REPORT

Issued by an Accredited Testing Laboratory

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Reference
1289061

Csd Sealing Systems AS
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Norge

Determination of radon transmittance

(2 appendices)

Work requested

RISE was requested to measure the radon transmittance through a membrane in accordance with SP Method no. 3873.

The material sample

The client delivered their product which was named Nofirno to RISE Research Institute of Sweden on 2024-10-01. There were no signs of visible damage to the material on arrival. The material was tested without joints. See Appendix 2 for a picture of the material.

Method of testing

Radon transmittance was tested in accordance with SP Method no. 3873. The material was mounted between two stainless steel boxes, the lower of which (the source box) contained a radon source. The perimeter was sealed very carefully, in order to ensure gas-tight joints between the boxes and the material, and also between the boxes themselves. The radon concentrations on each side of the test material was measured using an Atmos 12 DPX instrument.

Results

Material	Radon transmittance *P*, m/s	Radon resistance *Z*, s/m
Nofirno	$1.0 \cdot 10^{-8}$	$9.9 \cdot 10^{7}$

Note that the test results shown above apply only to the particular sample of material that was tested. Detailed results, including uncertainty of measurement, are given in Appendix 1.

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Building physics & sustainable buildings - Building physics testing

Performed by

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Examined by

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Appendices
1 Test results
2 Photograph of the tested material

Appendix 1

Test results

Client	CSD Sealing Systems AS
Sample for testing	Nofirno
Date of testing	2024-10-14 – 2024-10-21
Test data	Free volume, source box, V_1: 0.027 m^3 Free volume receiver box, V_2: 0.026 m^3 Total free volume, V: 0.053 m^3
Equipment	Atmos 12 DPX (KWP18569) for measurement of Polonium-218 concentration. Most recently calibrated 2024-07-17, by Radonova Laboratories AB.
Radon source	Lightweight concrete emitting Radium Rn-222, with Po-218 as the first decay product.
Ambient temperature	23 ± 3 °C
Ambient RH	50 ± 25 %
Uncertainty of measurement	The increased uncertainty of measurement was estimated as ± 11 %, including a coverage factor of k = 2. Uncertainty of measurement for temperature was ± 2 °C, and that for relative humidity was ± 5 % in the test chamber.
Observation	No changes in the test material were observed during the tests.
Miscellaneous	The test results given in this report relate only to the particular samples of material that were tested.

The following results have been calculated under the conditions as shown in the table below:

Material, name	Nofirno
Exposed area of test material A, m^2	0.250
Radon concentration at start $C_{0,}$ Bq/m	13
Radon exhalation Φ, Bq/s	$4.0 \cdot 10^{-3}$
Effective radon sink λ, s^{-1}	$7.6 \cdot 10^{-6}$
Radon transmittance P, m/s	$1.0 \cdot 10^{-8}$
Radon resistance Z, s/m	$9.9 \cdot 10^{7}$

Appendix 1

Theory

Emission of radon from the radon source results in an increase of radon concentration in the source box, leading to a difference in concentration between the source box and the receiver box. This difference causes a flow of radon by diffusion through the test material. Only radon gas (Rn) passes through, and not its decay products (RnD). Radon transmittance is measured by measuring the change in radon concentration on both sides of the test material. Figures 1 and 2 show how the radon concentrations build up in the two boxes.

