

Radon in daycares

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Pollution

Radon is a naturally occurring, radioactive gas in the underground that penetrates buildings through leaks (cracks, fissures, pipe penetrations, etc.) in the foundation. The level of radon depends on how much radon there is in the underground below the building, whether the foundation is tight and how great the air exchange is in the building - especially in the building's lower floor.

Radon is rarely a problem in apartments in apartment buildings with a basement, whereas radon can be a particular problem in buildings without basement, or in daycares where the basement is used as an activity room, nap area, etc.

The lowest concentrations of radon are not necessarily found in newer, radon-protected buildings with mechanical ventilation. In older buildings, equally low or lower concentrations can be found. This may be because older buildings have denser foundations or more leaky climate screens, which gives high air exchange as exists in new buildings with mechanical ventilation. Likewise, mechanical ventilation and cooker hoods can - under certain conditions - increase the radon concentration by creating a negative pressure, so that radon is sucked inside via the leaks in the foundation (e.g., pipe penetrations in technical rooms), which can create high concentrations in both new and old buildings.

Make your own measurements

If the basement is used as an activity room, you should always make measurements of the radon content with radon boxes over a 60–90-day period during the heating season, while the basement is used normally. It costs 65-70 euros for two measurements. You should measure in rooms where the children spend most of their time on the ground floor, if the daycare does not have a basement.

Alternatively, you can **buy an electronic radon meter**. It costs around 135 euros. Then you can monitor the radon content in different rooms of the daycare yourself. The good thing about an electronic radon meter is that you can investigate on what effectively reduces the radon content in the daycare, and what fits best the everyday life and habits of the daycare. You can thus start by implementing the easiest and cheapest measures (described on the next page) and see if it solves the problem before you embark on the more expensive and difficult measures. However, you should know that the radon level varies greatly seasonally, how the daycare is used, and weather conditions. It is therefore necessary to measure for longer periods (e.g. a month's time) in the same season to draw clear conclusions.

Radioactive radiation is measured in becquerels (Bq), where one Bq corresponds to one radioactive decay per second. The lower limit value for radon in Denmark is 100 Bq/m³, while the upper limit is 200 Bq/m³. When the lower limit value is exceeded, simple measures should be initiated such as increased aeration and sealing of the foundation. If the upper limit value is exceeded, more comprehensive measures must be taken (in addition to the simple ones). E.g., a tight membrane can be implemented on the inside of the foundation, or a radon extraction system, whereby the radon-containing air under the foundation is led up through a pipe with discharge along the roof. You can read more about various measures below.

What to do?

You can do a lot yourself, but several of the suggestions below require you to involve professionals.

1) In general, if the basement is used as an activity room

- Measure the radon concentration in the activity room if this has not yet been done.
- Aerate often with draughts and, if possible, leave windows in the aeration position in the summer.
- Establish and use mechanical ventilation that does not produce negative pressure if possible.
- Ensure pressure equalisation (open ventilation damper/window ajar) when using a cooker hood.
- Keep the door to the basement closed and ensure that the door closes tightly - preferably apply sealing strips.
- Never use the basement for long-lasting activities and nap area.

2) The lower limit value of 100 Bq/m³ is exceeded

- Carry out simple sealing of cracks, fissures, and pipe penetrations in the foundation.
- Adjust the mechanical ventilation so that it is balanced and does not create negative pressure in the building.
- Avoid prolonged (over 2 hours a day) stays in rooms where the limit value is exceeded.
- Repeat radon measurements for 60-90 days during the heating season to ensure that the implemented measures have helped.

3) The upper limit value of 200 Bq/m³ is exceeded

- All reduction measures mentioned under section 1) and 2) above are performed.
- Significantly increase the ventilation (manual and mechanical) in the lower floor of the building all year round.
- Carry out extensive sealing of the foundation, radon extraction and/or mechanical ventilation of the basement.
- Get in touch with a professional advisor regarding remedying the radon pollution in the daycare.
- Repeat radon measurements for 60-90 days during the heating season to ensure that the implemented measures have helped.

Have measurements made

We can help with measurements and assessments of the indoor environment, and solution options to get a better indoor environment. Contact the Head of secretariat Kaare Press-Kristensen: kaare@godtindeklima.nu / tel. (+45) 22 81 10 27.

More on indoor air pollution and solutions:

www.healthyindoorenvironment.org