

**PhotoBrasive®**  
SYSTEMS



# Sandcarver II

Professional Sandcarving Equipment



OPERATING & PARTS MANUAL

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## CONGRATULATIONS!

You have just purchased the Sandcarver II, one of the best sandblast etching systems in the country! This system was designed from the ground up for etching and engraving glass, crystal, stone, ceramics and metal. It will give you years of service with a minimum of unscheduled maintenance. Used in conjunction with our unique, top of the line photo resist, you are sure to get beautiful, high quality results.

## IMPORTANT

To get the full use of this equipment, and for your own safety, it is essential for you to read these instructions carefully, especially the safety instructions, before starting to assemble, operate or service the equipment described herein. Failure to follow the instructions could result in serious personal injury or damage to the equipment or surroundings.

Keep these instructions in a safe place for future reference.

## GENERAL SAFETY INSTRUCTIONS

Follow all electrical and safety codes, as well as the National Electric Code (NEC) and OSHA regulations when connecting your equipment to electrical outlets, air supplies or vacuum systems.

Keep floor around the machine clean. Abrasive can be slippery on a hard, smooth floor like linoleum or sealed concrete. Use of a rubber floor mat, like an anti-fatigue mat, is recommended because it lets the abrasive fall into the open areas of the mat while cushioning the area under your feet.

Do not operate the equipment in the vicinity of other sensitive equipment such as computers, engraving machines or photo resist exposure and processing units since there will be some dust in the air at any given time. Static electricity is created when blasting, particularly when using aluminum oxide. This can harm delicate electronic equipment such as computers if you touch it immediately after blasting and becoming charged.

Do not exceed maximum operating pressure of 125 psi.

Follow all maintenance requirements mentioned in other sections to maintain safe operation of equipment.

This is a dry blast unit only - it is not made to accommodate moisture or fluids of any kind used separately or as a mix with blast media. Do not use oil lubricators in the air stream.

**WARNING: Never operate sandblaster with cabinet door open. Doing so could result in serious skin damage, eye damage or even blindness if the compressed air or propelled abrasive comes in contact with unprotected parts of the body. It could also result in possible respiratory complications from breathing the dust.**

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## **Section 1**

### Receiving and Unpacking the Unit

The Sandcarver II is shipped by truck freight, strapped to a skid, protected by cardboard and plastic wrap. When you receive the unit, inspect the packing carefully to note any potential damage. If you are unsure of damage, before the driver leaves, remove packing materials without removing the unit from the skid. It is important to note any obvious damage on the bill of lading while the driver is still there. If you notice damage later, it is important to call the freight carrier immediately and report concealed damage. Concealed damage should be reported within 24 hours if possible.

To unpack the unit remove the plastic wrap and the cardboard and dispose of these items properly. Bundle the plastic and tie it securely. Do not allow children or pets to play with the plastic to avoid possible suffocation. The cabinet is attached to the skid with heavy plastic ties and metal banding. Cut these with a knife, heavy scissors, or metal snips, then take the unit off the skid with the help of another person and move it to the place of operation.

Open the side door of the cabinet and remove the vacuum system and vacuum hose. Remove the tie from the light's electric cord.

## **Section 2**

### Assembling the Unit

To make it faster and easier for you to get started with your sandcarving, we have pre-assembled your sandblaster and cabinet before shipping. Consequently, the unit is almost completely assembled when you receive it, and very little additional assembly is required. There are, however, a few things you will have to do.

## The light

A floodlight bulb in a swivel socket is the recommended light source for the Sandcarver II. Experienced sandblast etchers tend to prefer this type of light because it can easily be directed at the surface of the glass being etched (no matter how large or small), leaving the rear wall of the cabinet darker. When etching begins, it is far easier to see the quality of your work this way, because of the contrast between the brightly lit etched surface (which appears bright and white) and the clear areas yet to be etched, which appear quite dark. Unevenly etched areas are much easier to see in this type of light than with a fluorescent light, which illuminates both the glass surface and the entire inside of the cabinet very evenly, producing very little contrast.

The light fixture is installed on the top left side of the cabinet - the preferred side for most people. If you decide that you would rather put the light on the right side (as some left handers do), we have provided a hole in the top right side of the cabinet in the appropriate place. Simply remove the cover from the hole, move the light from the left side to the right side, and replace the left side hole cover to keep dust from coming out. Install a 75-watt floodlight bulb into the fixture.

