

Session 3 :

Radon Provisions in New Buildings

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Radon Provisions in New Buildings

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Radon Policy

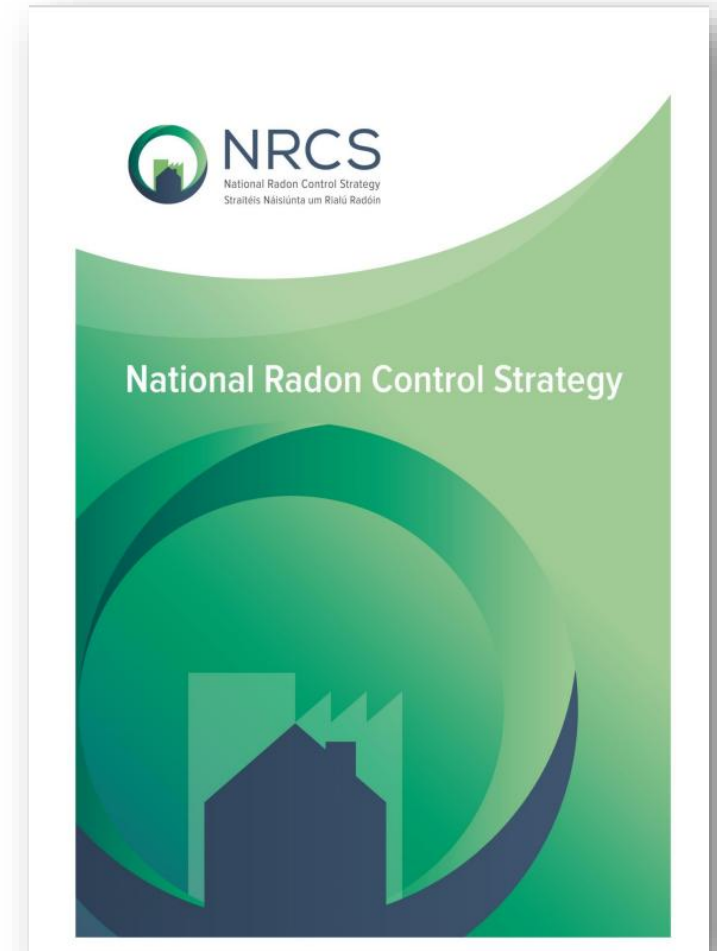


The National Radon Control Strategy sets the policy for radon control in Ireland and coordinates the work of several government departments with influence over radon exposure in buildings.

Dept of Climate, Energy and Environment are policy lead in this area and that EPA are their technical support agency

DHLGH are responsible for radon mitigation and remediation provisions installed new buildings.

DCEE are policy lead for radon remediation measures in the existing building stock.



Building Regulation C3 - Radon



Reasonable precautions shall be taken to avoid danger to health and safety caused by substances (including contaminants) found on or in the ground to be covered by a building.

In this Part -"contaminant" includes any substance which is or could become flammable, explosive, corrosive, toxic **or radioactive** and any deposits of faecal or animal matter;

