

Liquid Fuel Appliances

Introduction This document addresses the use of gas and kerosene appliances in a SCOUTS NZ environment. It covers the types of appliances and the relevant safety aspects.

Must not use *Keas and Cubs must not connect up and light gas or liquid fuel appliances.* Cubs may use a gas fired hot plate for cooking but only under one-on-one adult supervision. The preferred cooking appliance for Cubs is the Hobo stove.

Gas stoves

Personal Cookers

SCOUTS tend to use small portable gas cookers similar to that illustrated. The type that uses a re-sealable gas container are best as the containers may be removed and used in a gas light in the evening. They can also be removed from the appliance and placed in a backpack while tramping.

Non re-sealable gas containers are not regarded as suitable for carrying in a pack once the container is punctured for use.



Standing camps

A variety of gas fired cooking appliances may be used for cooking at standing Scout camps. Most use a 9kg gas bottle with a regulator in the line to the cooker.

The most common types of gas stoves used in camp are:

<p>One or more gas rings connected to a common gas line, sitting on a custom made steel or aluminium table frame.</p>	
<p>A hot plate heated by gas rings as listed above, sitting on a custom made steel or aluminium table frame.</p>	
<p>A commercial domestic barbeque with a grill and a hot plate.</p>	

Camping Stoves: Rules for Safe Gas Use

Rules for safety

Adapted from an article on <http://www.camptrainer.com/tips-and-strategies>

Always use these guidelines for safe stove use and practice using it before camping:

- Make sure there is nothing flammable close by or above the stove.
- Before lighting the stove make sure all connections are tight and there are no leaks.
- When attaching a canister or filling a fuel tank or fuel bottle, ensure there are no naked flames, or smokers nearby, or cell phones switched on. If there are, carry the stove some distance away before refilling it. 10 metres isn't too far.
- Never overfill the tank. If there isn't an adequate air space in the tank or fuel bottle for the fuel to vaporise in, the stove will burn erratically or not at all.
- Never cook inside the tent. If you're cooking in the tent porch (best only done in stormy weather or insect attacks) or under a tarp, refill the stove outside your shelter.
- When cooking in a porch, make sure the stove is well away from porch walls and the inner tent. Leave a porch door unzipped or preferably fully open.
- If you regularly cook in the porch or under a tarp, note that solid fuel stoves are safest for this, followed by alcohol stoves, then butane/propane canister stoves or kerosene burners. White spirit stoves are very dangerous and are best used outside.
- Light white spirit and kerosene stoves outside in case of flaring and then bring them under cover.
- When cooking (or sleeping) in a shelter, make sure there is plenty of ventilation. Stoves give off poisonous fumes (Carbon Monoxide).
- The flame must just touch the bottom of the cooking pan. Any closer and incorrect combustion can produce even more gas that is lethal in a small room or tent.
- Never have your head over a stove as you're lighting it or while it's burning.
- Never touch a stove until it has cooled down.
- White spirit and kerosene stoves usually need to be primed (pre-heated) before they will run properly. Only adults should use White Spirit stoves.
- Do not use synthetic gloves/clothing to handle hot appliances or to refuel an appliance. Synthetic material can melt and stick to the skin when heated.

Read the "Let it breathe" pamphlet by <http://mountainsafety.org.nz> for more information.

Gas leaks

Leaders must check all gas connections and hoses for leaks once the kitchen and gas cooker has been set up. This is done as follows:

- Squirt dishwashing fluid into a bowl and add water to make a solution that bubbles readily when stirred.
 - Turn the gas bottle on.
 - Using your hand, splash the soapy mixture over all the gas line connections from the top of the bottle to the gas cooker.
 - If spluttering or bubbles appear you have a gas leak. Tighten the connection and test it again. Repeat the process until the gas stops leaking.
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Gas Bottles

9kg bottles

These bottles are generally owned by the Scout Group. Here is some information to help you manage the gas bottles owned by the Group.

