

AbstractID: 11295 Title: Comparative Dosimetry of the Xoft Axxent Electronic Brachytherapy Skin Applicator at 50 kVp with Film, Chamber, and Diode in Various Backscatter Media

Purpose: The Xoft Axxent Electronic Brachytherapy Skin Applicator and miniature x-ray source delivers superficial dose to shallow depths using 50 kVp x-rays over small target areas (< 20 cm²). The Xoft Skin Applicator is a 25 mm SSD cone (1.0-5.0 cm diameter) with an embedded flattening filter which acts to both filter the low energy x-rays from the beam and to mitigate the radial inverse squares peak on a flat surface. **Method and Materials:** The relative depth and profile dose characteristics of the 35 mm diameter cone were measured in water and solid water using film (Kodak EDR2, GAFChromic EBT), ionization chambers (A16, RK, Marcus) and stereotactic diode (SFD). Correction factors for diode backscatter response and solid water density are derived by comparison. Beam profile metrics for penumbral transition width (PTW), field width, flatness and asymmetry were computed. A virtual SSD was computed using in-air diode measurements. The beam energy is defined using a TG-61 HVL approach at 25 cm distance. **Results:** The first and second HVL for this system are 1.4 mm and 2.5 mm. A VSSD of 22 mm was computed, differing from the nominal 25 mm SSD. PTWs, ranging from 0.4 to 5.0 mm, correlated with chamber size. Field widths from 38.8 to 42.0 mm correlated with chamber size; 38.2 mm width is expected at 2 mm depth. Flatness ranged from 2.0 to 9.6%, and asymmetry ranged from +/- 0.9 to 6.2%. A linear depth correction can be made solid water density of 1.13, while a non-linear depth dependant diode backscatter correction is required. **Conclusion:** The Xoft skin applicator provides depth doses similar to other 50kVp superficial systems. The dose profiles are similar to short SSD applicators. These comparisons provide the clinical physicist with options for measuring energy and beam characteristics. Research Sponsored by Xoft, Inc.