If you find that you would like even more light, we offer the option of an additional light kit (part # 206LK) so you can have a light on both the right and the left sides of the cabinet, with independent switching.

## The foot pedal

The blaster operates with a foot pedal as the on/off mechanism for the blasting process. The foot pedal is attached to the blaster with 2 plastic hoses (see item #10, Diagram A). When the unit is shipped, the foot pedal is strapped to the blaster. Upon receipt of the unit, cut the plastic ties that bind the foot pedal to the blaster so the foot pedal can be placed on the floor below the cabinet.

## The dust collector

Refer to Operating Manual and Parts List for the DC1500 Dust Collection System.

## Section 3

### Preparing the Unit for Sandcarving

**NOTE:** *It is important to have an airline filter placed before the main air valve (see item # 1, Diagram A) to assure no moisture enters the system. Moisture may lead to the system clogging.*

**WARNING:** BEFORE ATTACHING THE AIR HOSE FROM YOUR COMPRESSOR, MAKE SURE THE COMPRESSOR IS TURNED OFF AND THE BALL VALVE ON THE AIR COMPRESSOR IS TURNED IN THE “OFF” POSITION. IN ADDITION, MAKE SURE ALL BALL VALVES (see items #1, #5, and #7, Diagram A) ON THE SANDCARVER II ARE IN THE “OFF” POSITION. THE “OFF” POSITION IS WHEN THE LEVER OF THE BALL VALVES IS PERPENDICULAR TO THE VALVE ITSELF.

## Connect the air supply from the compressor.

An air compressor is needed to supply compressed air to your Sandcarver II sandblaster through an air hose. Attach the air hose from your compressor to the sandblaster. Any fittings you might need to do this are standard plumbing fittings available from hardware stores, plumbing stores, home building stores, etc. You can use metal fittings, either galvanized or black iron, but not plastic or PVC.

Attach the air hose to the on/off air valve (item #1, Diagram A). This is the main air valve. You can either permanently attach the air hose to the main air valve by screwing it together with pipefittings or you can use quick connect fittings. Quick connect fittings provide a fast and easy way to attach and detach the air hose that does not require tools. They do reduce the airflow somewhat, but not substantially.

The main air valve has a 1/2" female fitting. Ask a salesperson where you get your fittings to get you the correct ones to attach your air hose to the blaster. You will have to know what size and type fittings your air hose has (take it with you if you need.) Be sure to use Teflon thread sealing tape or pipe dope on the fitting threads to ensure a tight seal.

## Attach the dust collector

Plug the electric cord of your dust collector into the receptacle on the top of the blast cabinet. This is a switched receptacle that will turn on the light in the cabinet and the receptacle at the same time. Make sure one end of the vacuum hose is attached to the dust collector according to the instructions in section #2, and plug the other end into the exhaust outlet on the back of the cabinet. Plug the switched receptacle into the wall, then turn the switch on to make sure that both the light and the dust collector are operational.

## Fill the pressure pot with abrasive

***NOTE: Throughout these instructions the abrasive pressure blaster is referred to as the blaster, the pressure blaster or the pressure pot as interchangeable terms referring to the same piece of equipment.***

This is a special blasting system which has the pressure pot directly attached under the cabinet for easy filling and refilling of abrasive. Before filling the Sandcarver II with abrasive, make sure the main air valve on the blaster is turned off and the pressure pot is depressurized. The pressure pot is depressurized when the air pressure gauge reads zero. If the air pressure gauge reads anything higher than zero, step on the foot pedal until all air escapes and the air pressure gauge reads zero. Open the container of abrasive and open the door of the blasting cabinet. We recommend silicon carbide #180 or aluminum oxide #180. Pour 30 pounds of abrasive into the cabinet and allow it to flow through the perforated metal work surface to the bottom of the cabinet. The pressure pot has a 40 pound abrasive capacity, however, there must be some open space to allow the stopper to fall into the pressure pot. Always wear a dual cartridge respirator to avoid breathing in the dust.

There is a filtering screen mounted in the bottom of the cabinet that will filter any debris large enough to clog up your blaster. However, you should try to avoid introducing debris into the cabinet. The screen will have to be cleaned regularly (see Maintenance Procedures, section 5) but keeping debris out of the cabinet in the first place will make this job easier and less frequent.

