REPORT

issued by an Accredited Testing Laboratory

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1002 ISO/IEC 17025

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Determination of radon transmission

(2 appendices)

Work requested

SP was requested to measure the radon transmittance through a caulking compound material in accordance with SP Method no. 3873.

The material sample

The client delivered the material, under the name of Sikaflex AT Connection, to SP Technical Research Institute of Sweden on 2015-02-20. There were no signs of visible damage to the material on arrival. The material was tested without joints on a gypsum board. 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 were measured using an Atmos 33 instrument.

Results

Material	Radon transmittance P, m/s	Radon resistance Z, s/m
Sikaflex AT Connection	$1.5 \cdot 10^{-8}$	$6.5 \cdot 10^{7}$

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.

SP Technical Research Institute of Sweden
Sustainable Built Environment - Building Physics and Indoor Environment

Performed by
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Examined by
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Appendices

Test results
Photograph of the tested material

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Appendix 1

Test results

Client Sika Services AG

Sample for testing Sikaflex AT Connection

Date of testing 2015-05-11—2015-05-18

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 33 (SP no. 202266) for measurement of Polonium-218 concentration. Most recently calibrated 2014-12-03, by Swedish Radiation Safety Authority

Radon source Lightweight concrete emitting Radium Rn-222, with Po-218 as the first decay product.

Ambient temperature 23 ± 1 °C

Ambient RH 50 ± 5 %

Uncertainty of measurement The increased uncertainty of measurement was estimated as ± 21 %, 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	Sikaflex AT Connection
Exposed area of test material A, m^2	0.2896
Radon concentration at start C_0, Bq/m	32
Radon exhalation Φ, Bq/s	$2.8 \cdot 10^{-3}$
Effective radon sink λ 1 , s-1	$3.7 \cdot 10^{-6}$
Radon transmittance P, m/s	$1.5 \cdot 10^{-8}$
Radon resistance Z, s/m	$6.5 \cdot 10^{7}$

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.

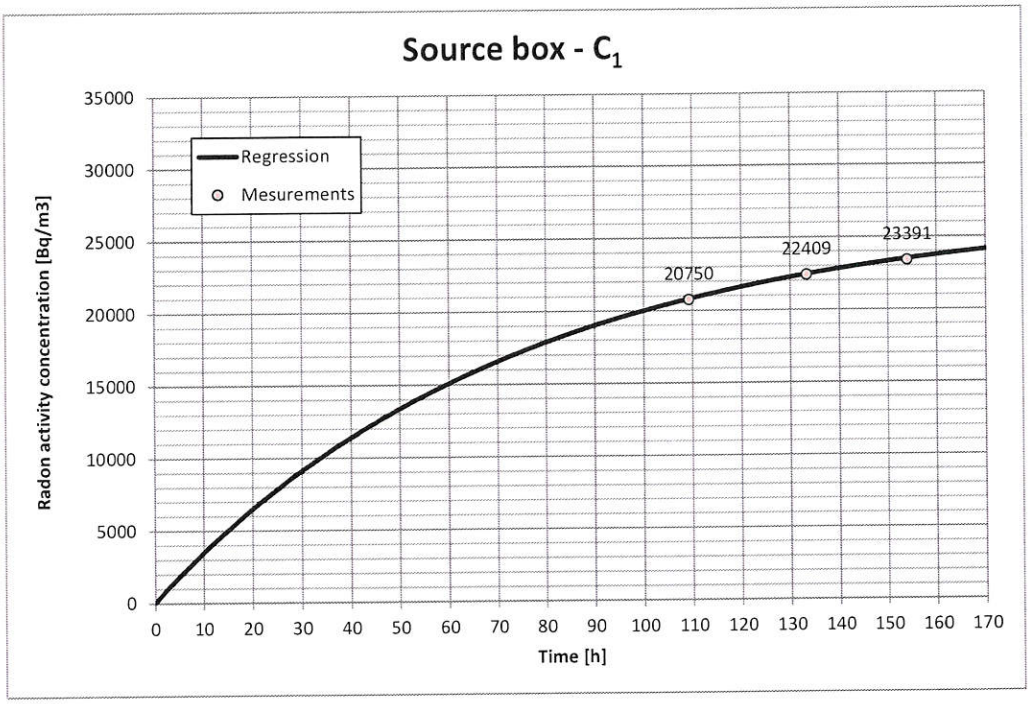


Figure 1 Radon concentration in the primary box: measured daily average values and the regression curve.

