



**Circular letter M46/01**

**Building Unit, Tullamore, Co. Offaly.**

**Radon Mitigation For Schools with a Maximum Average Level of between 200 Bequerels (Bq)Per Cubic Metre (m<sup>3</sup>) and 400 Bq/M<sup>3</sup> in One or More Rooms.**

**1 BACKGROUND**

Radon is a natural radioactive gas that has no taste, smell or colour and requires special equipment to detect its presence. It is found in all soils and rocks to some degree but the amount can vary in different parts of the country and at different times of year. Radon is formed naturally in the ground and, because it is a gas, it can move through soil enabling it to enter the atmosphere or seep into buildings. Radon that surfaces in the open air is quickly diluted to harmless concentrations, but when it enters an enclosed space, such as a building, it can sometimes build up to unacceptably high concentrations.

Radon can enter a building through cracks in the floor or gaps around pipes and cables. Levels in neighbouring buildings, or even in rooms within the one building, can be very different.

**2 HEALTH RISKS ASSOCIATED WITH EXPOSURE TO RADON**

An increased possibility of contracting lung cancer is the only proven health risk associated with exposure to radon.

This risk is significant, based on the level of exposure, the duration of the exposure and whether or not the exposed person is a smoker. Based on current knowledge it is estimated that in Ireland a lifetime exposure to radon in the home at a reference level of 200 Bq/ per m<sup>3</sup> carries a risk of about 1 in 50 of contracting fatal lung cancer.

There is no conclusive evidence that children are at greater risk from radon than adults.

### **3 NATIONAL REFERENCE LEVELS**

A Statutory Instrument<sup>1</sup> has set a national reference level of 400 Bq/ m<sup>3</sup> averaged over any three months in a workplace. Where a workplace is found to have levels in excess of the reference level an employer must evaluate whether remedial measures to reduce the level should be undertaken. Where an evaluation shows that remedial measures are justified these must be implemented as soon as is practicable. The Statutory Instrument also empowers the RPII to direct an employer or a self-employed person responsible for a workplace to measure radon levels in that workplace.

The risk from radon is based on the length of exposure. The reference level of 200 Bq/ m<sup>3</sup>, above which the Government has recommended that mitigation should be considered in a domestic setting, is based on an assumption that occupancy will consist of about 7000 hours each year. The Department of Education and Science, after consultation with the RPII, has set a reference level of 200 Bq/ m<sup>3</sup> for schools.

### **4 SCHOOL SURVEY**

The Department of Education and Science commissioned the Radiological Protection Institute of Ireland (RPII) to conduct a three-year national survey of radon levels in all recognised primary and second level schools in 1998.

The survey is taking place in three phases. The RPII decided on the counties to be surveyed in each phase. All schools were invited to participate.

### **5 MITIGATION OF RADON LEVELS BETWEEN 200 Bq/ m<sup>3</sup> AND 400 Bq/ m<sup>3</sup> IN SCHOOLS**

Advice available to the Department of Education and Science suggested that increasing ventilation may be the most appropriate way of mitigating radon in schools where levels of between 200 Bq/ m<sup>3</sup> and 400 Bq/ m<sup>3</sup> have been measured. The Department commissioned the Building Research Establishment (BRE), a U.K. based body with expertise in this area, to conduct a pilot study of ventilation in 10 schools where radon levels in a range from 200 Bq/ m<sup>3</sup> to just in excess of 400 Bq/ m<sup>3</sup> were measured. This was to establish if the radon levels in these schools could be mitigated using passive ventilation measures.

The BRE has concluded that, in general, ventilation rates in the schools studied were low during occupied and unoccupied periods. In addition measurements of the unoccupied ventilation rate and the long-term ventilation showed all of the schools to have a limited amount of background ventilation. The BRE concluded that ventilation at the levels measured is likely to have contributed to the levels of radon measured. Based on these findings the BRE has made three recommendations: -

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<sup>1</sup> “Radiological Protection Act, 1991 (Ionising Radiation) Order, 2000” which implements an EU Council Directive establishing a common basis for radiation protection in all EU Member States.

