

AbstractID: 14089 Title: Evaluation of two formulations of commercial water-equivalent plastic to establish suitability for dosimetry of The ZEISS Intrabeam® 50 kVp x-ray source.

Purpose:

The ZEISS Intrabeam® is a 50 kVp x-ray source intended for interstitial brachytherapy. The purpose of this investigation is to establish suitability of two formulations of commercial water-equivalent plastic for dosimetry measurements for this device.

Method and Materials:

Plastic Water® (CIRS, Norfolk, VA) is a water-equivalent resin material available in two formulations optimized for low energy dosimetry: LR 1 (5keV to 8MeV) and DT (50keV to 25MeV). The bare x-ray source with no applicator attachment was positioned in the center of a 30x30x30 cm volume of pure water with two Exradin A1SL ion chambers (Standard Imaging, Middleton, WI) held symmetrically 4 cm directly lateral of the nominal target position, one on either side. Without otherwise changing the geometry three sets of measurements were made for each material by interposing 0, 1 and 2 cm respectively of material (replacing some of the water) between the source and chamber on one side only. The chamber on the other side served as a constancy reference.

Results:

Both the Plastic water® LR and DT formulations yielded results which differed from water alone by less than 2%. LR measurements ranged from 1.5% to 0.4% corresponding to 1cm and 2cm width (of phantom material), while DT ranged from 0.5% to 1.5% respectively.

Conclusion:

Both LR & DT formulations of Plastic Water® appear to be suitable as water-equivalent media for dosimetry of the Intrabeam® 50kVp beam.