4 in 1 Cat Stove

Created by: J. Falk , 2003

The last alcohol stove you'll ever need! Backpackers, Hikers, Campers and Survivalists are discovering this versatile backpacking stove.



This powerful little stove can boil 2 cups of water within 4 minutes and runs on denatured or 70% rubbing alcohol. This is a variation of the traditional Cat and Super Cat Stoves. This version adds safety to the Super Cat Stove by incorporating a simple and stable pot stand.

Just a note on pressurized stoves and how they work. These simple stoves create pressure when the cooking pot is placed on top of the stove, sealing the top opening. This creates the simplest version of a pressurized stove I've found. As the stove heats up it vaporizes the alcohol which is ignited and continues to burn until exhausted.

I'll also show you how to build two non-pressurized stoves, possibly the best all weather alcohol stoves around. One of which is a Simmer Stove that can burn for close to an hour.

Let's get started building this simple alcohol stove ...

TOOLS & MATERIALS:

Safety glasses
Drill with 1/4" drill bit or Uni-bit.
Bottle opener (church key).
Tin snips or Dremel tool with cutting wheel
1" wide x 12" long strip of aluminum foil
Paper clip or small metal clamp

One 3 ounce can of cat food.
Two 5.5 ounce cans of cat food.

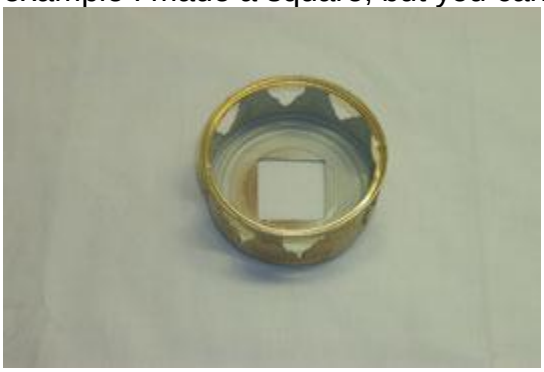
Cost - Less than $1.50.
Build time - 20 minutes.

IMPORTANT: You need to purchase two 5.5 ounce cat food cans from the same supplier. The diameter of the can is important to the design of this stove. Not all brands are the same size, so it's important to buy cans from the same manufacturer. Note: I prefer name bands over generics because the quality of aluminum is better.

STEP 1. PUT ON YOUR SAFETY GLASSES!!!. Always use eye protection when working with metal. Make the burner. Take the 3 ounce can of cat food, remove the lid and drill 8 - 1/4" holes around the center of the can. Use your dremel tool to grind down the jagged edges on the inside of the drilled holes. IMPORTANT: For best performance - do not alter the hole size or their placement around the can.



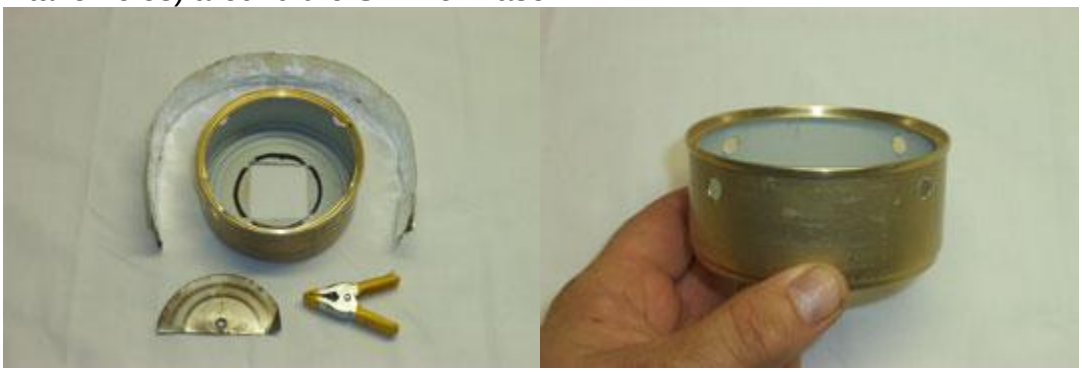

STEP 2. Make the pot stand. Take one 5.5 ounce cat food can, remove the lid, make 8 vent holes around the can using your bottle opener or church key (puncture outside in from the top opening), trim off the punched tabs with your dremel tool. Also, cut an exhaust hole (using tin snips or dremel tool) in the bottom center of the can. In this example I made a square, but you can make a circle if you desire.



STEP 3. Make the base for the Simmer Stove. Take the second 5.5 ounce cat food

can, remove the lid, cut an exhaust hole in the bottom center of the can. In this example I made a square, but you can make a circle if desired. Note - both exhaust holes (step 2 & 3) must not exceed the inner diameter of the smallest circle in the bottom of the can (note the black outline in picture 1 below).

