



EZFORM
Vacuum forming machines

PRODUCT MANUAL SV 1217
110-120 volts

Introduction

Thank you for your purchase. Your EZFORM SV 1217 vacuum forming machine is designed to be portable and powerful enough to perform most tasks. One of its unique features is that it can be plugged into a regular household outlet and it uses a specially designed 110 -120 volt 1500 Watts (approximately 12.5 amps) heating element, which is extremely durable and has a long life. The only thing you will need is a vacuum source such as a household vacuum/shop vac or a vacuum pump. If you have a vacuum source that has a large opening you can purchase reducers for the vacuum head to convert it to a smaller size, or tape it around the suction port. You can also use an electric pump connected directly to the small brass outlet for added suction (7/16 "O.D. x 5/16 "I.D. Vinyl or similar tubing recommended). Two suction sources can be used at the same time and the transition from one vacuum to another will be automatic. Please make sure the small brass port is capped if no vacuum source is connected to it

Step 1

Locate a safe and ventilated area to work and wear gloves.

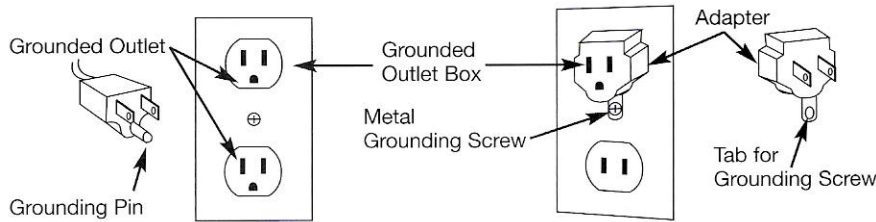
Step 2

Connect the vacuum source(s) to the left side of the unit Practice the movement of the frame going up and down (Both shafts should be lightly lubricated) . Make sure to bring both sides up or down at the same time. The frame will move very easily when this process is done correctly.

Step 3

Plug the unit in to a grounded outlet (please refer to the picture below), and never touch the oven unless the unit has been turned off for at least 15 minutes. At this point you can turn on the unit (switch located on the right side of the unit) and allow it to warm up. Place your mold(s) on the platen (forming area) and try to center the mold(s). Place thin washers/spacers under the mold to aid air flow. The mold should always be smaller than the platen by at least ½ to 2 inches from each side. Taller molds may require a lot more open space on the sides. If you try to use multiple, tall or awkward molds depending on depth and shape you might get some webbing (plastic folding on itself). If the mold is really tall in the center (max 7 inches) it should taper down from all sides or you may not be able to use it, unless a follower is used please refer to trouble shooting section. **Take the protective film off the plastic usually on both sides on some plastics.** The recommended plastic thickness is .125 (1/8 ") Thicker gauges can be used depending on the vacuum strength and the type of plastic used.

GROUNDING METHODS



TEMPORARY ADAPTER MENTIONED ABOVE
CANNOT BE USED IN CANADA

Step 4

At this point the oven is warming up. It usually takes about 2-3 minutes for the initial warm-up after that you can form parts in a series with no delay. After the oven has warmed up bring the frame down (half way) open the thumb screws and the frame, place the plastic on the bottom frame and tighten the thumb screws. The frame is adjustable in the rear to accommodate different plastic thicknesses, simply loosen the screws in the back (**lower screws**) and adjust. Bring the frame up all the way to the oven (make sure it is straight so it heats up evenly. The sag rate will depend on the plastic thickness/type, mold shape, mold height, but 2-3 inches is a good starting point (more for taller molds). If you are using thicker plastics or other forms of plastics that are harder you may need to heat the plastic longer and the opposite for thinner plastics.

