

AbstractID: 8981 Title: Measurement of Skin Dose when using FlexiShield® with the Axxent® Electronic Brachytherapy System

Purpose: To study the skin surface dose delivered when FlexiShield, a flexible tungsten silicone sheet, is placed on the skin to shield personnel in the treatment room. This surface dose is compared to the surface dose delivered when no FlexiShield is present and when a silicone and tungsten-only shielding is used.

Method and Materials: Axxent FlexiShield is designed to shield the operator and other personnel from x-ray radiation from the Axxent® Model S700 X-ray Source. In order to attenuate fluorescence photons from tungsten in the shield, a barrier layer containing a tuned-Z material was added to the silicone tungsten. A source holder was fabricated to hold FlexiShield against the surface of a PTW 34013 soft x-ray ionization chamber while allowing for the placement of the x-ray source at varying distances from the shield surface with water-equivalent material filling the intervening space. The skin dose is defined as the dose measured by the ionization chamber whose active face is recessed ~0.3mm from the FlexiShield inner surface.

Results: For a source to skin distance of 3cm, the increased skin dose was measured to be $6.9\% \pm 0.5\%$ for FlexiShield compared to no shielding. Silicon and tungsten-only shielding produced an increased skin dose of $14.4\% \pm 1.9\%$. These measurements compare well with MCNP5 simulations of the dose to the basal layer of the skin for a 3cm source to skin distance, which predict an increase of 7% for FlexiShield and 16% for a tungsten-only shield for a simulated Axxent x-ray source spectrum.

Conclusion: The use of FlexiShield produces a slightly increased dose near the surface of the skin when compared no shielding used. The tuned-Z layer added to FlexiShield decreases the measured dose near the skin surface by about a factor of two.

Conflict of Interest:

Research sponsored by Xoft, Inc.