

AbstractID: 11821 Title: On the Determination of the Absolute Dose for a ^{192}Ir HDR source Using a Fricke Dosimeter: Correction Factors for Several radii Using MC Calculation

Purpose: To determine the absolute dose at the reference point using measurement with Fricke dosimeter at various transverse bisector distances. **Method and Materials:** In a previous work we showed how the absolute dose from a ^{192}Ir source can be measured using a Fricke dosimeter. Ring shaped fricke volume of 1 mm width and 3 mm height was used to determine the absolute dose. AlphaOmega HDR ^{192}Ir source was located at the center of the ring which was 1 cm away from the source, the uncertainty at this point was too high ($k=7\%$). In another second study we demonstrated that there is a size detector dependence and source positioning uncertainty when doing the measurement. We did dose profile measurements along and away from a ^{192}Ir source using four different detectors (two ionization chambers and two diodes). We showed that the detector size effect goes from 1.3% at 1 cm to 0.2% at 2.5 cm. Therefore PENELOPE Monte Carlo simulations for several radii have been used to determine conversion factors to the reference point. **Results:** We show in this work that the absorbed dose at various distances away from the source does not have an inverse square law behavior. Therefore, factors have been determined to convert the dose at measured point to the dose at the reference point recommended by AAPM TG-43. These conversion factors are 4.454, 7.609, 11.288 and 16.003 for the distances 1.5, 2.0, 2.5, and 3.0 cm respectively. **Conclusion:** Feasibility of determining the absorbed dose using a Fricke dosimeter at the reference point (1 cm distance) was demonstrated in a previous work, however the uncertainty was too high (7%). Measurement at distances greater than 1 cm was demonstrated to lower the uncertainty. PENELOPE MC code was used to obtain the conversion factors at various radii to the reference point.