The key thing to remember is that the plastic on the frame should be heated **evenly including all four corners**. You can use a rounded stick or pencil to touch the plastic momentarily when it's sagging to get a feel of how you are doing on the corners. The more the plastic is heated the more detail will be transferred to the finished part, but this must be balanced so webbing does not occur. If webbing occurs either the plastic is too thin (try thicker plastic), you are trying to form multiple awkward objects at once, plastic has stretched too much or you need to raise the mold. This can be accomplished by cutting a piece of wood 2-3 inches high depending on the severity of the web slightly larger or same size as your mold (follow the contour of the mold) and placing it underneath the mold. You may need to drill some holes in the spacer you created for suction. This will cause the webbing to occur below the mold where it's not important in some cases. It is always better to keep the mold at room temperature or warmer since a cold mold will cause the hot plastic to cool faster as it touches it (especially when using thinner plastics). You can place your mold(s) on the platen while the machine is warming up to keep them warm.

Step 5

At this point turn on the suction source, and bring the frame down (make sure you bring it down all the way so the hot plastic makes contact with the frame and acts as a gasket). This movement should be quick and you should bring it down in a way that you come down level on all sides. As soon as the hot plastic goes over the mold and makes good contact with the forming area it will be sucked over the mold. Turn your suction source off once the plastic has cooled (you can leave the heater on if you are going to form more parts). The distance between the oven and the platen will not allow the plastic to get soft again. If you lift the plastic early (while still soft) it may deform. If you have trouble getting your mold

out of the vacuum formed part you can use compressed air and blow some air between the formed part and the mold, this will make it easier to separate the two in some cases. Chalk dust or other release agents can also be used on the mold to make the separation easier (Not on clear plastics).

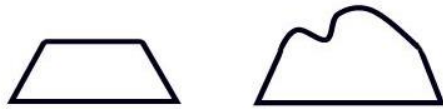
If you need help or have questions we can be contacted at :
sales@centroform.com

General Comments and tips

- If your mold has undercuts you might have to cut the plastic to get it out.
- You can easily use common items as molds for practice or make custom molds from plaster, metal (any kind), wood or experiment with different materials. Some molds will require a hole to be drilled from top to bottom so air can go through. This is usually needed in areas where vacuum will have a hard time pulling, like recessed parts in a mold.
- You can also make a duplicate mold by vacuum forming a part and pouring plaster of Paris/liquid plastic/2 part polyurethane in the mold and letting it cure. In order to get a crystal clear part (using clear plastics) the surface of the mold has to be very smooth.
- Please make sure your mold has the correct geometry for vacuum forming. The picture below shows the general shape of a mold that is suitable for vacuum forming.



Incorrect Mold Geometry



Correct Mold Geometry

Plastics:

In General most plastics are vacuum Formable. The type of plastic you decide to use should depend on your application. Some are harder than others and some form with better detail. One important thing to remember is that some plastics will absorb moisture if they are stored improperly or if they are old pieces. If you get bubbles in the formed part(s) then the plastic has absorbed moisture in it. Polycarbonate or Lexan may need pre-drying first in a circulated oven before use for about 1 hour (at 150-200°) or more depending on the thickness and moisture level. Some other plastics may also need pre-drying before use, please check with your plastic supplier. For food related or other products that need to be clear PETG (FDA approved) is the most common plastic used and it forms around 300 -330°. You can also use it for packaging, sign making, chocolate molds and almost anything else. ABS and Styrene are great for all around use and from around 350-390°. There are many other plastics but these 3 should be on the top of your list. Polycarbonate is a tough plastic but it is also hard to vacuum form. It requires a very strong vacuum, the sheets need to be pre-dried,

and the mold must be kept hot since it cools on contact. There are other plastics like Vinyl, PVC, Acrylic, Clear Acetate Butyrate, Kydex, Polyethylene but we recommend PETG, ABS, and Styrene since most plastic suppliers carry them and they are fairly inexpensive and easy to form. Also some plastics can generate some smoke or undesired odors and a respirator may be required.

Maintenance:

This machine does not require much maintenance due to its simplicity. However there are couple things you can do to prolong the life of the machine.

