Accurate dose and monitor unit calculations for intensity modulation with multileaf collimators require consideration of the head scatter component. Through experiments, analytical calculations and Monte Carlo simulations several authors have pointed out that the flattening filter acts as an extended source for which the contribution depends on how large portion of the flattening filter that is visible through the collimating aperture. A common approximation is to model the aperture as thin, i.e. assuming all collimating elements to be located in the same plane and not considering the sides of the collimators as blocking. The thin aperture approach enables use of simple convolution algorithms for integration over the visible part of the extended source. A more rigid approach models the collimators as a thick aperture including the effects of finite collimators with blocking sides. This requires that all collimating elements must be considered as 3D space-filling objects which in general is a very CPU time consuming task using standard raytracing techniques. We have instead developed a faster approach using a polygon delineation technique based on an effective grouping of projected collimator edges. Different collimating situations are compared to identify the importance of full thick aperture calculations. It is shown that simple rectangular fields can be treated as a combination of thin aperture convolutions while more complex fields require a thick aperture treatment.