

# Bunsen Burner

In a Bunsen burner air (oxygen) is mixed with fuel (propane).

You will quickly become competent with the Bunsen burner, and find it is as easy to use as a propane barbeque. Both need attention, and can be used safely and efficiently.

If the temperature is not hot enough, or there is not enough oxygen, soot is produced. Soot is desirable in a candle flame, because the soot is luminescent in the flame and provides light. However we want the Bunsen burner for heat (not light).

- 1) Students are busy, and don't have time to waste in the lab, so a hotter flame is great - work gets done quicker
- 2) If soot were produced, it would (at the very least) make the clean up longer, or worse, would throw off the mass of weighed materials.

Tie back hair (don't wear a lot of hairspray)

Check the hose has no cracks or breaks.

Remove the chimney/flame retainer and the needle valve. Know what each part does. The chimney valve regulates the amount of air. The needle valve regulates the supply of fuel.

Remove any residue (eg corrosion or soot) from the "chimney". Tap the base of the burner on a hard surface (to ensure the pinpoint opening free of soot).

Reassemble the burner. Turn the chimney completely down, thereby extinguishing the air source; turn the needle valve completely in, thereby shutting off the gas inlet.

One end of the hose is attached very tightly to the burner.

## Lighting:

Attach the other end of the hose very tightly to the bench gas valve. (If either end of the hose is not tightly attached to the tapered fittings, gas may leak into the air, permeating clothing, and lighting from nearby burners).

Do not use matches (in this lab) to light the flame. The concern is that someone might throw a still hot match into the garbage or, leave it plugging a drain. Do not use butane lighters (as they have been known to leak).

Borrow a sparker (from under one of the eye wash stations) and check the flint. Replace the flint if worn.

Position the burner so that it is stable.

On the burner, open the air vent and gas needle valves about 1/3 of the way. Then with the spark ready, and your head back, turn on the bench valve, and ignite the gas. If after several ignition attempts, the burner has not lit, shut off the bench valve, open the burner valves further, and try again.

**NEVER LEAVE BENCH VALVE ON WITHOUT FLAME LIT.**

Once lit, raise the chimney (hold thicker part) and/or close in the needle valve until the flame is properly adjusted. (Insufficient air and/or too much fuel will produce a yellow flame).

(Note what happens to the flame when each adjustable part of the burner is moved. Observe the effect on the flame from opening and closing the air valve).

Raise the chimney and/or turn in the fuel until you get a blue, lean two coned flame.

Develop the habit of keeping your hands away from the base of the burner (unless necessary to adjust needle valve). Ensure that when the chimney is being adjusted, only the thicker part is held (as the thin metal gets hotter).

**NEVER LEAVE THE FLAME UNATTENDED.** Should the flame extinguish, the person attending it will promptly turn off the bench valve, then relight.

If you smell something, shut off the bench valve. While propane is odourless, a smelly chemical (a mercaptan) is added so an alert person can better note a leak.

If the lit burner makes a rasping noise, if the tube of the burner gets hot, if the flame is small in size, or there are no cone-shaped regions, the flame should be properly adjusted or turned off.

When the burner is no longer needed, turn off the bench valve, **ENSURE THIS IS COMPLETELY SHUT**, double check this! Remove the hose from the bench valve and when the burner has cooled, shut off the air and needle valves.

Understand the significance of ensuring that there are not any leaks, when working with a compressed flammable gas

Take measures to work with such gases (be it in the lab or at a barbecue) safely and efficiently (clean burning)