



# Plasma Cutting Guide



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# Miller Makes A Full Line Of Plasma Cutting Equipment To Meet All Your Needs.

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# Spectrum® Product Specifications

## What do you need to cut?

Plasma Cutting Product	Rated Output	Input Power	Rated Cutting Thickness**			Recommended Generator Power*	Product Weight
			Mild Steel	Stainless Steel	Aluminum		
Spectrum® 125C	12 amps at 110 volts DC, 35% duty cycle	120 V	1/8 in. (3.2 mm)	1/8 in. (3.2 mm)	1/16 in. (1.6 mm)	2500 watts	50 lb. (22.7 kg)
Spectrum® 375	27 amps at 90 volts DC, 35% duty cycle	115 or 230 VAC	3/8 in. (9.5 mm)	3/8 in. (9.5 mm)	1/4 in. (6.4 mm)	4000 watts	56.5 lb. (25.6 kg)
Spectrum® 375 X-TREME™	27 amps at 92 volts DC, 35% duty cycle 27 amps at 92 volts DC, 20% duty cycle 20 amps at 88 volts DC, 35% duty cycle	240 V, 120 V (20 A), or 120 V (15 A)	3/8 in. (9.5 mm)	3/8 in. (9.5 mm)	1/4 in. (6.4 mm)	4000 watts	18 lb. (8.2 kg)
<b>NEW!</b> Spectrum® 625 X-TREME™	40 amps at 140 volts DC, 50% duty cycle	208/230 VAC	5/8 in. (15.9 mm)	1/2 in. (13 mm)	3/8 in. (9.5 mm)	8000 watts	21 lb. (10 kg)
<b>NEW!</b> Spectrum® 875	60 amps at 140 volts DC, 50% duty cycle for 230 V, 40% duty cycle for 208 V	208–230 V	7/8 in. (22 mm)	7/8 in. (22 mm)	5/8 in. (15.9 mm)	10,000 watts	52 lb. (24 kg)

1-Phase

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\*See pg 8 for specific Miller Welder Generator usage.

\*\*Recommended piercing capacity is approximately one half the rated cutting thickness.

# What Is Plasma Cutting?

Plasma - the fourth state of matter - is an ionized gas that conducts electricity. Plasma is created by adding energy to an electrically neutral gas. In this case, the gas is compressed air and the energy is electricity. The more electrical energy added, the hotter the plasma arc becomes. Plasma arc cutting machines control this powerful energy by constricting the arc and forcing it through a concentrated area (the nozzle). By increasing air pressure and intensifying the arc with higher amperage, the arc becomes hotter and more capable of blasting through thicker metals and blowing away the cuttings, with minimal cleanup required.

It is easy to learn and use the process. First time users of the process can achieve good quality cuts after minutes of practice.

## Plasma Advantages

Plasma provides numerous advantages over other cutting processes. While there are many common methods of cutting metal, the plasma process offers the following advantages:

- Cuts any type of electrically conductive metals including aluminum, copper, brass and stainless steel
- Cuts faster — up to 130 in. per minute on 1/4 in. steel
- Does not require a pre-heat cycle which saves time and is more convenient
- Produces a small and more precise kerf (width of the cut) — great when precision matters
- Has a smaller heat affected zone which prevents the area around the cut from warping and minimizes paint damage
- Provides gouging and piercing capabilities

Sawing or chopping can take a long time and will typically leave a rough edge — plasma cutting is fast, clean, and leaves a nice straight edge. It is also a less expensive and more convenient method for cutting than many other processes because compressed air is typically available in most applications via shop or portable compressors.

# What Should I Look For In A Plasma Cutter?

When you are considering a plasma cutter there are several features to keep in mind. However, portability and performance, ease-of-use and reliability greatly outweigh other factors.

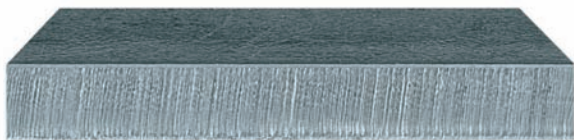
## Portability & Performance

### Size and Weight

Size and weight are important if there is a need for moving your plasma cutter from location to location. For example, the portable Spectrum 375 X-TREME and 625 X-TREME that weigh only 18 lbs. and 21 lbs respectively, yet are rated to cut 3/8 in. and 5/8 in. metal. There are many other hand-portable units available that weigh less than 55 lb., including Miller's Spectrum 125C, Spectrum 375, and Spectrum 875.