The abrasive will flow through the screen and into the pressure pot. You may want to tap on the side of the hopper a few times to make sure most of the abrasive has fallen into the pressure pot.

**IMPORTANT! The pressure pot has a 40 pound abrasive capacity. DO NOT OVER FILL THE PRESSURE POT. It will be difficult or impossible to get the pressure pot to seal and pressurize and will prevent the proper operation of the blaster. If this occurs, you will have to drain out the excess abrasive as described under section 6, Frequently Asked Questions.**

## Section 4

### Operating the Unit

#### **Double check!**

Now that your set-up is complete you are ready to blast (providing you have prepared a project). Take another close look at all connections to your Sandcarver II system. Is everything plugged in? Did you remember to start the air compressor so it had a chance to build-up pressure for blasting? Yes? Good!

#### **Turning on the air and the abrasive:**

Turn on the main air valve to pressurize the blaster. If the regulator pressure gauge (item #3, diagram A) is adjusted to a low pressure (approximately 5-10 psi), the blaster will pressurize automatically. Look at the regulator air pressure gauge. If no pressure registers on the gauge, turn the regulator handle (item #11, diagram A) right until you begin to see the needle move up. Set the pressure to 30 psi for your first test. If the pressure is greater than 30 psi, lower it to 30 psi by turning the regulator handle left. (Note: When adjusting the pressure down from a higher pressure, the most accurate way to do so is by lowering the pressure to just below your target pressure, then raise the pressure to the target.)

The valve at the bottom of the pressure tank is used to set the abrasive flow and is called the abrasive mixing valve (item #7, diagram A). This regulates the air/abrasive media ratio. When turned off, the handle of this valve is horizontal. Open the valve by moving the handle down, and set the handle to between 30 degrees and 45 degrees down from the horizontal position. The best setting will vary depending on which etching technique you are using and how fast you want to blast. You will learn to set this to your own preference with experience. For important additional information about setting abrasive flow, read Symptom 3, last paragraph, and Symptom 5, #1 in the Frequently Asked Questions section.

#### **Blasting:**

Put a small sample glass piece or other sandblastable object in the cabinet. Set it carefully on the perforated work surface. It can be beneficial to place a perforated rubber mat on the cabinet metal work surface. This allows the abrasive to fall through and into the hopper while protecting your object from being scratched. This type of mat is available in a roll from hardware stores and is used under rugs as an anti-skid mat.

Close the cabinet door and latch it. **NEVER BLAST WITH THE DOOR OPEN!** Turn on the light and the vacuum system. Make sure the vacuum works properly and that the light is positioned in a way that allows you to see well considering the etching technique you are using. For more information on etching techniques and lighting, see the instructional books and videos by Norm & Ruth Dobbins.

Place your hands into the rubber gloves and pick up the nozzle (pressure system) with one hand. Pick up the object you are going to sandblast with the other hand, if it is small enough. If the object is too large or heavy, lean it against the back wall of the cabinet or prop it up on a piece of wood or an easel.

Before pointing the nozzle at your object, hold it under the light, point it towards the back of the cabinet (away from your object), and step on the foot pedal. Watch the abrasive flow in the air stream. Before blasting, adjust the abrasive flow if necessary. You should see a thin stream of abrasive, but it should not be surging and sputtering out of the nozzle. If it does cut back on the abrasive flow by raising the abrasive mixing valve handle. If there is not enough abrasive, open the valve more by pushing the handle down slightly.

Hold the nozzle at a 90-degree angle to the etching surface and approximately 6" away (the distance is determined by the size of the area to be blasted as well as the technique you choose). Step on the foot pedal to blast the object. Anytime you are unsure of the blasting results you are creating - stop! Take your foot off the pedal and the whole operation will stop. It's better to stop and check often than to blast too much. When the etching is finished, take your foot off the pedal and put the object back on the work surface.

Before removing the object from the cabinet, make sure that all dust has been evacuated from the cabinet by the vacuum system. This will probably take 10 to 30 seconds. Next, open the cabinet door and take the object out. If you are the impatient type and open the door while dust is swirling, you should always wear a dual cartridge respirator to avoid breathing the dust.

Always leave your dust collector on while removing objects from the cabinet to control dust. After the object has been removed, turn off the dust collector and light.

### **Turning off the blaster:**

To shut down the system, simply close the main air valve (item #1, diagram A) and pull the pressure release valve (item #4, diagram A) The procedure outlined above is the basic procedure you will use whenever you sandcarve. Of course after you get the procedure down with a test piece or two, your object will be prepared with a photo resist stencil, so your etching will produce a design.

