

AbstractID: 9186 Title: A feasibility study of HDR source strength verification with EDR2 and X-V films

Purpose: The use of well type NIST calibrated ion chamber to verify HDR source strength before daily treatments has been well established in most clinics. However, generally there is no alternative means in most medical facilities to carry out source strength check in case the ion chamber fails to function. X-V and EDR2 films (Eastman Kodak, Rochester, NY) have become a popular choice for performing external beam QAs. But the feasibility of using these convenient means for HDR source measurement has not been fully explored. The purpose of this study is to verify both the energy dependence and feasibility of using films for HDR source strength measurements.

Method and Materials: The calibration curves respectively for X-V and EDR2 films with the same batches of films and similar film processor condition were obtained by exposing films in solid water phantom by linac 6X beams. The monitor units required for delivering certain amount dose to the film locations by linac 6X beam were calculated by Eclipse. A list of build-ups ranging from 1.2 to 3.9 cm and a series of HDR source dwelling time from 19 second to 274 seconds were used. The doses received by films were then obtained by applying corresponding calibration curves. A TG43U1 formula was used to derive the source strength. The ion-chamber measured source strength was used to compare the film measurements.

Results: Our results showed that the X-V films are capable of measuring the source strength within the uncertainty of 8%. But the EDR2 film is not able to make good reproducibility if use the calibration curve of linac 6X beam.

Conclusion: The X-V films showed less energy dependent than the EDR2 films and are more capable to predict the HDR source strength. Therefore, X-V film could serve as a rough alternative for source strength check.