

TOPIC: Reference dosimetry and comparisons in external beam radiotherapy

**Operational tests of the standard reference system used to gamma radiation calibration, therapy level, at Calibration Laboratory of IPEN-CNEN/SP**

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This paper shows the studies about the reference system to perform the calibration of clinic dosimeters in gamma rays, therapy level, and the calibration procedures and routines of Calibration Laboratory of the Instituto de Pesquisas Energéticas e Nucleares (IPEN-CNEN/SP).

The calibration of clinic dosimeters is very important to reduce the fail in the radiotherapy procedures, increasing the patient safety and decreasing the uncertainties in the measurements. The control quality applied to ionization chambers, electrometers and connecting cables can allows to reaching at high confidence level in the radiotherapy procedures. Then, technical staff for that routine can apply some different tests to confirm the good operation of that instrumentation.

It this work was performed some tests in the standard reference dosimeter of the Calibration Laboratory (IPEN-CNEN/SP), consisting of one ionization chamber (0.6 cm<sup>3</sup>), electrometer from PTW, model UNIDOS, with traceability of the Primary Standard Laboratory PTB (Germany). The irradiator is a teletherapy system from Siemens, model Gamatron, with gamma radioactive source of <sup>60</sup>Co (1250 keV), activity of 0.34 TBq (1999).

To perform the calibration procedures are applied the short and long term stabilities tests, following the brazilian and international recommendations. The leakage test is performed in the clinic dosimeters following IEC-60731 standard, before the calibration procedures to verify the operational conditions of that instruments to avoid fail in that systems and to determine the fail in each part of that (electrometer, ionization chamber and cables or connectors). That leakage tests is part of the control quality procedures of the clinic dosimeters. That control quality test can be performed by the research institutes, hospitals and clinics where it is used, just to assure the high quality of the measurements of that system. The standard system of the IPEN/CNEN was tested for one year, and about 4 month for leakage test (performed three times a week). The Figure 1 shows the results obtained.

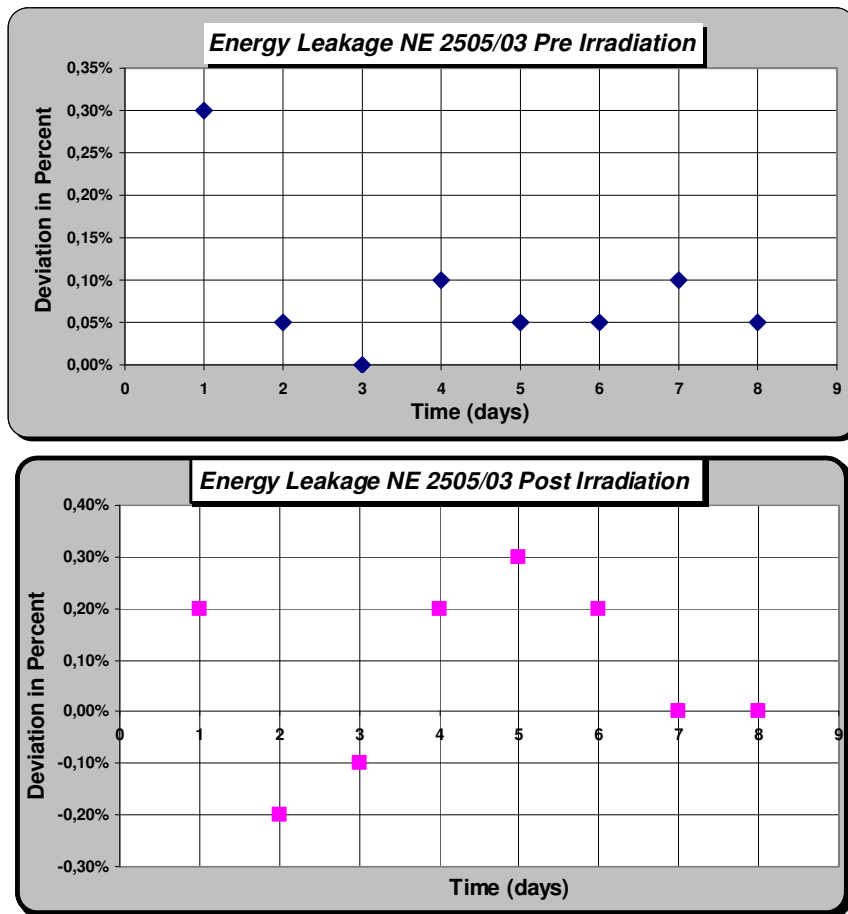


Fig 1. Leakage current test realized in clinical reference of IPEN.

The reference system presented good results, such as: maximum leakage of + 0.30%, and the standard IEC-60731 allowed a maximum variation of the  $\pm 0.58\%$  in the readings. That results show that the reference system for calibration of clinic dosimeters of the Calibration Laboratory of the (IPEN-CNEN/SP) is operating in good conditions. These studies show the importance of the periodicity of the quality control tests.

## REFERENCES

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