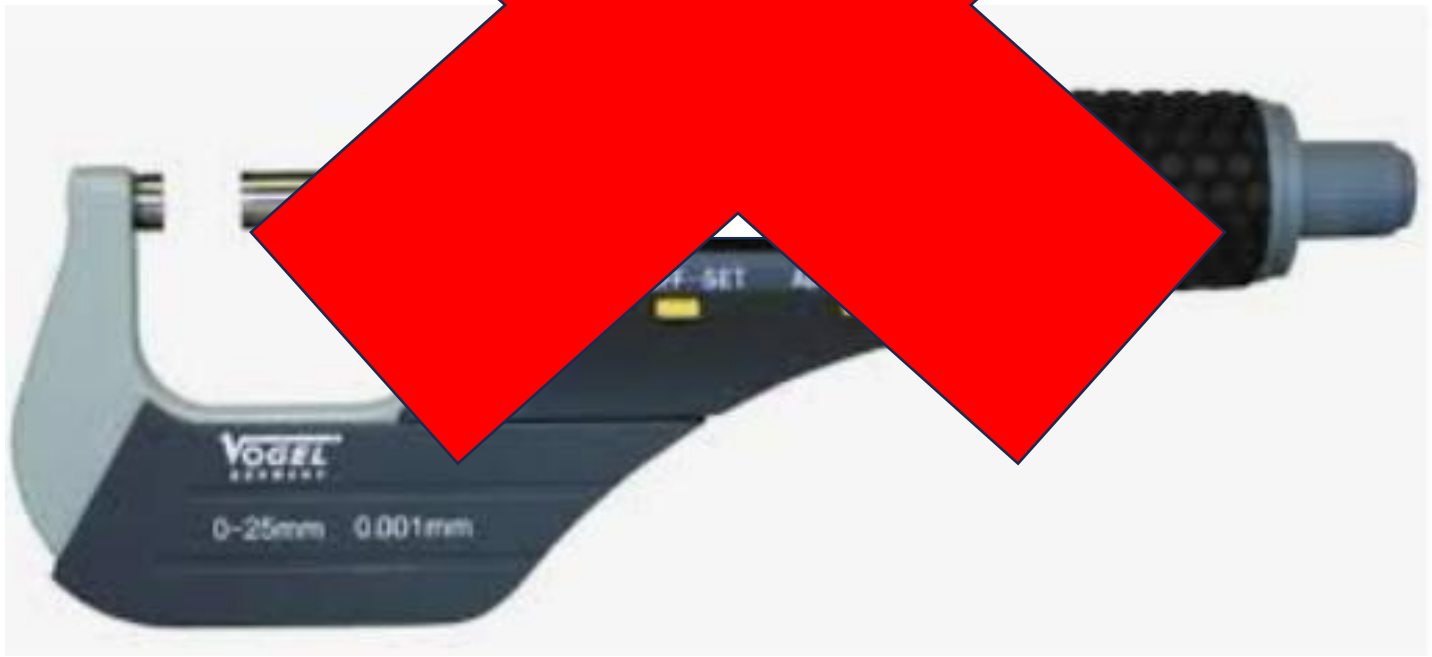
2015

0.3mm or 1200 gauge thick

Radon membranes

2015

0.3 ge thick



Radon membranes

2023

0.4mm or 1600 gauge thick

Radon membranes

A membrane of 300 microns polyethylene sheet is adequate to provide damp-proof protection and should provide some protection against radon entry. British Standard 8485:2015 + A1:2019 states that a polyethylene membrane material less than 400 microns is unlikely to withstand construction damage post installation. It is generally accepted that the robustness of a gas-resistant membrane is more critical to its performance than its permeation rate to challenge gases, **therefore it is advisable to use a membrane of 400 microns or above** according to construction conditions identified by the design.

Radon membranes

Recycled membranes, such as DPM's are **not** considered Radon membranes

The inconsistent nature of feedstock results in inconsistent performance and durability.