### Cutting Capability

Determine the type and thickness of metal you need to cut and your desired speed. Then compare your needs to product specifications. Miller qualifies its cutting capabilities by a rated cutting capacity at approximately 10 in. per minute. You can increase your speed by using a machine with more amperage power. For example, a Spectrum 375 cuts 3/8 in. steel at 10 in. per minute.; a Spectrum 875 can cut that same material at 41 in. per minute.



### Rated Cutting Capacity

Approximately 10 in. per minute (minimum speed at which an operator achieves a smooth, steady cut using a hand-held torch).

## Duty Cycle Requirements

Duty cycle is the number of minutes out of a 10-minute period that a welder or plasma cutter can be operated at its rated capacity. For example, a 300-amp welder with a 60% duty cycle could operate at 300 amps for 6 minutes and then need to cool with its fan running for 4 minutes. Miller rates its products, including its Spectrum plasma cutters, at 104° F. Therefore, even in the hottest environments your machine will run accurately at its rated duty cycle.

## Air Requirement

All Miller air plasma cutting machines require a clean, dry air supply. Check the required PSI for each machine. Also, a filter and dryer are recommended for all applications. Miller's Spectrum 125C comes complete with a built-in piston driven compressor which provides the exact amount of air needed for cutting.

## User-Friendly Front Panel

Look for a machine with easy-to-use controls with less need for manual adjustment. Many Miller Plasma systems offer intelligent design which eliminates the need for pressure knobs and gauges. Miller's Automatic Air Regulation, Automatic Consumable Detection and Auto-Retire technology make set-up and cutting easy. Diagnostic lights that aid in troubleshooting are time saving and convenient.

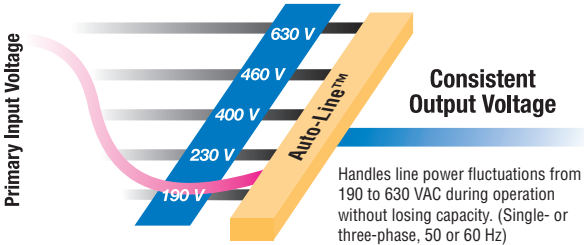


1. Status and Troubleshooting Lights
2. Output Control

## Input Power

Keep in mind the type of input power you have available or if you will be moving the plasma cutter from job to job. All of Miller's Spectrum units can be powered from a generator with at least 10,000 watts of power, such as Bobcat™ or Trailblazer®. Miller also offers innovative input power technologies:

**Auto-Line™** technology permits direct connection to almost any type of input power- 115-575 VAC (varies by product), 1- or 3-phase, 50 or 60 Hz. Simply connect the power cord to the correct plug or junction box and start cutting. Auto-Line technology allows the plasma power source to draw fewer amps and provides exceptional electrical efficiency. This technology allows you to cut at any location, at any job site, and in any country without



Miller's exclusive **multi-voltage plug (MVP™)** on the Spectrum 375 X-TREME allows connection to 115 or 230 V receptacles without tools — choose the plug that fits the receptacle and connect it to the power cord.



## True Blue® Warranty

Look for a manufacturer to stand behind its product so you have the confidence that your purchase will last. Miller provides its True Blue® 3-year

Warranty on its entire family of Spectrum plasma cutter power sources, parts and labor. The supplied ICE torches are backed by a one-year parts and labor guarantee.