Picture (1) Cut a narrow strip of aluminum foil (1" wide x 12" long, doubled over) to wrap around the Simmer base. Also, cut a half moon simmer plate out of one of the discarded lids or any scrap aluminum, bend up a corner so it's easy to grab. You'll also need a paper clip or small metal clip to secure the aluminum foil strip (to cover the 4 intake holes) around the Simmer Base.



Picture (2) Drill 4 - 1/4" air intake holes from 1/8" to 1/4" down from the top lip around the can. For best performance - do not alter the hole size or their placement around the can.

FINISHED STOVES:

The following stoves are shown without windscreens. I'm assuming you're familiar with building and using a windscreen. If not, windscreens can be easily made out of aluminum foil or disposable aluminum pans used to cook large meats like turkey.

To build a simple windscreen use a piece of tin foil wrapped around the stove and cooking pot. The tin foil should extend from the ground to about 1" to 2" up the side of the cooking pot, with a 1/4" to 1/2" gap around the cooking pot. Puncture a few small holes around the bottom of the windscreen to let air into the stove. Take a look at some windscreen examples in the stove section at www.HomeMadeGear.com or www.ZenStoves.net

The cooking times listed below are based on using denatured alcohol with perfect weather conditions at 78 degrees, no wind and limited humidity. These times may fluctuate based on your environmental conditions. Note: pressurized alcohol stoves

have problems vaporizing the fuel in cold weather. For cold conditions I recommend using my Wood Burning Trail Stove or my non-pressurized **Stove #3** below.

STOVE #1. This is the Super Cat Stove configuration (by Jim Woods) which consists of only the 3 ounce burner with the cooking pot. With this setup you'll boil water in 3 to 4 minutes using 3 tea spoons of denatured alcohol. Total burn time 4 to 5 minutes.



To start this stove ... Place the stove on a safe, flat noncombustible surface. Pour denatured alcohol (4 tea spoons max) into the 3 ounce burner. Carefully ignite with a lighter or match. Wait about 30 seconds for the stove to heat then carefully place the cooking pot on the stove.

Problems: The small 3 ounce can lacks stability, unstable platform for cooking pots. Can not simmer. Does not work well in cold temperatures.
Benefits: Very simple, very efficient. One piece pressurized stove. Rapid boil times.

STOVE #2. Here I show you my favorite setup using the 3 ounce can as a burner and the larger 5.5 ounce can as the pot stand. With this setup you'll boil water in 4 to 5 minutes using 3 tea spoons of denatured alcohol. Total burn time 5 to 7 minutes.





VERSION 1: Burner inside the pot stand.

To start this stove ... Place the stove on a safe, flat noncombustible surface. Place the 3 ounce burner inside the 5.5 ounce vented pot stand. Pour denatured alcohol (4 tea spoons max) into the 3 ounce burner. Carefully ignite with a lighter or match. Wait about 30 seconds for the stove to heat then carefully place the cooking pot on the stove.

- OR -




VERSION 2: Pot stand over the burner. Note - this version works best if you want to quickly switch to the Simmer Stove after the boil.

To start this stove ... Place the stove on a safe, flat noncombustible surface. Pour denatured alcohol (4 tea spoons max) into the 3 ounce burner. Place the 5.5 ounce vented pot stand over the 3 ounce burner. Carefully ignite with a lighter or match. Wait about 30 seconds for the stove to heat then carefully place the cooking pot on the stove.

Problems: Slightly longer boil times than stove #1 (Super Cat Stove) above. Two piece stove as opposed to one piece. Can not simmer. Does not work well in cold temperatures.
Benefits: Simple to use. Larger diameter pot stand creates a more stable platform for cooking pots. Acceptable boil times. Longer burn times. Pressurized stove.

STOVE #3. Here's an excellent all weather non-pressurized stove. With this setup you'll boil water in 4 to 5 minutes using 3 tea spoons of denatured alcohol. Total burn time about 6 to 7 minutes. This setup works best when it's too cold for your pressurized stove. This is my version of the original Cat Stove (by Roy "TrailDad" Robinson).

Here's a tip about the four air intake holes in the Simmer Base. If you notice the boil times are too long, try increasing the air flow into the stove by placing the Simmer base on the ground, using a branch or twig, dig little trenches that extend under the stove base. This will allow extra air into the stove (under the bottom lip) which will shorten the boil times. Your other option is to make additional intake holes. However, be careful if you add holes (once you make them you're stuck), too much air flow will cause the

stove to burn out too fast.




Place the 5.5 ounce Simmer Base over the 3 ounce burner.




Place the vented pot stand on the Simmer Base then place the cooking pot on the stove. Note: To avoid spilling make sure the top vented pot stand is securely placed on the bottom simmer base. This is why you need cans from the same supplier. Mismatched name bands may not stack correctly.

To start this stove ... Place the stove on a safe, flat noncombustible surface. Pour denatured alcohol (4 tea spoons max) into the 3 ounce burner. Place the 5.5 ounce simmer base over the 3 ounce burner. Now place the 5.5 ounce vented pot stand on the simmer base.