- 1- Always unplug the unit when not in use and for general maintenance.
- 2- Do not let dirt and particles enter the suction area, you can turn the table upside down and use a vacuum cleaner to suck any dirt out.
- 3- Lightly lubricate the round guide rails on both sides of the unit for a smoother operation (place some lubricating oil on a cloth and go over the round rail)
please note a very small amount is necessary do not over lubricate .
- 4- Keep the forming area clean specially the metal platen where the hot plastic first makes contact. The platen (forming area) should not be used for drying or any other uses. **Do not leave plaster molds on the forming area for long periods !**

Trouble shooting:

Webbing (plastic folds on itself) :

Possible causes:

- 1-Plastic is too thin (try thicker plastic)
- 2- You are trying to form multiple awkward objects at once
- 3-Plastic has stretched too much
- 4-Raise the mold by placing a wood cut out (same shape) on the bottom
- 5-Too much vacuum is applied too early try an electric pump instead of a shop vac or try to regulate the shop vac flow
- 6-Sharp awkward corners/shapes

The hot plastic is not sucked over the mold:

Possible causes:

- 1-The mold is too large or tall
- 2-Try heating the plastic a little longer, or use thinner plastic
- 3- Make sure there is adequate suction and no leaks
- 4- Your mold is too tall try making a follower. A follower is a cut out pattern from wood (same shape as your mold but larger all around, hollow in the center). It is used to push the hot plastic down when forming
- 5- If you are using only a vacuum pump try using it with a shop vac simultaneously
- 6-If the brass out let is not being used keep cap on so there is no suction loss

Not enough detail on the formed parts:

Possible causes:

- 1-Try drilling tiny (1/16 inch) holes in the mold especially in recessed parts where the vacuum will have a hard time pulling
- 2-Make sure the vacuum has no leaks and has good suction (check the filter)
- 3-Heat the plastic a little longer or use thinner plastic
- 4-Use a vacuum pump in conjunction to the shop vac

Using storage tanks and other vacuum pumps with the machine:

This machine is equipped with 2 suction ports on the left side they do not to be plugged or covered since they will open only when suction is applied.

Possible options:

- 1- Use only a shop vac inexpensive and simple with great results for thin gauge plastics.
- 2- Use a shop vac and an electric pump (transition from shop vac to electric pump is automatic just leave both on) connect the vacuum pump to the small outlet (Use a shop vac for initial suction then use a vacuum pump that pulls about 26 or more In.Hg. and has a CFM of 2 or higher for secondary high source)

great for tall molds

- 3- Use only a direct vacuum pump, a simple and efficient way if you have an electric pump that is 4 CFM (cubic feet per minute) and it pulls 25 In.Hg. or more . Connect it directly to the small brass outlet.
- 4- If using a storage tank we recommend connecting it directly to the larger outlet, you can still use a vacuum pump in conjunction and attach it to the smaller brass outlet. Transition from storage tank to the vacuum pump is automatic just have the electric pump running before using the storage tank.

Safety Warnings & Cautions

1. Keep work area clean. Cluttered areas invite injuries.
2. Keep Children away. All children should be kept away from the work area. Don't let them handle the machine, disassemble, or play with the machine.
3. Do not operate the machine if you are under the influence of Alcohol or drugs.
4. Use a respirator and Protective Gloves at all times.
5. Use an outlet that is grounded and properly maintained.
6. Do not attempt to modify or repair the machine.
7. Always turn machine off and unplug it when not in use.
8. Always work in a well-ventilated area.
9. Do not let loose material around you touch any part of the oven at any time. Never touch the oven unless you are certain it is not hot.
10. Use common sense when operating the machine.
11. Never use the machine for something it was not designed for.
12. If unsure do not use the machine. Get help before you proceed and read the manual.
13. Use safe plastics that are recommended for vacuum forming.

14. Store the unit after it has completely cooled.
15. Use extension cords that are suitable for high draw equipment
16. Always unplug the unit and turn it off when not in use to prolong element life and for safety purposes.
17. Follow the instructions and do not try to modify repair the machine.
18. The oven does get very hot do not touch it or place flammable material on top or around it.
19. Store the device in a safe dry place away from children, and exposure to harmful elements.

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