Building Regulations – Technical guidance Document C



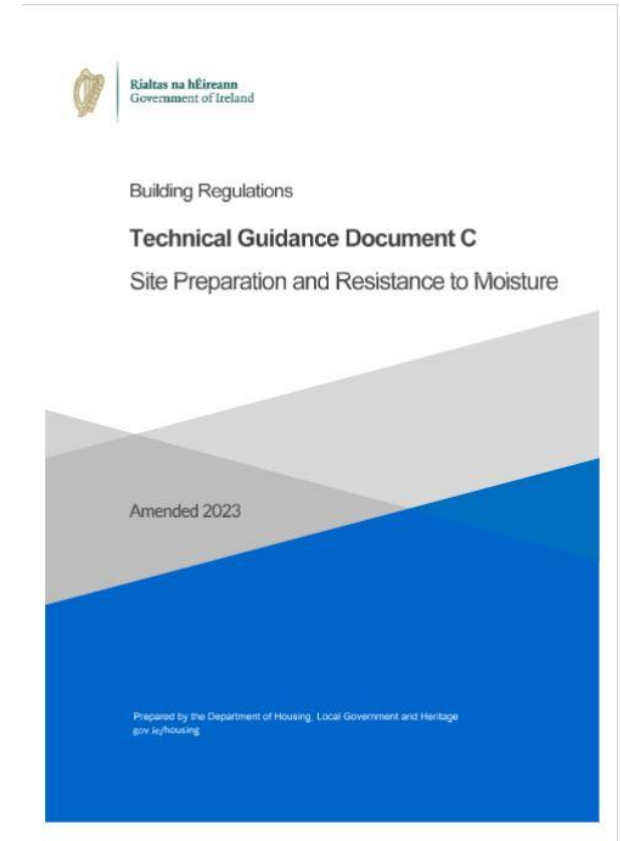
Site preparation and site drainage

Dangerous substances

- Radon
- Landfill gases

Resistance to weather and ground moisture

- Floors next to the ground
- External Walls – Moisture from ground
- External Walls – Moisture from outside



Radon provisions



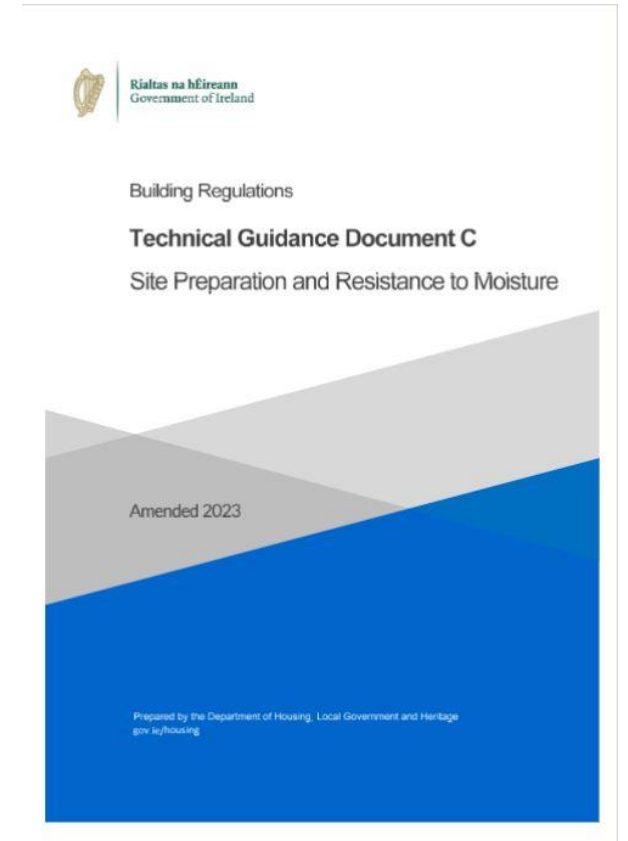
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Technical Guidance Document C



Where works are carried out in accordance with the guidance in this document, this will, prima facie, indicate compliance with Part C of the Second Schedule to the Building Regulations.

However, the adoption of an approach other than that outlined in the guidance is not precluded provided that the relevant requirements of the Regulations are complied with.

Those involved in the design and construction of a building may be required by the relevant building control authority to provide such evidence as is necessary to establish that the requirements of the Building Regulations are being complied with.

2.7 National Reference Levels

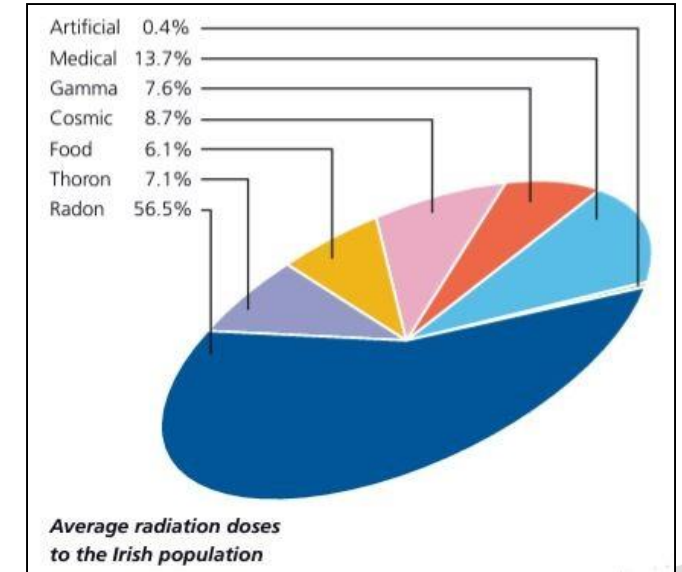
Dwellings:

The National Reference Level for long-term exposure to Radon in dwellings is 200Bq/m^3 .

