

**Purpose:**The aim of this study is to determine the optimal backscatter thickness and later phantom dimension beyond the field size on the dosimetry verification with radiographic film when irradiating large volumes.

**Methods:**The experiments were conducted for 6 and 18 MV 20 x 20 cm<sup>2</sup> field sizes with XV2 and EDR2 films positioned at 10 cm depth inside (30 x 30 cm<sup>2</sup>) polystyrene and Virtual Water™ phantoms by varying the phantom backscattered thickness and changing the table height accordingly. A constant 100 cGy dose was delivered to EDR2 film for 6 and 18 MV by adapting the MU setting. A Farmer-type ionization chamber was inserted centrally in a dedicated slab so that chamber position was kept at the same depth as the film. A laterally increased phantom studies were done by symmetrically increasing the lateral dimension in the gun-target direction of the linear accelerator.

**Results:**For 6 MV beam at 20 cm backscatter thickness, EDR2 film response in polystyrene is 20% higher than in Virtual Water™ phantom. Approximately the same difference exists between the XV2 results.

The results show 11.4% and 6.4% over-response of the XV2 film when compared to the ion chamber for 6 MV 30 x 30 cm<sup>2</sup> and 10 x 10 cm<sup>2</sup> field sizes respectively when the backscatter phantom thickness is 5 cm. For the same setup, measurements with EDR2 films indicate 8.5% and 1.7% over-response.

The film response on later scattered phantom study show nearly firm within 5 cm of lateral thickness and it increases when lateral thickness increases due to more multiple scatter of low energy photons.

**Conclusions:**The backscattered phantom should not exceed more than 7cm for film accuracy. The lateral extension of the phantom should not be more than 5 cm from the field boundary in the case of large volumes.