WATERPROOFING
RADON BARRIERS

SAFEGUARDING INDOOR ENVIRONMENTS

BUILDING TRUST

RADON:
THE INVISIBLE THREAT

RADON, A COLOURLESS, TASTELESS, AND ODORLESS GAS, is the second leading cause of lung cancer when inhaled over an extended period.

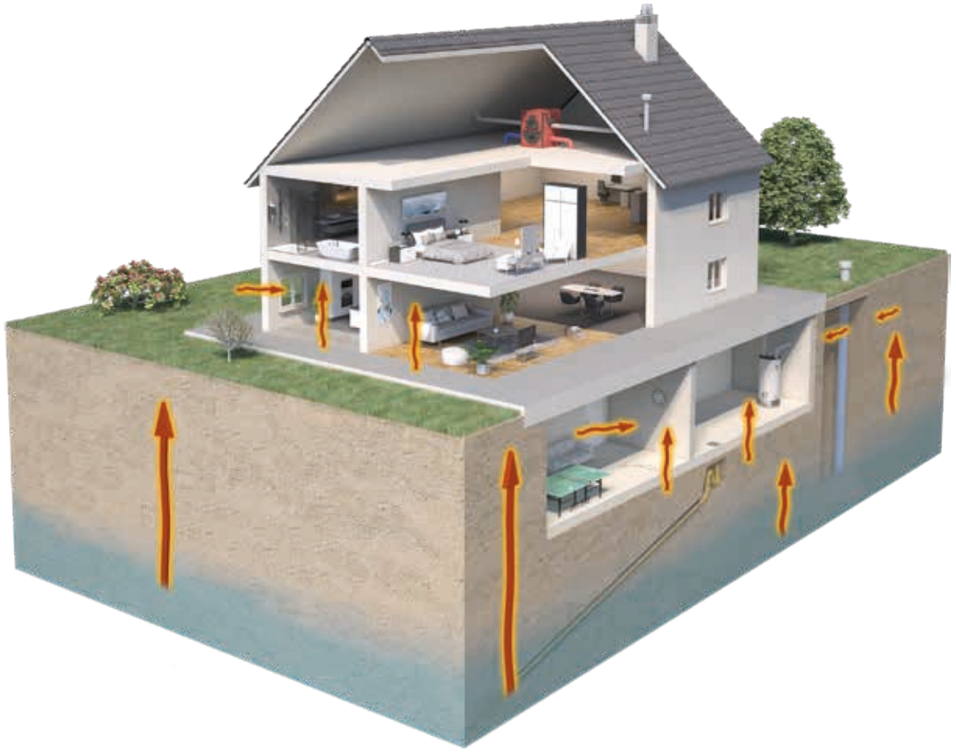
RADON AND ITS IMPACT ON HUMANS
Radon is a radioactive gas that emanates from rocks and soils. Being odorless, tasteless, and colorless, we can all be breathing this gas without noticing it.

Radon typically moves up through the ground into the air and can enter buildings through cracks, pores, and other foundation openings. It tends to concentrate in enclosed spaces, such as underground mines or ground floors in buildings, with radon levels usually lower on upper floors.

Studies have found a significant association between indoor radon exposure and lung cancer incidence in the general population, estimated to range from 3% to 14%. This makes radon exposure the second leading cause of lung cancer after smoking.

RADON PREVENTION AND MITIGATION
The World Health Organization (WHO) recommends a reference level of 100 Bq/m^3 as a safeguard against health risks associated with indoor radon exposure. However, in situations where achieving this level is not feasible due to unique country-specific conditions, the chosen reference level should not exceed 300 Bq/m^3.

