

**Purpose:** To develop a practical method for calculating expected diode readings for in-vivo dosimetry in electron beams.

**Methods and Materials:** Electron beams of 6, 8, 10, 12, and 15 MeV from an Elekta SL 25 series linac, using 100 and 110 cm SSD, were investigated. Several circular cut-outs with diameter ranging from 2.3 to 6.0 cm were constructed for the 6x6 cm<sup>2</sup> cone and from 4.1 to 8.5 cm for the 10x10 cm<sup>2</sup> cone. Cut-out factors were measured for each energy and SSD, using an ion chamber placed at dmax. Similar measurements were also made using a previously calibrated diode placed on the surface of the phantom. A diode cut-out factor was obtained from these measurements. For each cone and SSD, graphs of cut-out factors and of diode cut-out factors vs. cut-out diameter were constructed. The points were connected by a smooth line, such that we could relate the cut-out factors as a function of the cut-out diameter, and the results were compiled in the form of tables for ease of use. Output factors were measured for all available cones, all energies, and different SSDs using the ion chamber. Corresponding diode output factors were also measured, and tables of output factors and diode output factors were constructed.

The following formula was used to calculate expected diode readings when using electron beams:

$$DiodeRdg = \frac{Dose * Diode Output Factor * Diode Cut - Out Factor}{Output Factor * Cut - Out Factor}$$

**Results:** The method was validated by calculating expected diode readings for several different doses, cut-outs, energies, and SSDs, and comparing to measured values. Agreement between calculated and measured readings was better than 1.3%.

**Conclusions:** This work presents a practical method to calculate expected diode readings for electron beams, based on a few measurements performed with electron cut-outs of different diameters, and the presentation of the results in the form of tables.