Next Generation Ultra-Lenses – The Future is Bright!

Laser power absorbed by a cutting lens remains a critical factor in high power laser sheet metal cutting systems for achieving good and consistent cut quality, long term process control and tool throughput. For high power laser systems, thermal distortion of a lens impairs its ability to maintain stable focus and, hence, optimum cut quality. It is essential to use the best precision lenses with the lowest initial absorption for handling multi-kilowatts of power to maintain consistent performance. LOM's proven Ultra-Lens technology offers a next generation of ultra low absorption technology to meet growing demands of laser sheet metal cutting up to 6kW. With greater than 50% improvement in initial absorption compared with standard OEM lenses, the technical benefits are significant enough that an increasing number of laser system manufacturers only recommend ultra low absorption (ULA) lenses for their laser cutting machines. LOM's Ultra-Lenses ship factory-direct and provide the only cost effective solution for today's high power sheet metal cutting. *Contact Max Purohit at LOM for further information.*

Ultra-Lens Benefits:

- Greater than 25% improvement in lens life has been reported by many customers over standard OEM lenses improving laser up-time, productivity and reducing cost of operating the lasers.
- Improvement to focus stability from low thermal distortion of the laser beam between piercing (cold lens) and normal cutting (warm lens) operations. A stable dynamic focus spot helps to reduce backspatter, promotes faster feed rates, improves cut quality and process control. Figure 1 illustrates the differences between ultra-lenses with absorption of 0.15%, standard lenses with absorption of 0.30% and slightly degraded lenses with absorption of 0.50%; the focal length shift (ΔF) is directly proportional to the lens absorption and laser power.
- Clear coatings (not black or cloudy) work with advanced plasma light detecting auto-focus systems; allow inspection of lenses with cross-polarizers unlike black or cloudy lenses.
- Ultra-lens prices are comparable with standard lenses - lower in many cases.
- Longer lens life has been reported for existing water cooled and air cooled lens housings for Amada FO-NT style lens mounts. Free express lens replacement service for various Amada lens mounts.

Ultra-Lenses Available For Most Laser Cutting Systems:

Type:	Plano-Convex, Meniscus
Lens Diameters:	1.5" and 2.0" +0 / -0.005"
Thickness:	0.25" to 0.380" +0/ -0.010"
Surface Quality:	40-20 or 20-10 scratch-dig
Absorption:	Absorption <0.15%, Typical ~0.10%
Broadband Spectrum:	Transmission > 99.0% at 10.6µm
Visible Light:	Transmits He-Ne beam
Custom Configuration:	OEM Quantities Available

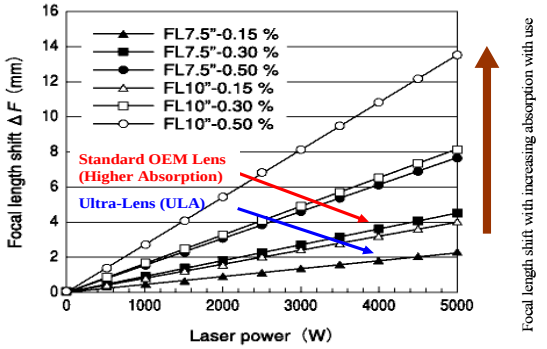

Fig. 1. Focus shift of ZnSe lenses by thermal lens effect

Ultra-Lens Care and Application Tips:

Focus: Ultra low absorption lenses generally give a slightly longer focal length than standard lenses. The change in focus position depends on the lens absorption and laser power. Re-optimization of the focus is recommended to compensate for the initial change in the focal length and focus stability of a new lens. Routine focus checks and optimization are also recommended to compensate for normal aging of the lens and other optical elements in the laser system. Other factor that can help reduce backspatter and enhance lens life: accurate focus adjustment; regular lens and optics care; adequate delay between gas-on and laser firing; cleanliness of the cutting gas, bellows and beam purge gas, nozzles centration / adjustment.

Lens Care: The light crystalline structure of the ultra-lens surface is very normal for this high performance ultra low absorption coating. Only use distilled research (HPLC) grade acetone or methanol (>99.9% pure) dispensed from a steel pump action bottle and clean lint-free lens wipes such as Techclean Absorbwipe for cleaning the lenses and other optics - both available form LOM.

General Note: Individual experiences will very depending on system optimization, materials processed, lens contamination and other factors. To get maximum benefit from the Ultra-Lens, please ensure that you are working with a well tuned laser and beam delivery system.

Laser Optics and Mechanisms

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Ultra-Lens Improvement & Initial Lens Setup Explained
Not to Scale