PhotoBrasive• Systems provides you the tools to create high quality sandcarved pieces, of any complexity, fast and easy. With our photo resist products and equipment, you can effortlessly create stencils of your intricate graphic designs, company logos or lettering - for use on a variety of surfaces (crystal, glass, stone, ceramic, and more). Call us today for a Lake Superior Crystal♠ catalog! These beautifully polished optic crystal and jade glass blanks are a perfect choice to convey sophistication and elegance.

## **Section 5**

### Maintenance Procedures

There are some important maintenance procedures required to keep your Sandcarver II in good operating condition. Even if you are not particularly mechanically inclined, most of these should prove easy to perform. Qualified repair personnel can perform any others.

## **1. Dust collector:**

### **Clearing the vacuum bag**

Anytime you are blasting, the dust collector should be turned on. After 30 minutes to an hour of continuous operation, the vacuum bag can accumulate a thick coating of fine abrasive dust, restricting the airflow through the dust collector and causing a buildup of dust in the cabinet while blasting. The restricted airflow can also overheat the electric vacuum motor, shortening its life span.

To prevent this, stop blasting and turn off the dust collector at least every hour. This allows the weights attached to the bottom of the vacuum bag to fall back down into the lower part of the collector, emptying the bag into the canister. When you restart the vacuum, most of the dust will stay in the lower canister allowing the dust collector to resume high efficiency operation.

### **Empty the canister**

To keep the dust collector functioning properly, you should empty the dust out from the lower canister every few days. Don't let more than a few pounds of dust accumulate in the canister.

Wearing a good cartridge type respirator, disconnect the dust collector from the Sandcarver II and take it outside. Open the canister, carefully remove the bag and shake it into a plastic lined trash can. Empty the dust from the lower canister into the trash can, reassemble the dust collector and attach it to the cabinet.

### **Replace vacuum bag**

After a few months to a year of use, the vacuum bag will begin developing pinholes that will allow dust to go through the bag. This will ruin the motor if allowed to continue and will permit unfiltered dust into the room. Inspect the bag whenever you empty the dust. When you notice holes in the bag or anytime you notice dust coming out of the dust collector while it is in operation, replace the bag with a new one.

### **Replace motor**

In spite of your best efforts, the bearings and bushings of the vacuum motor will eventually burn out. This will cause the motor to have a grinding sound whenever it is running, which will get worse over time. Replace the motor whenever you notice this grinding noise. This may happen in 4 months to a year, depending on how well you maintain the unit. It may be a good idea to have a spare motor on hand. Replacing the motor is something a handyman, electrician or vacuum technician can do. With a little mechanical experience and knowledge about motors, you can easily do this yourself.

## **2. Blaster**

### **Drain the water separator**

A water separator or filter is highly recommended to be installed on your blaster. This mechanism helps keep moisture in the air from condensing in your blaster and reduces the risk of abrasive clumping. In order for the water separator to be effective, you must empty the separator on a regular time schedule, the frequency of which depends on how humid it is in your part of the country. In humid areas, it could be as often as every 20-30 minutes, while in dry parts of the country, it could be as infrequent as every couple of days.

Empty the separator by opening the mechanism at the bottom of the container and allowing the water to flow out, pushed by the compressed air in the system. After all water is exhausted, close the mechanism. If you are in a very humid area, you may have to leave the mechanism open very slightly, so that it will continuously drain water as it accumulates. If your abrasive still gets too damp to flow well, speak to your sales representative about adding a higher efficiency water separator to your system.

### **Replace your blasting nozzles:**

It only makes sense that the same abrasive that erodes glass or stone will erode your blasting nozzle. It will wear out from the inside, enlarging the orifice until it is so large that it uses an excessive volume of air from your compressor, causing the compressor to run continuously.

Nozzles should be replaced as soon as you realize that your compressor is running most of the time, trying to keep your blaster supplied with air. If your compressor runs constantly and doesn't get time to cool off, it can overheat and sustain damage.