Workplaces:

SI No. 30 of 2019 ... sets a National Reference Level for Radon Gas in Workplaces of 300Bq/m^3 averaged over any three months.

Above this level the need for remedial action should be considered.



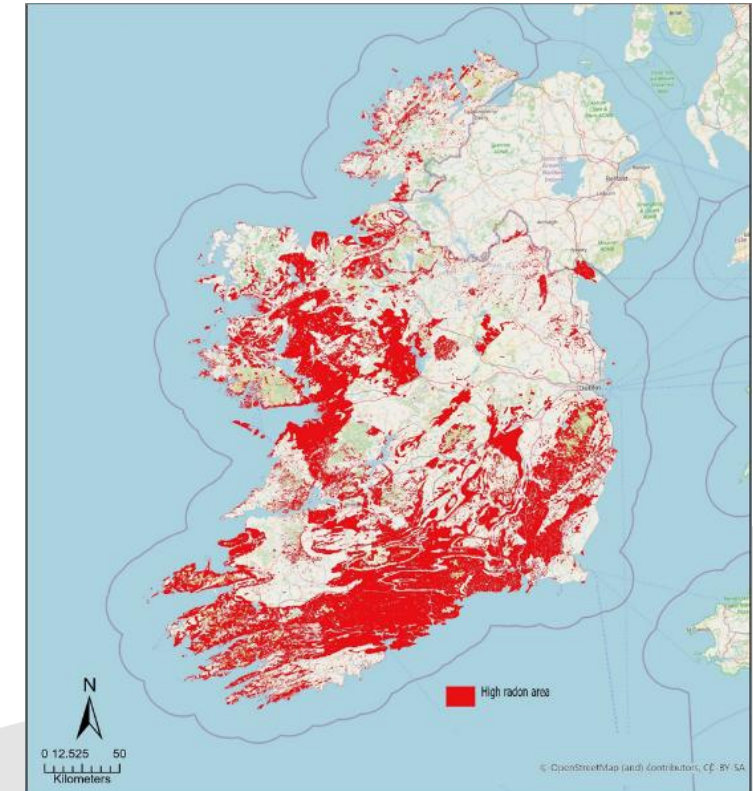
2.8 Radon risk map



It is not possible to accurately predict the concentration of indoor radon likely to occur in a proposed building on the basis of a pre-construction site investigation.

The Environmental Protection Agency (EPA) publishes a high spatial resolution Radon Risk Map of Ireland identifying High Radon Areas.

High Radon Areas are defined as areas where it is predicted that more than 10% of dwellings will have Radon gas concentrations above 200 Bq/m³.



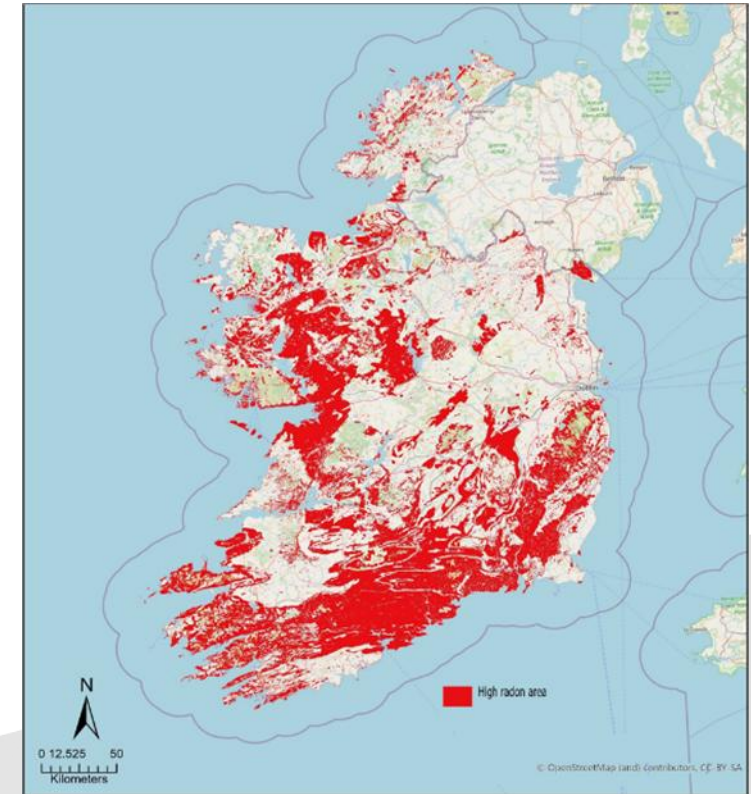
Buildings with high concentrations of Radon gas are not confined to these areas and can be found in any part of the country.

