

Metal cutting Lasers

A basic understanding of laser applications, requirements, characteristics of gases, and equipment can go a long way to help gain knowledge of this rapidly growing specialized market.

CO² (Carbon dioxide) lasers used for cutting ferrous and nonferrous materials have distinct gas requirements.

Within the tube: *Beam generation gases*, generally mixtures of helium, nitrogen, and carbon dioxide stimulated electrically to emit radiation in the form of light (the laser beam).

Assist gas. This gas acts to remove material melted by the laser. It is usually oxygen or nitrogen, but for exotic metals, it can be argon or even helium.

Metal cutting is achieved by melting, and the molten material is removed by using an assist gas such as Oxygen or Nitrogen. When Oxygen assist gas is used, exothermal reaction takes place during the formation of FeO (Ferrous Oxide) and other oxides to generate extremely high temperatures.

To cut metal, the focused laser beam exits through the bottom of a cutting head nozzle. Oxygen under pressure is fed into the side of the chamber below the focusing lens. This gas exits the nozzle along with the beam, raising the temperature significantly, and the laser beam/oxygen combination serves to vaporize the steel for cutting.

When purchasing a Metal cutting laser, you will need to either purchase an Oxygen cylinder (normally a smaller cylinder) or rent (on a monthly basis) a large cylinder. This is your Assist gas for metal cutting. There are many gas suppliers who can assist.

The laser also comes with an air assist pump for cutting of other substrates - and engraving.

When renting, the cylinder usually comes with a regulator and pressure gauges, but when buying outright you will have to add the price of a set of multistage Oxygen gauges to your purchase - around R1300. The regulator must be able to deliver between 7 and 8 Bar (+/- 105 to 115 PSI) continuously.

Also, when renting, the gas supplier will normally install and test the Oxygen setup at no cost. All metal cutting lasers supplied by Perfect Laser come standard with a set of water traps and debris filters attached to the machine, so there is no need to purchase these separately.

