

Gas protection



# Radon [active] Protection System

**Comprehensive provable  
protection**

- **Gas barrier plus active mode**
- **Demonstrable compliance**
- **Modular to suit individual projects**
- **Design and installation**



# Radon – the risks

Radon is a radioactive gas that emanates from rocks and soils and tends to concentrate in enclosed spaces such as underground mines as well as houses. Soil gas infiltration is recognised as the most important source of residential radon. Other sources, including building materials and water extracted from wells, are of less importance in most circumstances. Radon is a major contributor to the ionising radiation dose received by the general population.

## The history of the radon problem

As early as 1556 Agricola described excessive lung disease in miners in central Europe. He refers to miners dying of the pestilential air they breath.... their lungs rotting away” and of wives who had lost as many as seven husbands from the same cause. It was not until 1879 however that Harting and Hesse showed that this disease was lung cancer.

Recent studies on indoor radon and lung cancer in Europe, North America and Asia provide strong evidence that radon causes a substantial number of lung cancers in the general population. Current estimates of the proportion of lung cancers attributable to radon range from 3 to 14%. Radon is the second largest cause of lung cancer after smoking.



## The “affected area” myth

Claims are sometimes made that certain properties are “free from radon” based on their not being in a “designated area”. It should clearly be understood that radon is everywhere and even if a property is ostensibly in a non effected area it could still be affected with high levels of radon. An area is defined as affected based on the percentage probability of a property being above a national “Action level!” The only way to find out if a property in the UK is affected is to test!



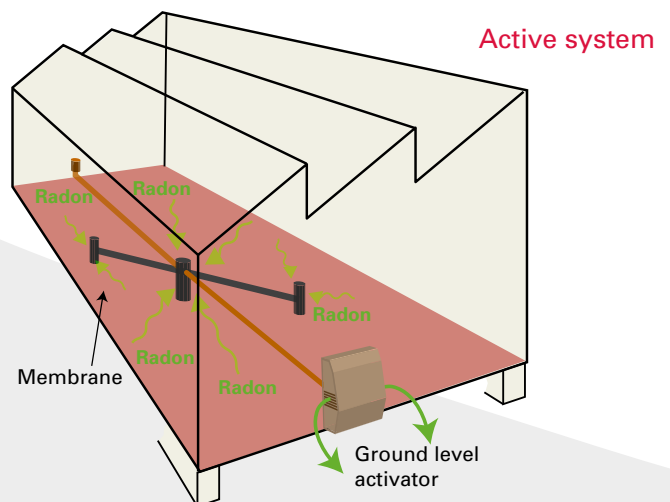
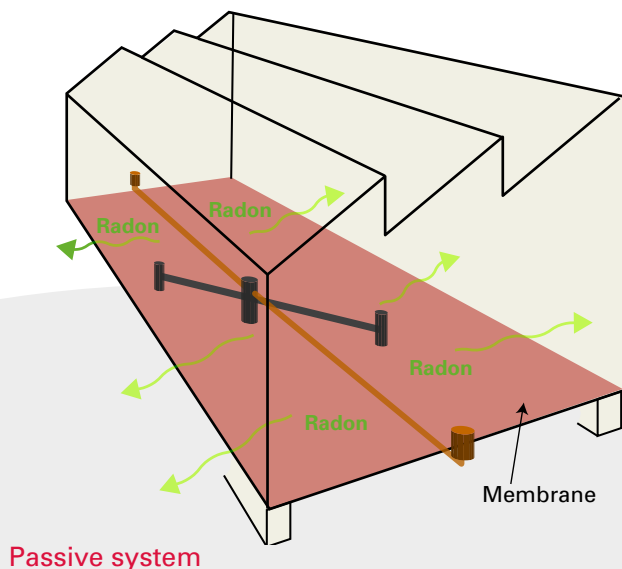
## The RaPS solution

**With over 20 years of experience in managing ground gas, PAGEotechnical Ltd and Prestige Air technology Ltd. have developed a state of the art Radon Protection System combining the best current practices in membrane technology, installation and validation including optional extraction offering unheard of flexibility and confidence.**

The system relies on the new barrier installed to current gas membrane installation standards and with a dormant extraction manifold installed underneath. Measurements are taken post installation to demonstrate that the system is in fact reducing the radon levels to legally required levels.

