

AbstractID: 1408 Title: Relative Dosimetric Measurements of the Novoste Beta-Cath ⁹⁰Sr/Y and Cordis Checkmate ¹⁹²Ir source trains using a thermoluminescent sheet

Two dimensional dosimetric characterization measurements were performed on the Novoste Beta-Cath ⁹⁰Sr/Y β -emitter source trains and the Cordis Checkmate ¹⁹²Ir source trains using a 5 cm wide and highly sensitive thermoluminescent (TL) sheet film. The TL films of various sizes are made of teflon homogeneously mixed with small powders of thermoluminescent material (BaSO₄: Eu doped). The special properties of the TL sheet, including high spatial resolution (0.5 mm) and a wide dynamic range with a linear dose response, make it suitable for the dosimetric measurements at the sub-millimeter distances for the intravascular brachytherapy (IVB) source trains which produce very steep dose gradients in the near field. Measurements were performed in a Solid Water™ phantom. Two dimensional dose distributions were acquired for the 30, 40 and 60 mm Beta-Cath ⁹⁰Sr/Y source trains, and for the 39 and 55 mm Cordis CheckMate ¹⁹²Ir source trains. Various relative dosimetric parameters were derived for the four source trains following the recommendations and formalism of AAPM TG-60m for radial distances up to 15 mm. The dose values relative to that at 2 mm are in reasonable agreement with published data from previous studies (e.g. measured by using Gafchromic film). The results indicate that the TL sheet is of potential use in high resolution, 2-D relative dosimetric measurements of various IVB beta and photon emitter sources in the sub-millimeter distances. This method offers the advantages of a higher sensitivity and a wider dynamic range over radiochromic film.