

Dosimetric characteristics for multileaf collimators from three different manufacturers (Elekta, Siemens, Varian) are compared for a 6 MV photon beam. Measurement and analysis techniques were controlled to be exactly the same, and the most current model MLC was used in each case. Two collimators had rounded leaf ends (E&V), and one MLC (S) had flat ends that followed beam divergence. Film was used for all measurements, and a scanning densitometer with a 0.45 mm spot and 0.5 mm step size was used for analysis. The measurements included: 1) penumbra profiles for different positions of a leaf relative to beam center, 3) leaf transmission and between-leaf leakage, and 4) isodose curves representing dose undulation for maximum leaf stepping. Results showed that a flat leaf end reduces the penumbra width compared to a rounded end design. However, the distance of the MLC from the x-ray target also played an important role, and one of the systems with rounded ends (V) gave the smallest 80 to 20% penumbra width for leaves at the field midline (4.5 mm). The flat leaf design with the MLC positioned closer to the target produced a slightly larger width (5 mm), and the rounded end design at approximately the same distance gave the largest width (6.5 mm). The source-to-collimator distance was also important in determining the dose pattern at a stepped field edge. The MLC furthest from the target showed pronounced undulation while the other two systems showed blurring of the pattern. This report eliminates the confusion that can result when measurements available from different sources are used to compare MLC systems.