- Some retailers offer a swap a bottle service which costs slightly more per fill but it's a quick and easy way to collect a full bottle.
- Be aware that Gas bottles have an expiry date after which they must be discarded or retested (every 10 years) as they will not be refilled by suppliers. Always check the expiry date before going to camp. It's stamped on the top of the bottle.
- Gas bottles to be carried on public transport (includes ferries) may need to be purged and sometimes refilled with a non explosive gas by a certified gas retailer.
- Never open the valve at the top of the gas bottle by more than two turns. Screwing the valve right open can jamb the valve in the open position which can cause significant problems when packing up to go home. Should this happen, move 30 metres away from the camp site and any naked flames, then undo the purge valve (the small square valve) and empty the cylinder.
- The connection between the regulator line and the gas bottle is a left hand thread. Remember this and save yourself some time when connecting bottles.
- Check how much gas is left by pouring warm or hot water down the side of the bottle. The part of the bottle with gas in it will show condensation on the outside of the bottle. This shows how much gas is left in the bottle.
- 9kg gas bottles must be connected to a gas appliance via a gas regulator and an approved rubber/plastic gas line that is free from splits and cracks.
- Going to a Jamboree? Hire a 9kg bottle on site (pre-book though) and take advantage of the swap a bottle service.



230g canisters

Small personal gas stoves generally use 230g propane canisters. Those with a seal on them allow the canisters to be swapped from a stove to a gas light, or stored in a pack if gas remains in them after use.

- These canisters cannot be carried on aircraft and may be prohibited on public transport so if travelling by these methods, be prepared to purchase canisters when you arrive at your destination. Always check that the type and brand required are available at your destination.
- Be very wary of highly reflective pots, pans and kettles as they can reflect the heat down on to the canister, causing the fuel to boil and the canister to rupture and then explode.
- Canisters that are not re-sealable must not be removed from the appliance until all the gas has been burned and the canister is empty.
- Place empty canisters in the rubbish bag. Do not "bash, burn and bury".



Gas Lanterns

Introduction



High powered gas lights as illustrated are probably the best option for dining shelters and the kitchen areas in camp.

However, many Scout Groups are changing to battery powered fluorescent lanterns for use in sleeping tents as they are safe and don't emit poisonous fumes. They do however need a plentiful supply of D sized batteries which is the trade off between safety and running costs.

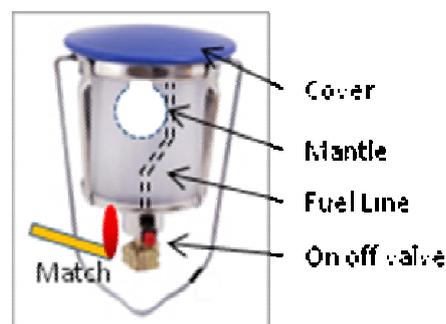
Gas 'mantle' explained

A mantle is a small net like bag, smaller than a golf ball, that is attached to the fuel line and hangs down from the top of a gas or kerosene lantern.

- The mantle is made of silk impregnated with a mixture of chemicals.
- It's pliable when fitted to the fuel line, but once heated, burns off the silk and leaves behind a fragile ceramic shell that glows white hot when heated by the burning gas.
- The lantern is not safe to use if the mantle is knocked and a hole appears in it. The mantle must be replaced.

Replacing a mantle:

- Turn the gas off and if possible disconnect the lantern from the gas source.
- Unclip the top cover off the lantern and remove the glass wind shield.
- Clear the remains of the old mantle out and blow all the dust away.
- Take the new mantle and locate the ends of the string used to tie it to the fuel line. Note that the new mantle is twice the size of a mantle that has been used.
- Carefully place the opening in the mantle over the fuel line and tie the string tight so that it fits in the groove on the end of the fuel line.
- Light the mantle and watch as the silk initially turns black, shrinks to half its size and burns away.
- Clean and replace the glass wind shield and the top cover.
- Reconnect the gas lines or canister.
- At this point the lantern is ready for use and can be lit. The mantle should glow white.



Lighting a gas lantern

Some gas lanterns have an igniting device fitted beside the gas valve. The user simply turns on the gas and twists the lever to send a spark that ignites the gas in the mantle.

Most however, require the user to light a match, turn on the gas, then carefully guide the flame from the match through a hole in the base plate up towards the mantle and wait for the gas to ignite and the mantle start to glow.

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Gas Lanterns, Continued

Personal gas lanterns

These lanterns are rated about 150 candle power or less and like all gas lanterns, don't stand up to bumps and bangs. If a gas lantern is severely knocked the following may happen:

- The glass shield surrounding the burner may crack and leave the flame exposed, creating a potential fire hazard.
- The mantle may break, effectively stopping the lantern from working at all.

These lanterns must not be used in one, two or three person tents due to the poisonous fumes they emit (carbon monoxide), as well as the fire risk from heat and from being knocked over in a confined space.