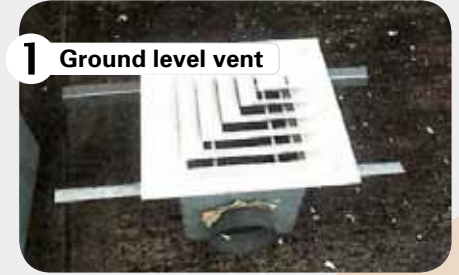
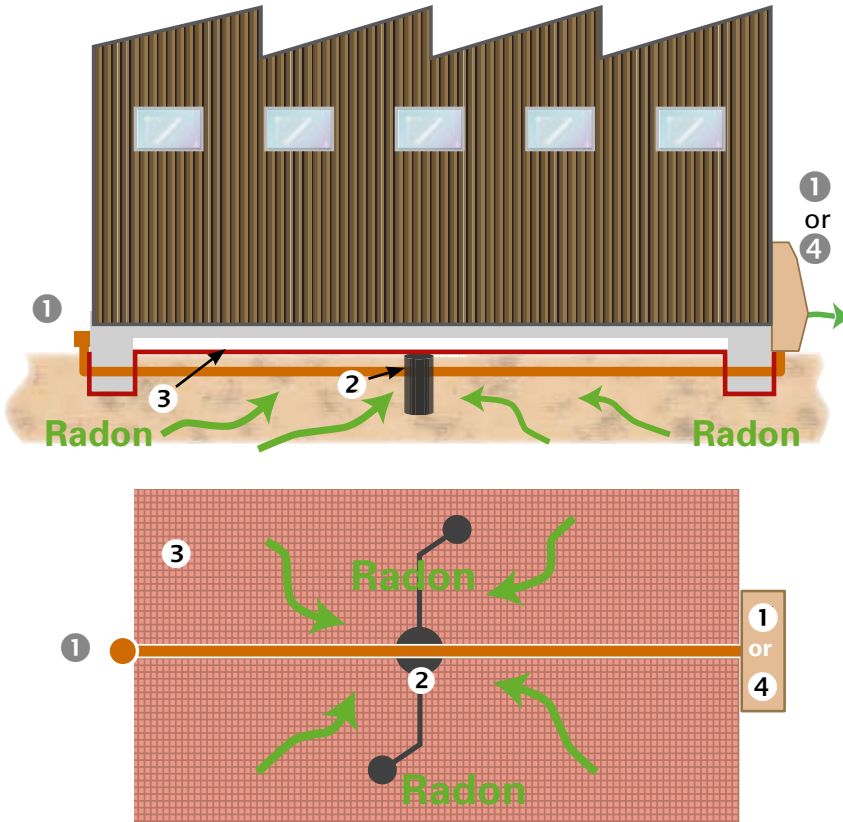
## Provable

All RaPS membranes will be integrity tested using the current state-of-the-art tracer gas integrity testing system developed for other ground gas membranes. For further peace of mind, all RaPS systems will be further tested once the building is completed AND have a built in dormant extraction system which can be activated at any time in the future should levels rise (or minimum action levels fall).

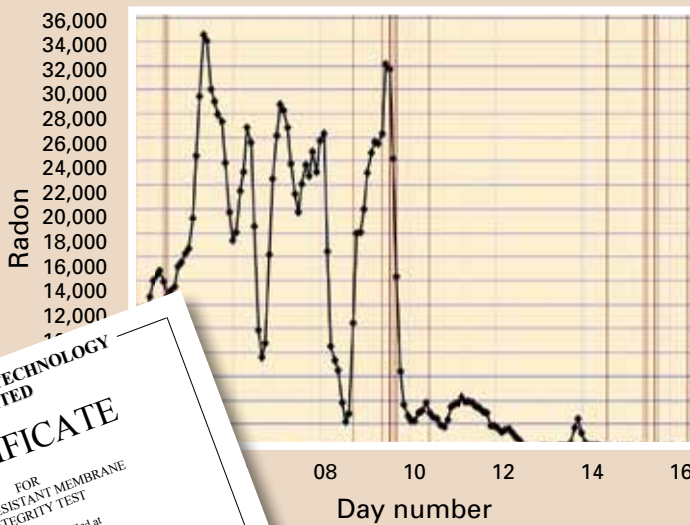


# The RaPS system

Suitable for all new buildings the RaPS system can be applied to large or small footprints and as it is modular is particularly effective on larger buildings. The individual components are combined in a specific design for that building and installation is managed in conjunction with the build programme.