2.9 Radon measures



Measures can be taken during the design and construction of a building which will:

- significantly **reduce the risk** of Radon concentrations in excess of the NRL and
- provide a potential **means of remediation**, which can be activated at low cost and with little disruption, should Radon concentrations be found to be excessive when the building is in use
- TGD F also provides for **validated ventilation** which has been shown to be very effective at diluting indoor radon concentrations.



2.10 Dwellings or other long-stay residential buildings

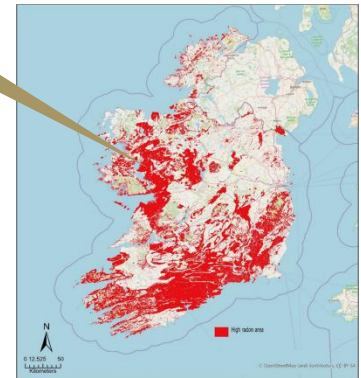


- (a) **High Radon Areas:** measures should be taken to protect the building from Radon in the ground.

For example, in the case of a non-complex building of normal design and construction, the following measures should be provided:

- a **fully sealed membrane** of low permeability over the entire footprint of the building *and*
- a potential means of extracting Radon from the substructure such as a **standby Radon sump**, or sumps, with connecting pipework, or other appropriate certified systems

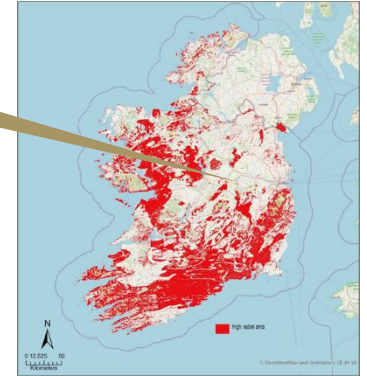
Red areas



2.10 Dwellings or other long-stay residential buildings



White areas



(b) Areas **other than** High Radon Areas:

the building should be provided with a potential means of extracting radon from the substructure, should that prove necessary after construction.

For example, in the case of a non-complex building of normal design and construction, the provision of:

- a **standby radon sump**, or sumps, with connecting pipework, or other appropriate certified systems, should be adequate.

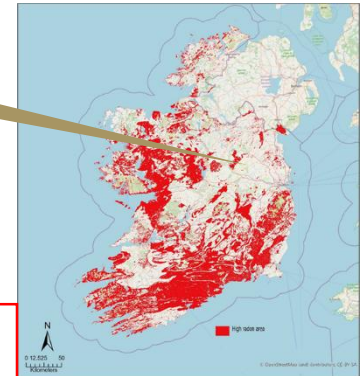
TGD C – Resistance to Ground Moisture

Damp-proof membranes



Not strictly part of the radon provisions,
but necessary for the activation of the standby radon sump

White areas



3.1.5 A damp-proof membrane laid below the concrete should be at least 300 μm (1200 gauge),
laid with the joints sealed as prescribed in CP102
on a bed of blinding material which will not damage the sheet.