PROTECH RADON 400
www.proctorgroup.com
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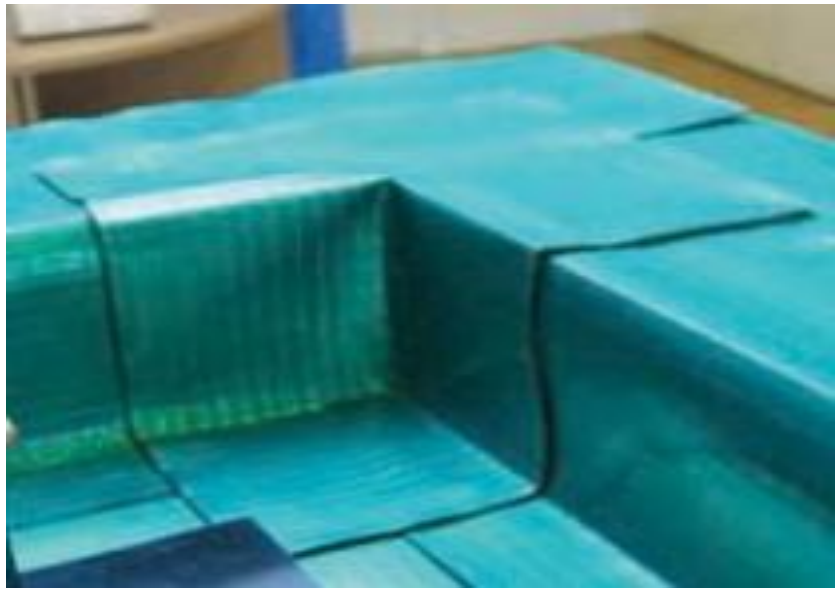
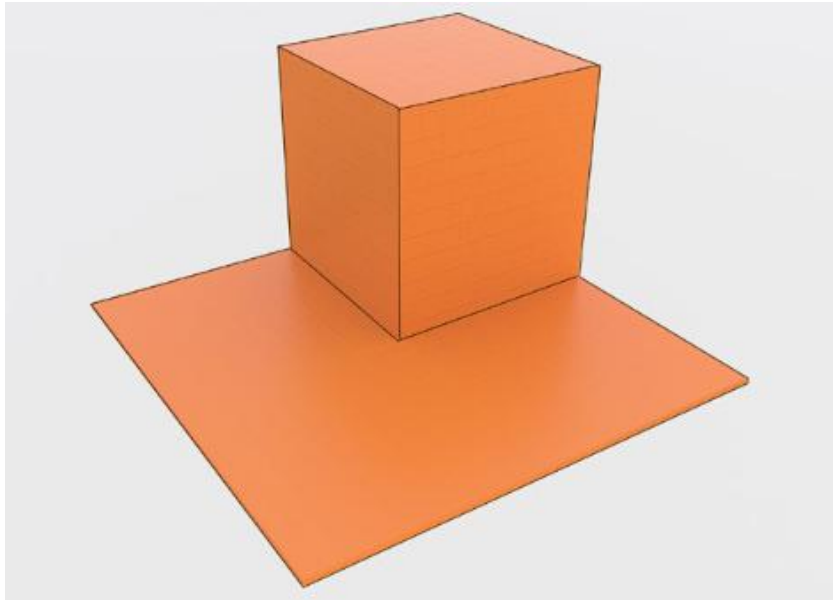
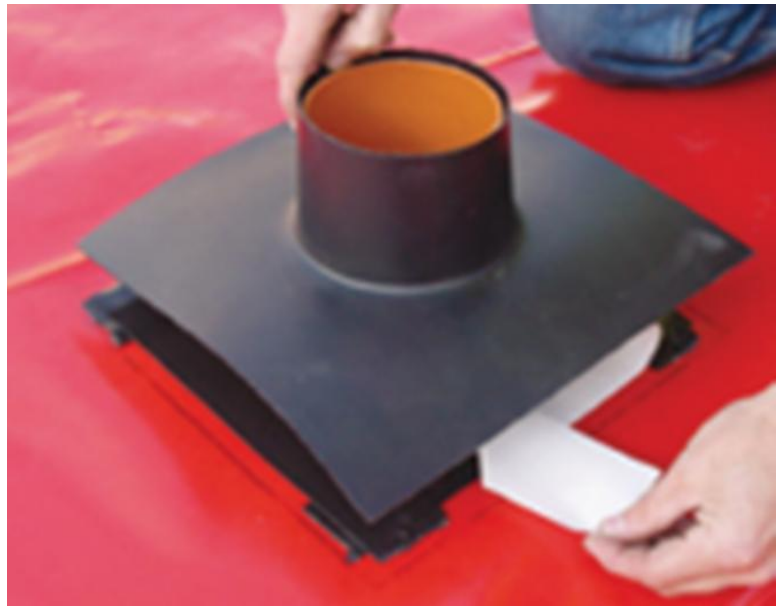