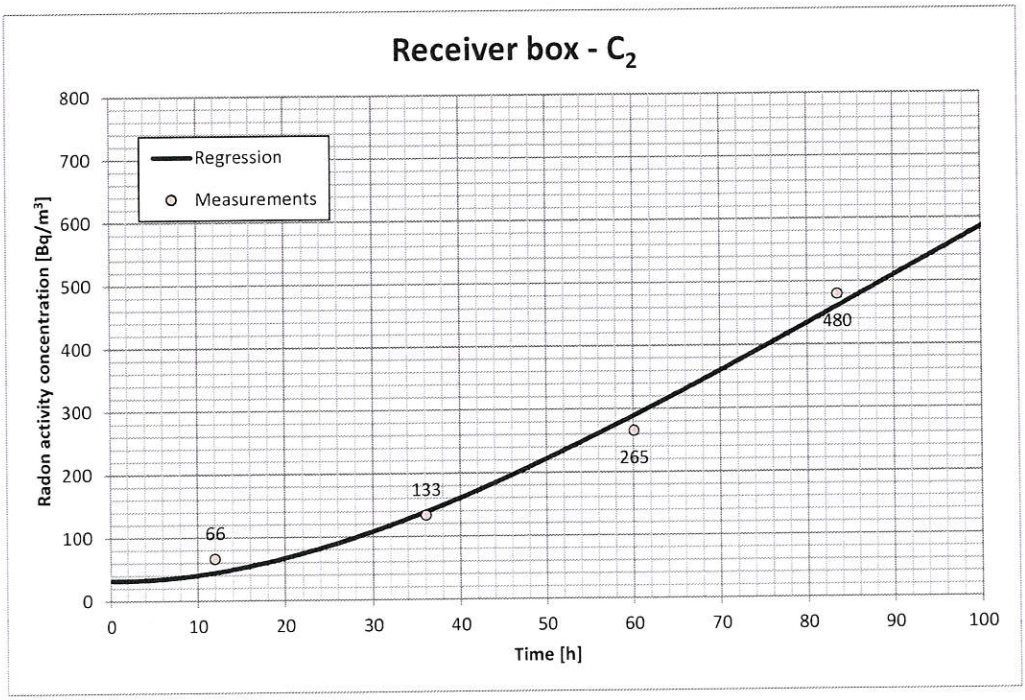
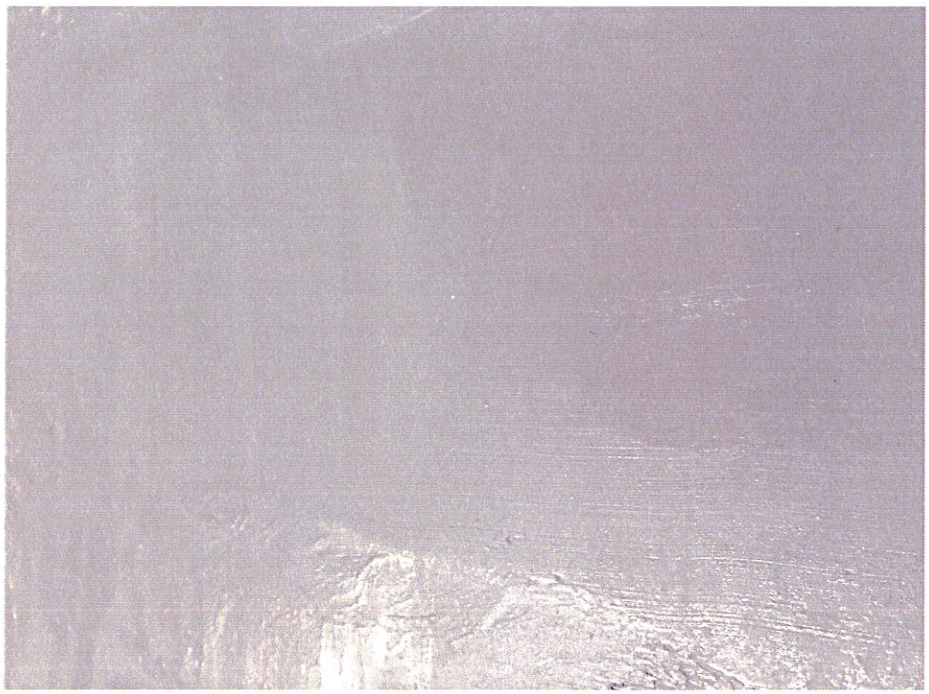


Figure 2 Radon concentration in the secondary box: measured daily average values and the regression curve.

Appendix 2

Photographs of the tested material



Sikaflex AT Connection