



Plasma Cutting Guide

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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		
1-Phase	Spectrum® 125C	12 amps at 110 volts DC, 35% duty cycle	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	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)
	NEW! Spectrum® 375 X-TREME™ w/X-CASE™	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	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)
	Spectrum® 625	40 amps at 140 volts DC, 50% duty cycle	1/2 in. (13 mm)	1/2 in. (13 mm)	3/8 in. (9.5 mm)	8000 watts	60 lb. (27.2 kg)
1 & 3-Phase	Spectrum® 2050	55 amps at 140 volts DC, 60% duty cycle for 3-phase, 50% duty cycle for 1-phase	7/8 in. (22 mm)	7/8 in. (22 mm)	5/8 in. (15.9 mm)	10,000 watts	86 lb. (39 kg)
	Spectrum® 1000	80 amps at 150 volts DC, 60% duty cycle for 3-phase, 40% duty cycle for 1-phase	1 in. (25.4 mm)	1 in. (25.4 mm)	5/8 in. (15.9 mm)	15,000 watts	92 lb. (41.7 kg)
3-Phase	NEW! Spectrum® 1251	100 amps at 160 volts DC, 80% duty cycle at 380–575 V 50% duty cycle at 230 V	1-1/4 in. (32 mm)	1-1/4 in. (32 mm)	1 in. (25.4 mm)	20,000 watts	97 lb. (44 kg)

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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 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 workpiece. The gas used is typically air and it 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 workpiece and severs the material.

It is easy to use, and a person using a plasma cutter for the first time can achieve professional quality cuts faster, cleaner and safer than with many other cutting methods.

Plasma Advantages

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

- Cuts faster — up to 75 in. per minute on 3/8 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 or paint damage
- Provides gouging and piercing capabilities

Also, some processes cannot cut stainless steel or aluminum, whereas the plasma process can cut ANY type of electrically conductive metal including brass, copper, titanium and galvanized. 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 other processes because compressed air is typically available in most applications via shop or portable compressors.

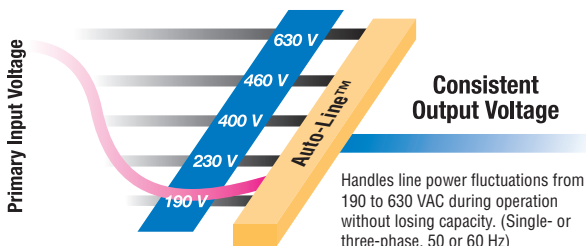
What Should I Look For In A Plasma Cutter?

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

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. Many of Miller's Spectrum units can be powered from a generator with at least 8,000 watts of power. Miller also offers innovative input power technologies:

Auto-Line™ technology allows a direct connection to ANY primary power level, including 50 or 60 Hz, single- or three-phase, 208 through 575 VAC. Simply connect the power cord to the correct plug or junction box and start cutting. Auto-Line allows you to cut at any location, at any job site, and in any country without having to open the machine and manually link it.



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.



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 of 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 2050 can cut that same material at 35 in. per minute.; and a Spectrum 1000 can cut the material at 75 in. per minute.



Rated Cutting Capacity

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 welding machine can be operated at its rated capacity. For example, a 300-amp machine at 60% duty 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. Diagnostic lights that aid in troubleshooting are time saving and convenient. Also, some machines provide a consumable compartment conveniently mounted on the side panel to make consumables readily available for replacing.



1. Power Switch
2. Gas/Air Pressure Gauge
3. Gas/Air Pressure Adjustment Control
4. Output Control
5. Status and Troubleshooting Lights

Portability

Weight and size are important if there is a need for moving your plasma cutter from location to location. For example, the portable Spectrum 375 X-TREME weighs only 18 lb. including the torch, yet is rated to cut 3/8 in. metal. There are many other hand-portable units available that weigh less than 75 lb., including Miller's Spectrum 125C, Spectrum 375, Spectrum 625 and Spectrum 2050. Miller also offers compatible running gears for larger, heavier machines.

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.

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 pre-flow air; the pilot arc will then light. 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. If the system provides 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.





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Cutting Guide Spectrum Cutting On Engine Driven Welders

Engine Driven Welders	Generator Power	Spectrum® 375 and 375 X-TREME™		Spectrum® 625		Spectrum® 2050 */2050 (55A)	
		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)	3/4"	50 A
Bobcat™ 225 NT	10.5 kW	3/8"	27 A (240 V, full KVA plug)	5/8"	40 A (240 V)	3/4"	50 A
Trailblazer® Pro 350 D	12 kW	3/8"	27 A (240 V, full KVA plug)	5/8"	40 A (240 V)	3/4"	50 A
Miller Legend® 302	5.5 kW	3/8"	27 A (240 V, full KVA plug)	3/8"	30 A (240 V)	1/2"	35 A
PipePro™ 304/PRO 300	12 kW	3/8"	27 A (240 V, full KVA plug)	5/8"	40 A (240 V)	3/4"	55 A
Big 40® CC/CV	15 kW	3/8"	27 A (240 V, full KVA plug)	5/8"	40 A (240 V)	3/4"	55 A
Big Blue® 500 CC/CV	20 kW	3/8"	27 A (240 V, full KVA plug)	5/8"	40 A (240 V)	3/4"	55 A

*Models manufactured after (and including) serial number KJ283702.



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nearest Miller distributor, call:

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