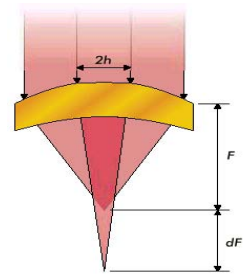


## Increase your productivity in laser cutting with BIFOCAL™

The principles of what are known as bifocal lenses is to place two focusing points along the same axis a few millimetres apart.

The first focusing point, obtained from the greater convergence angle, is positioned on the surface of the material. The second, obtained from the smaller convergence angle, is positioned on the underside of the material.

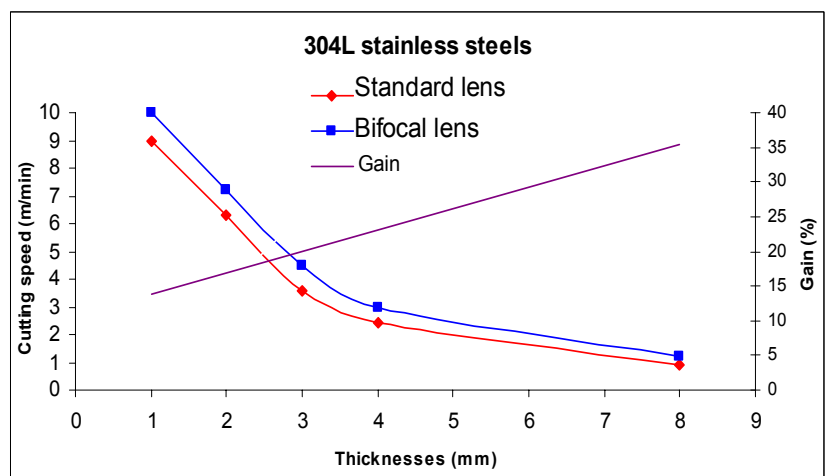


Compared with a conventional lens, a bifocal lens allows one of the two focusing points to be located on the underside of the work piece to be cut, so avoiding burrs, and the other point is located on the upper surface, giving sufficient energy on the surface to increase cutting speeds. This type of lens is therefore mainly suitable for cutting stainless steels and also aluminium alloys under high-pressure nitrogen. This type of lens offers the following advantages:

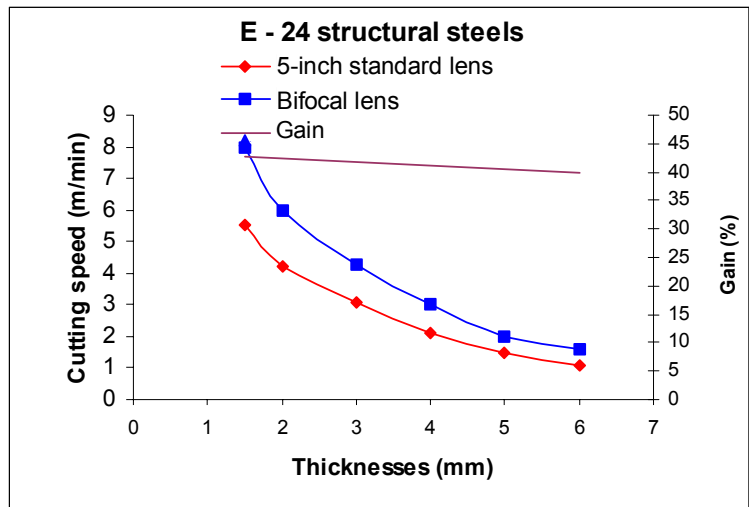
- Greater cutting thicknesses,
- Higher cutting speeds,
- Optimisation of assisting gas consumption levels,
- Improved striking.

Example of applications :

Tests on **stainless steels** showed an increase in cutting speeds as well as an increase in cutting thicknesses for identical power levels.



The cutting of **carbon steels** under oxygen leads to the formation of oxides on the cutting face and these oxides reduce the adherence of paint. For this reason, either parts must be finished before being painted, or cutting must be performed under nitrogen. The second solution is unfavourable in terms of the cost price of the part (low cutting speed and higher nitrogen consumption).



Although this lens is recommended for stainless steels and aluminium alloys, tests conducted on carbon steels at our research centre show interesting increases in cutting speeds. In certain cases, these increases can give favourable economic results compared with cutting under oxygen followed by finishing.

This type of lens can be adapted for use with any machine in place of a conventional lens, but it must be optimised for each type of laser machine. This optimisation is achieved by allowing for the local energy distribution in the beam (mode), which is both necessary and essential in order to calculate the lens geometry.

### **BIFOCAL™** Service:

On the basis of experience acquired during tests conducted at our research centre, Air Liquide is able to offer you an innovative service defining :

- The most suitable lens geometry,
- New cutting parameters,
- Integration of this new technique in your applications with your operators.
- Supplying of lenses with a cleaning kit.