

Development of a practical test procedure for the determination of radon exhalation of construction materials

Oliver Jann, Matthias Richter, Joachim Kemski, Ralf Klingel, Uwe Schneider, Christian Krockner

The project conducted by BAM Federal Institute for Materials Research and Testing was designed to develop a test procedure for the determination of the radon exhalation of construction materials. Measurements were carried out in emission test chambers with volumes of 22 L and 1 m³. Six different materials (three types of clay materials, light-weight concrete bricks, honeycomb and clinker bricks) mainly used for wall constructions and with different source strengths were investigated. Three different commercially available measurement devices were used for measurements of the radon concentration. Due to their low sensitivity, the chamber tests were carried out at low air change rates. All results showed good comparability between both chamber sizes. In order to calculate the test chamber concentrations into model or real room concentrations respectively, a calculation model is proposed. This model also takes into account the conditions of a real wall construction.

It could be generally shown that the use of emission test chambers is well suited for the determination of the radon exhalation. Unlike conventional methods based on the determination of the emanation rate followed by a mathematical calculation of the exhalation rate, the chamber measurements are close to reality considering climate conditions, such as temperature, relative humidity and air change rate.