

Sika Sverige AB

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## Determination of Radon transmittance

(2 appendices)

**Revision:** *The report was revised to give the correct names of the tested products.*

### Work requested

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

### The material sample

The client delivered their products which was named Sikaflex®-11 FC Purform® and Sikaflex® PRO-3 Purform® to RISE Research Institute of Sweden on 2022-02-08. There were no signs of visible damage to the material on arrival. Both materials were applied by the client next to each other on the same standard paper coated gypsum board. See Appendix 2 for a picture of the materials applied to the gypsum board. Gypsum is totally permeable to radon gas and do not affect the radon transmittance. The material was tested without joints.

### 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 33 instrument.

### Results

Material	Radon transmittance $P$ , m/s	Radon resistance $Z$ , s/m
Sikaflex®-11 FC Purform® and Sikaflex® PRO-3 Purform®	$4.5 \cdot 10^{-8}$	$2.2 \cdot 10^7$

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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Confidentiality level

C2 - Internal

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Accred. No. 1002  
Testing  
ISO/IEC 17025

**RISE Research Institutes of Sweden AB**  
**Department Building and Real Estate - Building Envelopes and Building Physics**

Performed by



Fredrik Ståhl

Examined by



Eva-Lotta Kurkinen

**Appendices**

- 1 Test results
- 2 Photograph of the tested material

## Appendix 1

**Test results**

<b>Client</b>	Sika Sverige AB
<b>Sample for testing</b>	Sikaflex®-11 FC Purform® and Sikaflex® PRO-3 Purform®
<b>Date of testing</b>	2022-02-11 – 2022-02-18
<b>Test data</b>	Free volume, source box, $V_1$ : 0.027 m <sup>3</sup> Free volume receiver box, $V_2$ : 0.026 m <sup>3</sup> Total free volume, $V$ : 0.053 m <sup>3</sup>
<b>Equipment</b>	Atmos 33 (SP no. 202266) for measurement of Polonium-218 concentration. Most recently calibrated 2021-05-22, by Swedish Radiation Safety Authority
<b>Radon source</b>	Lightweight concrete emitting Radium Rn-222, with Po-218 as the first decay product.
<b>Ambient temperature</b>	23 ± 3 °C
<b>Ambient RH</b>	50 ± 25 %
<b>Uncertainty of measurement</b>	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.
<b>Observation</b>	No changes in the test material were observed during the tests.
<b>Miscellaneous</b>	The test results given in this report relate only to the particular samples of material that were tested. The tested sample is a combination of two materials, Sikaflex®-11 FC Purform® and Sikaflex® PRO-3 Purform®.

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

Material, name	Sikaflex®-11 FC Purform® and Sikaflex® PRO-3 Purform®
Exposed area of test material $A$ , m <sup>2</sup>	0.240
Radon concentration at start $C_0$ , Bq/m	26
Radon exhalation $\Phi$ , Bq/s	2.4·10 <sup>-3</sup>
Effective radon sink $\lambda_1$ , s <sup>-1</sup>	3.8·10 <sup>-6</sup>
Radon transmittance $P$ , m/s	4.5·10 <sup>-8</sup>
Radon resistance $Z$ , s/m	2.2·10 <sup>7</sup>

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.

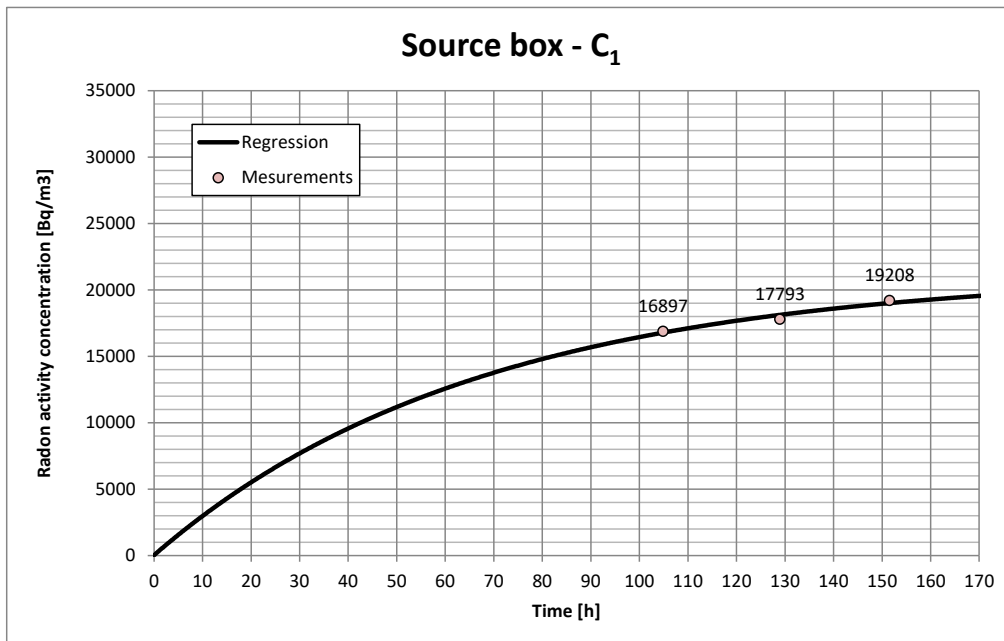


Figure 1 Radon concentration in the primary box: measured daily average values and the regression curve.

