

PEPSI CAN STOVE INSTRUCTIONS

[NOTE: Updated Instructions are now available. The new stove is less likely to develop flame leaks and the fuel/air mixture is improved. Instructions for a simmer ring are provided as are instructions for a smaller version of the stove.]

If the directions are unclear or you have suggestions on how to improve the stove construction or function please post to the stoves section in the Message Board on this web site or e-mail Scott Henderson directly.



[FIGURE 1]

STEP 1. MAKE THE BURNER HOLES.

With the push pin (or small drill bit) make a circular ring of 24 to 32 evenly spaced holes **OUTSIDE** and concentric with the circular ridge on the bottom of the soda can (Figure 1).

The location of the holes can be marked with a marking pen before making the holes. A hammer can be used to tap on the push pin. The hammer will save wear and tear on your thumb and will provide more penetration control. Smaller holes are made if the push pin is not allowed to penetrate its full length.



[FIGURE 2A]

STEP 2. FORM THE LARGE CENTRAL HOLE.

The large central hole in the top stove section can be formed with or without a drill. The drill-based method is described in detail first.

The central bowl-shaped section of the bottom of the soda can is about 45 mm in diameter (1 3/4 in). To cut it out, make another circular ring of about 16 evenly spaced holes with the push pin, but this time make the holes **INSIDE** and concentric with the circular ridge (Figure 2A). These holes are pilot holes for the large drill bit and should be positioned inside the base of the ridge slightly more than the radius of your drill bit so that you don't drill out any of the ridge material.

Drill out the pilot holes (Figure 2B). Drill vertically so as not to drill through the side wall or your hand.

Depending on the size of the drill bit, there will be some aluminum between the holes. Cut through this aluminum webbing with the diagonal cutters (or scissors) to form a large hole with a jagged perimeter (Figure 2C). Warning: If you try to tear out the center piece with needle nose pliers you may bend the rim of the can.



[FIGURE 2B]

Alan Crabtree suggests an alternative way to make the large central hole. He writes, "After making several of them I decided that, at least for me, it is much easier to cut out the center of the can with a utility knife rather than making a number of drilled holes. Holding the can firmly, I lightly score along the inside rim while turning the can until I get a pretty smooth circle. You can keep scoring with a little more pressure until the bottom pops out. There is no need to actually push the knife all the way through. You get a much cleaner cut and you don't need a drill."



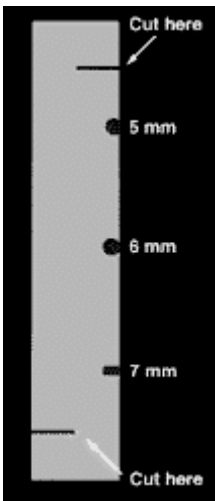
[FIGURE 2C]



[FIGURE 2D]



[FIGURE 3]



[FIGURE 4A]

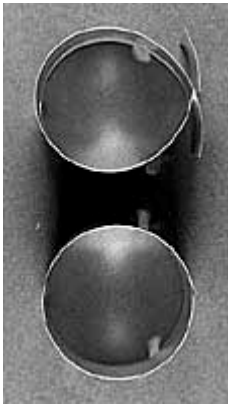
No matter how you cut out the large central hole, smooth the hole with a half round file. Remove material right up to the base of the ridge (Figure 2D). To remove material quickly, place the can on its side on a flat surface and move the file horizontally. For more fine work, place the can on its end and move the file vertically. Try not to bend the walls of the can when filing, particularly at the end with the burner holes. Smooth any sharp edges inside the large hole with the file and sand paper after you cut the top section to size in Step 3. At that time, make sure the circular groove (i.e., the inner surface of the circular ridge) is free of metal particles.

STEP 3. CUT OUT THE TOP AND BOTTOM SECTIONS.

Cut the top can section 20 mm (3/4 in) in height (Figure 3).

Use a second soda can for the base section. Cut the base section 25 mm (1 in) in height. A good cut will vary by a millimeter or less in height around the entire circumference. The precision of the cut is more important for the bottom section than the top.

To make an even cut, draw a circle around the entire circumference of the can with a marking pen. Keep the marker stationary while you rotate the soda can about its long axis with its bottom on a flat surface. To keep the marker stationary, use a piece of cardboard with a hole cut in it to insert the marker tip. Actually the cardboard should have two holes, one 20 mm (3/4 in) from a straight edge and one 25 mm (1 in) from a straight edge for the top and bottom section, respectively.



[FIGURE 4B]

STEP 4. MAKE THE INNER WALL OF THE STOVE.

From the walls of a third soda can, cut out a rectangle 35 mm (1 3/8 in) wide and 190 mm (7 1/2 in) long (Figure 4A). To do this is to use scissors to horizontally cut off the top and bottom of the soda can close to the ends so that you have a cylinder with ragged edges. Cut vertically straight across the cylinder to form a long rectangle with ragged long sides. Lay the aluminum down on a cutting board and place a ruler on top parallel to a long side. Trim off one ragged long side with the utility knife using the ruler as a guide. Measure 35 mm (1 3/8 in) from the new clean edge and repeat the cut on the opposite long side. The long sides of the rectangle should be as parallel as possible. Trim the ends so that the rectangle is 190 mm (7 1/2 in) long.

