

Natural radioactivity of turkish natural stones as building materials

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Abstract

The Turkey has very important natural stones potential with over 5 billion m³ marble reserves. According to 2002 giving data the number of Turkish stones export is 303 million US Dollars. In this regards, the present study deals with 90 Turkish natural stones. The studied samples were analyzed and the concentrations in Bq/kg dry weight of radioisotopes were determined by gamma-ray spectrometry using HPGe detector. The radon exhalation rates of natural stones were also measured by using solid state nuclear track detectors (LR-115)

The radium equivalent activity varied from 183 Bq/kg to 522 Bq/kg for granite samples and from 1 Bq/kg to 37 Bq/kg for marble samples. The value of radon exhalation rate ranged from 0.003 Bq/m²h⁻¹ to 0.768 Bq/m² h⁻¹ for granite samples and from 0.001 Bq/m² h⁻¹ to 0.02 Bq/m² h⁻¹ for marble samples. The total absorbed dose rates in air ranged from 22 to 61 nGy h⁻¹ for one quarter utilization of granite samples. The annual effective dose rates per person indoors were determined to be between 108 and 298 µSv y⁻¹ for of for one quarter utilization of the materials.

Applying the dose criteria recently recommended by UNSCEAR for building materials, the natural stones meet the upper dose limit of 1mSvy⁻¹. So, there are not restrictions for use of any Turkish commercial marble as covering materials, including Turkish granits.

Keywords: *marble, granite, natural radioactivity, radon exhalation rate.*

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