### **Over filled blaster**

If you pour too much abrasive into your pressure pot, the stopper on the pressure pot will not be able to seal and pressurize. If the pot does not pressurize, you cannot blast. The best way to solve this problem is to first turn off the air from the compressor and disconnect the air hose. **IMPORTANT NOTE: ALWAYS TURN OFF THE AIR FROM THE COMPRESSOR, TURN OFF THE MAIN AIR VALVE, DEPRESSURIZE THE PRESSURE POT AND DISCONNECT THE AIR HOSE BEFORE ATTEMPTING TO WORK ON THE BLASTER OR ANY ATTACHED PART.**

Place a plastic drop cloth on the floor under the blaster to catch the abrasive. Remove the cap from the pipe cross (item #6, diagram A) and let the abrasive drain out. Once abrasive stops draining, replace the cap and refill the pressure pot with a portion of the abrasive. Another option is to open the oval shaped cleanout cover (item #9, diagram A) on the front of the pressure pot and push it into the tank, allowing the abrasive to fall out. When the abrasive gets low enough that it stops coming out on its own, reach your hand in and remove more abrasive, until it is about 2 inches below the opening of the cleanout. This will allow you to reinstall the cleanout cover and seal it properly. Make sure the bolt and fixture holding the cleanout cover are sealed well and tightened securely. Refill blaster with a portion of the abrasive that has been removed, but do not overfill again.

### **Damp abrasive**

When blasting in a humid area, your abrasive will naturally absorb moisture from the air. Abrasive combined with moist compressed air can result in abrasive that is so damp it will clog in the bottom of the blaster and will not flow. If you have moisture problems, you can do a couple of things. If the problem is not too bad, you can blow the moist abrasive through the valves and fittings at the bottom of the tank to restore consistent flow. **THIS MUST BE DONE WITH THE CABINET DOOR CLOSED!** To do this, remove the nozzle and nozzle holder from the end of the blasting hose, raise the pressure to 40-50psi, close the choke valve (item #5, Diagram A), open the abrasive metering valve all the way, and step on the foot pedal. A large amount of abrasive will come sputtering and shooting out of the hose. After 3-5 seconds, the moist abrasive should purge from the system so you can resume blasting.

If this doesn't work or you have to perform this procedure every half hour or less, you will have to open the cleanout as mentioned previously and remove all abrasive from the blaster. Disconnect the air hose from the compressor, turn off the main air valve, depressurize the pressure pot, disconnect the hoses from the bottom of the blaster, remove the fittings and valves and clean out the damp abrasive. Reassemble all the parts, attach the hoses, and fill the pressure pot with fresh, dry abrasive.

If the abrasive is not contaminated with oil, you can possibly dry it out by baking it in an oven, a little at a time, spread thin on a cookie sheet or large tray. Bake at a low temperature for about 10 minutes. Allow cooling just enough to put into a sealed storage container, and keep container closed to prevent more moisture absorption.

### **Replace abrasive hose**

Sooner or later, the abrasive will wear a hole through the abrasive hose. This usually happens within a few inches of where the hose attaches to a metal fitting at the bottom of the blaster or to the nozzle holder. When this happens, simply stop blasting. Turn off the air compressor. Disconnect the air hose from the compressor, turn off the main air valve, depressurize the pot, remove the hose clamp and hose from the fitting, cut a segment of the hose off that includes the hole (plus 2 or 3 inches) and reinstall the hose. After doing this a few times, the hose may get short and you will need to replace the entire hose. Average time to develop a hole in the hose is from 6 months to several years, depending on how much blasting you do and what pressure you use.

### **Replace mixing valve**

The mixing valve, or abrasive metering valve, will eventually wear out and you will not be able to adjust the flow of abrasive properly. The seals may fail and the valve will develop air leaks around the stem. To solve this problem, simply remove the valve and replace it with a new one.

### **Replace diaphragm in foot pedal**

The foot pedal operates a valve (the media valve, item #8, Diagram A) that turns your blaster on when you step on the pedal, and off when you step off the pedal. There is a rubber diaphragm inside the valve that allows this to happen. The diaphragm will eventually develop a hole in it that prevents the blaster from turning off completely when you remove your foot from the foot pedal. To fix the problem, turn off the air, disconnect the air hose from your blaster and depressurize the pressure pot. Remove the 4 bolts and nuts from the valve body and separate the valve at the seam in the middle, where the edge of the black diaphragm shows. Remove the diaphragm, replace it with a new one, and reassemble the valve and continue.

