

Purpose: To compare electron cutout factor (COF) measurements with various dosimeters of different geometries.

Method and Materials: The COFs for various electron fields were measured on a Varian-2300EX linear accelerator at 6, 9, 12, 16 and 20 MeV. A thimble ion chamber, plane parallel chamber, thermoluminescent dosimeters (TLDs), EDR film, Xomat-V (XV) film, Gafchromic film and Thomson-Nielsen MOSFETs were used to measure COFs. Each detector was placed along the beam's central axis at 10.0 cm from the source. Measurements were made in solid water at d_{max} for 6x6, 10x10 and 20x20 cm size with circular cutouts. The thimble chamber was used as the standard to compare COF measurements. The raw measurements made with the two chambers and the diodes were used to determine the COFs. Films were analyzed with RIT software and TLDs were read the next day to determine COFs.

Results: Measurements for the 10x10 and 20x20 cm sizes agreed within 3.5% between all the dosimeters and the thimble chamber. Measurements made for the 6x6 cm size cutout were more than 3.5% from those made with the thimble chamber. There was better agreement for COF measurements between the MOSFETs, TLDs, EDR film and XV film.

Conclusions: This study takes a look at the various dosimeters available at the clinic that can be used to determine electron cutout factors. For most cutout sizes, ionization chambers, MOSFETs, TLDs, EDR, XV and Gafchromic film can be used to measure the COFs for all electron energies. For small field sizes, the use of TLDs, MOSFETs, and film can give more accurate COFs.