

Background

The air exchange rate plays the crucial role on the behaviour not only of radon and its short-lived decay products in the interiors of houses and workplaces, but also of all gaseous and aerosol pollutants, in general.

The air exchange rate is also responsible for the transfer of all gaseous and aerosol pollutants from the outdoor environment into the indoor environment of buildings. Its measurement is therefore important not only in radon issues but also for example, in the construction industry for the determination of heat losses of buildings and in radio-hygiene for the measurement emissions of the VOC pollutants in the interiors of dwellings that are released from walls and furniture according to the ISO EN 16000-8 standard.

Measurement buildings

The comparative measurements will be carried out in a total of 10 (un)/occupied Czech buildings during the heating season. Five of them will be apartments of type (2+1, 3+1) and the rest will be multi-storey family houses. A typical internal volume is 250 m³ for apartments and 500 to 600 m³ for the family houses.

Measurement quantity

The measured quantity for each object will be the average air exchange rate during the measurement time interval in (1/h). In addition, the total uncertainty of its determination for the 95% confidence interval will be required. The required internal volumes of the whole measured buildings or of the individual zones (floors) in the case of multi-storey houses will be provided to the participants by the organiser of the comparison.

Prevailing conditions at the site

The measured ACH value will be in the usual range, i.e. approximately (0.05 - 1) 1/h. In some houses equipped with a heat recovery units measured average ACH may exceed the value of 1 (1/h). Participants will be informed about these houses. Temperatures are expected to be above 17 °C and RH may be in the range of (25 - 60) %.

Time frame

The beginning November 2024 or end of January 2025 if participants' calendars are confirmed. The exact time frame will be available in due time.

Duration of measurement

The planned measurement period is 2 to 4 weeks and will depend mainly on the willingness of the homeowners.

Who should participate?

Mainly relevant accredited measuring institutions and laboratories but also those that intend to accredit apply.

About organizers:

-The SURO passive integral approach based on ECD chromatographic end- up for a 5 different PFT tracer gases was accredited by a Czech accreditation body.

- Inter-laboratory comparison between the National Brookhaven Lab. NY (USA) and the SURO integral approach for the average ACH estimation was carried out in 15 different houses located in the Czech Republic. The results indicated a very good agreement up to 10 %.

- The Czech State Office for Nuclear Safety has certified the SURO measurement protocol for the assessment of the average ACH in buildings under the reference number: SÚJB/RCHK/4581/2017.

NOTE: The State Office for Nuclear Safety is the central authority of state administration central authority of state administration responsible for exercise of regulatory activities in the peaceful utilisation of nuclear energy and ionizing radiation and in the field of non-proliferation of weapons of mass destruction.

- The SURO long-term experience with measurement of ACH using tracer gases, both integral and continuous approaches [see references].

References

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3. Brabec, M., Jílek, K. (2004): Improved air ventilation rate estimation based on statistical model, 4th European Conference on Protection against radon at Home and at Work, Prague, ISBN 80-01-3009-1.
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