



Did you know....

A 6mm labelled IOL can have as little as 4.8mm of usable optic.

Lenstec manufactures one of the largest usable optic IOLs available today. Due to the demands for micro-incision, companies have had to come up with inventive ways to reduce the centre thickness of the optic, as this is the controlling factor for what will pass through an injector tip.

The optic size that is labelled for an IOL is the whole lens diameter and NOT the optic power curvature also known as usable optic! A lens can be labelled as 6mm, yet the optic can be as low as 4.8mm.

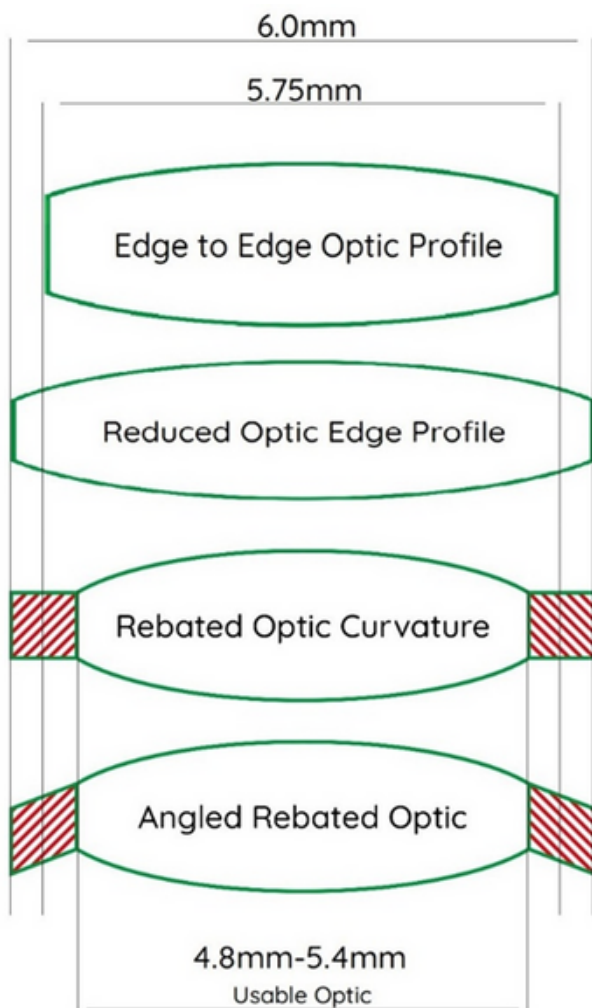
To decrease the centre optic thickness, IOL manufacturers use several options. The following graphic highlights these options: -

Edge to Edge Optic – This generally results in the largest incision size requirement due to the centre profile of the lens being thicker. The advantage is that the whole surface is usable optic.

Reduced Optic Edge – You can reduce the centre profile of the lens by reducing the edge thickness. This will now pass through a smaller injector tip; however, you will reduce torsional stability, especially in younger patients with more aggressive fibrosis.

Rebated Optic Curvature – This has the same effect to reduce the incision size and keep stability, you achieve this by starting the optic curvature further into the lens diameter and not at the extreme edge of the lens. Unfortunately, this means that you are losing usable optic area.

Angled Rebated Optic – Again this will allow you to pass the lens through a smaller tip by keeping the same edge profile but cutting down at an angle into the optic so that the curvature starts at a lower point and so reduces the centre thickness. As with the regular rebated optic edge you are sacrificing usable optic surface area.



The highlighted red hatching signifies non-usable optic.

To reduce incisions even further, lens manufacturers must make compromises to the optic design that vastly decrease the amount of optic that the patient can use. Also, patients that have particularly large pupils or drive in the dark where the pupil is naturally larger can have issues with edge glare and dysphotopsias.

What difference does this make to the usable optic

6mm Usable Optic Area = 28.27sqmm

5.75mm Usable Optic Area = 25.98sqmm
 = **8.1% loss of usable optic compared to 6mm**

4.8mm Usable Optic Area = 18.10sqmm
 = **30% loss of usable optic compared to 5.75mm**

Another technique to reduce center thickness and incision size, is to use materials with a very high refractive index associated with hydrophobic materials. By doing so you can use a less pronounced curve on the optic to achieve the required power. Unfortunately, this also has a well-documented negative effect that can cause a phenomenon called negative dysphotopsia. This results in the patient often noticing a dark crescent in their peripheral vision. (NOTE, need to reference the Jack Holladay paper on this)

Companies have strived for many years to reduce incision sizes and rightly so, considering in the late 1990's a lot of surgeons were using 6mm incisions with hard PMMA lenses. The advent of foldable lenses then brought this down to 3.5mm, at which point lens injectors and cartridges were introduced to reduce it below 3mm. The reduction of usable optic size and advances in cartridge technology have reduced incision sizes further to around 2mm in some cases.

By using the edge-to-edge optic profile, with current injector technology you can achieve safe implantation through 2.2mm to 2.5mm depending on incision style with the SoftecHD. Lenstec is of the belief that a larger usable optic is more important than the minimal gains from a 0.2mm smaller incision size. There is little or no peer reviewed clinical data that shows statistical advantages in these differentials.