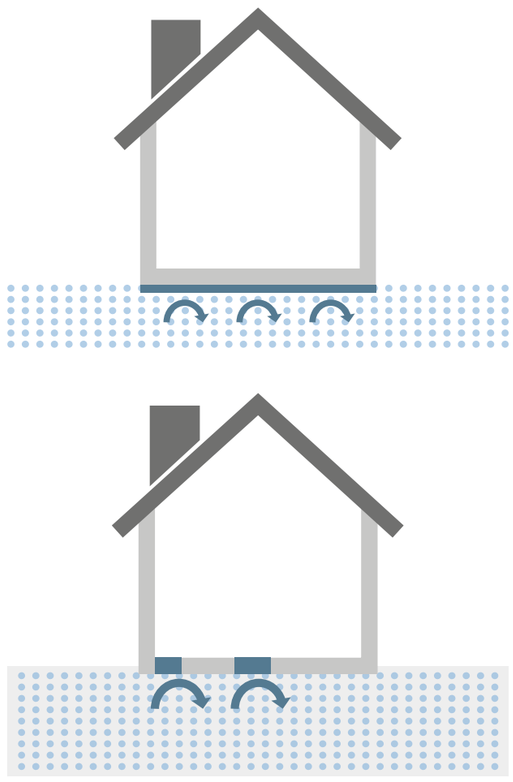
To achieve the desired radon concentration limits, various techniques are readily available in the market. These methods encompass a range of mitigation strategies and technologies designed to effectively reduce indoor radon levels, thereby ensuring a safer living environment.



RADON BARRIERS

BLOCK THE PASSAGE OF RADON and prevent water infiltration with special barrier systems installed between the soil and the outer skin of the building, creating a barrier that safeguards against both radon migration and water infiltration.

SPECIALIZED RADON-TIGHT MEMBRANES AND SEALANTS EFFECTIVELLY DECREASE THE CONCENTRATION OF RADON WITHIN BUILDINGS



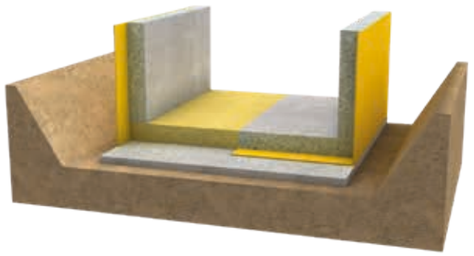
While most national legislation assesses the effectiveness of radon prevention measures based on indoor radon concentration measurements, some recommendations pertain to the performance of radon barriers:

- In the UK, according to BRE Report BR 211:2023, a typical radon transmission rate for a radon-resistant membrane should be 12 x 10–12 m^2/s.
- In Spain, the Technical Building Code (Código Técnico de la Edificación) stipulates that barriers can be considered valid if they have a radon diffusion coefficient of < 10–11 m^2/s and are ≥ 2 mm thick. For those that do not meet these criteria, a calculation method based on radon exhalation through the barrier is provided.
- In other European countries, it is common to refer to the work of Professor Keller (Keller, G & Hoffmann, B. (2000). The Radon Diffusion Length as a Criterion for Radon Tightness. IRPA. 10.). This work considers a material radon-tight if its applied thickness is more than three times the diffusion penetration length obtained after testing.

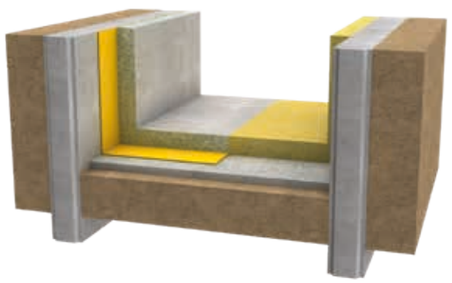
NEW BUILD

PLANNING FOR RADON MITIGATION in the initial stages of building design not only ensures compliance with safety standards but also lays the groundwork for long-term well-being in the newly constructed space.