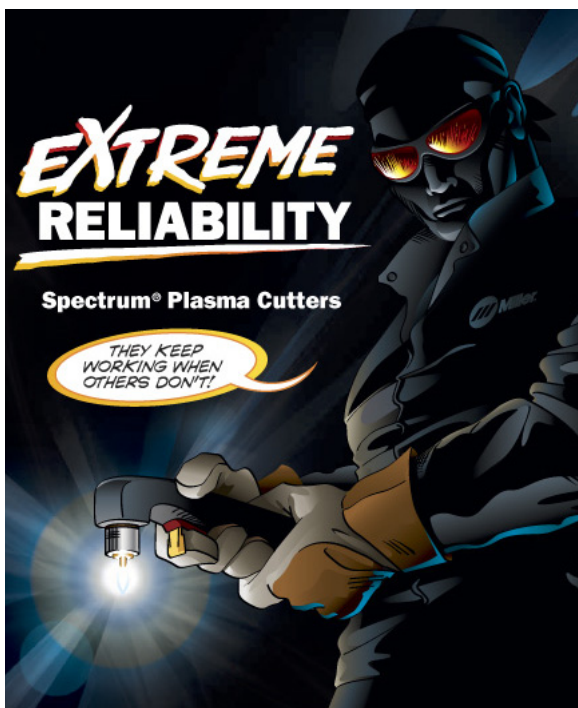
## More Power

Look for a plasma cutter that offers superb cutter performance at lower operating costs and purchase price. Many Miller plasma cutters offer similar cutting speeds as higher amperage competitor models by more efficiently using power in the cutting arc to deliver faster cutting speeds at lower output amperages. Therefore drawing less power from the wall.

## Reliability

You want to find a plasma cutter that works in real world applications. At Miller, plasma units are shaken, baked, frozen and dropped. They are subjected to tests that provide you with the security that your plasma system will operate when and where you need it to.

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# How Do I Use My Plasma Cutter?

Begin cutting by placing the torch as close as possible to the edge of the base metal. Pull the trigger to initiate the pilot arc. Move the torch near the workpiece to initiate the cutting arc. Wait for the arc to penetrate through the bottom of the workpiece. Start moving the torch slowly, perpendicular to the workpiece. Watch sparks leaving the bottom of the workpiece to judge your speed. If the sparks are not visible at the bottom of the plate, you have not penetrated the metal. This is because your travel speed is too fast or you have insufficient output amperage.

At the end of a cut, angle the torch slightly or pause briefly to completely finish the cut. Miller plasma systems provide a post-flow circuit, the post-flow air will continue for a short period of time after the trigger is released to cool the torch and consumable parts. However, cutting can be resumed immediately.

To maximize cutting speeds, it is recommended to turn your power source to full output for all material thicknesses.

## Proper Safety Procedures

Safety procedures must be closely followed in any application of a plasma cutter. Be aware of potential hazards involved with the process, including high voltages, noise, temperatures, flammable materials, fumes, ultraviolet radiation, and molten metal. Proper welding clothing should be worn, as well as shaded eye protection, as specified by the manufacturer. As with all industrial products, read the owner's manual for proper safety procedures.



# Cutting Guide Spectrum Cutting On Engine Driven Welder/Generators

Engine Driven Welders	Generator Power	Spectrum® 375 and 375 X-TREME™		Spectrum® 625 X-TREME™		Spectrum® 875	
		Steel Quality Cut	Spectrum Output Amp Setting	Steel Quality Cut	Spectrum Output Amp Setting	Steel Quality Cut	Spectrum Output Amp Setting
Bobcat™ 250, Trailblazer® 302 & 275 DC	11 kW	3/8"	27 A (240 V, full KVA plug)	5/8"	40 A (240 V)	1/2"	45 A
Bobcat™ 225 NT	10.5 kW	3/8"	27 A (240 V, full KVA plug)	5/8"	40 A (240 V)	1/2"	45 A
PipePro™ 304/PRO 300	12 kW	3/8"	27 A (240 V, full KVA plug)	5/8"	40 A (240 V)	5/8"	50 A
Big Blue® 500 CC/CV	20 kW (optional)	3/8"	27 A (240 V, full KVA plug)	5/8"	40 A (240 V)	7/8"	60 A



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visit [MillerWelds.com](https://www.MillerWelds.com)





# SIZE DOES MATTER

**Big Cutting Power  
in a Small Package**

When Size Does Matter, look to Miller Spectrum Plasma Cutters for the right portable package to fit your needs

**[MillerWelds.com/SizeMatters](http://MillerWelds.com/SizeMatters)**

For detailed specification sheets or to locate your nearest Miller distributor, call:

**1-800-4-A-Miller  
(1-800-426-4553)**

Or visit

**[MillerWelds.com](http://MillerWelds.com)**



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