AbstractID: 2121 Title: Could MOSFET detectors substitute TLD dosimeter as a remote monitoring device of megavoltage beams output?

The response of thermoluminescence dosimeters (TLD), and Metal-Oxide-Silicon Field-Effect Transistors (MOSFET) dosimeters were evaluated under four different irradiation conditions: in air using acrylic and Solid Water™ (SW) mini-phantoms with identical geometrical dimensions, under full scatter conditions using a water phantom, and with a special cubic-shaped water phantom. The dosimeters were irradiated at the depth of maximum ionization with ^{60}Co , 6 and 18 MV photon beams, and 6 to 20 MeV electron beams from a Clinac 2100CD. Both detectors were calibrated in a ^{60}Co beam using the AAPM TG-51 protocol. MOSFET dose-calibration factors were obtained for each individual detector. The average MOSFET calibration factor for photon beams showed an energy dependence of about 2% with respect to ^{60}Co. The MOSFET energy dependence for electron beams was 4% for 9 and 12 MeV electron beams with no dependence at the higher energies. The electron energy dependence was the same for measurements in SW and acrylic to within 3%. MOSFET measurements made in SW and acrylic materials irradiated with a ^{60}Co beam agreed to within 2%. The electron beam dose to TLD inside acrylic mini-phantoms compared to the dose to TLD inside SW blocks in the cube phantom were within 1%, and compared to TLD inside acrylic blocks in the cube phantom were within 3%. More specific results for all experiments performed will be presented.

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