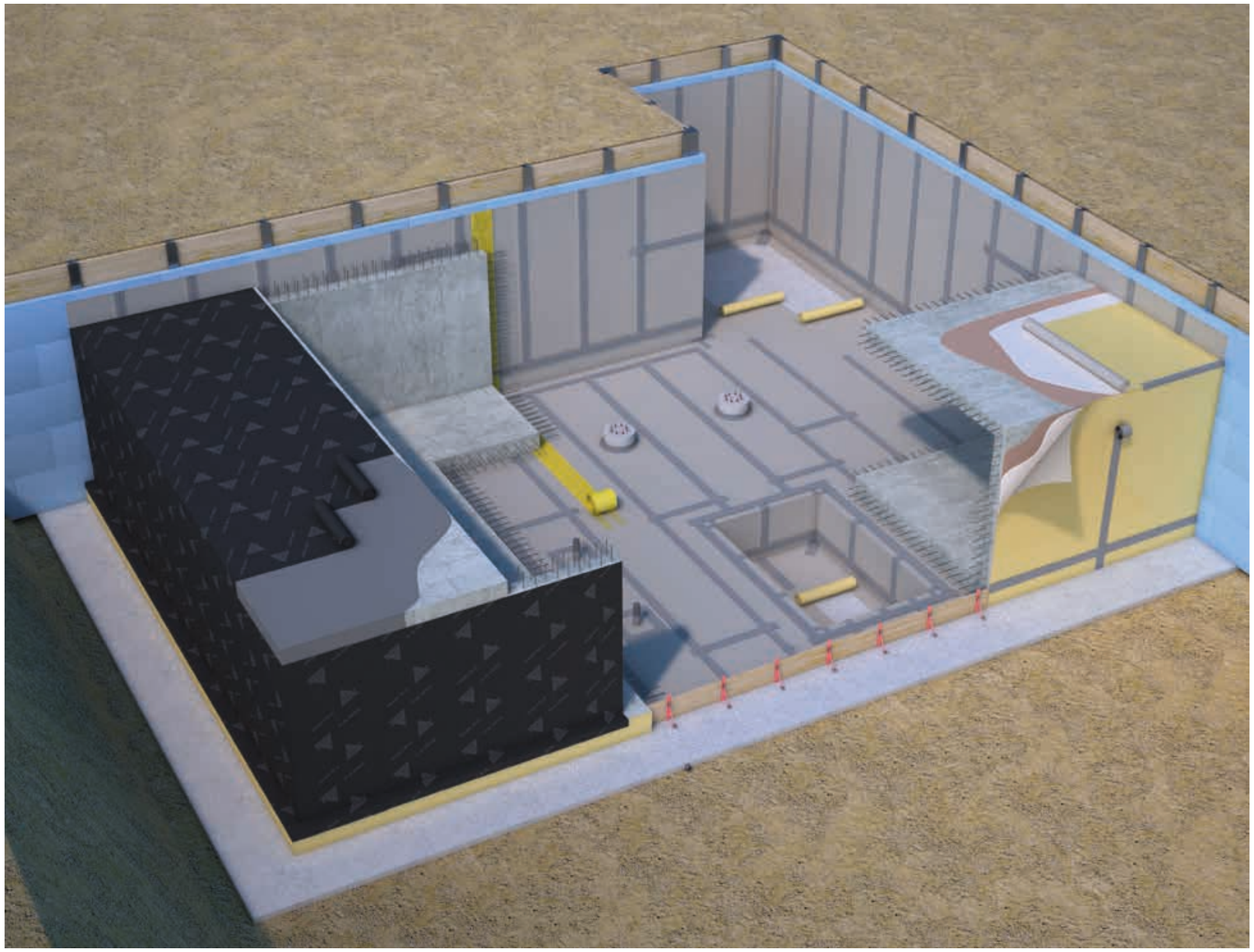
The open-cut excavation procedure allows for the installation of waterproofing and radon-tight membranes between the soil and the structure.



Construction with piled or diaphragm walls can limit the selection of the waterproofing system due to limited space and restricted access.



Waterproofing systems:
- Pre-applied: SikaProof® A+12
- Post applied: SikaProof® A+12; SikaShield® E80



Sikaproof® A+ 12

Polyolefin (FPO) based sheet membrane pre- or post-applicable.