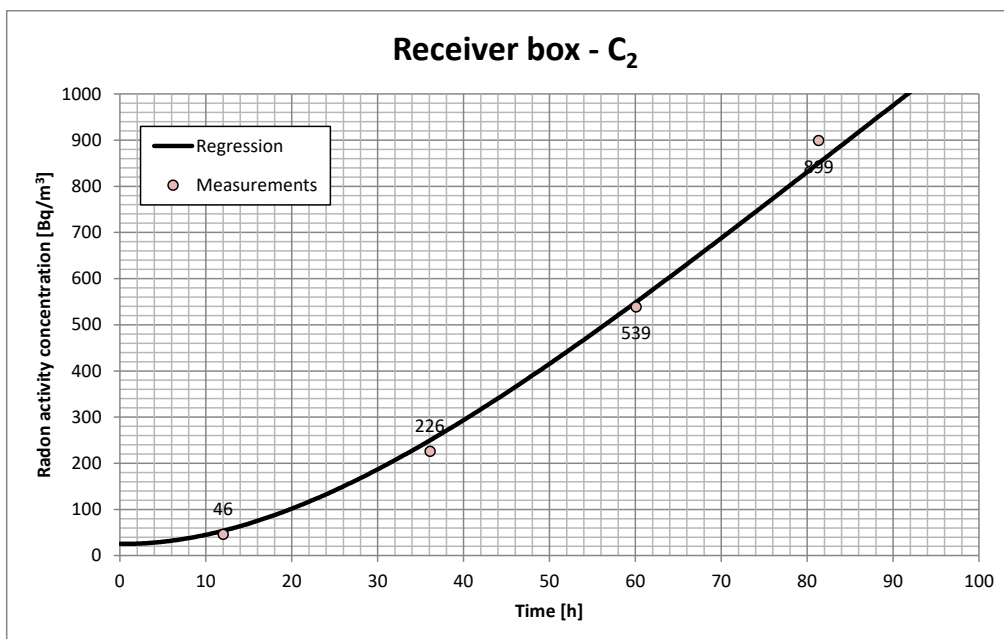
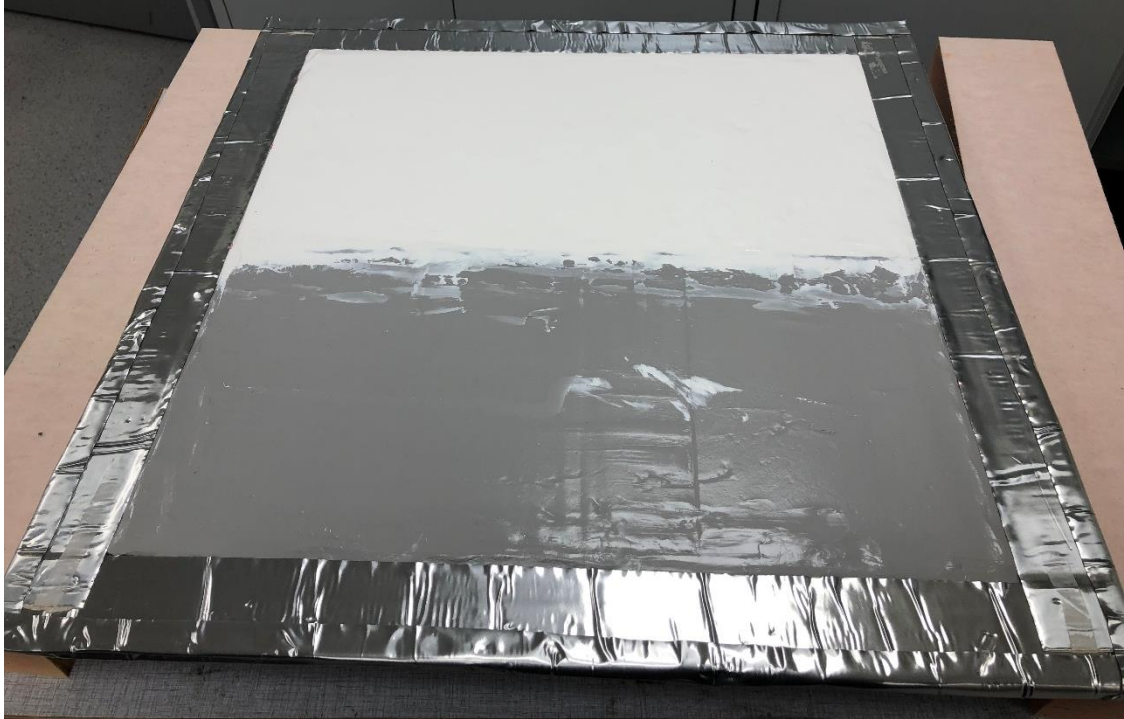


Figure 2 Radon concentration in the secondary box: measured daily average values and the regression curve.

## Appendix 2

**Photograph of the tested material**

Sikaflex<sup>®</sup>-11 FC Purform<sup>®</sup> and Sikaflex<sup>®</sup> PRO-3 Purform<sup>®</sup> applied next to each other on a gypsum board. The metering zone is bounded by aluminium tape.


# Verifikat

Transaktion 09222115557466842876

## Dokument

**1104265rev Rpt Radon transmittance For review**  
Huvuddokument  
5 sidor  
*Startades 2022-04-08 12:35:55 CEST (+0200) av Fredrik  
Ståhl (FS)*  
*Färdigställt 2022-04-13 15:44:56 CEST (+0200)*

## Signerande parter

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