



High-performance dry air is definitely a process that any aluminum fabricator would want to add to their shop.

## 2) WHAT KIND OF GAS IS BEST FOR CERTAIN MATERIALS OR THICKNESSES? WHY?

The power level really controls which gases can be used with different material types.

**ALUMINUM:** Compressed dry air is by far the best way to go with aluminum. With virtually dross-free cuts and smooth edges up to 3/8" at 3kW and 1" at 8kW and higher, the low cost and speed of operation is hard to beat. Nitrogen can also be used with aluminum, but results in more dross at a higher

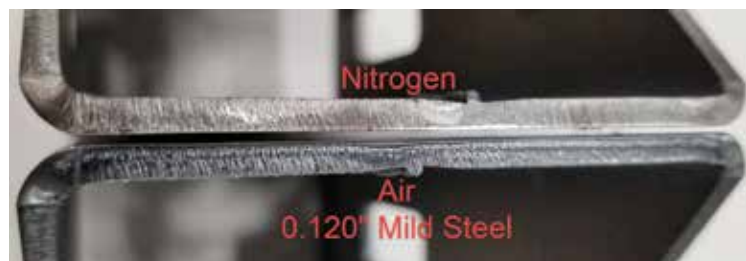


Use of high or low pressure dry air can greatly improve edge quality when laser cutting aluminum.

costs with no speed benefits. Use of dry air can greatly improve edge quality when laser cutting aluminum.

**STAINLESS:** Nitrogen continues to be the best method for processing stainless, with gas purity dictating the cleanliness of the edge quality. Though air will cut stainless, it leaves a blackened edge due to the 21% oxygen content of air, so the use of air depends on the desired end result.

**MILD STEEL:** As for mild steel, this is where power and gases have the most variety of choice. Air is the lowest cost and provides comparable speeds to nitrogen. However, power levels will limit the thickness at which air can be used (up to 1/8" at 3kW or 1/4" at 6kW and above). Additionally, air leaves an embedded oxide layer on the material surface which could affect some powder coating treatments or the part's weldability. However, it's less likely than oxygen to affect the painting process. You should consider your secondary process when



In laser cutting of mild steel, the choice of air or nitrogen depends upon material thickness, cost considerations and finishing.

# FAQs

## FREQUENTLY ASKED QUESTIONS

### OPTIMIZING LASER CUTTING PERFORMANCE WITH ASSIST GAS

With the growing use of compressed air in laser cutting applications, fabricators need to understand which assist gas is the best suited for each application to optimize productivity and quality.

#### 1) WHAT ARE THE BENEFITS OF USING HIGH PRESSURE DRY AIR?

There have been significant improvements in both speed and quality using high or low pressure dry air systems. This change has been occurring on flat lasers for the last few years and now BLM GROUP is leading the way in processing tube with air as well. When cutting mild steel materials, we are seeing a high reduction in costs – up to 75% – with speeds matching or exceeding nitrogen by up to 15%.

However, dry air cutting is really leading the way in aluminum processing with greatly reduced burr on the material, smoother edge quality and up to 150% increases in speed (on 1/8" thick AL).



reviewing whether dry air with mild steel is right for you.

Oxygen is low cost and can be used on virtually any thickness level your laser power dictates (up to 3/4" thick at 3kW and 1" at 4kW and higher). Unfortunately, the exothermic reaction of oxygen results in much slower speeds than nitrogen on thinner materials (up to 1/4" at 3kW and 3/8" 6kW and higher). Additionally, all oxygen cuts leave an oxidized edge that normally needs cleaning off before powder coating to prevent paint chipping. Nitrogen is used for faster speeds in 1/4" and under and leaves a completely clean edge that shows no reaction to paint or powder coating, making it the universal "best case" gas to use for gage materials.

### **3) WHAT ARE SOME TROUBLESHOOTING TIPS ON GAS USAGE?**

Focus, gas and speed are the Big 3 when troubleshooting cut conditions with air or nitrogen. Gas can affect the cut in the following ways:

Too little gas will not push the molten material out of the cut and cause the cut to not go all the way through the material (or possibly refill the bottom of the cut

**BLM GROUP supplies filtration of all incoming gases on all its laser cutting machines.**

with oxygen).

Too much gas can cause excess dross (slag) to reconnect to the material since the process is cooled too fast (before the molten material can separate from the cut) or will cause excessive gouging in the cut surface (in the case of oxygen).

### **4) HOW IMPORTANT IS THE PURITY OF THE GAS TO THE CUTTING PROCESS?**

It is up to the gas supplier and/or facilities management to ensure the gases are at the high purity levels required for quality cutting. Using lower than recommended purity of gases will lead to darkened edges (in the case of stainless), inability to cut thick materials (with oxygen) and/or the inability to reach listed speeds (with any gas).

### **5) WHAT ARE THE MOST EFFICIENT DELIVERY SYSTEMS AND WHY?**

Gas generation systems allow the company to control how much gas they have at

any point and time. Over time they also provide the best ROI and avoid being tied into long term contracts with gas suppliers. Bulk systems work well, but require long term contracts and high gas usage to get the best rates. With automated systems that call for a refill when needed, the last part is less important these days, yet a company could potentially end up empty in some cases.

### **6) HOW CAN OPERATORS AVOID ANY INLINE CONTAMINATION?**

Understanding that the cleanliness of the gas is very important to any fiber laser system, BLM GROUP supplies filtration for all incoming gases on all our models -- both tube and flat. Any contamination in the optic path can lead to costly parts replacement and machine down time. Having good filtration ensures maximum productivity and return on investment.

For more information, visit us at **FABTECH**, or contact:

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