



Objective:

The objective of this workshop guide is for the Scout Leader and/or Scout youth to be able to describe and demonstrate safe use of assembling and lighting a campfire stove.

There are many different types of stoves used in Scouting and each requires its own specific instructions for use. Further, the season in which you operate a camp stove will add additional operational requirements. Therefore, the purpose of this workshop is to not to convey the specifics of how each stove works, but rather to understand the essential safety guidelines required to operate any kind of stove.

To obtain your permit, you will need to demonstrate knowledge of both general Stove safety guidelines as well as safe operation of the Camp stoves that your scout group uses.

How do Stoves Operate?

All stoves operate the same way. Flammable fuel is stored in a vessel where it is pressurized and delivered to the burner where it mixes with oxygen. An ignition source is applied to the fuel / air mixture to generate flame.

Types of Stoves

There are two common types of stoves widely used in Scouting.

Pressurized liquid fuel stoves. These stoves require fuel to be placed in a tank and then pressurized a pump (which is typically a small hand pump). Fuel for these stoves may range from White Gas (Naphtha), Kerosene and unleaded auto Gasoline.



Gas Cartridge Stoves. These stoves use fuel which is pressurized in prepackaged tanks. The fuel tanks have a single screw connection to the stove and automatically release the fuel when connected. Common fuels include Propane and butane.



GENERAL STOVE SAFETY GUIDELINES

Check your Stove

- Prior to use, ensure that you have the instructions on how to use your stove and/or are familiar with how to safely assemble and start it up.
- Ensure that all of the parts to your stove are present
- USE THE CORRECT FUEL for your lantern. NEVER MIX FUELS on single fuel stoves.
- Always make sure that a suitable first aid kit is present



Transportation

For Pressurized Liquid Stoves, never transport a stove with fuel in the tank.

- Always carry the fuel in an approved fuel tank AND NOT in anything that looks similar to any food container or a water bottle

For Gas Cartridge stoves never transport with the gas canister attached.

- Keep the fuel tank away from any heat or ignition source.
 - In a vented environment to avoid any build up of gas smell
 - Away from heat or ignition source
 - In an environment where they will not be shaken or impacted by any other sharp instrument





Fuel Storage and Safe Campsite Layout

- Always store the fuel for your stove away from your cooking and food locations
- Whether you have a Gas Cartridge or Liquid fuel stove, always refuel the stove tank or replace the canister away from your cooking and food storage areas
- Ensure that there are no ignition sources in your fuel storage area

Filling the fuel tank on a Stove

Pressurized liquid fuel stoves

- Use a fuel filter when filling fuel as this can filter out any sediment which could clog the stove or cause the stove to burn erratically
- Never fill the tank when it is connected to the stove as you can spill fuel and a hot stove can ignite fuel
- Inspect the stove after filling the tank. Never use a stove if there is a fuel leak
- Never overfill the fuel tank. Stick to the recommended levels. If there isn't an adequate air space in the tank, the stove won't pressurize properly and it will burn erratically.
- Tighten the fuel cap securely as this avoids spillage as you carry the fuel tank
- Clear up all spillage

Gas Cartridge stoves

- Check the fuel level before you connect the canister to the stove
- You may have to judge this by weight
- Screw the canister to the stove and ensure that it makes a tight seal.
- Never replace a gas canister on a stove while it is hot. Allow to cool before replacing the canister.

Lighting the stove

Environment

1. Never light a stove inside your tent. Ever. Not even in the tent porch.
 - *Tents are remarkably flammable and stoves are hot enough to light your tent fabric*
2. Ensure that there is at plenty of air space around your stove
 - *If using a tarpaulin, allow at least 3 to 5 feet of space above the stove (allow for fire ball on start up)*
 - *Ensure that your cooking area has a boundary area to keep others away from the flames*
 - *Ensure that your stove is setup on a flat and secure base*
 - *Ensure that there is plenty of ventilation (Stoves give off poisonous fumes)*
3. Ensure that you have adequate space around the stove so that you can place all of your utensils near the stove - thus making it easier to cook without leaving the stove unattended.

Ignition

1. Prime the fuel tank by pumping the correct number of times
 - *If this is not done, the stove may burn erratically due to incorrect fuel pressure*
2. Do not stand / or lean over the burner when you attempt to light the fuel (in case of flare up)
3. Place a flame near the burner prior to turning on the fuel (*Barbeque lighter or match*)
4. Slowly turn on the fuel - so that the fuel vapor is slowly released
 - *If fuel is released too quickly it can blow out the flame or generate a large ball of gas which can ignite and create a ball of fire*
5. When the fuel is burning, slowly increase the fuel flow to keep the burner alight
 - *This also help stabilize the fuel pressure and heat the stove so it burns more efficiently*
6. If the fuel vapor ignites and then goes out
 - *Turn off the fuel to stop a large build up of fuel vapor*
 - *Wait a few moments to allow the fuel vapor to disperse does not ignite the fuel first time*
 - *Place the flame near the burner and then turn the fuel on slowly (see previous step)*



7. Fuel Flare up. On ignition the flame may flare up. If this happens, do the following
 - *Adjust the fuel feed OR adjust the fuel air feed (if your stove has an air feed)*
 - *Pump the fuel nozzle to increase the pressure in the fuel tank*
8. Optimal Fuel burn with a Blue Flame
 - *A yellow flame generates more soot and smoke than a blue flame and cooking will take longer and generate a sooty grime on your cooking utensils*
 - *Adjust the fuel feed and / or fuel pressure until the flames turn blue*
 - *A blue flame burns with more heat than a yellow flame. This makes cooking faster and quicker*

