Development and Calibration of the Units for Dosimetry Monitoring System

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Abstract. This paper demonstrates the development of a simple measurement unit built on available and non-professional electronics. G-M tube in combination with programable microcontroller creates a hardware base, which in basic configuration can measure just the counts. To determine conversion factors, which transform measured values to dosimetry relevant quantities, it is necessary to go through the calibration process. Within this paper, calibration of the developed device is demonstrated based on the determination of the intrinsic efficiency. Theoretical value of impinging photons is define using an analytical model and Monte Carlo calculation for various distances from the source. Measurement with the developed device was carried out using two calibration sources, Co-60 and Cs-137. Determined conversion factors in combination with conversion coefficient from the ICRU-57 report were applied to measured data and compared to results from SCALE calculation. The obtained agreement was sufficient for this stage of the development. Proposed calibration methodology demonstrated its universality and applicability for following the development of a complex Dosimetry Monitoring System.