### **Debris in blaster**

Because the filter screen is permanently attached to the inside of the hopper of the cabinet, you should rarely have the problem of clogged abrasive due to debris in the bottom of the blaster. The symptoms are clogging of the abrasive and lack of free flowing abrasive with which to blast. The diagnosis of the problem and the solution are the same as with damp abrasive. If you can't use the air pressure to blast out the obstruction, you will have to remove the abrasive in the pressure pot and remove whatever material is clogging it, either damp abrasive or debris.

### **3. Blasting Cabinet**

#### **Clean strainer screen**

Because the pressure pot is built into the cabinet, there must be an integrated filtration screen or strainer to strain foreign particles and debris out of the abrasive to keep them from getting into the pressure pot. This screen is in the bottom of the cabinet, permanently mounted over the opening into the pressure pot.

You have to clean off the screen anytime there is debris on it. Excess debris on the screen will restrict the flow of abrasive into the pressure pot. To remove the debris, simply open the cabinet door, raise the metal worksurface, insert the wand from a vacuum cleaner under the worksurface and vacuum off the screen. This should take about 3 minutes and should be done after every 5 or 6 days of blasting, or whenever debris accumulates on the screen.

#### **Replace gloves**

Gloves are mounted in the armholes in the cabinet to protect your hands and arms. These gloves will develop holes in the fingers with prolonged use. When this happens, we recommend that you replace the gloves. Simply remove the clamps holding the gloves onto the mounting brackets, replace the gloves and tighten the clamps.

#### **Replacement of mylar**

Reflected abrasive, bouncing off the object being blasted, will slowly frost the inside of the cabinet window, making it difficult to see what you are doing. Since replacing the glass window is time consuming and expensive, the inside of the window can be protected with a mylar sheet attached with adhesive strips. When the mylar gets scratched and frosted to the point where it is difficult to see through, remove it and wipe the excess dust off the glass and reapply a new mylar piece.

To reapply a new mylar piece, unroll and remove the protective strips. Holding the mylar with the adhesive towards the glass, reach into the cabinet carefully, avoid getting dust on the mylar or the adhesive and press the adhesive to the glass one side at a time, until all 4 sides are adhered to the glass.

#### **Replace the window**

Since mylar attracts abrasive, some users may prefer to replace the glass window. Simply loosen the screws holding the glass brackets onto the cabinet, slide the glass out and dispose of it.

### **4. Compressor**

Even though PhotoBrasive® Systems doesn't sell compressors, we want to remind you that there are a couple of very important things to remember about maintaining your compressor. Always follow the maintenance, operational and safety instructions from the compressor manufacturer. Maintain your compressor properly and it will give you better service and will last longer.

#### **Drain the air compressor tank**

Moisture from the air will condense inside the air compressor tank. It will collect there until it is drained out at the bottom. If you regularly drain the water from your air tank (according to the manufacturers instructions), you will have less trouble with moisture clogs in your blaster. Keeping water out of the tank leaves more room for air storage and increases the safety and longevity of the air tank.

## Change oil

The oil in the compressor lubricates internal parts of the compressor pump. Remember to add oil before starting the compressor for the first time, keep the oil level at the manufacturer's recommended level, and change it according to the manufacturer's recommended schedule. Maintenance is important!

## Section 6

### Frequently Asked Questions

#### IMPORTANT: BE SAFE!

**Whenever you are performing maintenance or repair on the Sandcarver II, always turn off the compressor, disconnect the air hose from the blaster, turn off the main air valve, depressurize the pressure pot by stepping on the foot pedal and unplug the unit from the electrical outlet. Always wear appropriate safety gear, including safety glasses, gloves as necessary, and a respirator (when working with abrasive or abrasive dust)**

#### Symptom 1: No abrasive coming out of the nozzle

##### Solution:

Does air come out of the nozzle when you step on the foot pedal? If no, go to question 2. When you reestablish air flow, check for abrasive flow. If there is none, return here. If there is air flow from the nozzle, but no abrasive:

1. Check the abrasive metering valve (item #7, diagram A) at the bottom of the blaster. If it is turned off, no abrasive will come out. Open the valve slowly. For proper abrasive flow, the valve should be open between 30 degrees to 45 degrees from the closed position.
2. You may have run out of abrasive in the pressure pot. If so, stop blasting and refill according to the instructions in Symptom 3, number 2.
3. Still no abrasive? The problem could be damp abrasive. To check, turn off the main air valve and depressurize the pot. Next, remove the nozzle holder and nozzle from the end of the blast hose. Close the choke valve and open the abrasive mixing valve all the way. Turn on the main air valve. Turn the pressure to 40-50 psi and step on the foot pedal. If abrasive starts shooting out the end of the hose, in large damp clumps, moisture is the problem. Clearing the clogged abrasive by pressure will generally work for a few hours to a day or two, but clogging will continue to worsen until you replace the damp abrasive with dry abrasive as mentioned under the maintenance section.
4. If the moisture is enough to slow the flow of abrasive but not enough to stop it, you will not be able to etch successfully since so little abrasive is coming out. To solve this, you can partially close the choke valve, to force a higher percentage of the air into the pressure pot. You can operate the blaster with the choke valve from 10% to 50% closed to force more abrasive out the nozzle during a blasting job, but you will eventually have to replace the damp abrasive. If you close the choke valve more than 50%, you will restrict the air volume so much that your etching speed will dramatically decrease.

## **Symptom 2: No air coming out of the nozzle**

### **Solution:**

1. Check to see if the compressor is on and pressurized. Also, make sure the main air valve (item #1, diagram A) leading from the compressor to the blaster is turned on.
2. Is the regulator turned on and the blaster pressurized? If the regulator is adjusted to zero pressure, the pressure pot cannot be pressurized and no air will flow through the system. Adjust the regulator to between 5 and 40 psi and step on the foot pedal to test.
3. Is the nozzle clogged? Occasionally, little pieces of debris like pieces of resist, metal shavings from the cabinet, wood chips or rubber (from a rubber mat in the cabinet) can get through the filter screen, through the blaster and into the nozzle. If these pieces are large enough, or if there are two or three of them, they can completely clog up the nozzle. To remove the clog, turn off the main air valve and depressurize the pressure pot. Unscrew the nozzle holder and take the nozzle off, push a small wire or nail into the nozzle and remove any obstructions.
4. Is the choke valve on? If not, almost no air will come out. There may be a slow, steady stream of abrasive if the abrasive mixing valve is open. With low pressure, no abrasive may come out even if the abrasive mixing valve (item #7, diagram A) is open, especially if the abrasive is a bit damp. Open the choke valve and step on the foot pedal to check for air flow. If there is none, see the next step.
5. If you are using pressure below 20 psi and if you step on the foot pedal when the mixing valve is open and the choke valve is closed, the abrasive hose may fill up with abrasive and become clogged from excess abrasive. In this case, close the mixing valve, open the choke valve, turn the pressure to 40-50 psi and step on the foot pedal. If this doesn't clear the hose, remove the nozzle holder (to further reduce flow restrictions) and try again. If this doesn't work you will have to remove the fittings and valves at the bottom of the pressure pot and manually clean them out. This may even involve opening and cleaning out the media valve in very bad cases. Refer to section 5, maintenance procedures for overfilled blaster and damp abrasive.

## **Symptom 3: Blaster seems to be etching very slowly**

### **Solution:**

1. Is the pressure set properly on the regulator? If the pressure is low, blasting will be slow. Raise the pressure to increase blasting speed. 25 - 30 psi is recommended, for most surface etching and light carving.
2. Are you running low on abrasive? If you have not stopped to refill the pressure pot in a couple of hours, all of the abrasive could be sitting in the hopper. In that case, simply turn the main air valve off and step on the foot pedal until the pressure pot is completely depressurized. The pressure pot stopper will drop down, allowing the abrasive to fall from the hopper into the pressure pot. Allow several minutes for all of the abrasive to fall. Tapping on the hopper with your hand will speed-up the process.
3. Is the blaster running out of abrasive? As you recycle the abrasive through the pressure pot time after time, it breaks down into dust and is sucked into the dust collector. Eventually, you will have little or no abrasive left in the pressure pot. To prevent this, whenever you empty the dust from the dust collector, add the same amount of new abrasive to the blaster, through the cabinet.

Do you have too much abrasive in the air stream? The purpose of the abrasive mixing valve at the bottom of the blaster is to provide a variable amount of abrasive that gets mixed into the air stream from the compressor. You can increase the amount of abrasive in the air stream (to increase the speed of etching) by opening the valve, or decrease the amount of abrasive (to decrease the speed of etching, giving you more control) by partially closing the valve. However, if you open the valve too much, the excess abrasive actually slows the etching speed down. This is considered too rich of a mixture of abrasive to air flow. You can tell if you have too rich a mixture if the abrasive is surging and sputtering out of the nozzle. The mixing valve only moves 90 degrees from completely off to completely on. The normal setting for this valve varies from 1/3 to 2/3 open.

