

AbstractID: 11417 Title: Dosimetric characterization of small sensitive volume chambers

Purpose: To perform a dosimetric response characterization amongst the following chambers: two Slimline Microchambers (A16 and A14P, Standard Imaging, Middleton WI), a PinPoint, Semiflex and MicroLion chambers (PTW, New York City, NY). Sensitivity, stability, bias voltage dependence, dose rate dependence, energy dependence, spatial resolution and angular dependence are tested for each chamber.

Method and materials: Measurements were performed using both a Co-60 irradiator and a Varian 2300 C/D linac accelerator. The Slimline microchambers (A14P and A16) have collecting volume of 0.002 cm^3 and 0.007 cm^3 , respectively, with the effective point of measurement (EPM) located 1.5 and 1.7mm from tip of chamber. The pinpoint and farmer type possess sensitive volume of 0.015 cm^3 and 0.125 cm^3 with the EPM located at 3.4 and 4.5mm from the tip of the chamber. The MicroLion possesses a sensitive volume of 0.002 cm^3 with the EPM at 0.975 mm from the entrance window. Most of the measurements were evaluated in water using the Blue Phantom (Scanditronix) and associated software. A Unidos^{webline} electrometer (PTW) was used to measure the charge and current. An external high voltage supply was used in the case of the MicroLion to function at the recommended bias voltage of 800V.

Results: Results show similar photon energy characterization among the chambers. For all chambers, electron energies response differences of $<2\%$, dose rate percent differences $<2\%$ and good spatial resolution was observed. Overall, the MicroLion chamber demonstrates better responses in comparison to the other chambers while the A14P was shown to be the most difficult to characterize due to the small volume.

Conclusion: The preliminary results show that all chambers are suitable for clinical use for both relative and absolute dosimetry. Small variations exist among the chambers.