

Unlocking the myths about plasma cutting

The view that plasma cutting systems are expensive and difficult to use is outdated. Advanced technology means plasma systems are versatile and can be used on thick and thin metals, are easy to use and economically efficient.

PLASMA systems have been used to cut metal for more than 50 years and provide several advantages over other cutting methods. But some people believe that plasma systems are too expensive or too hard to learn. This article aims to show why today's plasma systems are essential productivity-enhancing tools.

Expense

Plasma systems are higher priced than some other cutting tools. But there is a difference between price and cost. Plasma systems' fast cutting speeds and cut quality deliver productivity gains, saving operators time and money. Faster cutting speeds – without any preheating of the work piece – enable operators to complete jobs quickly. Better cut quality, with less dross and better edge quality, means fewer labour-intensive finishing operations are required. Unlike oxyfuel cutting, most handheld plasma systems run off of compressed air meaning costly cylinder rentals and delivery charges are eliminated.

Cost is one reason why Northern A1 Services, a safety and environmental clean up company based in Michigan, USA switched from oxyfuel to plasma. For several years, the company used oxyfuel to cut titanium for a variety of aerospace projects. Today, it uses a Hypertherm plasma system to cut titanium up to an inch thick.

"There's no question our company is saving money by using plasma," said Brian Balon, a project manager for Northern A1. "We used to pay a lot for gas. With plasma, we are saving that money and at the same time, we have created a safer working environment since we no longer have to worry about gas leaks."

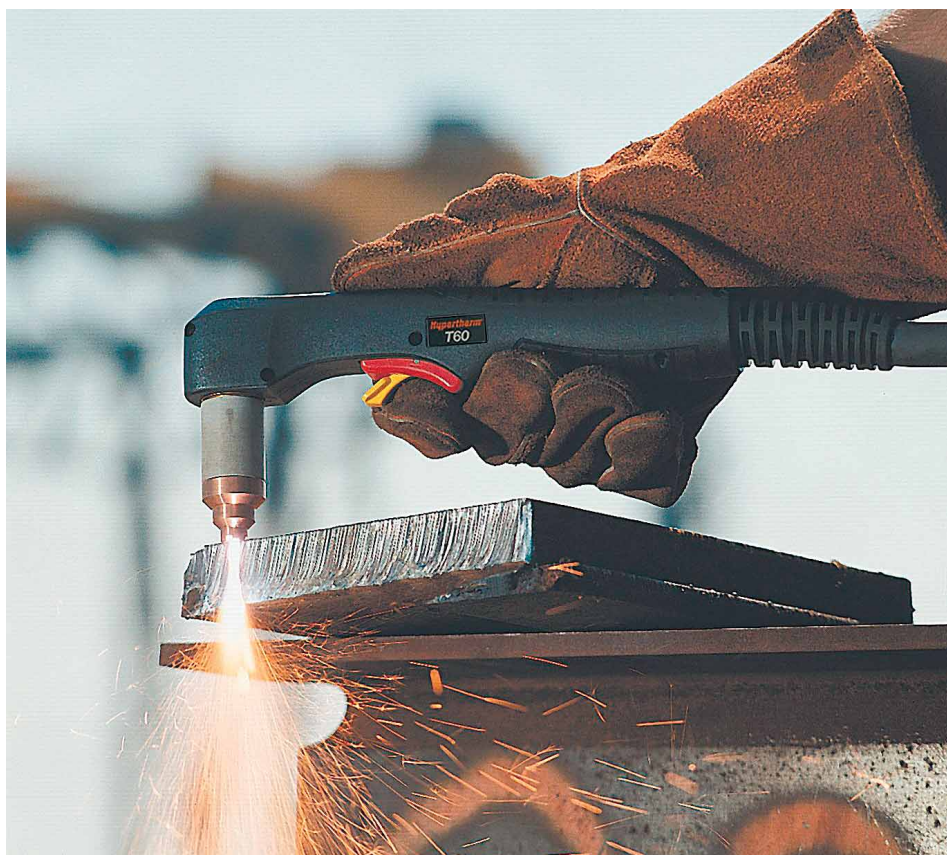
These gains are only realised when using a high-quality plasma system. Many low-price, low-quality plasma models are available. The low price may make these models look like a good deal – especially in a downturn – but ultimately the poor design, workmanship and outdated technology will disappoint operators, who may not see the productivity gains and cost savings they expected.