Continuous radon monitor

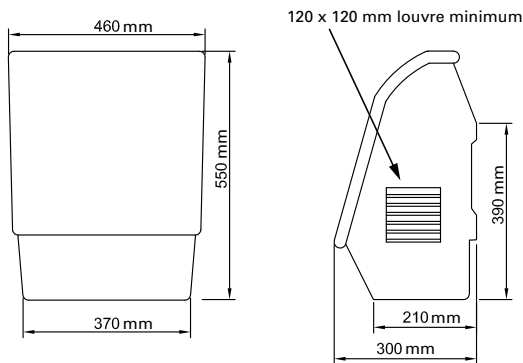


## Guaranteed compliance

The RaPS system is both flexible and upgradeable. As pre-construction measurements are not possible, the system is designed to offer a guaranteed solution whatever the ultimate radon risk on the site turns out to be. Most installations will operate entirely passively reducing exposure to indoor radon to below acceptable (or action levels) In the event of action levels being changed or a site having a particularly high radon risk the ability to activate any RaPS system gives absolute confidence to the building owner that they can ALWAYS demonstrate compliance with the regulatory requirements..

# Technical data

## Active component: Ground level activator



Gas protection



Containment



Bioremediation



Geosynthetics



Root barriers



## Passive component - RUT 350 radon membrane

A two layer radon barrier.

	Value	Tolerance	Test method
<b>Composition: Blown layer</b>	200 micron red LDPE layer with HDPE, UV and Thermo stabiliser.		
<b>Composition: Coated layer</b>	150 micron black LDPE layer with HDPE, UV and Thermo stabiliser.		
<b>Colour</b>	Matt Black / glossy red		
<b>Application</b>	100 mm overlap with welded joints		
<b>Length</b>	25 m	+1% -0%	EN 1848-2
<b>Width</b>	4.00 m	+/- 2%	EN 1848-2
<b>Thickness</b>	0.35 mm	+/- 10%	EN 1849-2
<b>Weight</b>	328 g/m <sup>2</sup>	+/- 5%	EN 1849-2
<b>Straightness</b>	Pass		EN 1848-2
<b>Visible defects</b>	No visible defects		EN 1850-2
<b>Tensile strength</b>	MD: > 400 N/50 mm CD: > 400 N/50 mm		EN 12311-2
<b>Elongation</b>	MD: > 200 % CD: > 200 %		EN 12311-2
<b>Radon transmittance</b>	19 10 <sup>-9</sup> m/s		SP internal test
<b>Radon permeability</b>	6.6 10 <sup>-12</sup> m <sup>2</sup> /s		SP internal test
<b>Sd value</b>	189 m	±40	EN 1931
<b>Water vapour transmission</b>	1.04x10 <sup>-12</sup> kg/(m <sup>2</sup> .s.Pa)	±2.62x10 <sup>-14</sup>	EN 1931
<b>Nail tear resistance</b>	MD: > 170 N CD: > 170		EN12310-1
<b>Resistance to static loading</b>	Pass at 200 N		EN 12730, Method B
<b>Impact resistance</b>	200 mm		EN 12691, Method A
<b>Bitumen compatibility</b>	Pass class W1		EN 1548
<b>Joint strength, tape</b>	>60 N/50mm		EN 12317-2
<b>Water tightness to liquid water</b>	Pass at 2 kPa		EN1928
<b>Durability of water tightness against ageing</b>	Pass at 2 kPa		EN 1296
<b>Durability of water tightness against chemicals</b>	Pass at 2 kPa		EN 1847
<b>Classification</b>	Moisture Barrier Type A – EN 13967		



PAGeotechnical is pleased to work in partnership with Prestige Air Technology Ltd., the experts in active gas protection, to bring the RaPS solution to a wide range of construction projects affected by radon.

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