

# Radiance™ Optics

## Radiance™ High Energy Optics

The laser tube is the heart of your laser system, but a high quality laser tube is not the only technology involved in creating crisp, sharp engraved images. To enhance the natural characteristics of the CO<sub>2</sub> laser beam, Epilog has developed our **Radiance™** high energy optics system. These high energy optics, shape and refine the laser beam to create the best possible beam profile for engraving and cutting applications.

Included as a standard feature in all Mini 24 x 12, Helix, and Legend EXT lasers systems, Epilog's **Radiance** optical technology helps produce the sharpest images available in any CO<sub>2</sub> laser system today.

There are four significant advantages that Epilog's **Radiance** technology provides to our customers:

- 1) Rounder spot:** A spot that is more circular in shape means that the laser characteristics are the same in both the X and Y directions, providing a more crisp engraving.
- 2) More uniform spot over the entire table:** When a laser beam diverges, it changes size as it moves away from the laser tube. The size of the beam depends on how much the laser beam diverges and the size of the engraving table. The difference in beam size will have a significant affect on the image quality. Epilog's **Radiance** technology produces the most uniform spot size in the industry, even on our largest area of the 36" x 24" Legend 36EXT!
- 3) Smaller spot size:** A smaller spot means that you can produce finer detail in engraving and cutting applications. Just look at the detail on our samples. Epilog's **Radiance** technology makes this level of detail easy to achieve!
- 4) Higher power density:** When a laser beam is focused to a smaller size, its power density goes up because you've got the same amount of energy in a smaller area. This helps to produce a deeper, darker engraving than a beam from the same wattage tube that hasn't been optimized. And, when the power density goes up, it also enhances the laser's ability in vector cutting mode.

In order to understand good engraving, it's necessary to understand the importance of the laser beam and the optics it passes through from the time it leaves the laser tube until it reaches the work surface. There are three primary characteristics of any CO<sub>2</sub> laser beam that contribute to image quality: **Shape, Divergence, and Size.**



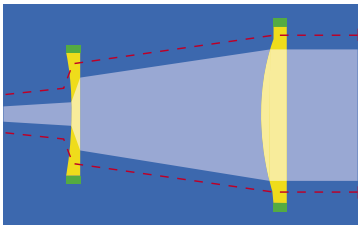
**Shape:** The shape of the laser beam is very important. If a beam is not round, you will see different engraving characteristics in the x-axis than in the y-axis. Epilog's **Radiance** technology incorporates optics that shape the beam to achieve the most circular spot possible, providing you with the sharpest and cleanest engraving possible.

**Divergence:** As the beam gets further from the laser tube, the beam spreads, eventually losing its laser properties. **Radiance** technology straightens the diverging beam and stops it from spreading out. This has the effect of producing a beam that maintains a uniform shape over long distances; even over our full 36" x 24" engraving table.

**Size:** As the laser beam diverges, the diameter of the beam grows, affecting the properties of the laser beam. A laser beam that has been expanded slightly before it goes through the focus lens actually produces a smaller, sharper spot size, after it's focused. By using our **Radiance** optics to expand the beam to the ideal diameter before focusing, we are able to produce a spot that is optimized for the best laser engraving possible.

## The Path of the Laser Beam

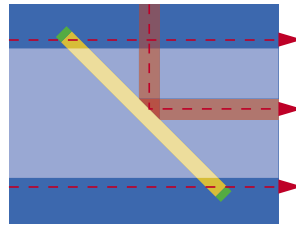
### 1. Beam Expander/Collimator



After the beam leaves the tube it passes through a set of two optical components that straighten and expand the beam. This set of optics dramatically reduces beam divergence and produces a beam that maintains its size and straightness for much longer distances, which in turn, produces a much more uniform beam over the entire work area.

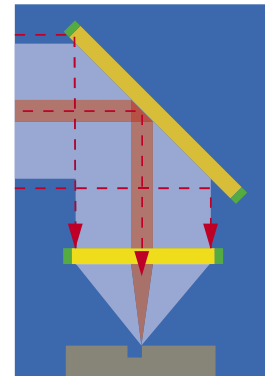
Start

### 2. Beam Combiner



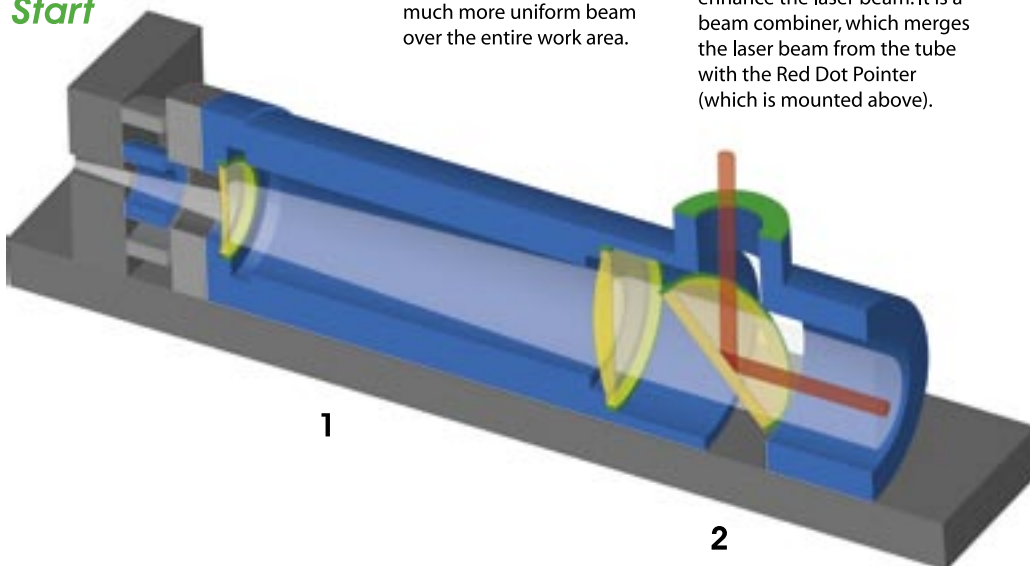
This optic is not used to enhance the laser beam. It is a beam combiner, which merges the laser beam from the tube with the Red Dot Pointer (which is mounted above).

### 3. Beam Focusing Optics



The last and final step to Epilog's enhanced Radiance optics is the focusing of the laser beam to a tiny circular point of engraving.

Finish



At this point the enhanced laser beam will travel to the focus lens where it is focused to a small spot size.



Specifications Subject to Change Without Notice. Features Subject to Availability.