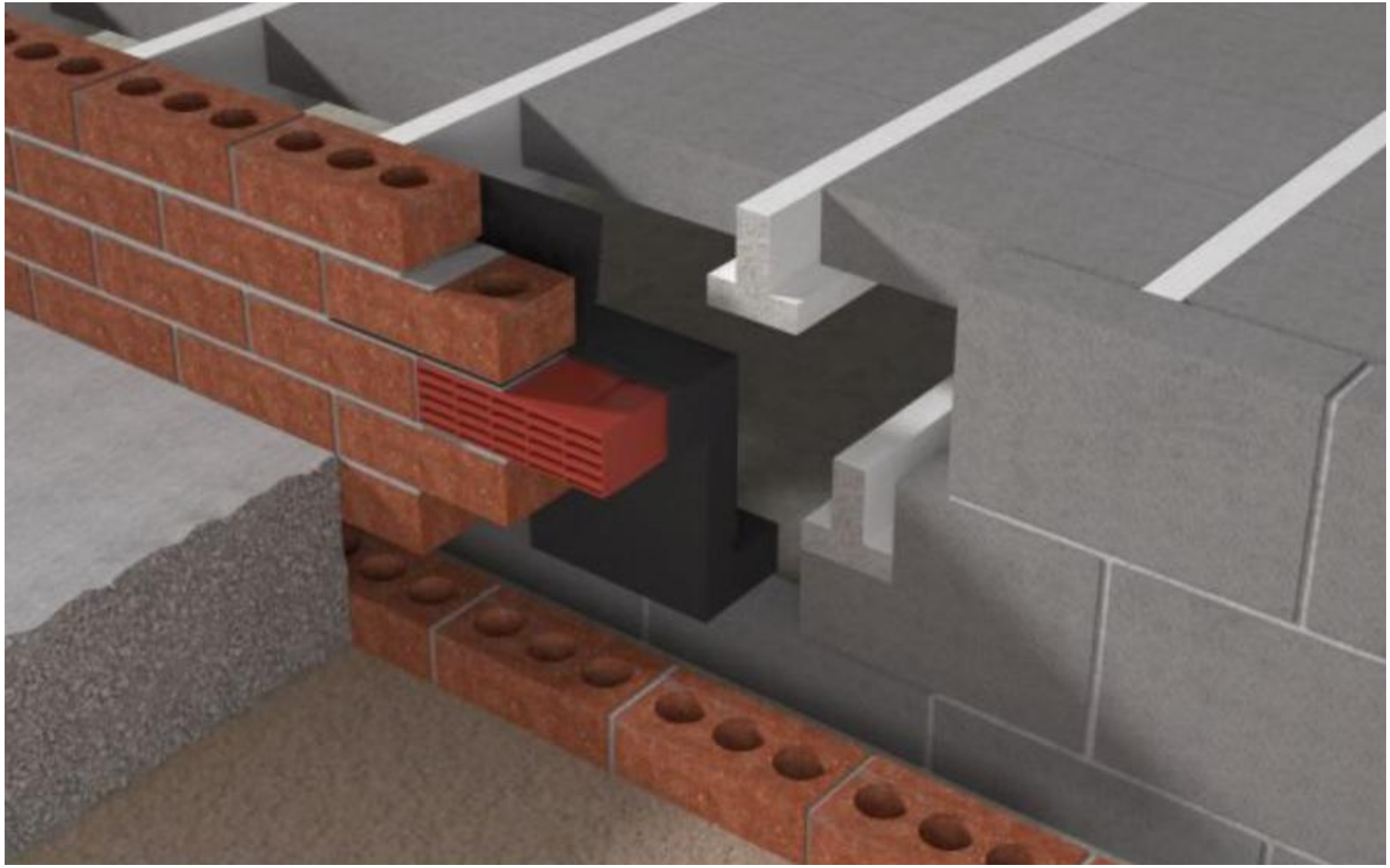
Corners



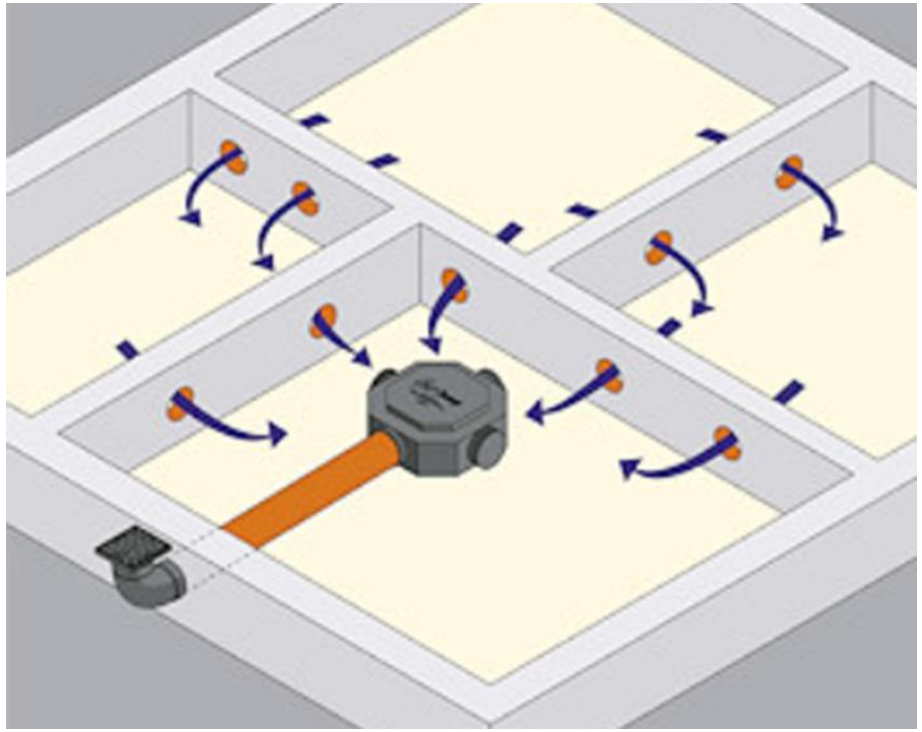


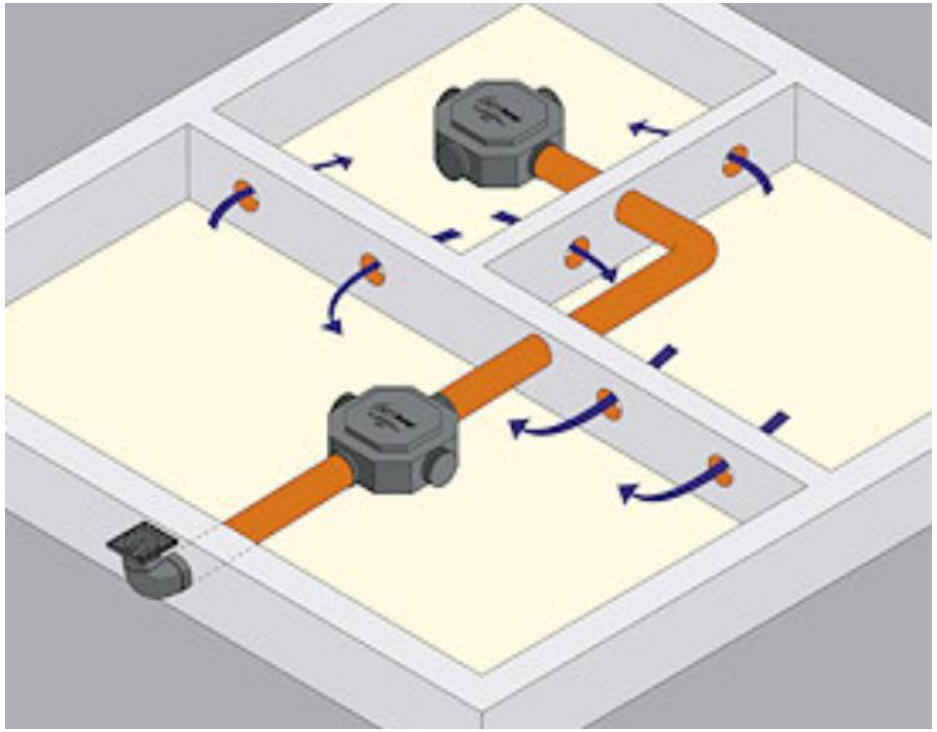
Pipe Penetrations

Ventilated Void



Multiple sumps can be linked together if required





Each sump has an area of influence of around 250m²


Garages

Integral garages with rooms above, or with direct access through a doorway from the garage to the house, need the same provision as the rest of the dwelling.

This ensures protection to the rest of the dwelling and to the garage area should it be temporarily or permanently converted into occupied space.

Detached garages do not require radon protective measures.

Old Sign Off

The Guidance Document BR211 2015 recommends that the purchaser of a building is informed the following:

- **The level of radon protection provided – Basic /Full**
- **The location of the radon barrier – to the suspended floor, beneath the concrete slab etc.**
- **Recorded site checks: Quality Management Checklist (Appendix B of BR211)**
- **The position of any installed sumps and the exhaust outlets**
- **That underfloor vents should be maintained and kept clear.**
- **UKHSA recommends that a new building should be subject to an appropriate radon test during the first year of occupation.**

Old Sign Off

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New Sign Off

The updated Guidance Document BR211 2023 recommends that the radon protection installation is independently verified

It is important that conflicts of interest in inspection and testing reporting are avoided. Inspection and testing reporting by the main contractor, system applicator, gas protection system manufacturer and/or supplier is not good practice.

New Sign Off

The updated Guidance Document BR211 2023 recommends that the purchaser of a building is informed the following:

Chapter 7

Quality of construction and inspection, testing and reporting

Quality Management Record to include:

Radon search
Drawings
Specification
Barriers through walls
Barriers within floors
Sumps
Underfloor ventilation

New Sign Off

The updated Guidance Document BR211 2023 recommends that the purchaser of a building is informed the following:

Handover to purchaser

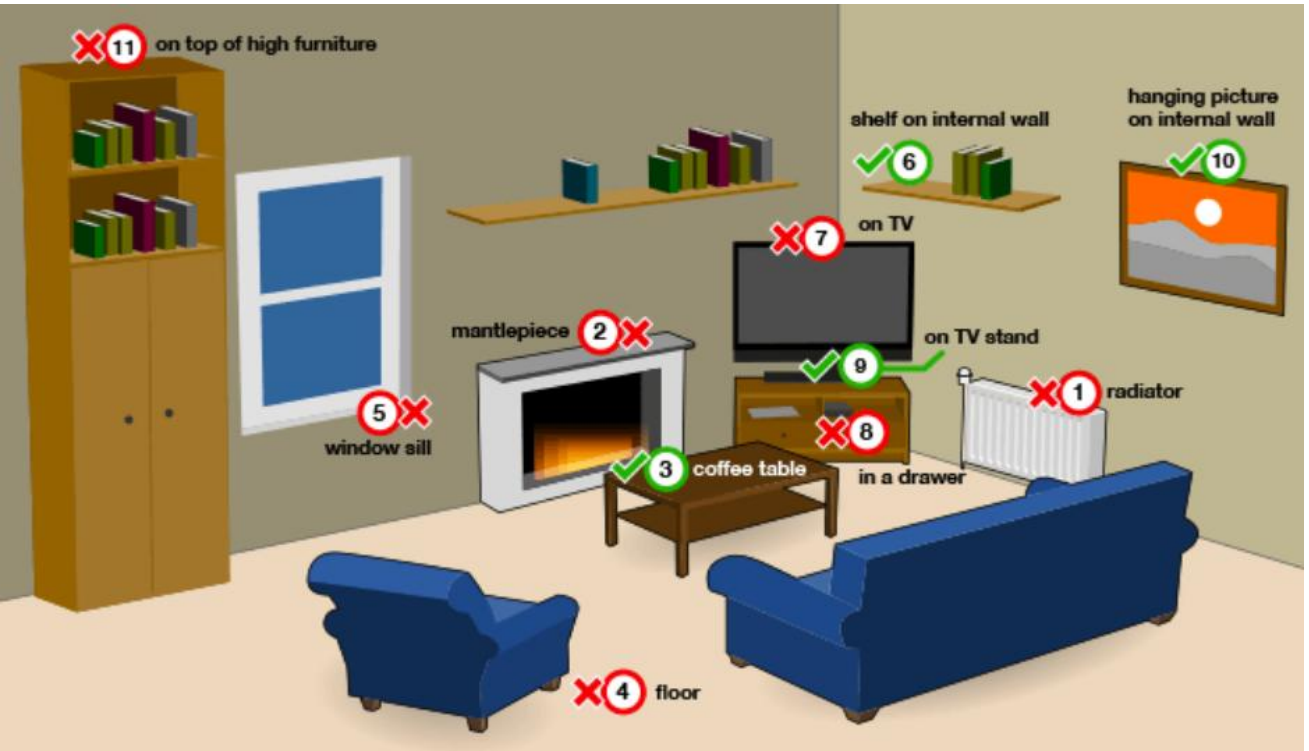
Provide a report explaining the level of Radon protection provided.
This report should include a completed Radon Protective