

Characterization of a homemade ionization chamber for radiotherapy beams

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This work presents the study of a homemade cylindrical ionization chamber for routine use in ⁶⁰Co beams. This ionization chamber was developed at the Calibration Laboratory of IPEN. This chamber is made of PVC, the wall material of the chamber sensitive volume is graphite coated, and its collecting electrode material is aluminum, with a thickness of 1.20mm. The chamber internal diameter is 6.70mm, and its wall thickness and the sensitive length are 0.26mm and 30.00mm, respectively. The sensitive volume is 1.06cm³. The characterization tests performed were: short- and long-term stability, stabilization time, saturation, ion collection efficiency, leakage current, linearity of response, angular and energy dependence. The ionization chamber was linked to a PTW electrometer, model UNIDOS E. The results obtained showed values within those recommended internationally (IEC, 1996). This chamber was also used to determine the behavior of the ⁶⁰Co field as a function of distance. The distance between the source and the ionization chamber varied from 80cm to 120cm, in 2.0cm steps, and 10 measurements were taken for each position. The results were in good agreement with the theoretical behavior of the field. All results obtained were considered satisfactory, and this homemade ionization chamber presents usefulness for routine dosimetric procedures in radiotherapy beams

IEC 1997, *Medical electrical equipment – Dosimeters with ionization chambers as used in radiotherapy*, IEC 60731, International Electrotechnical Commission, Genève.

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