#### **Symptom 4: Abrasive flow is inconsistent**

##### **Solution**

This situation can evolve from damp abrasive or debris in the blaster or nozzle. Damp abrasive and nozzle obstructions have been discussed previously. If all else fails, open the cleanout and remove all abrasive from the blaster, check for debris and remove any you find. If there are small pieces that could have gotten into the valves under the blaster, you may have to remove them and clean out as described under damp abrasive in the maintenance section.

#### **Symptom 5: Too much dust in the cabinet-can't see while etching**

##### **Solution**

This is caused by either setting the abrasive flow too high or problems with the dust collector.

1. If abrasive is sputtering and surging out of the nozzle, the abrasive flow is set too high and will not only slow down the etching speed, but will also cause the cabinet to be very dusty inside. Simply reduce the abrasive flow by partially closing the abrasive mixing valve and the cabinet will clear in a few seconds.
2. If you have been blasting for more than 45 minutes or an hour without stopping, the dust collector bag is probably caked with abrasive dust. This condition drastically reduces the air flow from the cabinet to the dust collector. Stop blasting, turn the dust collector off and let the motor completely stop. The weight on the bag will force the bag to drop - shaking the dust into the bottom canister. Turn the dust collector on and the air flow should be much better.
3. The dust collector hose could have become partially or completely detached from either the cabinet or the dust collector, the vacuum hose could have a hole in it, or possibly the motor could be wearing out. If the motor is failing, you can generally hear the bearings grinding. In this case, replace the motor.

#### **Symptom 6: Blaster won't shut off when you take your foot off the pedal**

##### **Solution: *This could be one of two problems.***

**First:** if the blaster stays on 100% when you take your foot off the pedal, that only means one thing: The air pressure from the air compressor has fallen lower than the blasting pressure set on the Sandcarver II regulator. In order for the foot pedal to work properly, the pressure on the foot pedal should be at least 10 to 20 psi higher than the regulator pressure. (It is common for the air compressor pressure to be 40 - 60 psi higher than the regulator pressure.) Since air compressors are set to turn on and rebuild pressure when the tank pressure falls to about 90 psi, and you will rarely blast over 60 psi, you will normally not have this problem.

##### **However, this could happen under the following circumstances:**

1. You forget to turn on your air compressor when you started blasting. If the air valve is on from the compressor and you have a full tank of air, you may not notice that the compressor is not on since you have enough air pressure to blast for a few minutes. This could also happen if your compressor has a blown breaker. To solve, turn the breaker or compressor on.

2. If you have a regulator on your compressor and it has been turned down to a pressure no more than the pressure at which you are currently blasting. Turn the air compressor regulator up to 80 psi. Always keep the regulator on the compressor set at least 20 psi higher than the highest pressure at which you intend to blast.
3. You may have allowed your nozzle to become worn out and enlarged to the point where it is using all the air from your compressor. In this case, the compressor will not be able to build enough pressure. It will be running constantly, yet the air pressure will gradually fall to zero because the nozzle is using more air than the compressor can produce. When the pressure from the compressor falls to about the same pressure at which you are blasting, taking your foot off the foot pedal will not stop the blasting. This occurs much faster with a small compressor than with a large compressor, but the solution is the same - replace the worn nozzle with a new one. Let the air compressor cool off for an hour or so (if it seems overheated), then begin blasting again.

But what do you do if this happens while you are blasting? Simply turn off the choke valve and the mixing abrasive valve and the blasting will immediately stop. Make sure the blast hose is not aimed at your blast object since it might ruin the object. Hold the nozzle with one hand, pointing it away from your object, while you reach down with the other to turn off the choke valve, then reach over with one foot to turn off the mixing valve.

**Second:** The problem could be that when you take your foot off the pedal, there is a small amount of abrasive and air that comes out of the nozzle, but not the full force. This is an indication that a small hole has developed in the media valve diaphragm or the media valve has become clogged with debris or damp abrasive, and cannot close completely.

To correct this condition, turn off the air compressor, disconnect the air hose, turn off the main air valve, and depressurize the pressure pot. Open the media valve and clean it out or replace the diaphragm according to the instructions under maintenance of the blaster, "Replace the diaphragm in the foot pedal".