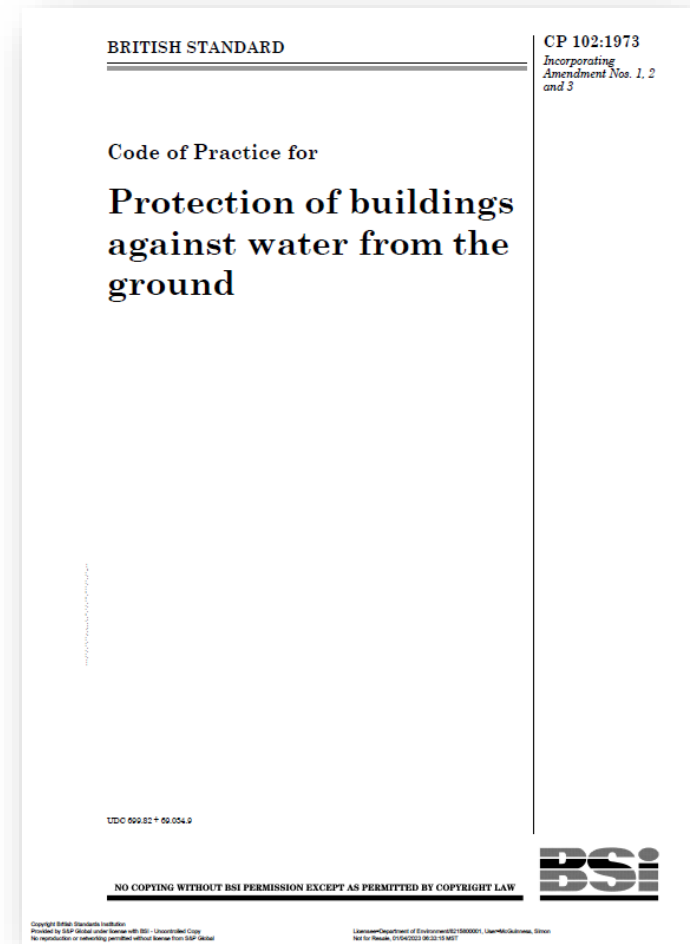
3.1.4(c) The damp-proof membrane may be located above or below the concrete, and should be continuous with the damp-proof courses in walls

CP 102:1973 (as amended)



11.4 Continuity of membrane.

- It is essential that the damp-proof membrane in the floor **should be continuous with** the damp-proof course in the surrounding walls. Where necessary, a vertical damp-proof course should be incorporated to link the two
- It is also essential that polythene sheet joints should be lapped at least 150 mm **and should be sealed with double-sided pressure sensitive tape**;
- Punctures in polythene sheet should be patched with polythene of identical thickness lapped at least 150 mm beyond the limits of the punctures, and that the joints between the patches and the sheeting should be similarly sealed with double-sided pressure sensitive tape.

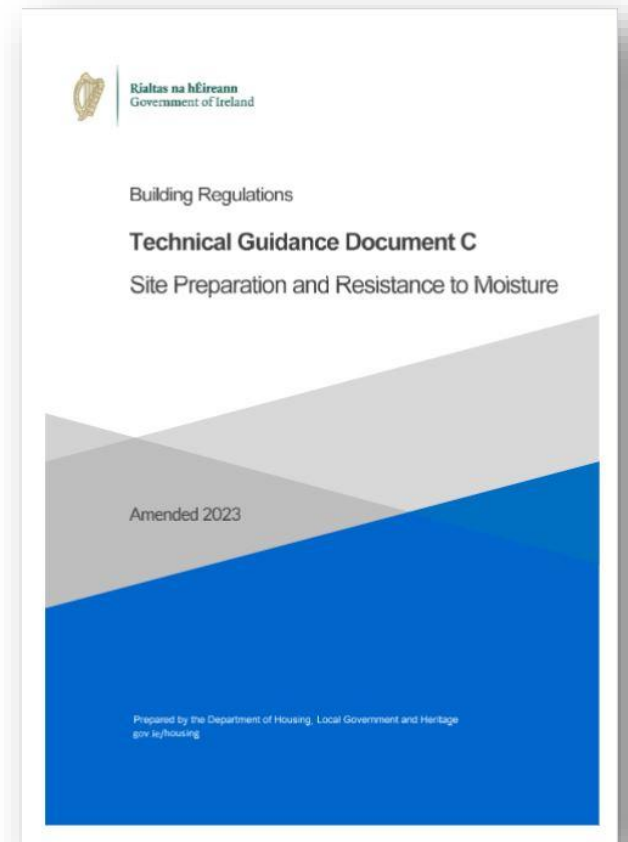


2.11 Other Buildings



The designer should consider the provision of measures to protect buildings against high Radon concentrations.

In the absence of specific guidance, provisions similar to those in 2.10 (Dwellings or other long-stay residential buildings) may be adopted.