Measures Quality Management Record and documented evidence of the installation inspection.

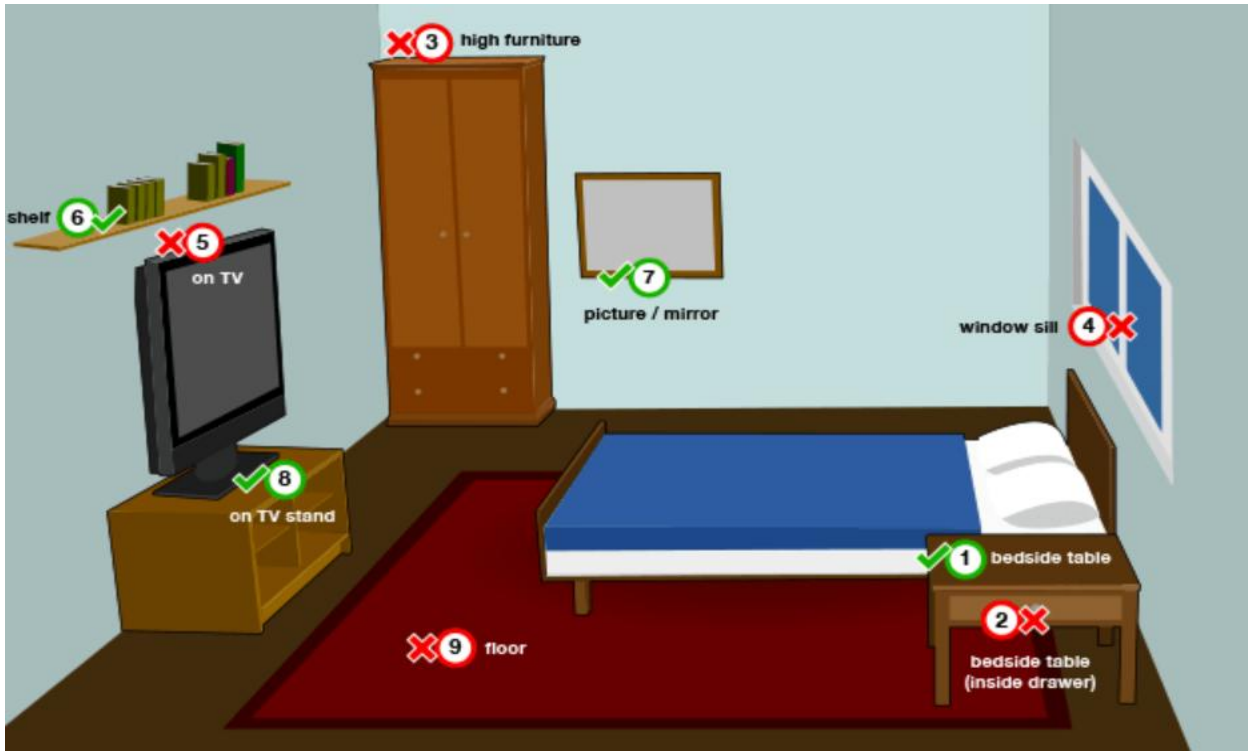
This is the responsibility of the house builder.

