

Laser vs. Plasma

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CUT QUALITY

While the definition of “cut quality” can vary and is usually determined by the customer, laser is commonly recognized as the better of the two processes when it comes to quality. Laser machines offer superior part accuracy as they are capable of delivering cuts at very high tolerances. Traditionally, the knock against plasma was that the cut had a taper or a rounded edge. The advancement of high definition plasma has really done a nice job of reducing the taper or roundness – however, because plasma cutting is not as precise as other metal cutting technologies, it may not be able to deliver a series of functional holes. The wider kerf width affects part definition and further issues can arise when cutting slots or holes. Holes and slots don’t typically finish as well on the plasma because the slug can lose conductivity with the plasma and the rest of the sheet. Most lasers also offer superior piercing technology. In a recent part, we made two .100 holes per second in .250 mild steel.

Advantage: Laser

THICKNESS/MATERIAL CAPABILITY

Early lasers were limited to thinner sheet metal applications. However, with the advancement of laser technology to higher wattages, lasers are now capable of comfortably cutting 1” mild and stainless steel, and ¾” aluminum. In fact, at this year’s FabTech show in Las Vegas, TRUMPF will introduce a 7,000 watt laser which will even further increase the range of thicknesses and improve speed. Plasma offers similar cutting capacities ...as an example, the most popular model today, the Hypertherm HPR 260 pierces and cuts 1.25” mild and stainless steel, and 1” aluminum. Other amperages are available but they do not increase capability. However, most plasma machines also allow for optional Oxyfuel cutting heads. Oxyfuel is capable of cutting up to 12” or greater, but is not nearly as accurate as plasma and laser.

Advantage: Plasma

FLEXIBILITY

Laser cutting machines have become very popular choices because they can move from one metal to another fairly quickly and can handle various thicknesses with a simple change in focus setting. Laser cutting control technology has also improved, making management of the cutting process much simpler. A non-contact cutting head allows for perfect nozzle standoff when cutting flat or not so flat material. In addition, correct focus is achieved automatically through the use of tech

tables. Most machines today will also compensate for a consistent beam path length through various means when using a “flying optic” laser. Assist gas delivery is adjusted as the laser moves to the next pallet. Most plasma machines offer an optional automated gas console...which will automatically adjust gases through the machine control when different material are used (this is otherwise a manual process). However, fine tuning is sometimes required.

Advantage: Laser

INITIAL COST

A typical 5’ x 10’ Laser will range in initial cost from \$500,000 - \$1,000,000 depending on the power. A high definition plasma system with an oxyfuel cutting head will be far less expensive...in the ballpark of \$125,000 - \$300,000 to purchase the machine.

Advantage: Plasma

AUTOMATION

Most laser machines use a shuttle table design, which allows the operator to unload/load the one table while the machine is cutting. Even further automation is available – and can provide almost endless capability. This can range from an automated loader...all the way to finished parts sorting, finished part delivery to a press brake or folder, or an automated tower system for storage of raw material and finished pieces. In most cases, automation can be easily added to a laser machine after the initial purchase. While plasma machines do not offer the same level of automation...many times the cutting table is quite a bit larger – allowing the operator to load multiple sheets and unload while the machine is cutting. This is a good in theory but most shops do not have the available space. Without an automatic pallet changer, parts and skeleton must be collected and removed prior to loading the next sheet. During this time the system is idle and not producing parts

Advantage: Laser

SUMMARY

As with most things in the world today, there is no clear choice. We always recommend having a time study performed on your parts. Looking at the big picture and not just price is critical. Considerations in part quality, throughput, flexibility, and cost per hour need to be discussed.

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