Summary of measures in Ireland



Measure – TGD C	Effect	High Radon Area	Other Area
Standby sump	Facilitates radon remediation	✓	✓
Sealed radon membrane	Resists radon entry	✓	
Sealed damp-proof membrane	Resists radon entry		✓
TGD F - Validated ventilation	Dilutes radon concentrations	✓	✓

2.12 Membranes



Membranes used for Radon protection should be appropriate for this use.

- Fitness established by independent certification by an approved body e.g. by NSAI Agrément.
- The parameters certified should include those in Table 3.
- Minimum performance levels set for Low Density Polyethylene (LDPE) membranes.
- Equivalent performance required for non-LDPE materials

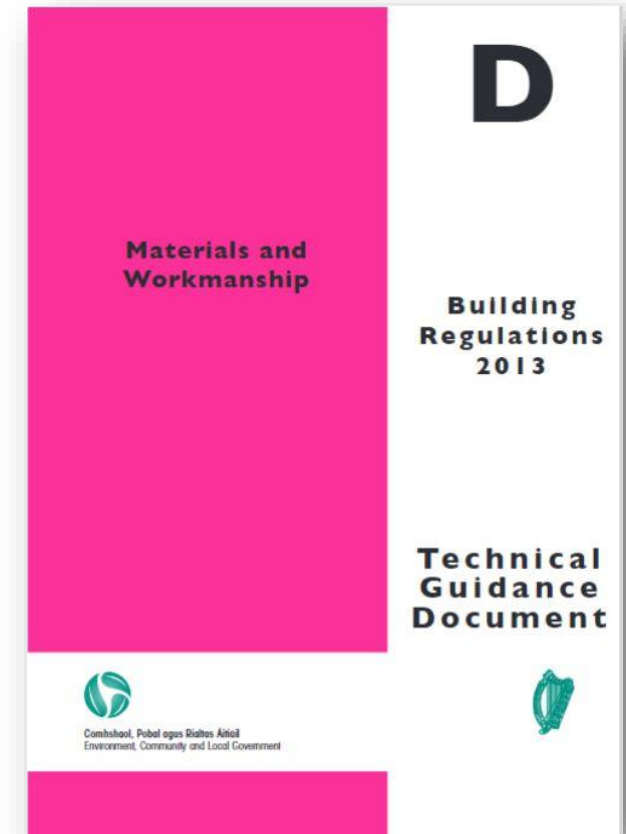
Building Regulation D3 – “Proper Materials”

Technical Guidance Document D



Materials which are fit for the use for which they are intended and for the conditions in which they are to be used, and includes materials which:

- a) bear a CE Marking in accordance with the provisions of the Construction Products Regulation;
- b) comply with an appropriate harmonised standard or European Technical Assessment in accordance with the provisions of the Construction Products Regulation; or
- c) comply with an appropriate Irish Standard or Irish Agrément Certificate or with an alternative national technical specification of any State which is a contracting party to the Agreement on the European Economic Area, which provides in use an equivalent level of safety and suitability.



