

## Development and evaluation of a tissue equivalent ionization chamber

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Tissue equivalent materials have a variety of uses, including routine quality assurance and quality control in both diagnostic and therapeutic procedures. They are often utilized in research, to measure doses delivered to patients undergoing different clinical procedures. This work presents the development and evaluation of a homemade tissue equivalent ionization chamber for routine use in <sup>60</sup>Co beams. This ionization chamber was developed at the Calibration Laboratory of IPEN. The new tissue equivalent material was developed at the Physics Institute of São Paulo University. This material is composed by polyethylene, calcium carbonate and TYRIN™ chlorinated polyethylene. The ionization chamber developed is a parallel plate chamber with an outside diameter of 5.00cm and an ionizing volume of approximately 6.00cm<sup>3</sup>. 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. Some of the tests were performed in <sup>60</sup>Co beams. The stability measurements were taken using a <sup>90</sup>Sr + <sup>90</sup>Y check source device, PTW, model 8921, with nominal activity of 33MBq, 1994. The results obtained showed values within those recommended internationally (International Electrotechnical Commission 1997). All results were considered satisfactory; this homemade ionization chamber presents potential for routine use in radiotherapy.

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

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