Carefully ignite through the top vent holes with a lighter or match. Wait about 30 seconds for the stove to heat. Carefully place the cooking pot on the stove.

Problems: Three piece stove as opposed to one or two pieces. To avoid spilling make sure the top vented pot stand is securely placed on the bottom simmer base.
Benefits: Simple to use. Quick boil times. The best all weather stove.

STOVE #4. Here's an excellent non-pressurized Simmer Stove. Total burn time about 35 to 45 minutes using 3 tea spoons of denatured alcohol.




1) Wrap the strip of aluminum foil around the bottom of the Simmer base (secured with a clip) covering the four air intake holes. Lost your foil strip? If you drilled the four intake holes as directed in step 3 above (close to the lip) you can cover the intake holes with dirt. By choking the air flow into the stove you can produce a low temperature slow burning flame.

2) Place the 5.5 ounce Simmer Base over the 3 ounce burner, followed by the half moon simmer plate for adjusting the flame.




3 & 4) Place the vented pot stand on the simmer base then place the cooking pot on the stove. Note: To avoid spilling make sure the top vented pot stand is securely placed on the bottom simmer base.

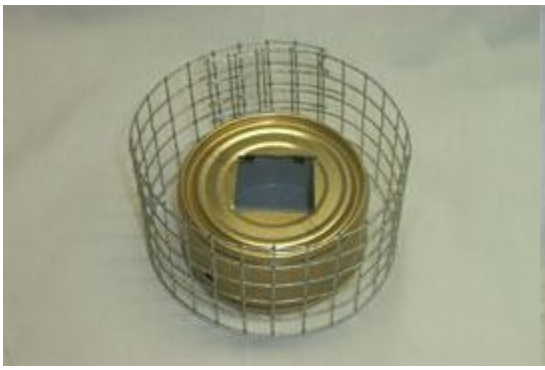
To start this stove ... Place the stove on a safe, flat noncombustible surface. Pour denatured alcohol (4 tea spoons max) into the 3 ounce burner. Place the 5.5 ounce simmer base over the 3 ounce burner followed by the half moon simmer plate (exposing the exhaust hole to its maximum size). Now place the 5.5 ounce vented pot stand on the simmer base.

Carefully ignite through the top vent holes with a lighter or match. Wait about 30 seconds for the stove to heat. Carefully place the cooking pot on the stove. Control the flame by adjusting the half moon simmer plate as desired using a piece if wire, twig or needle nose pliers through the holes in the vented pot stand.

Problems: Three piece stove as opposed to one or two pieces. To avoid spilling make sure the top vented pot stand is securely placed on the bottom simmer base. Long time to boil water.

Benefits: Simple to use. Adjustable flame control. Extremely long cooking times. All weather stove. Perfect simmer stove.

BETTER POT STAND: For those of you who would like a better pot stand (for stoves 3 & 4 above), here's a variation using the 5.5 ounce Simmer base over the 3 ounce burner.




Using heavy wire mesh screening, cut a strip 2.5 inches wide x 15 inches long. Wrap the wire mesh around the Simmer base, overlapping the ends just a little. Secure by hooking the tips of the outside wire into the inside overlapping mesh. Now place the cooking pot on the pot stand. This is the safest pot stand for stoves 3 & 4 above. If you build this pot stand correctly it will fit inside the cooking pot for storage.

EXTINGUISH THE FIRE:
Since this is an alcohol fueled stove the only safe way to extinguish a burning fire is to place an opened ended can (larger in diameter than the 5.5 ounce can) over the top of the stove. This will cut off the air supply and extinguish the fire. DO NOT attempt to blow the fire out and DO NOT throw water on the stove, this will only spread the fire.

TIPS:
1) This stove is designed for use "only" with small backpacking cooking pots!!!
2) This stove uses alcohol based fuels like denatured or 70% rubbing alcohol. Be careful with alcohol stoves because the flame may not be visible in the light.
WARNING: Never use gas or petroleum based fuels in the stove.
3) Always wipe you hands of any spilled alcohol before lighting the stove. Failure to do so could cause injury when you ignite the stove.
4) Always place the cooking pot on the center of the stove.
5) Keep all body parts and clothes away from the stove at all times.
6) To avoid flare ups, always remove the cooking pot slowly from the stove.
7) Always remove the cooking pot from the stove before stirring its contents.

PROBLEMS AND SOLUTIONS:
Problem: Fire goes out after the cooking pot is placed on the stove.
Solution: The stove is not hot enough to sustain the flame. You need to pre-heat the

stove. Place a piece of tin foil under the stove. Bend up the edges of the foil to make a bath tub around the stove. Pour a little denatured alcohol in the tub. Carefully light the tub and wait about 30 seconds. This will pre-heat the burner, allowing the flame to continue when you place the cooking pot on the stove.

DISCLAIMER:
Use common sense and safety at all times when using any stove. The author of this web page will not be responsible for any injury or damage resulting from constructing or use of this stove design. If you choose to build, use or experiment with this design, do so at your own risk.