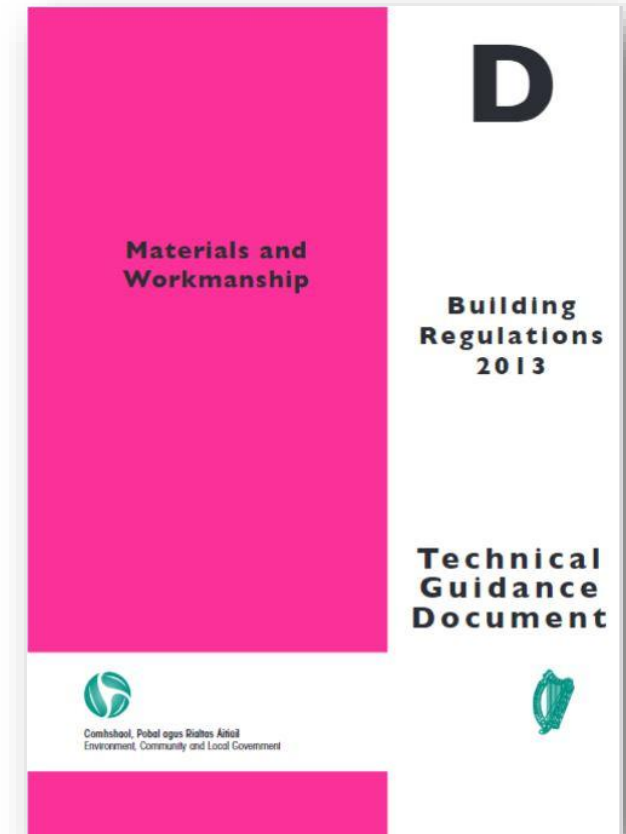
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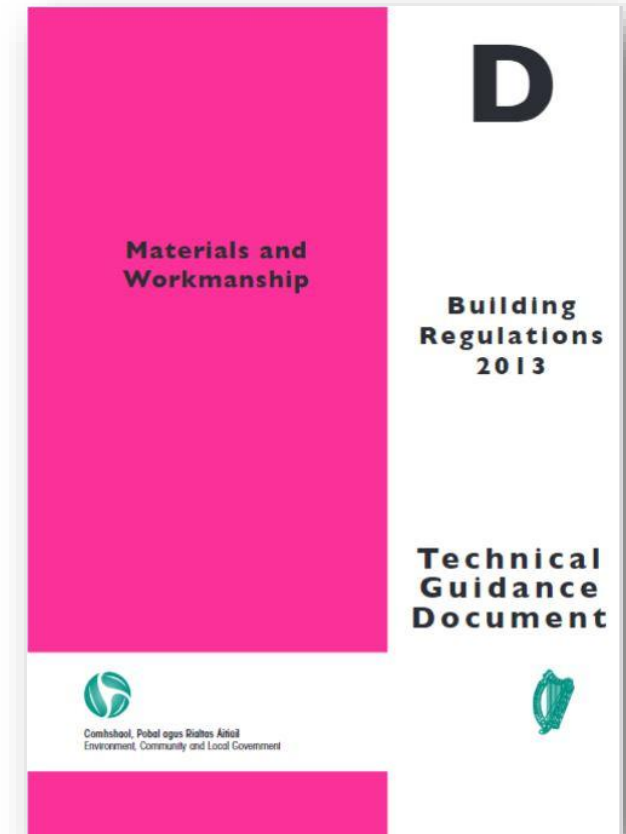
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TGD C - Table 3

