

### **Dependence of Wedge Factors on Source-to-Wedge Distance.**

The current volume of data demonstrates a large variation in the field size dependence of wedge factors. Heukelom et al.,<sup>1</sup> developed a general equation which predicted the field size dependence within a few percent for a variety of accelerators equipped with internal wedges. However, recent reports<sup>2,3</sup> indicate that the Heukelom equation fails for wedges placed beyond the collimating jaws.

The intention of this paper is to develop a consistent approach to determine the field size dependence of external wedge factors as a function of source-to-wedge distance (SWD). Measurements have been made at 5 cm depth as a function of field size and SWD for 4-, 6- and 18-MV photon beams. Wedge factors were taken at a depth of 5cm with conventional physical wedges placed on a specially constructed adjustable support assembly. SWDs were varied from 50-90% of the nominal SAD. Readings were also taken as a function of wedge angle and material. Additional data were obtained at extended SSDs to simulate typical internal wedge geometries.

Measured data showed deviation from the Heukelom approach. Better agreement was obtained using an inverse square correction<sup>2</sup> to account for changes in SWD. Quantitative comparisons are made with wedge factor predictions based on different scattering coefficients.

<sup>1</sup>Heukelom et al., *Radiother. Oncol.* 30: 66-73, 1994.

<sup>2</sup>Thomas, S.J., *Radiother. Oncol.* 32: 271-273, 1994.

<sup>3</sup>Cozzi, A.F. et al., *Radiother. Oncol.* 39: 31-34, 1996.