When cutting the aluminum with the ruler and utility knife, score the aluminum and repeat several times. Then bend the aluminum over at the score once or twice and it will break right off.

Cut a slit into each of the long sides of the rectangle (Figure 4A). The two slits should be 150 to 152 mm apart (5 15/16 to 6 in) and each long side of the rectangle should have only one slit. Slit depth (or length) should be slightly more than half the length of a short side, or about 20 mm (3/4 in). Make the slits as perpendicular to the long sides as you can. Center the slits, that is, if your rectangle is 190 mm (7 1/2 in) long the slits should be about 20 mm (3/4 in) from each end.

To allow alcohol to flow from the middle of the stove to the perimeter, make three gaps along one of the long edges of the rectangle (Figure 4A). Measuring from one of the slits, mark the location of the gaps with a marking pen at 25 mm (1 in), 75 mm (3 in), and 125 mm (5 in). Form the gaps by using a common hole punch set in from the edge about 90% of its diameter or 6 to 7 mm (1/4 in) deep. An alternative way to make a gap is to cut 2 parallel slits about 6 to 7 mm (1/4 in) deep and about 3 mm (1/8 in) apart into the edge of the band. Fold the tab 180 degrees up against the painted side of the rectangle or bend the tab back and forth to break it off. Figure 4A shows 3 different gaps. The 5 mm gap will work but the other two are preferable.

Interlock the two slits of the long rectangle to make a circular band (Figure 4B). It is possible to interlock the slits so that the ends of the band are on the inside or the outside of the formed cylinder. If you interlock the slits so that the ends of the band are outside the cylinder then glue them down with Crazy glue (Figure 4B). This helps position the band into the grooves of the stove bottom and top. A small piece of Scotch tape can be used instead of glue. If you interlock the slits so that the ends of the band are inside the cylinder you won't have to glue or tape them down, but the final product doesn't look quite as good.



[FIGURE 5]

STEP 5. MAKE SLITS IN THE TOP SECTION.

With scissors, cut vertical slits in the vertical sides of the top soda can section. The slits start from the cut edge of the can section and should end 2 mm from the shoulder (rounded edge) of the can (Figure 5). If you cut the slits too deeply flames may leak out at that point. Make eight slits evenly spaced around the circumference of the can.



[FIGURE 6]

STEP 6. ASSEMBLE THE STOVE.

Insert the cylindrical band into the circular groove of the stove bottom so that the edge with the gaps is down. The circumference of the band should be the same as the circumference of the circular groove. If the band fits too loosely or too tightly, make a new one. A band that is slightly smaller than the groove and fits snugly with gentle pushing is acceptable if not preferable. The top of the band should extend 8 to 10 mm ($5/16$ to $3/8$ in) higher than the top of the bottom section. This ensures that the top soda can will rest against the band and not the bottom section.

When fitting the top and bottom soda can sections together make sure the top can with the slits fits over the OUTSIDE of the bottom can. You will need a thin screw driver (or a feeler gauge or a small flat piece of soda can) to help ease the slit tabs of the top section over the bottom section. Don't put a permanent bend in either section. This process is made easier if you fit one side of the top section 5 mm ($3/8$ in) over the bottom section and then tape the two sections together at that point with masking tape. Then use the thin screw driver to ease the other tabs over the bottom section.

When all the tabs are over the bottom section remove the masking tape and gently press the two sections together. At the same time manipulate the inner wall into the grooves of the top and bottom sections. When the band is positioned correctly, press the two sections together tightly. If you made your band correctly the upper and lower sections and the stove ends should be perfectly parallel.

Pull 300 mm (12 in) of High Temperature Flue Tape off the roll and cut it in half lengthwise giving you two pieces of tape $3/4 \times 12$ in, which is enough for two stoves. Trim an inch off each end to have a clean, wrinkle-free piece. Tape over the slits and the junction of the top and bottom sections. The straightest edge of the tape should be the upper edge and should be placed right at the shoulder (rounded edge) of the section with the burner holes. As you install the tape, burnish it by rubbing with your thumb, but don't push too hard and put a dent in the stove.

Congratulations, you now have a completed a Pepsi Can Stove (Figure 6)!

Pepsi One cans are silver and blend in well with the foil tape. However, if you want total coverage of the paint on the sides of the stove, then measure the width of the flat side of your stove (should be about 20-22 mm) and cut the tape exactly to that width.



STEP 7. LIGHT MY FIRE!

Add denatured alcohol to the center of the stove and light it. The stove lights promptly so be careful, you won't see an alcohol flame in daylight. It takes about a minute for the alcohol to heat up and achieve an even burn out the burner holes. Once the stove get going wind will not blow out the stove and neither can you. If you must extinguish the stove immediately, douse it with water.

My pot is about 25 mm (1 in) from the flame. I currently use 3 light weight tent stakes which serve double duty as tarp stakes. A foil windscreen with a circumference slightly larger than the circumference of the pot is routinely used for fuel efficiency. Fire protection under the stove is a good idea if cooking on forest duff.