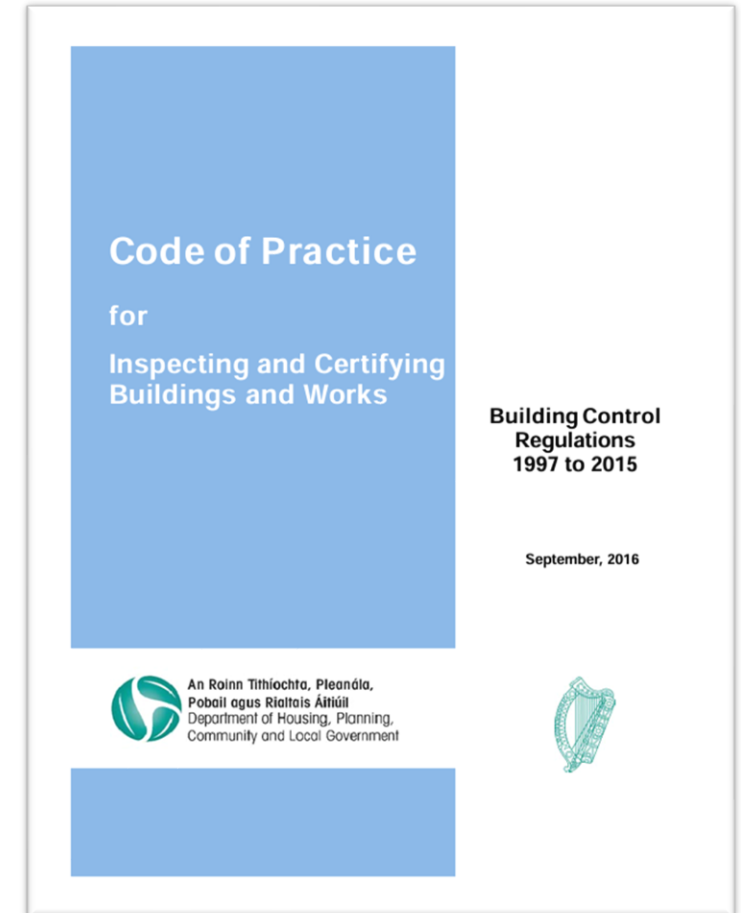


Table 3 Minimum Performance Level for LDPE Radon Proof Membranes		
Parameter	Test	Performance Level
Radon Permeability	Laboratory Test with Radon Gas – Rn 222	$12 \times 10^{-12} \text{m}^2/\text{s}$
Tensile Strength	I.S. EN 12311-2:2000 or IS EN ISO 527-3	MD > 12Mpa CD > 12Mpa
Elongation	I.S. EN 12311-2:2000 or I.S. EN ISO 527-3	$\geq 100\%$ (at break) Un-reinforced LDPE $\geq 12\%$ (at max. load) Reinforced LDPE
Tear Resistance	I.S. EN 12310-2:2000	> 100N
Moisture Vapour Resistance	BS 3177	> 50MN/g
Low Temperature Flexibility	I.S. EN 495-5:2000	No cracking at -25 deg C

Inspection and Certification



S.I. 9 of 2014 (BCAR)	Effect	High Radon Area	Other Area
Sign off by competent professional “Assigned Certifier”	Independent oversight	✓	✓
Priority elements for inspection Table B.2 Stage 3(a)	Ensures membrane is in place and intact Ensures standby sump & pipework is in place	✓	✓
Priority elements for inspection Table B.2 Stage 5(d)	Ensures proper ventilation is provided	✓	✓



EPA certified - Radon Testing



- The installation of measures in accordance with this guidance is **NOT a warranty** that Radon concentration levels will be reduced below the relevant National Reference Level. (TGD C, 2.16)
- Building owners are recommended to have the Radon concentration level assessed when the building is in use and again after remediation action, should such prove necessary.
- Information on the procedure to assess Radon concentration levels in occupied dwellings or workplaces can be obtained from the EPA.



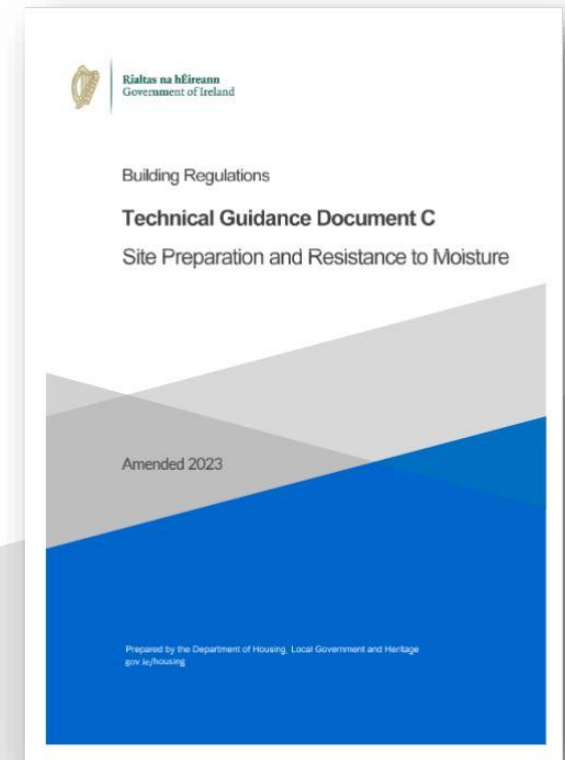
www.radon.ie

Planned Review of the TGD-C

Ongoing Consultations



- Research into various wall types and their application based on enhanced u-values suitable for NZEB and ZEB
- Research into renders and their application
- Construct-Innovate research on Modern Methods of Construction and Defective Concrete Blocks
- Application of the updated Met Éireann Driving Rain Index
- Application of the revision of S.R. 325 - Recommendations for the design of masonry structures in Ireland to Eurocode 6
- Incorporation of the National Radon Control Strategy 2026-30.



Session 3:

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THANK YOU



An Roinn Aeráide,
Fuinnimh agus Comhshaoil
Department of Climate,
Energy and the Environment



An Roinn Tithíochta,
Rialtais Áitiúil agus Oidhreacht
Department of Housing,
Local Government and Heritage

