

DECLARATION OF PERFORMANCE CERT- 99/3603.

TOUGHSHEET RADON /GAS BARRIER – EN13967

Usage, 400/500 micron Flexible Sheeting to be used for water proofing and gas control in solid concrete floors that are not subject to hydrostatic pressure from the ground.

SPECIFICATION- CFS -2MT/ 4MT X 20MTS X 400MICRON

CFS -2MT/ 4MT X 12.5MTS X 500MICRON

THICKNESS -EN12311	400mu Amber1	500mu AMBER 2
LENGTH – EN1848-2	20 MTS - 0 + 5%	12.5 MTS - 0 +5%
WIDTH – EN1842-2	4MT - 0 + 10%	4MT - 0 + 10%
DROP DART-EN12691	30 MLV	30MLV
WATER TIGHTNESS		BBA PASS.
STATIC LOADING		BBA PASS
DURABILITY / AGED		BBA PASS
MASS BBA TEST.	368 MLV	460 MLV

GAS TRANSMISSION RATE: 2015

Rapra ASTM-D1434/2009.	23 ± 2°C	-Report.
Methane transmission	321+	222+
Carbon Dioxide Transmission	1077+	771+
Radon- K124/02/95	0.2 x 10 ⁻¹¹ m2 .5 ⁻¹	

Test regulation: ISO/TS 11665-13

Test execution date: 3.1.2022 – 5.1.2022

Test execution place: laboratory OL124 – D2044d

Test samples

Test samples were cut from the material handed by the client representative Alan Blundell on 3.1.2022. The samples were registered with marks 02/22/J (1 to 3) by M. Jiránek. The dimensions of the samples were 135 x 325 mm (effective area $293 \cdot 10^{-4} \text{ m}^2$) and their thickness was 0,39 mm.

Test method

Radon diffusion coefficient was determined according to the method A of ISO/TS 11665-13. The tested samples were placed between the source and the receiver containers. Radon diffuses through the samples from the source container, which is connected to the radon source RF 100, to the receiver containers. Concentrations on both sides of the tested samples are measured continuously by radon detectors TSR-4 of the TERA system (receiver containers) and current mode ionization chambers (source container). Radon diffusion coefficient was derived from the process of fitting the numerical solution to the curves of radon concentration measured in the receiver containers. Numerical solution is based on the one-dimensional time-dependent diffusion equation describing radon transport through the tested material.

Laboratory conditions

Radon Barrier 400 – material

Steady state radon concentration in the source container: $1,9 \pm 0,1 \text{ MBq/m}^3$

Maximum radon concentration in the receiver containers: $36,4 \pm 0,2 \text{ kBq/m}^3$

Laboratory temperature: $22^\circ\text{C} \pm 1^\circ\text{C}$

Relative humidity of air in the laboratory: $39\% \pm 3\%$

Pressure difference between the lower and the upper containers: $1 \text{ Pa} \pm 1 \text{ Pa}$

Test device

Radon detectors TSR-4 of the TERA system (N17)

Measuring system with ionization chambers operating in current mode (N14)

Radon concentration measuring system RM-2 (N15)

Micrometer (N11)

Test results

The resulting values of the radon diffusion coefficient, the radon diffusion length and the radon resistance including expanded measurement uncertainty, are listed in the following table. The results refer to the samples as they were taken over.

TESTED MATERIAL		Radon Barrier 400
RN DIFFUSION COEFFICIENT D (m ² /s)	mean value	$7,4 \cdot 10^{-12}$
	$\pm U$	$\pm 0,9 \cdot 10^{-12}$
RN DIFFUSION LENGTH l (m)	mean value	$1,9 \cdot 10^{-3}$
	$\pm U$	$\pm 0,2 \cdot 10^{-3}$
RN RESISTANCE R_{Rn} (Ms/m)	mean value	51,7
	$\pm U$	$\pm 6,2$

The expanded uncertainties of measurement $\pm U$ mentioned are the product of standard measurement uncertainties and the expansion coefficient $k = 2$, which provides a confidence interval of approx. 95 %. The radon diffusion length was calculated according to the equation $l = \sqrt{D/\lambda}$ and the radon resistance as follows: $R_{Rn} = \frac{\sinh(d/l)}{\lambda \cdot l}$, where $\lambda = 2,1 \cdot 10^{-6} \text{ s}^{-1}$ and $d = 0,39 \text{ mm} = 0,39 \cdot 10^{-3} \text{ m}$.

The test was performed by: prof. Ing. Martin Jiránek, CSc., Ing. Veronika Kačmaříková, Ph.D.

The report was prepared by: prof. Ing. Martin Jiránek, CSc.

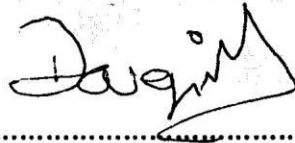
F mercer & sons hold current CE markings and harmonized EN13967 standard.
NHBC standards 2016 has accepted Toughsheet Radon Barrier when installed
In accordance with NHBC standards, this product must be laid in accordance
Of the BRE report – BRE 211:2015. See guidance.

This product must be stored flat and undercover from direct sunlight.

Certificate of factory production control- 0836-CPR-13F030.

Singed for and on behalf of manufacturer.

Signed

A handwritten signature in black ink, appearing to read 'Duggin', written over a dotted line.

dated

4-4-22