

# WHAT IS THE DIFFERENCE BETWEEN CO2 LASER CUTTING MACHINE AND FIBER LASER CUTTING MACHINE?

Posted on 2023-08-24 by redsail



Category: [Laser Cutter News](#)



First of all, as the mainstream traditional laser cutting and welding equipment, CO2 lasers are used, which can stably cut carbon steel within 20mm, stainless steel within 10mm, and aluminum alloy within 8mm. Fiber lasers have obvious advantages in cutting thin plates within 4mm, but the quality of cutting thick plates is poor due to the wavelength of solid-state lasers. [Laser cutting machines](#) are not omnipotent either. The wavelength of CO2 lasers is 10.6um, while that of solid-state lasers such as YAG or fiber lasers is 1.06um. The former is easier to be absorbed by non-metals and can cut wood, acrylic, PP, organic glass with high quality And other non-metallic materials, the latter is not easy to be absorbed by non-metal, so it can't cut non-metallic materials, but the two kinds of lasers are helpless when encountering high-reflective materials such as copper, silver, and pure aluminum.

Secondly, because the wavelengths of CO2 and fiber lasers differ by an order of magnitude, the former cannot be transmitted by optical fibers, while the latter can be transmitted by optical fibers, which greatly increases the flexibility of processing. In the early days before the launch of fiber lasers on the market, in order to achieve three-dimensional processing, we used optical joint technology to guide the CO2 laser to the three-dimensional curved surface through a highly precise and dynamic combined mirror system to achieve three-dimensional processing of the CO2 laser. The limitation of precision processing technology is mainly in the hands of a very small number of ODA countries. It is expensive and requires high maintenance. While the market share of fiber laser is gradually expanding, it has gradually lost its market. Fiber laser can be transmitted through optical fiber, and its flexibility is unprecedentedly improved. Especially for the automotive industry, since it basically processes thin plate surfaces of about 1mm, fiber laser is combined with the same flexible robot system, which has low cost and few failure points. , easy to maintain, and extremely fast, it has firmly occupied this market without hesitation.

Again, the photoelectric conversion rate of fiber laser is as high as 25%, while the photoelectric conversion rate of CO2 laser is only about 10%. The advantages of fiber laser are quite obvious in terms of electricity consumption and supporting cooling system. If there are more manufacturers of fiber laser , the price is more appropriate, and the thick plate cutting process is solved, the threat to the CO2 laser will be huge. However, as an emerging laser technology, fiber laser is far less popular than CO2 laser. Its stability and reliability and the convenience of after-sales service still need to be observed by the market for a long time.

It is worth mentioning that according to international safety standards, laser hazards are divided into 4 levels. CO2 lasers belong to the least harmful level, while fiber lasers are the most harmful level due to their short wavelength and great damage to the human body and eyes. For safety reasons, fiber laser processing requires a fully enclosed environment.