MEASUREMENT OF THE THORON EXHALATION RATE FROM NORM SAMPLES – A ROUND ROBIN STUDY

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Thoron exposure from building materials has been a topic of considerable research; nevertheless, measurement of thoron exhalation from building materials is still subject of continued investigation. While international harmonized standards for radon from building materials such as e.g. ISO-11665-9 (ISO, 2016) already exist, measurement protocols for determining the thoron exhalation rate from building materials are at present still based on internal procedures developed by the laboratories itself. For this reason an inter-laboratory comparison on the thoron exhalation rate of two NORM samples is performed with eight participating laboratories. The laboratories use different testing principles, such as different sample preparation, test setup and detection equipment.

The laboratory measurements are analyzed using the statistical methods of ISO-13528 (ISO, 2022) for proficiency testing in interlaboratory comparisons. The results demonstrate a relative standard uncertainty of around 20% in the assigned value. The findings highlight three areas for improvement of the measurement robustness. These are: i. traceable thoron standards for detector calibration, ii. robust protocols for measurement and sample treatment and iii. implications of material characteristics and its effect on thoron exhalation. The work will present the findings from the inter-laboratory comparison and will critically review the test procedures used by the laboratories.