

AbstractID: 11848 Title: Use of GAFCHROMIC® EBT film for in-water measurements of surface dose of build up region, and other dosimetric parameters using 6, 9, 12, 16, and 20 MeV electron beams.

**Purpose:** Use of GAFCHROMIC® EBT film for in-water measurements of surface dose of build up region, and other dosimetric parameters of 6, 9, 12, 16, and 20 MeV electron beams.

**Materials and Methods:** PDD measurements were acquired using a radiation field analyzer and a parallel-plate ionization chamber. Linear interpolation and the fit-generated data were used to estimate depths of 100%, 90%, 85%, 80%, 50% dose, surface dose, percent dose due to bremsstrahlung, practical range, and Rq. The normalized dose gradient, mean energy at the surface, and most probable energy at the surface were also calculated. A single energy value at the surface was also calculated. EBT film was cut in rectangular strips each measuring 2.54 x 7.0 cm<sup>2</sup> or 2.54 x 12.0 cm<sup>2</sup> and placed in a water phantom, parallel to the beam, with the upper edge flush to the water level, and exposed to 150 MU. The beam central-axis crosshairs were carefully aligned and centered on the film's edge. The electron beam energies used were 6, 9, 12, 16, and 20 MeV with electron cones of 6 x 6, 10 x 10, 15 x 15, 20 x 20, and 25 x 25 cm<sup>2</sup>. The SSD was 100 cm and a dose rate of 600 MU/min. The films were immersed in water for no more than 3-5 minutes and were carefully dried after exposure. The films were protected from excessive ambient light or adverse environmental conditions before and after exposure. The EBT films were scanned after at least 12 hours post-exposure.

**Results:** The EBT film measurements in water, for all electron beam dosimetric parameters investigated, were in agreement with the ionization chamber results.

**Conclusion:** Using a simple set up, EBT film can be used, in water, to perform accurate PDD measurements of electron beams with high resolution