Radon diffusion coefficient:
5.45 x 10^-13 m^2/s
Thickness: 1.75 mm

SikaShield® E80

Self-adhesive, fully bonded, post-applied, membrane based on a cross-laminated HDPE film precoated with an SBS modified bitumen compound.

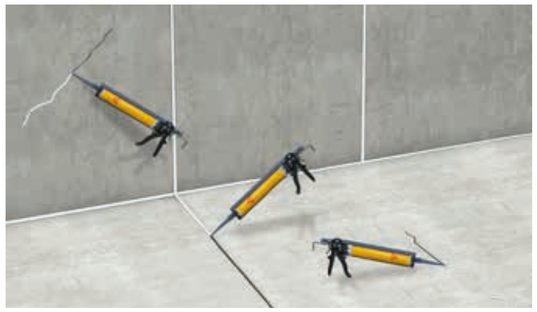
Radon diffusion coefficient:
2.3 x 10^{-13} m^2/s
Thickness: 1.5 mm

REFURBISHMENT

NOT TO OVERLOOK THE EXISTING STOCK OF BUILDINGS. Implementing comprehensive measures and upgrades in these structures can significantly contribute to overall risk reduction for the population.

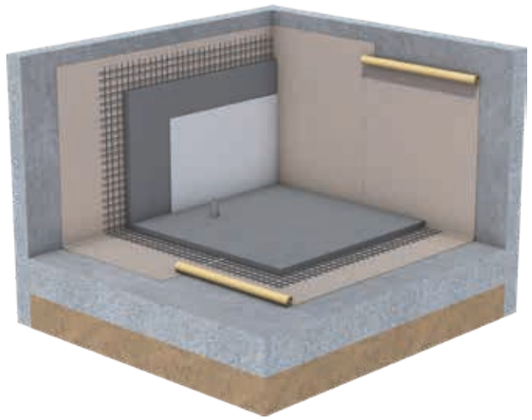
Sealing cracks, joints, and other openings is the first step in radon reduction. This measure also enhances the effectiveness of other radon control methods for both new and existing buildings.

Sealing systems:
- Sikaflex® 11 FC Purfom®
- Sikaflex® PRO-3 Purform®



The box-in-box concept reduces the available volume of the basement but offers the advantage of providing flexibility in selecting the waterproofing system.

Waterproofing systems:
- Sikaproof® A+ 12
- SikaShield® E80
- Sikadur Combiflex® TF
- Sikalastic®-6100 FX
- Sikalastic®-8800



Negative side application can be the only solution in the case of refurbishment of existing basements and slabs on grade.

Waterproofing systems:
- Sikadur Combiflex® TF
- Sikalastic®-6100 FX
- Sikalastic®-8800

Sikalastic®-8800

Highly flexible, fast curing, two-component resin based on pure polyurea, spray-applied onto structural concrete for waterproofing of retaining walls and roof sections.

Radon diffusion coefficient:
2.3×10^{-13} m²/s
Thickness: 1.5 mm

Sikadur Combiflex® TF

Adhesive sealing tape based on FPO, bonded with Sikadur Combiflex® Adhesive for post applied waterproofing system.

