
Contribution ID: **267** Type: **Oral**

# Determination of radioactivity concentrations in building materials with respect to French decree

Following International Commission on Radiological Protection (ICPR) recommendations, the European Community has written a directive to face the potential risk of ionizing radiation from Naturally Occurring Radioactive Materials (NORM), especially in building materials.
France published a decree, mandatory on the 1st of July 2020, to apply the EC directive.

In the article 75 of Euratom-BSS directive (2013/59/EURATOM), "the reference level applying to indoor external exposure to gamma radiation emitted by building materials, in addition to outdoor external exposure, shall be 1 mSv per year". In order to prove each building material to be below this dose, the European Committee of Normalisation (CEN) has written a technical report CEN/TR 17113 and a test standard CEN/TS 17216 which describe how to calculate the activity index I:
I= C[Ra226]/300+C[Th232]/300+C[K40]/3000
Where C[Th232],C[Ra226] and C[K40] are mass activities in Bq/kg of the corresponding radionuclides for a building material. These 3 radioelements are measured by gamma spectrometry, with an assumption (not always true) for thorium232, deduced from its progeny actinium228. Thorium232 would theoretically be analysed with alpha spectrometry, but would need a long, complex and expensive mineralization and chemical separation.

French decree is much more precise, analysis for French market is aimed to high qualified laboratories. Indeed, 10 natural radionuclides have to be quantified, by an accredited laboratory, with a mandatory participation to a proficiency test.

The building industry needs to qualify all material used to build flats and houses to unsure workers and public that their dose assessment will be less than 1 mSv/year. As the number of different materials and origin are huge, building industry needs reliable, quick and economically reasonable protocol to determine the activity index I.

Through an oral presentation, Eurofins Eichrom which is specialized in radioactivity measurement for the past 15 years, will expose and answer to different problematics to fulfill the needs of the building industry, like:
- methods to measure to potassium40, radium226 and thorium232,
- consequences of the mandatory efficiency calibration of CEN/TS 17216,
- alternative method of calibration described in others standards to unsure reliable, cheaper and quicker results,
- how to deal with unknown chemical composition,
- impact of predetermined chemical composition on results of building materials,
- how to answer to French decree to analyse mandatory radionuclides, with an accreditation process of building materials.

**Primary author:** DANIEL, Benoit (EUROFINS EICHROM Radioactivité)

**Co-author:** Mr RIELLAND, Christophe (EUROFINS EICHROM Radioactivité)

**Presenter:** Mr RIELLAND, Christophe (EUROFINS EICHROM Radioactivité)

**Session Classification:** Session IV - Characterization in Industrial Facilities and in the Environment

**Track Classification:** NORM Characterization, Measurement, Decontamination