

AbstractID: 9457 Title: Characterization of MOSFET dosimeters for applications in mammography dosimetry

Thompson Nielsen high-sensitivity MOSFET dosimeters in the TN-502 and TN-1002 series are evaluated for use across the mammography energy range (22-39 kVp). The dosimeters are utilized in conjunction with the Thompson Nielsen Patient Dose Verification System, model number TN-RD-15, which consists of a dosimeter reader and high sensitivity bias supplies, model number TN-RD-22. Sensitivity, defined as dosimeter response in mV per C kg⁻¹ exposure, is measured free in air with the bubble side of the dosimeter toward the x-ray field at a constant exposure. Sensitivities of approximately 4.7×10^4 mV per C kg⁻¹ (12 mV per R) and 1.0×10^5 mV per C kg⁻¹ (27 mV per R) are observed for different dosimeter models. The energy response is presented and is observed to vary with dosimeter model, generally increasing with tube potential through the mammography energy range. The angular response of the dosimeters shows up to a 35% decrease in response when exposed at orientations of approximately 140° and 210°. The MOSFET dosimeters are subsequently utilized to perform comparative dosimetry measurements in phantom studies simulating MLO and CC views to evaluate their capability for providing reliable dosimetry measurements for routine screening mammography examinations.

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