This is the end of the developers responsibility!

Homeowners Radon Test

Recommended in 1st year





NHBC
Traffic Light System

Methane
&
Carbon Dioxide

NHBC Traffic Light System

Traffic Light	Ground Gas Protection Measures Required
Green	Ground gas protection measures are not required.
Amber 1	Low-level ground gas protection measures are required, using a membrane and ventilated sub-floor void that creates a permeability contrast to limit the ingress of gas into buildings. Gas protection measures are to be installed as prescribed in BRE 414. Ventilation of the sub-floor void should be designed to provide a minimum of one complete volume change per 24 hours.
Amber 2	High-level ground gas protection measures are required, creating a permeability contrast to prevent ingress of gas into buildings. Gas protection measures are to be installed as prescribed in BRE 414. **Membranes used should always be fitted by a specialist contractor and should be fully certified (see Appendix E).** As with Amber 1, ventilation of the sub-floor void should be designed to provide a minimum of one complete volume change per 24 hours.
Red	Standard residential housing is not normally acceptable without further Ground Gas Risk Assessment and/or possible remedial mitigation measures to reduce/remove the source of the ground gases. In certain circumstances, active protection methods could be applied, but only when there is a legal agreement assuring the management and maintenance of the system for the life of the property.

NHBC Traffic Light System

	Gas Regime	Minimum gas protection expectations	Verification or information requirements
CS1	Green	N/A – but need to comply with BR211 radon requirements, where applicable	
CS2	Amber 1	Ventilation – subfloor venting to achieve at least one air exchange per day (minimum 150mm void height; 1500mm2/m air vent opening or 500mm2/m2 floor area spaced at not more than 2m centres on at least two opposing sides). Membrane – must be suitable for purpose. Membrane installation/design - to achieve complete integrity across entire building footprint. Penetrations and joints sealed.	Construction drawings – showing position of membrane; sealing details and ventilation points to be provided. Membrane specification – technical data sheet(s) for gas membrane (including gas permeability data) to be provided. Installation – photographic evidence of installed membrane may be requested.
CS3	Amber 2	Ventilation – subfloor venting to achieve at least one air exchange per day. Membrane – must be suitable for purpose (criterion detailed in BS8485 clause 7.2.4). Membrane installation and design to achieve complete integrity across entire building footprint. Penetrations and joints sealed. Installer – installers must be experienced and appropriately trained and/or qualified.	Construction drawings showing position of membrane, sealing details and ventilation points to be provided. Membrane specification – technical data sheet(s) for gas membrane (including gas permeability data) to be provided. Installation – third-party verification report with supporting evidence to be included (i.e. photographic evidence and certificates of conformity, observations relating to sealing, location of ventilators and standards of installation). Integrity testing – may be requested; testing plan to be agreed in advance.
CS4-6	Red	Standard residential housing is not generally acceptable without further ground gas risk assessment and/or possible remedial mitigation measures to reduce or remove the source of the ground gases.	

Traffic Light System Technical Extra 20

Published 2016

GUIDANCE AND GOOD PRACTICE

Ground gas update – site assessment, characterisation and design of gas protection measures

Who should read this: Technical and construction directors, architects, designers, consultants and site managers

NF94 Hazardous Ground Gas

An essential guide for housebuilders

Published July 2023

Project Support

Proctor Group

Contact:
Iain Fairnington, Technical Director **iain.fairnington@proctorgroup.com**
Bruce Manning, National Housebuilder Manager **bruce.manning@proctorgroup.com**