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DEVOLVER AO BALCÃO DE EMPRÉSTIMO

ENERGY DEPENDENCE OF PEN DOSEMETERS FOR X-RAYS (20-60 kV)

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The pen dosimeters are specially important for individual radiation monitoring because they allow direct and rapid exposure measurements. Three kinds of pen dosimeters, designed A, B and C (different manufactures), were tested in low energy X radiation fields (radiation protection level) of the Calibration Laboratory of São Paulo, in order to verify their energy dependence. Two pen dosimeters were each time simultaneously exposed to X radiation with energies varying between 15.7 and 37.6 keV. They were irradiated free in air for the energy dependence study and in front of a PMMA phantom (30x30x15 cm) with the objective to establish the backscattering contribution to their responses. All of them were tested in both studies in five different standard radiation qualities. The dosimeters of type A and C presented the highest radiation sensitivity of the investigated energy range. Short-term stability tests were performed and the results depend on the dosimeter type and the energy: the highest and lowest variations were obtained respectively for the type C pens (15% and 15.7 keV) and type B pens (0.93% and 37.6 keV). All dosimeters presented high energy dependence, varying for type B pens between 98% (15.7 keV) and 64% (37.6 keV). In the case of the backscattering response contribution study with the phantom the type C pens showed the largest values (45%, 15.7 keV). These high values are probably due to their strong radiation sensitivity. The obtained results showed consistency with literature data. All tested pen types must be used very carefully for X radiation detection in the investigated low energy range using convenient correction factors.

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