

AbstractID: 2952 Title: Surface Dose Determination with an Interpolation-Extrapolation Method Using EDR2 Films

Purpose: Kodak EDR2 films have been used for surface dose measurements in radiotherapy. However, with the conventional method, the difference of surface percent doses measured with the film and with chamber could be as high as 5%. In this study, a double extrapolation method was used to correct for the overdose response due to the wrapping papers and film itself so that the surface dose can be accurately determined.

Method and Materials: In the surface dose measurements, multiple EDR2 films were stacked together and placed on the surface of a 30 cm x 30 cm solid water phantom. Efforts were made to ensure the placement was as air tight as possible. Radiation was delivered, and the doses on the films were measured. Two curves were generated from the measured doses. One is the percent-depth-dose curve for the films, the other is the percent-depth-dose curve for the wrapping paper, where the later curve was interpolated from the film curve. The surface percent dose was derived by extrapolating the paper curve to zero depth. The surface percent dose was also measured using a parallel plate chamber for comparison.

Results: This method has been applied to the surface dose measurements for various open fields, oblique fields and IMRT fields. It was found that at zero degree gantry angle the surface percent doses measured using this method were in agreement with the chamber measurements to within 2% for both 6 MV and 23 MV photon beams at all the field sizes for conventional and IMRT beams; the agreement was within 3% at gantry angles other than zero degree.

Conclusions: An interpolation-extrapolation method has been developed to measure the surface doses using EDR2 films. The accuracy of the method is comparable to that of a parallel plate ion chamber for both conventional and IMRT beams.