

Assist Gas System

CONCOA process gas systems enhance the performance of lasers used in cutting, welding, cladding, and marking applications. The type of gas will vary according to the process material. To achieve the best performance, the process gas must be delivered instantaneously and precisely at the specified pressures and flows. For bulk installations, CONCOA's 623 is the ideal choice for quick response and balance stem seat that delivers flow rates in excess of 15,000 cfm. CONCOA's next generation 622 unibody dome-loaded regulator is the right choice for liquid cylinders, high-pressure twelve-packs, or as a point-of-use regulator. For continuous operation, an adequate supply of gas must be available at all times.

When cutting mild steel, an oxygen assist gas can be used; the oxygen creates an exothermic chemical reaction with the material that provides up to 30% of the heat input, thereby requiring minimal pressures and flows. CONCOA's 600 Series Automatic Switchovers are the ideal choice for high pressure bundles or liquid sources where a continuous supply is necessary to maintain production. Higher powered CO₂ lasers (4-6 kW) may obtain greater cutting speeds with high-pressure nitrogen on thin gauge material. Nitrogen will also produce an oxide-free cut that is advantageous if the material cut is to be painted or powder-coated.

Stainless steel typically is processed with high-pressure nitrogen, but air may be used if moisture and oil levels are minimized. Nitrogen pressure and flow levels are much higher than those of oxygen. Pressures as high as 390 PSIG and flows of 5,300 cubic feet per hour may be required at the nozzle.

Materials such as titanium should not be cut with either oxygen or nitrogen. Oxygen will "burn" the cut edge while nitrogen will leave nitrides in the material. The use of either argon or helium is recommended; the proper selections of the assist gas depend on material thickness and the power of the laser. Argon must be free of any oxygen; therefore, the supply in cryogenic form is suggested. Helium also must be free of oxygen; a certificate of purity levels for either gas should be supplied.

The 603 incorporates a stainless steel diaphragm and boasts a helium leak rate of 1×10^{-8} scc/sec, both of which make it the ideal choice for bulk and microbulk argon assist applications. The 605 encompasses the same features as the 603, but is designed to work with liquid cylinders or high-pressure twelve-packs.

