

Purpose: This study was undertaken to study the effects of the jaws and MLC openings on the neutron flux and dosage.

Methods: Activation detectors constructed from natural Indium (In) were exposed with and without the Cd envelope to neutrons created in the head of a 15 MV therapy linear accelerator for the purpose of estimating thermal and epithermal neutron fluences at the patient plane. All measurements were performed using openings for the jaws which defined various field sizes up to 40 cm x 40 cm. The neutron dose was measured at the maze entrance door of a therapy room.

Results: Our studies determined that the epithermal neutron flux as measured using different jaws openings can differ by approximately 10%, the dose at the door is highest when the jaws are closed, and the maximal jaws opening reduces the dosage about 20%. When an MLC is inserted into a fixed geometry for the one opening of the jaws, the epithermal neutron flux can increase by up to 10%, while the neutron dose at the maze entrance door increases by approximately 6%.

Conclusions: As expected, the epithermal neutron flux, as well as dosage measured at the maze door is lowest when the largest width is used for the jaw and MLC opening. The range of changes of flux and dose is determined for several different field geometries.