

Measurement of filtered PDD for higher energy photon beams

Electron contamination corrections are necessary when the Percentage Depth Dose (PDD) (@ 10cm depth in water, 10x10cm² field, SSD= 100 cm) is used as the beam quality indicator for photon energies higher than 10MV.

Published results indicate that a 0.1 cm lead sheet placed immediately below the accelerator head can be used to obtain a filtered PDD (PDDF). The measured PDDF (10cm depth in water, 10x10cm² field, SSD= 100 cm) is used to calculate the electron contamination correction factor (ECCF). PDDF were measured for energies ≥ 10 MV for several models of linear accelerator. Scanners were used for data acquisition. Different thicknesses of lead foil (0.015" thick) and a lead vinyl sheet (1mm lead eq., 1/8" thick) were used as filter materials. The effect on PDDF of the position of the filter in the beam was evaluated. Measured PDDF at 10 cm were within .5% (18 MV) and .7% (15 MV) for lead thicknesses between .4mm and 1.6 mm. For 18 MV the measured PDDF at 10 cm were within .5% when the lead filters were placed at 46 cm and 62 cm from the source respectively. Commercially available lead foil or lead Vinyl sheets can be taped immediately below the head or the tray of an accelerator to measure the PDDF value used to calculate the ECCF.