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Radiation Protection. Measurement of radioactivity in the environment – Air- radon 222. A proposed ISO standard.

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Radon isotopes (222, 220, 219) are radioactive gases produced by the disintegration of radium isotopes 226, 224 and 223, which are decay products of uranium238, thorium232 and uranium235 respectively. All are found in the earth's crust. Solid elements, also radioactive, are produced by radon disintegration. Radon is classed as a rare gas in the periodic table of elements, along with helium, argon, neon, krypton and xenon. When disintegrating, radon emits alpha particles and generates solid decay products, which are also radioactive (polonium, bismuth, lead etc.). The potential danger of radon lies in its solid decay products rather than the gas itself. Whether or not they are attached aerosols, radon decay products can be inhaled and deposited in the bronchopulmonary tree to varying depths according to their size. Radon today is considered to be the main source of human exposure to natural radiation. At the international level, radon accounts for 52% of global average exposure to natural radiation. Isotope 222 (48%) is far more significant than isotope 220 (4%), whilst isotope 219 is considered as negligible. Exposure to radon varies considerably from one region to another, depending on factors such as weather conditions, and underlying geology. Activity concentration can therefore vary by a factor of 10 or even a 100 from one period of time to the next and from one area to another.
There are many ways of measuring the radon 222 activity concentration and the potential alpha energy concentration of its short-lived decay products. Measuring techniques fall into three categories: - spot measurement methods; continuous measurement; integrated measurement. The proposed ISO (International Organisation for Standardisation) document suggests guidelines for measuring radon222 activity concentration and the potential alpha energy concentration of its short-lived decay products in a free (environment) and confined (buildings) atmosphere. The target date for availability of this work item is 2011. The ISO document here highlighted is a working draft. ISO is a worldwide federation of national standards bodies.

Keywords: radon; international standards; measurement techniques.