- (i) The natural ventilation in rooms should be increased by opening windows as often as is possible without discomfort to the users of a room during the periods in which the school is occupied.
- (ii) Background ventilation in affected rooms should be increased in an effort to prevent the build up of radon during unoccupied periods. Details of a scheme of grants to assist affected schools in ensuring that background ventilation is provided are set out in Section 6 below.
- (iii) The level of radon in any school in which mitigation action is taken should be measured post-mitigation.

Schools where radon levels in **excess** of  $400 \text{ Bq/m}^3$  were measured are outside the scope of this circular letter as mitigation action in those schools mainly involves the installation of sub-floor depressurisation chambers (commonly known as sumps) linked by piping to fans.

## **6 GRANT AID TO ASSIST AFFECTED SCHOOLS IN INCREASING BACKGROUND VENTILATION**

The estimated cost of labour and materials for providing background ventilation comprising of 1 no. wall vent is £90 including VAT. The Department of Education and Science is making arrangements to pay the management authority of each affected school a grant of £150 per room in which a radon measurement in excess of  $200 \text{ Bq/m}^3$  but not exceeding  $400 \text{ Bq/m}^3$  has been recorded. The grant amount allows for local variations in cost and for any minor re-decoration and/or additional cleaning costs associated with the installation of a vent.

Schools must organise the installation of vents in accordance with public procurement procedures and meet the cost of the installation out of the grant amount provided. There is no need to make application for relevant grant amount as this will issue automatically from the Department to each affected school.

The cost of post-mitigation testing by the RPII will be borne by the Department of Education and Science. To facilitate post-mitigation testing school management authorities are requested to complete the attached form and return it to **Radiological Protection Institute of Ireland, 3 Clonskeagh Square, Clonskeagh Road, Dublin 14** to inform the RPII when the vents have been installed. A form for this purpose is appended to this document. In any case where post-mitigation testing indicates that average radon levels in the affected rooms have not been reduced to at most  $200 \text{ Bq/m}^3$  further mitigation measures will be considered.

## **7 QUERIES**

Any school management authority considering that the contents of this circular cannot be applied to all of the affected rooms in the school for which it has responsibility (i.e. where an affected room does not have an external wall, where windows installed are not designed to open etc.) is requested to contact Post Primary Building Unit, Department of Education and Science, Tullamore, Co. Offaly. If such contact is made in writing it can be treated by the Department of Education and Science as a formal request from the relevant school management authority for assistance towards modifications to facilitate passive radon mitigation or for an alternative method of radon mitigation, as appropriate.

E-mail queries concerning this Circular Letter should be directed to [Claire\\_Rush@education.gov.ie](mailto:Claire_Rush@education.gov.ie).

Postal queries should be addressed to the Post Primary Building Unit, Portlaoise Road, Tullamore, Co. Offaly, marked "radon"; fax queries should be sent to 0506-51119 marked "radon" and telephone queries concerning this Circular Letter should be made to (01) 873 4700 or (0506) 21363 extension 4423 or 4431

John Rigney

Principal

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## SPECIFICATION FOR VENTS TO BE INSTALLED

Technical Guidance Document F – Ventilation; Table 1 (Building Regulations 1997) recommends background ventilation for an occupiable room in a building other than a domestic dwelling as follows: -

- ◆ Floor area up to 10m<sup>2</sup> requires 6500mm<sup>2</sup> of background ventilation.
- ◆ Floor area over 10m<sup>2</sup> requires 650mm<sup>2</sup>/m<sup>2</sup> floor area of background ventilation.

A standard 225 x 225mm wall vent with a suitable internal wall grille and external wall grille (or any other arrangement providing the equivalent ventilation) located so as to avoid undue draughts provides 50625mm<sup>2</sup> of background ventilation.

A competent building contractor will be in a position to supply and fit the vent.

