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Quality assurance of radon measurements with a walk-in type calibration chamber

A diverse variety of Rn-222 measurement instrumentation available today poses a substantial challenge for the quality assurance (QA) of the measurements provided. QA is crucial for realistic and efficient preventive measures of Rn-222 exposure in buildings, workers'protection, and for the potential legal impacts that measurements may have in regulatory non-compliance situations. Setting up standard protocols and maintaining mutual conformity between various detectors and instruments used by different laboratories and researchers need state/of/the/art calibration facilities. Calibration chamber designed to simultaneously accommodate a large number of detectors of different types and perform experiments like Rn-222 spiking, sensitivity analysis, and response evaluations are desirable. In Europe, metrological infrastructure for QA of measurements is always essentially maintained. This serves to continuously test, approve, verify and calibrate the instrumentation used in any type of Rn-222 study. Metrological traceability of Rn-222 concentration measurements requires calibration or periodic check of the detectors used with respect to its measurement standard. This should be performed using calibration system equipped with an accurate reference measuring instrument and carried out in a well-defined measurement condition. Calibration protocols followed must consider the range of environmental conditions (T, RH, 222Rn concentrations, air flow) in which measurements are routinely or anticipated to be performed. Special attention must be paid to detectors used in extreme meteorological conditions. Environmental conditions which may affect the outcome of the measurement should be monitored, and be retained as stable as necessary during the calibration procedures. A strategic and budgetary considerations to these calibration facilities is necessary in any National Radon Action Plans.

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