

How to Light a Bunsen or Fisher Burner

Lighting a Bunsen burner can cause anxiety for some. Dealing with fire and gas can seem scary. However, if you know the proper procedure for lighting a Bunsen burner, the task does not seem so bad. Follow these steps to safely and successfully light a Bunsen burner.

Instructions

Things You'll Need

- Bunsen burner
 - Tubing
 - Gas source
 - Match
 - Safety gear
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- Hook the Bunsen burner up to a gas source or tap using rubber tubing. Be sure that the tubing does not have any holes by examining it before use.
 - Turn the collar on the lower portion of the Bunsen burner so the holes in the burner are slightly open.
 - Light a match carefully. Be sure to hold the match securely and keep your fingers away from the flame to avoid burns.
 - Turn on the gas tap. To do this, push down and turn the nozzle so it is parallel with the gas tap or tubing. This will allow the gas to start flowing to the Bunsen burner.
 - Move the lit match over to the top of the burner to light the Bunsen burner. Do this very carefully making sure that the match does not go out before the Bunsen burner lights.
 - Adjust the holes in the Bunsen burner using the collar until you have the appropriate flame. Typically, you will want a blue flame. You can get the blue flame when the holes in the Bunsen burner are either entirely open or almost entirely open.

Tips & Warnings

- Wear appropriate safety gear, such as a lab coat and safety goggles, when lighting a Bunsen burner.
- Keep all flammable items away from the Bunsen burner when lighting it. Flammable items can include papers and chemicals.
- Be sure to use a Bunsen burner on a flat, nonflammable surface.
- Take great care when working with fire to avoid burns.
- Never leave a lit Bunsen burner unattended.

Bunsen burner

Bunsen Burner



A Bunsen burner with [needle valve](#). The hose barb for the gas tube is facing left and the needle valve for gas flow adjustment is on the opposite side. The air inlet on this particular model is adjusted by rotating the barrel, thus opening or closing the vertical baffles at the base.

A Bunsen burner, named after Robert Bunsen, is a common piece of laboratory equipment that produces a single open gas flame, which is used for heating, sterilization, and combustion.

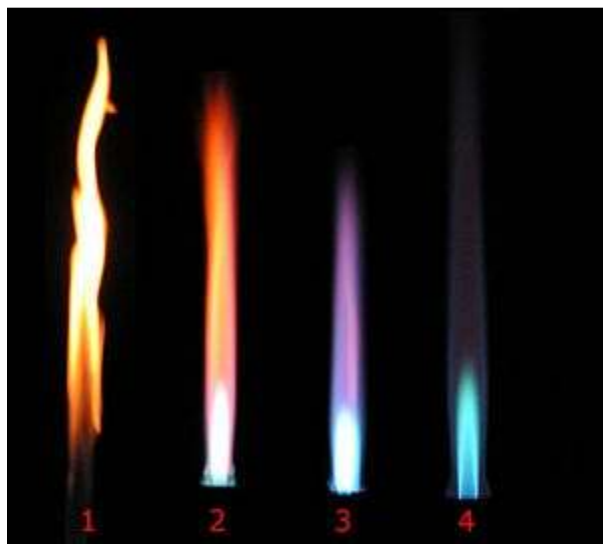
History

When the University of Heidelberg hired Robert Bunsen in 1852, the authorities promised to build him a new laboratory building. Heidelberg had just begun to install coal-gas street lighting, so the new laboratory building was also supplied with gas. The laboratory required *heating* from the gas as well as illumination. For heating, it was desirable to maximize the temperature and minimize the luminosity. Previous laboratory lamps left much to be desired regarding economy and simplicity, as well as the quality of the flame for a burner lamp.

While his building was still under construction late in 1854, Bunsen suggested certain design principles to the university's mechanic, Peter Desaga, and asked him to construct a prototype.

(Similar principles had been used in an earlier burner design by Michael Faraday as well as in a device patented in 1856 by the gas engineer R W Elsner.) The Bunsen/Desaga design succeeded in generating a hot, sootless, non-luminous flame by mixing the gas with air in a controlled fashion before combustion. Desaga created slits for air at the bottom of the first cylindrical burner, the flame igniting at the top. By the time the building opened early in 1855, Desaga had made fifty of the burners for Bunsen's students. Bunsen published a description two years later, and many of his colleagues soon adopted the design. Bunsen burners are now used in laboratories all around the world.^[6]

Operation



Different flame types of Bunsen burner depending on flow through the throat holes (holes on the side of the Bunsen burner -- not to be confused with the needle valve for gas flow adjustment). 1) air hole closed (Safety flame used for when not in use or lighting). 2) air hole slightly open. 3) air hole half open. 4) air hole almost fully open (this is the roaring blue flame).

The device in use today safely burns a continuous stream of a flammable gas such as natural gas (which is principally methane) or a liquefied petroleum gas such as propane, butane, or a mixture of both.

The hose barb is connected to a gas nozzle on the laboratory bench with rubber tubing. Most laboratory benches are equipped with multiple gas nozzles connected to a central gas source, as well as vacuum, nitrogen, and steam nozzles. The gas then flows up through the base through a small hole at the bottom of the barrel and is directed upward. There are open slots in the side of the tube bottom to admit air into the stream via the Venturi effect, and the gas burns at the top of the tube once ignited by a flame or spark. The most common methods of lighting the burner are using a match or a spark lighter.

The amount of air mixed with the gas stream affects the completeness of the combustion reaction. Less air yields an incomplete and thus cooler reaction, while a gas stream well mixed with air provides oxygen in an equimolar amount and thus a complete and hotter reaction. The air flow can be controlled by opening or closing the slot openings at the base of the barrel, similar in function to the choke in a carburetor.

If the collar at the bottom of the tube is adjusted so more air can mix with the gas before combustion, the flame will burn hotter, appearing blue as a result. If the holes are closed, the gas will only mix with ambient air at the point of combustion, that is, only after it has exited the tube at the top. This reduced mixing produces an incomplete reaction, producing a cooler but brighter yellow which is often called the "safety flame" or "luminous flame". The yellow flame is luminous due to small soot particles in the flame which are heated to incandescence. The yellow flame is considered "dirty" because it leaves a layer of carbon on whatever it is heating. When the burner is regulated to produce a hot, blue flame it can be nearly invisible against some backgrounds. The hottest part of the flame is the tip of the inner flame, while the coolest is the whole inner flame. Increasing the amount of fuel gas flow through the tube by opening the needle valve will increase the size of the flame. However, unless the airflow is adjusted as well, the flame temperature will decrease because an increased amount of gas is now mixed with the same amount of air, starving the flame of oxygen.

Fisher burner

A **Fisher burner** is a piece of laboratory equipment that produces a single open gas flame, used for heating, sterilization, and combustion. It is used when laboratory work requires a hotter flame than would otherwise be attainable using a Bunsen burner. It is also used when a larger diameter flame is desired, such as with an inoculation loop, or in some glassblowing operations.

The Fisher burner heat output can be in excess of 12,000 BTU (13,000 kJ) per hour (3.5 kWh) using LP gas.^[1] Flame temperatures of up to 1100–1200 °C (2000–2200 °F) are achievable. A stainless steel grid top ensures uniform heating. The Fisher burner is made with a chrome plated brass body and zinc-aluminum base. An air valve and gas flow valve (visible underneath the shaft) allow for the control of flame height and intensity.

