



The University of Florida Biological Safety Office strongly discourages the use of Bunsen burners or open flames in biosafety cabinets.

Early microbiologists had to rely on open flames to ensure sterility while engaging in certain techniques. With the advancement of modern technology, including the introduction of the biosafety cabinet (BSC), the use of an open flame is almost always no longer necessary. In fact, the use of open flames, flammable gases, and flammable liquids in a biosafety cabinet:

- Disrupts the air flow, compromising protection of both the worker and the work
- Causes excessive heat buildup, may damage HEPA filters and/or melt the adhesive holding the filter together, thus compromising the cabinet's integrity
- Presents a potential fire or explosion hazard. Electrical components such as the BSC fan motor, lights and electrical outlets are not designed to operate in flammable atmospheres, where a flash fire could be ignited by a spark. A majority of BSCs, recirculate 30-70% of the air in the cabinet through a HEPA filter; gas leaking in the cabinet from a faulty connection or burner can quickly build to explosive levels due to this recirculation process.
- Inactivates manufacturer's warranties on the cabinet: cabinet manufacturers will assume no liability in the event of fire, explosion or worker exposure due to the use of a flammable gas in the cabinet. Additionally, the UL approval will automatically be void.

The 5th edition of "Biosafety in Microbiological and Biomedical Laboratories" published by the CDC and the NIH states that "Open flames are not required in the near microbe-free environment of a biological safety cabinet. On an open bench, flaming the neck of a culture vessel will create an upward air current that prevents microorganisms from falling into the tube or flask. An open flame in a BSC, however, creates turbulence that disrupts the pattern of HEPA-filtered air being supplied to the work surface. When deemed absolutely necessary, touch-plate micro burners equipped with a pilot light to provide a flame on demand may be used. Internal cabinet air disturbance and heat buildup will be minimized. The burner must be turned off when work is completed. Small electric "furnaces" are available for decontaminating bacteriological loops and needles and are preferable to an open flame inside the BSC. Disposable or recyclable sterile loops should be used whenever possible." This is also the recommendation of the World Health Organization (WHO) as well as biosafety cabinet manufacturers.

Recommended Alternatives to Bunsen burners and open flames:

- Alternative technology such as electric incinerators, glass bead sterilizers
- Disposable loops, spreaders, and other instruments
- Pre-sterilized packs of instruments such as tweezers, scissors and scalpels

If it is deemed absolutely necessary for the work being done, a small alcohol burner containing only enough alcohol for one day's work, or a touch-plate microburner, providing a flame on demand (e.g. Touch-O-Matic) may be used.

See the backside of this handout for examples.

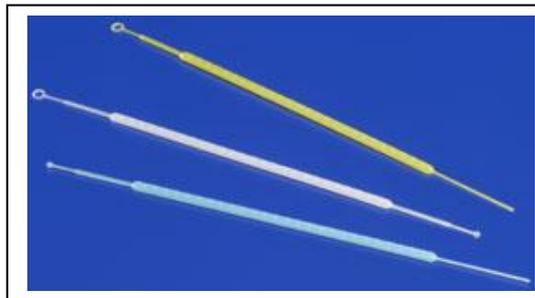
References:

- http://www.cdc.gov/biosafety/publications/bmb15/BMBL5_appendixA.pdf
- http://www.ehs.uci.edu/programs/biosafety/Bunsenburner_BSC.pdf
- <http://www.who.int/csr/resources/publications/biosafety/Biosafety7.pdf>
- <https://www.aiha.org/get-involved/VolunteerGroups/LabHSCCommittee/Incident%20Pages/Lab-Safety-Biological-Safety-Cabinets-Incidents.aspx>

Disposable Spreaders



Disposable Loops



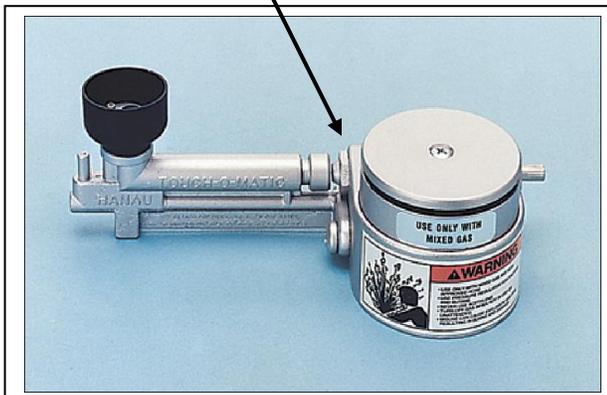
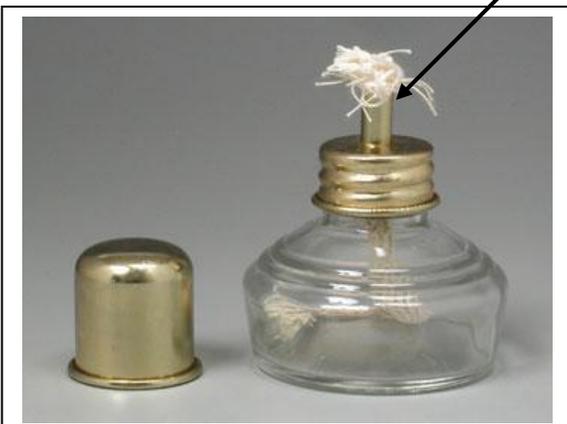
Bacti-Incinerator (electric loop sterilizer)



Glass Bead sterilizer



An alcohol lamp with a minimal amount of alcohol within or a touch-plate gas burner may be acceptable as a last resort; please check with EH&S first.



Touch-O-Matic burner