

AbstractID: 13049 Title: Dosimetric characterization of a set of surface applicators from Xoft Inc.

Purpose: A set of conical surface applicators with diameters ranging from 10 mm to 50 mm have been developed by Xoft Inc. These applicators are designed to be used with the Axxent[®] eBx System, allowing for conformal dose delivery for the treatment of surface lesions. Current methods of output verification for these applicators are based on the AAPM's TG-61 protocol. Certain components of TG-61 may need modification for applicators like those under investigation. The goal of this work is an accurate experimental determination of the output of each applicator with comparison to Monte Carlo determined values.

Methods and Materials: Air-kerma rate measurements along the central axis of each applicator were performed using an Attix free-air chamber, and at the applicator window with two parallel plate chamber models. Each applicator was simulated using MCNP5 and a collision kerma tally was used to determine the air-kerma rate along the central axis and at the applicator window.

Results: Initial measurements of the air-kerma rate at the applicator window with the parallel plate chambers agreed within the expected uncertainty. Extrapolation of the air-kerma rate measured with the FAC back to the window surface agreed with the parallel plate chambers within 15% for all but the 50 mm diameter applicator. Monte Carlo calculated values agree with the parallel plate chambers for all applicators except the 50 mm diameter as well.

Conclusions: Current forms of output verification for these applicators are based on TG-61, which was designed for low-energy external beams, not miniature X-ray sources in an applicator. Initial work has shown that output verification may be performed using calibrated ionization chambers, however some aspects of TG-61 need modification for use with applicators like those under investigation here.

Conflict of Interest: Xoft Inc. provided sources and applicators.