

AbstractID: 6881 Title: Evaluation of the Exradin A19 ion chamber for reference dosimetry in megavoltage photon beams

Purpose:

The Exradin A19 is a new design of reference-class 0.6cc ion chamber that externally resembles the NE2571 Farmer chamber but internally is very similar to the well-known Exradin A12. This project involved the characterization of a single version of this chamber in high energy x-rays.

Method and Materials:

The Exradin A19 was compared against primary and reference standard ion chamber chambers at the National Research Council of Canada in a range of megavoltage photon beams (6-25 MV). Investigations looked at chamber settling, ion recombination and polarity, and determination of experimental k_Q factors.

Results:

- i) Chamber settling - the chamber response stabilizes very quickly (within 5 minutes), even after a large change in the polarizing voltage
- ii) The polarity correction was measured for 6 MV and 25 MV beams and found to be small (within 0.15% of unity)
- iii) The recombination correction showed a linear variation with the dose-per-pulse. The correction was similar to that of other Farmer-type chambers.
- iv) Beam quality conversion factors were found to be closer to that of the NE2571 than the A12, which is not consistent with the guidance given in TG-51. However, with only a single chamber under investigation one cannot draw any definitive conclusions.

Conclusion:

An initial investigation of the Exradin A19 Farmer-type ion chamber suggests that it is fit for purpose for the calibration of megavoltage photon beams. Further work is in progress to evaluate this chamber in kilovoltage x-ray and high-energy electron beams.