Large bottle mounted gas lights



These lanterns are usually about 350 candle power and fit on top of a 2kg, 4kg or a 9kg gas bottle.

Some gas lanterns are fitted on a rigid gas pipe extension (pictured) which screws on to the gas bottle, raising the lantern itself up to about 1.5 meters above the ground.

The extension can make the light unsteady in gusts of strong wind so care must be taken when using this type of light. A tether to a stake is probably wise, although not too close to the lantern itself as the heat given off is considerable and may burn the tether.

An advantage of these lanterns is that it's usually daylight when dinner is cooking, so the BBQ gas bottle is available to power the lantern after dinner.



Safety around gas lanterns

Safety is paramount and the youth members must be well disciplined when in the area where these lights are used.

- Rough and tumble and running type behaviour around the area where gas lights are used will inevitably end up in:
 - cuts from broken glass wind shields;
 - burns from the flames that may occur when the lantern hits the ground;
 - burns from hot metal parts.
- Don't smoke within 10 metres of a gas bottle or a canister being changed.
- Switch off all cell phones within 10 metres of a gas bottle or a canister being changed.

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Gas Lanterns, Continued

Hurricane Lanterns

There are two other types of lanterns that are used by Scout Groups. Both use 'old' technology but are reliable.

Hurricane Lantern powered by Kerosene

This lantern is very robust and relatively safe, but the light emitted is in the region of 10 candlepower or less. They are particularly suitable for leaving burning all night in the latrines so that visitors can see in the dark exactly where the latrine is located.

A few maintenance hints:

- The top cap is spring loaded and can be pulled up to remove the glass for cleaning.
- Once the glass is removed or swung to one side, the wick holder can be removed from the top of the fuel tank.
- Trim the blackened tip of the wick with a pair of scissors to achieve a brighter light.
- Turn the knob on the side of the wick holder to raise the wick slightly. The higher the wick, the bigger the flame and more smoke generated. Experiment with the wick height until you get the best result.
- To fill the lantern with Kerosene or Paraffin as it is also known, unscrew the lid on the side of the fuel tank, or fill through the top where the wick holder is placed. These lanterns will also burn coconut oil.



Tilley Lanterns

Tilley Lanterns are powered by kerosene (paraffin) but also need methylated spirits or a fire lighter to heat the Kerosene up before it will burn efficiently.

Fuel is inserted by unscrewing the pump mechanism. Once $\frac{3}{4}$ full of kerosene, screw the pump handle back in firmly and wipe up any spilt fuel. Then lightly pressurise the fuel tank by pumping the pump handle back and forth about 15 times.

Pre-heating of the fuel line is done using a special clip that has two cups that hold about 20ml of methylated spirits each. The clip is placed around the fuel tube as shown in the illustration and the methylated spirits lit with a match. If you have firelighters, insert pieces in the cups in place of meths.

As the methylated spirits starts to die down, open the on/off valve slowly. The mantle should start to glow as the hot kerosene ignites.

Once the mantle is functioning efficiently, pump the fuel tank to increase the pressure and open the valve slowly until the light is really bright.

To keep the lantern glowing brightly you will need to pressurise the fuel tank periodically by pumping the Pump Handle.

Other brands of lanterns – Primus, Coleman etc, have a similar method of operation.



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Gas Lanterns, Continued

Tilley Lanterns (continued) Like all similar lanterns, the fuel jet that vaporises the Kerosene blocks occasionally. Tilley lanterns require the use of a special pricker to clear the jet. A pricker is a metal handle with a fine steel wire poking out the end. The wire is inserted into the jet to clear it. Other models – Primus and Coleman may have an on/off valve that is designed to clear the blockage by turning the valve fully on, then off and back on again. This usually clears the blockage.

Other brands of lanterns There are various makes of liquid fuel lanterns and cookers. Coleman, Primus and Tilley are recognised brands in New Zealand. Some of them use Kerosene as a fuel. Others may use White Spirits.

White Spirits "Fuelite", "Pegasol", " Shellsol" are some of the trade names of White Spirits that are available from Supermarkets and Hardware stores – it should be a water like clear liquid. Petrol is coloured.

White Spirits is sometimes known as "White Petrol" – which is not the same as the petrol from the local garage – but some lanterns and cookers are designed to use unleaded automotive petrol but their use in SCOUTS is not recommended.

SCOUTS strongly advise that youth members should not use cookers and lanterns powered by white Spirits or Petrol. It is very volatile and can be dangerous in inexperienced hands.