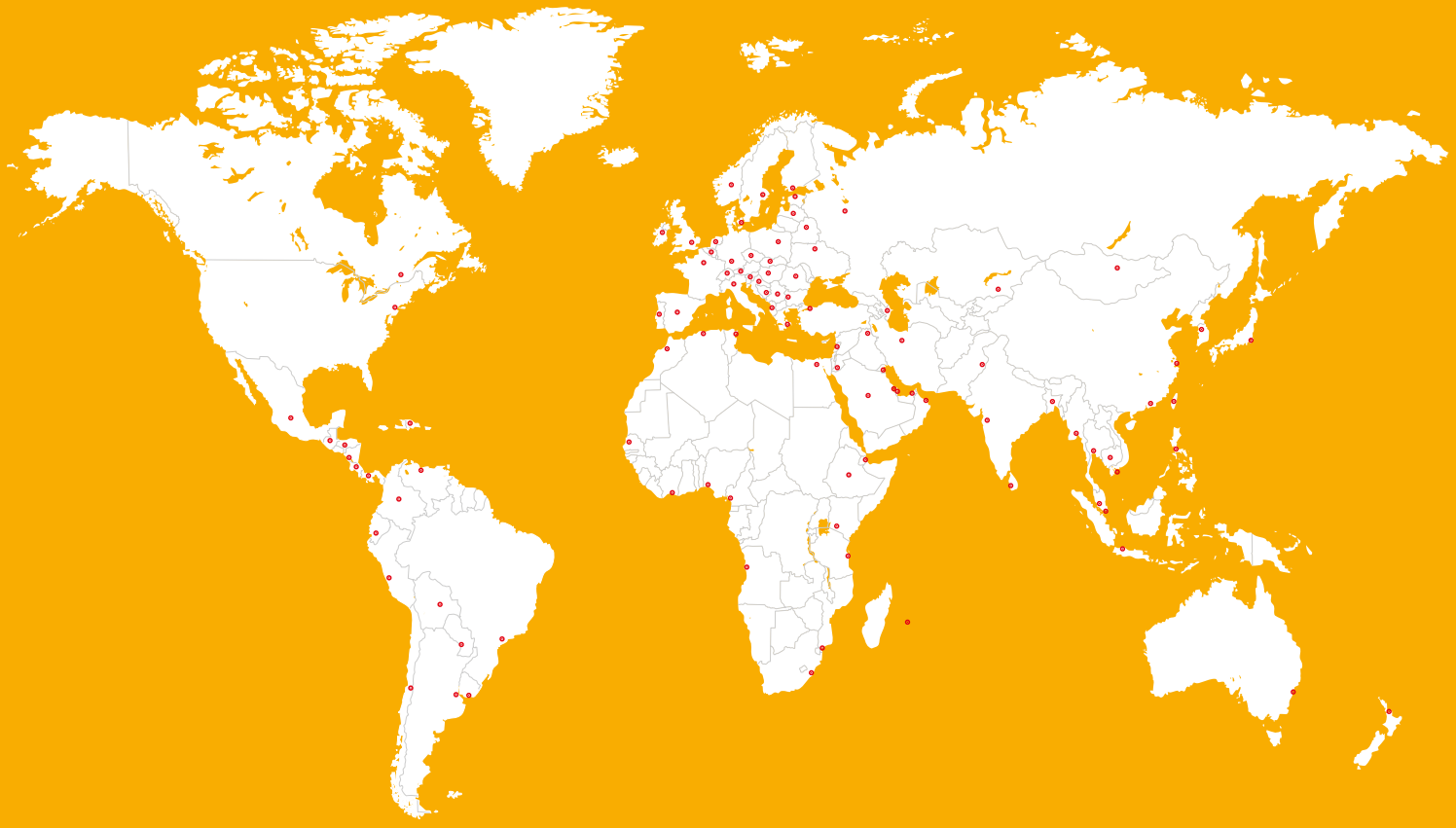
Radon diffusion coefficient:
1.3×10^{-13} m²/s
Thickness: 1 mm

Sikaflex®-11 FC Purform® Sikaflex® PRO-3 Purform®

One-component polyurethane penetration sealants with high elasticity and bonding properties.

Radon diffusion coefficient:
$\approx 10^{-10}$ m²/s
Thickness: 10–20 mm

GLOBAL BUT LOCAL PARTNERSHIP



FOR MORE WATERPROOFING INFORMATION:

WE ARE SIKA
Sika is a specialty chemicals company with a leading position in the development and production of systems and products for bonding, sealing, damping, reinforcing and protecting in the building sector and the motor vehicle industry. Sika's product lines feature concrete admixtures, mortars, sealants and adhesives, structural strengthening systems, industrial flooring as well as roofing and waterproofing systems.

SIKA SERVICES AG
Tueffenwies 16
CH-8048 Zurich
Switzerland

Contact
Phone +41 58 436 40 40
www.sika.com

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