Safe Cooking practice

1. Make sure that your stove is placed on a flat and solid surface. Your stove may wobble if you place a large or heavy pot on the burner.
2. Do all food preparations before operating the stove, keep cooking area tidy, put garbage away promptly, do not allow food to spill onto the burner - don't leave an operating stove unattended
3. Never use too large a cooking utensil on your cooking stove
 - *This increases the chance of it tipping over and spilling on your camp stove*
4. Be aware of the following cooking pot safety guidelines
 - *Never overfill a pot with water or food (A boiling pot may overflow and extinguish the flame and generate a large fuel vapor area)*
 - *Never leave pot handles over the burners*
 - *Hot Handles will blister your hands and cause you to drop utensils creating further fire risk)*
 - *Centre the cooking pots on the burner*
5. Never lean over a stove when it is on
6. Do not allow the fuel tank or canister to heat up: keep it away from the burner or protected by a foil heat shield as you cook.

Packing up your stove

- Turn the stove regulator to OFF.
- When you turn a stove off, don't wait for the flame to fade. Blow it out so the fumes can clean the jet.
- Don't dismantle the stove until it has cooled down. This may take between 5 to 15 minutes - so plan this time into your agenda.
- Remove the fuel tank from the stove when the stove has cooled down

Pressurized liquid fuel stoves

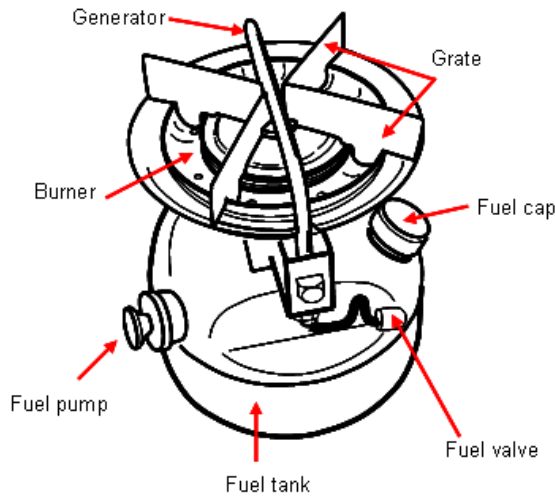
- Take the tank away from the cooking area and depressurize it. Point the fuel tank away from you and others when you release the pressure as there may be a slight spray of fuel on depressurization
- Fuel degrades when it comes into contact with air, so empty the fuel back into an approved fuel container

Gas Cartridge stoves

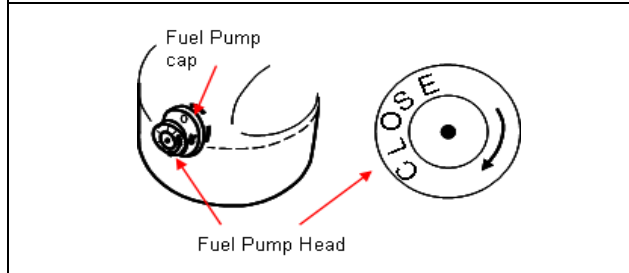
Unscrew the canister quickly in order to not let too much gas escape



ANATOMY OF A TYPICAL SINGLE BURNER CAMP STOVE



Fill tank with fuel and screw fuel cap tight. Locate fuel pump. Note the arrow and the direction that it points. Turn the fuel pump head in the opposite direction to loosen the pump head. Note the hole in the fuel pump head. Air is drawn through the hole as a means of equalizing pressure in the fuel tank



Example: Pressurizing the Stove

<p>STEP 1 Using two fingers slide the fuel pump outward to its fullest extent. DO NOT COVER THE HOLE IN THE FUEL PUMP as this will create negative air pressure and the pump will slide back into the tank Judge whether the fuel pump slides smoothly or not. If the pump does not slide smoothly, it may need to be oiled or cleaned.</p>	
<p>STEP 2 Grip the pump head firmly and then place your thumb over the hole in the pump head.</p>	
<p>STEP 3 Keep your thumb tight over the hole in the pump head and push the pump backwards. This represents one full pump. Repeat the pumping progress (STEP 2 and STEP 3) until you have pumped the recommended number of times as defined by your instruction manual. With the pump head fully retracted and your thumb over the hole turn the pump in the direction of the arrow to close the fuel valve. The stove is now primed and ready for ignition.</p>	



PERMIT DEMONSTRATION

In the presence of your instructor, perform the following:

Questions to be answered

1. State the components of the stove
 - a. *Fuel tank, pump and cap*
 - b. *Generator*
 - c. *Burner and Grate*

2. State the precautions that should be taken when fueling a stove
 - a. *Fuel in an area distant from your cooking/eating area*
 - b. *Fill the fuel tank to the correct level (filter / do not over fill / clear up spilt fuel / ensure tank does not leak)*
 - c. *Prime the stove correctly*
 - d. *Never refuel the tank when the stove is hot*

3. State the precautions for igniting a stove
 - a. *Turn on fuel slowly until you hear the hiss of escaping fuel vapor*
 - b. *Place ignition source close to the burner (match or barbeque lighter)*
 - c. *When flames are seen, adjust fuel flow and pressure to turn the flame blue*
 - d.

4. What equipment should always be present when using a stove?
 - a. *Suitable first aid kit*

Demonstration

Due to the wide variety of stoves used by scouts in all seasons, all stove demonstrations should be performed on the stoves that your scout group uses

1. Demonstrate how to setup and add fuel to a stove
2. Demonstrate how to safely light a stove
3. Demonstrate how to safely boil water on a stove
4. Demonstrate how to turn off and pack away a stove