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RADON PERMEABILITY AND RADON EXHALATION OF BUILDING MATERIALS

Radon gas diffusion through concrete can be a significant mechanism for radon entry into dwellings. Measurements of radon diffusion coefficients in the pores of residential concretes ranged from $2.1 \times 10^{-8} \text{ m}^2 \text{ s}^{-1}$ to $5.2 \times 10^{-7} \text{ m}^2 \text{ s}^{-1}$. The pore diffusion coefficients generally increased with the water-cement ratio of the concrete and decreased with its density.

Testing permeability of building materials for radon diffusion

Interestingly, they did not rely on experimental data from

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radon exposure tests with subjects to derive a parameter associated with that process; this parameter was determined using four pieces of information—the diffusion coefficient of radon in tissue, the thickness of the surface skin layers, the skin surface area and the volume of subcutaneous fat.

Determination of the radon diffusion coefficient and radon ...

Figure 1. Principle of the measuring method for determining the radon diffusion coefficient The radon concentrations in both chambers are determined alpha-spectroscopically using surface barrier detectors. The radon progeny Polonium-218 is positively charged and can be electrostatic deposited onto the +HV detector pre-amplifier amplifier

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Radon Diffusion Coefficients for Residential Concretes ...

Monte Carlo method for determining radon diffusion coefficients in porous media. Full Text. Mark. Sheng-yang Feng [0] Han-qing Wang (???) [0] Yu Cui. Yong-jun Ye. Xiang-yang Li. Dong Xie. Zheng-zhong He. Rong Yang. Radiation Measurements, pp. 1061302019. Cited by: 0 | Bibtex | Views 5 | Keywords: diffusion coefficient in air theoretical ...

Radon diffusion coefficients and radon resistances of ...

where D is the radon diffusion coefficient [m^2s^{-1}], λ is the radon decay constant ($2.1 \times 10^{-6} s^{-1}$) and $C(x,t)$ is the radon concentration [Bqm^{-3}]. We assume simple boundary conditions: constant radon concentration in the lower

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container of the system $C(0,t) = C_0$ and zero concentration $C(d,t) = 0$

NEW TECHNIQUE FOR THE DETERMINATION OF RADON DIFFUSION ...

Radon diffusion coefficient was measured according to the accredited method K 124/02/95 (method C of ISO/TS 11665-13). The tested sample is placed between two containers. Radon diffuses from the lower container, which is connected to the radon source, through the sample to the upper container. When the steady state

A simple model to simulate the diffusion pattern of radon

...

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where D is radon diffusion coefficient and λ is decay constant of radon. In the present study, radon diffusion coefficients and diffusion lengths have been calculated using Eqs (2) and (3) for building materials like: limestone powder, sandstone, granite, crusher, soil, sand, cement, fly ash, gypsum and wall putty.

Radon Diffusion Coefficient In Radon

In both cases, the calculation results in determining the radon diffusion length, from which the radon diffusion coefficient and the radon resistance are subsequently calculated. A detailed description of the measuring process and the mathematical procedure can be found in (O/11665-13 (E) Measu, 1166 ;

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Jiránek and Svoboda, 2009).

Evaluation of the intake of radon through skin from ...

Once the equivalent diffusion coefficient is determined from the experimental profile of radon concentration at the soil surface layer (Antonopoulos-Domis, Xanthos, Clouvas, & Alifrangis, 2009), the radon current $J(z)$ can be determined and the radon entrance into dwellings can be estimated.

Estimation of radon diffusion coefficients in soil using ...

where C is the radon concentration within the membrane (Bq m^{-3}), D is the radon diffusion coefficient ($\text{m}^2 \text{s}^{-1}$), λ ($2.1 \cdot 10^{-6} \text{ s}^{-1}$) is the radon decay constant, x the membrane's thickness (m) and t the time (s). One attempt for the solution

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to this equation is by means of numerical methods such as Finite Element Methods (FEM) [10, 11]. With this methodology, it is possible to get the value of ...

Radon diffusion modelling.

for plastic foil) up to 1.1 m for gypsum. The diffusion length R was calculated from the diffusion coefficient D with $RD = ?$. If the thickness of the material is more than three times the diffusion length, then it is called radon-tight. The mean radon-222 exhalation rates for the building materials varied between 0.4 mBq/m²s and 0.05 mBq/m²s.

The effects of some soil characteristics on radon ...

The model developed was fed with experimentally derived

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input parameters. The radon depth profile thus obtained was compared with the experimental values. The model was used to investigate how the radon concentration profile evolves with time, for two different diffusion coefficients.

Monte Carlo method for determining radon diffusion ...

The radon diffusion coefficient of concrete quantifies the ability of the radon gas to flow through concrete when a concentration gradient is the driving force. This parameter is also closely related and proportional to the porosity and permeability.

Measurements & Analysis of the Transport of Radon Through ...

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The diffusion coefficient value found in the literature is an effective diffusion coefficient (interstitial diffusion coefficient)- D_e . The bulk and the effective radon diffusion coefficients in the soil are correlated by the total soil porosity, p , according to the following expression (Rogers and Nielson, 1991 ; Hassan et al., 2009 , Kumar and Chauhan, 2013):

$$D_e = D p$$

REPORT Radon Diffusion coefficient in FOAMGLAS cellular ...

Radon diffusion modelling. ... Initially, the model considered the diffusive flow of radon from its soil source and this simulation has highlighted the dependency of the flux of radon into the house on the magnitude of various parameters,

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such as the diffusion coefficient of radon in soil.

RADON DIFFUSION COEFFICIENT IN RADON-PROOF MEMBRANES ...

Radon diffusion coefficient corresponding to the curve with the least-squares fit to the measured data is identified as the right coefficient (in this case $D = 2,6 \cdot 10^{-11} \text{ m}^2 \text{ s}^{-1}$). The final step includes the verification of the numerical solution by comparison with measured curve of radon concentration in the upper container (Figure 5).

New technique for the determination of radon diffusion ...

Diffusion coefficient $D = 1,93 \cdot 10^{-12} \text{ m}^2/\text{s}$ Radon transfer diff
= 0,11 Bq/(m²h) at 100 kBq/m³ source strength Evaluation

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and usage instructions The diffusion coefficient is considerably smaller than concrete. The material can reduce the transfer of radon very good at a material thickness of 4 mm.

The Radon Diffusion Length as a Criterion for the Radon

...

Radon diffusion through soil is strongly affected by the degree of water saturation of the soil pores. Methods have been developed by many researchers to measure radon diffusion coefficient. We developed an updated experimental system to estimate radon diffusion coefficients for typical types of soil in Japan and applied it to a typical loam with different water saturation levels (0–0.82).

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Finite element modeling of radon distribution in natural ...

NEW TECHNIQUE FOR THE DETERMINATION OF RADON DIFFUSION COEFFICIENT IN RADON-PROOF

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Republic This paper describes a new device and a method to determine the radon ...

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