

Despite extensive literature devoted to MLC dosimetry, uncertainty persists among clinicians as to the dosimetric consequences of MLC usage in specific treatment situations. This is compounded by differences in multi-leaf collimator design. We performed measurements to compare the dosimetric properties of two MLC designs: a "single-focused" MLC (SF-MLC) mounted below the jaws, and a "double-focused" MLC (DF-MLC) which is a complete replacement for the lower jaws. The ability of each MLC to conform isodose lines to a prescribed field edge (PFE) was evaluated using film dosimetry. Circular fields, centered on-axis and off-axis, were used because they produce a range of "angles of approach" between the MLC leaves and the PFE. They also have the advantage that for an ideal field shaping system the resulting isodoses are concentric perfect circles, a well defined basis for evaluation. The amplitude of the oscillations of the 50% isodose line about the PFE and the penumbra width as determined by the 20%, 80% and 90% isodose lines were examined. We observe that the 50% isodose line oscillates around the PFE with a greater amplitude for SF-MLC. We attribute this, at least in part, to the rounded ends of the SF-MLC leaves. However, the SF-MLC has a noticeably sharper penumbra, which we attribute to its position further from the source. We conclude that these results are relevant for accurate dosimetric modeling of these devices, and guidelines for treatment planning are device dependent.