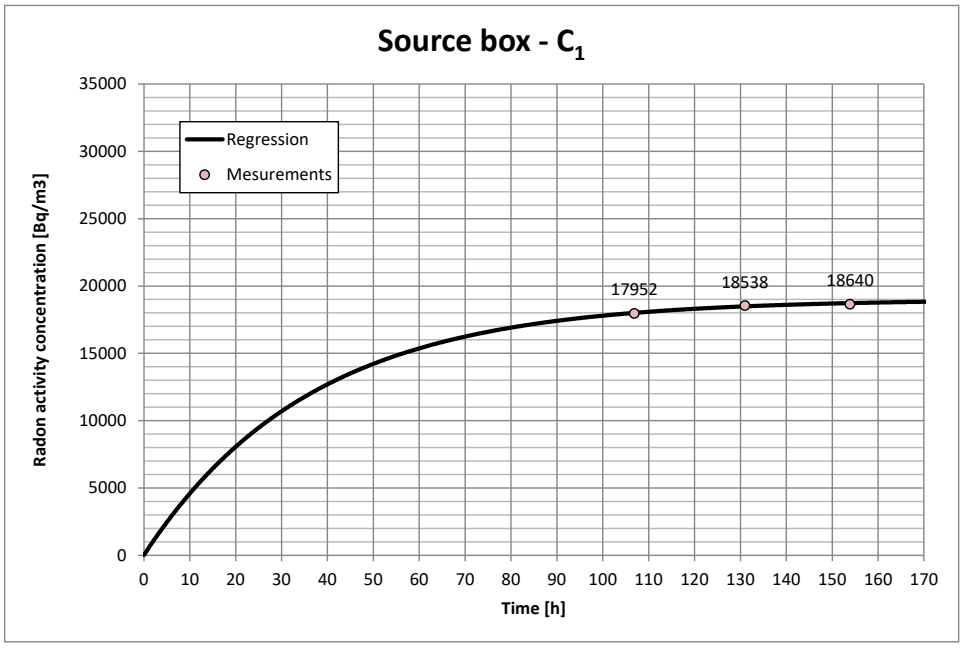

Figure 1 Radon concentration in the primary box: measured daily average values and the regression curve.

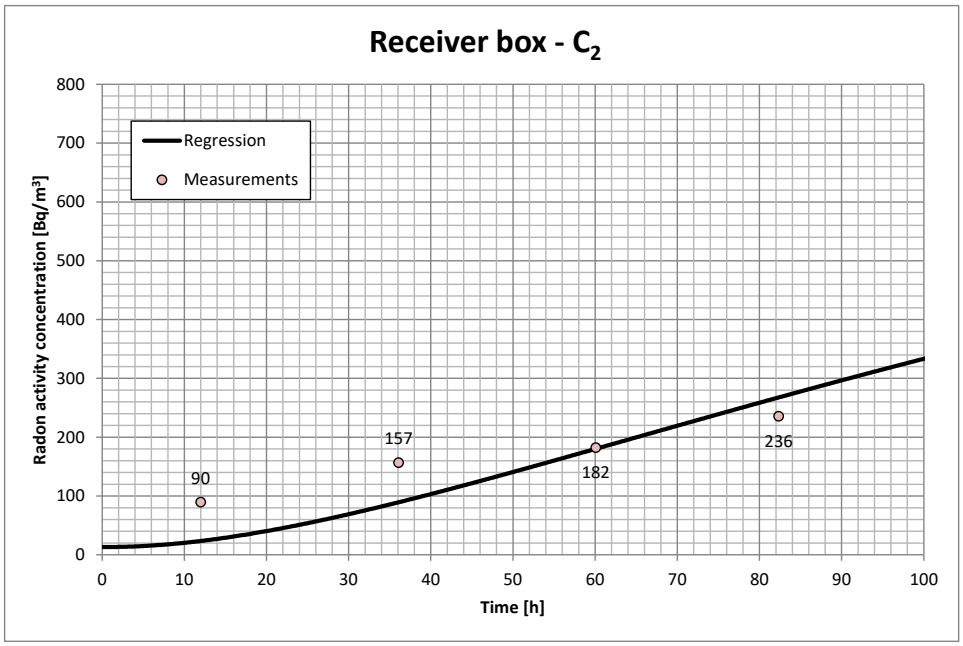

Figure 2 Radon concentration in the secondary box: measured daily average values and the regression curve.

Appendix 2

Photograph of the tested material

Nofirno

Verifikat

Transaktion 09222115557530127797

Dokument

1289061 Rpt Radon transmittance For review
Huvuddokument
5 sidor
Startades 2024-10-24 09:23:04 CEST (+0200) av Fredrik Ståhl (FS)
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