

Plasma Arc Cutting

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The Basics and Getting Started

READING ELECTRIC, a leading supplier of electro-mechanical equipment, services, and problem solver for Industrial and Commercial customers for over 50 years provides technical information to the Region's Residential, Commercial and Industrial Community. This Bulletin is the first in a series providing informational tips on Plasma Arc Cutting.

Plasma Arc Cutting – What it is...

REMEMBER: Always read and follow the safety precautions and operational instructions in your owner's manual.

Plasma arc cutting is a process where an open arc, much like in TIG welding, can be constricted by passing through a small nozzle, or orifice, from the electrode to the work-piece. The gas used, typically air, combines with an electrical current to create a high temperature plasma arc. When placed in contact with an electrically conductive material, the arc passes through the metal, melting a thin area. The force of the arc pushes the molten metal through the work-piece and severs the metal. Plasma will cut any metal that is electrically conductive including steel, aluminum, copper, and stainless steel. The cut will be de-rated a little with the softer metals like aluminum, copper, and stainless. Rating refers to the thickness a plasma cutter can cut at a rate of 10 inches per minute.



Plasma Cutting Requirements...You, Plasma Cutter, CFM and Electric

You: From a training and skill standpoint, depending on what you are cutting and having a steady hand there is not a lot of training involved to operate a Plasma cutter. The torch should remain at a 90-degree angle and depending on the machine, you can keep a standoff or drag either the tip or the drag shield on the metal.

Plasma Arc Cutter: Typically you only have two switches to work. They are the on/off switch and the amperage control. The on/off speaks for itself and the amperage is only going to change when you want to cut thicker material, but most operators will leave the amperage switch on full output for all thickness of metal. Selecting the size of the Plasma Cutter, depends on the type and thickness of metal you'll be cutting and the desired cutting speed. Normally three criteria are considered: rated cut, quality and sever cuts. A rated cut is the thickness of mild metal that an operator can manually cut at a rate of 10 inches per minute (IPM). A quality cut is rated at a slower speed but on thicker metal. A sever cut is the maximum thickness a plasma cutter can handle. The travel speed is slower and the cut may require clean up.

CFM air requirements: Compressed air is the most popular gas used for plasma cutting. You can use an air compressor or a bottle of compressed air. The CFM (Cubic Foot per Minute) is important because that is the amount of air that will be distributed per minute and will keep your Plasma machine running consistently. The PSI (Pounds per Square Inch) is the actual air pressure required to operate the machine. All machines need different PSI and CFM. The other gas used is nitrogen, but the only advantages to using it are when cutting stainless steel. You will get a cleaner cut but the cut thickness will be diminished a little. With some exotic metals a gas mixture may be needed.

Electrical Requirements: Select a Plasma Cutter that can operate at both 115V or 230V, and has Line Voltage Compensation which allows the voltage to vary by +/- 10 percent without affecting output. This will be an important consideration if the working area is subject to dirty power or brownouts. Another good feature is the ability to adapt to a wide range of voltages, single or three-phase and compensate for power fluctuations in the supply.

[Information contributed by Miller Electric]

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