Advanced technology

As plasma technology has advanced, the belief that plasma is only for use on thin materials has become outdated.

Advances in torch, consumable and power supply design have allowed plasma engineers to deliver systems that provide more cutting power and thicker cutting capacity – as much as 1.75" (44mm) or more – even as system sizes have shrunk and duty cycles climbed.

True, 20 years ago some early handheld plasma systems did not meet operators' expectations for performance on thicker material. Plasma does also offer some distinct advantages on thin materials – like a smaller heat affected zone and less warping – over oxyfuel cutting.



Plasma systems cut, pierce and bevel electrically conductive metals of all types, shapes and sizes up to 44mm thick or more

The belief that plasma is only for use on thin materials causes too many operators to use their oxyfuel torch for cutting thicknesses on which a plasma cutter would deliver faster cutting speeds and better cut quality. By not using plasma through the tool's specified cutting range, the operator limits the productivity gains and cost savings that could be achieved.

Northern A1 finds plasma is the best choice for 80% of the time. "We still use oxyfuel when cutting our thickest stuff, but for the vast majority of jobs, plasma is faster and gives us better cuts," Balon said.

Stainless steel

Many plasma owners purchase their first plasma system for cutting stainless steel, aluminium or other non-ferrous metals. Some people believe plasma can *only* be used on these materials. In truth, plasma is effective at cutting *any* electrically conductive metal and is one of the world's most popular methods for cutting mild steel.

Plasma's ability to cut stainless steel and aluminium is one of its advantages over oxyfuel cutting, which is not effective on these materials. Plasma is also effective at cutting painted, dirty or rusted steel, which makes it an indispensable tool for heavy equipment repair, automotive restoration, farm equipment maintenance and other tasks.

Cutting materials

Plasma systems are highly versatile cutting tools. Plasma systems cut, pierce and bevel

metals of all types, shapes and sizes. With a change of the torch and/or consumables, some plasma systems can switch between hand and automated cutting. Plasma can also be used on X-Y cutting tables; robotic arms; with a track burner for effective long, straight cuts; or with pipe cutting and beveling tools.

But, beyond cutting, some plasma equipment – including small, portable systems like Hypertherm's new Powermax45 – are also effective gouging tools. For some customers, a plasma system is a gouging tool first and a cutting tool second. Plasma systems are perceived to offer benefits – including less smoke and noise – not matched by other gouging methods. Some common plasma applications include back-gouging for weld preparation and gouging out worn or cracked parts for repair or replacement.

By using their plasma systems for gouging as well as cutting, operators derive greater value from their system and can quickly realise a positive return on their investment.

Location

Plasma systems require power and a gas source to operate. Some people believe this means plasma can only be used in a location where fixed power and air are readily available.

But today's leading plasma systems incorporate technology that enable them to deliver full performance when running off an appropriately-sized motor generator, combined with a portable air compressor or compressed air tank.

Cutting

The small size and light weight of the latest inverter-based plasma systems make them easy to transport from the shop to the field. Also, taking systems that run off of compressed air into the field does not require the transportation of flammable gases such as those required for oxyacetylene cutting.

Easy to use

While the underlying technology of a plasma system may seem complicated, using today's plasma equipment is anything but. Even a first-time plasma operator can achieve good quality results within minutes of picking up a plasma torch. With air plasma systems, there are no gases to regulate and with features like nozzle shielding, operators do not need to hold a standoff. A lack of a standoff makes cutting easier as operators can drag the tip of the torch directly along the work piece and use pre-cut templates. Ergonomically designed torch handles and quick-connect torch leads also enhance ease of use.

Getting started with plasma is easy. Systems such as the *Powermax45* come with nearly everything an operator needs to get started – the power supply, torch, consumable parts for cutting and gouging and operating instructions in both print and DVD format. The operator needs to supply the power, gas (clean, dry compressed air or nitrogen) and protective hand and eye wear.

The importance of these ease of use features cannot be underestimated given the high rate of operator turnover and lack of skilled welders and cutters in many regions.



Small, portable systems are effective gouging tools

Some impressions about plasma's capabilities are rooted in beliefs that were once – but are no longer – true. The best plasma systems offer several advantages over earlier generations of plasma tools, as well as benefits over other methods of cutting and gouging metal. Plasma systems from Hypertherm and other leading brands are productivity-enhancing tools that require little training,

are inexpensive to use and can be used for cutting and gouging materials at various thicknesses, whether in the shop or in the field. ■

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