



Fiber Laser vs. CO₂ Laser for Cutting Metal

As fiber laser technology emerges into the metal cutting industry, more shop owners and customers may be asking: What's the difference between fiber laser and CO₂ laser technology? Is one better than the other for cutting metal? Basically, they each have their own advantages – but also significant differences that make it worthwhile to consider which is best for your application.

CO₂ lasers have been widely used by metal cutting shops for decades, and have been greatly improved upon in the past few years. Fiber lasers have been used in other industries for years, but fiber is a more recent development for sheet metal cutting applications in job shops.

Fiber lasers use a fiber cable to deliver a laser beam, whereas CO₂ systems operate with mirrors. The beam of a fiber laser is typically half the size of a CO₂ system laser beam and can create a cutting kerf as small as .004".

The primary differences between fiber and CO₂ laser systems focus on several areas:

Metal Thickness

- Fiber cuts thinner materials, particularly stainless steel, faster than CO₂ laser – mainly, materials 0.25" and thinner.
- CO₂ laser typically cuts thicker metals (0.25" and thicker) faster and more accurately than most fiber lasers can, producing a better cut quality for those parts.
- An "evening out" point between the two laser options can be considered at approximately 0.375".
- With a vast majority of cutting applications in sheet cutting now using materials under 0.25" thick, it's worth considering using fiber laser cutting services.

Speed/Throughput

- Fiber laser cuts stainless steel approximately three times faster than CO₂ systems. For example, using fiber to cut 12 or 16 gauge stainless steel offers significant time and cost savings because of its high speed cutting capabilities.
- Fiber laser creates less downtime than CO₂ systems, especially important for high-volume production runs on appropriate parts.

Cut Quality/Accuracy

- On thinner materials, fiber laser delivers a superior cut quality than CO₂, but CO₂ typically produces cleaner-cut parts from thicker materials.
- General tolerances of +/- .005" are easily held in materials .250" or thinner. Tighter tolerances can be achieved but may require more testing and setup time.



Flexibility & Cost-Saving Potential

- Fiber laser can cut brass and copper, but CO₂ can't.
- Fiber laser can cleanly cut small, intricate parts or larger parts up to 10 feet long.
- With our automated sheet loading system we can run minimally attended or even lights out to save on labor costs.
- With fiber laser, flat blank prototypes can be created fast, without any tooling costs. We also have the ability to bend and form prototypes and production parts in our brake presses or metal stamping presses.
- Fiber systems typically have lower operating and maintenance costs than CO₂ systems and require less down time.
- With on-site fiber laser services, additional cost savings can be realized by starting with a part print and carrying through to the finished part, all in one facility. We can handle your project from prototype all the way through production.

For gas-assisted laser cutting, nitrogen cutting typically produces the cleanest parts – ideal for edges that will be visible or will be welded on. Oxygen cutting is typically the fastest and ideal for parts that will be painted, hidden, or won't require a perfectly smooth surface for welding.

(As a side note, Electric Discharge Machining (EDM), or wire cutting, is a different process altogether than CO₂ or fiber laser. We can hold tolerances of +/- .00005" using our wire EDM machines.)

Ultimately, the best cutting method for a given part depends on your needs for part quality and cost per part. Wisconsin Metal Parts has chosen to add fiber laser along with our existing wire EDM, machining, punching and assembly capabilities so we can offer our customers the best value by processing their parts all within one facility.