

Use of an open flame (bunsen burner) within a biological safety cabinet (BSC) directly impacts the BSC's laminar air flow and compromises its efficiency and user safety. Significant damage from lab fires have occurred at USC in the past that were directly attributed to use of open flames in BSCs.

The World Health Organization's (WHO) Laboratory Biosafety Manual, NSF/ANSI Standard 49, BSC manufacturers, and academic institutions STRONGLY discourage/forbid the use of Bunsen burners inside the BSC for the following reasons:

- *Air flow disruption.* Heated air from an open flame mixes with the Class II BSC's downward laminar flow to produce turbulence and recirculation inside the work area. Aerosolized particles will be distributed throughout the BSC, compromising both personnel and product protection.
- *Excessive heat build-up.* This can damage the HEPA filter and housing resulting in loss of BSC integrity and migration of contaminants into and out of the BSC. Additionally, loss of media components (e.g., growth factors, amino-acids, and vitamins) and heat-sensitive cell lines as well as worker discomfort impact research stability and quality.
- *Fire or explosion hazard.* Excessive heat may cause flammable liquids used for disinfection to vaporize creating a flammable atmosphere. An open flame or electrical discharge may ignite the vapor causing a flash fire or explosion.
- *Void Manufacturer's Warranty and UL Listing.* Fires within a BSC caused by use of open flames will nullify the manufacturer's warranty and UL listing.

SAFE ALTERNATIVES TO BUNSEN BURNERS

- Use disposable sterile loops and sterile lab supplies. This eliminates the need to use open flames for sterilizing.
- Autoclave utensils and equipment prior to use. Place loops, spreaders, needles, forceps, scalpels and other tools in autoclavable plastic or wrap in autoclavable foil.



WHAT I NEED TO KNOW

- Do not use an open flame in the BSC. The BSC provides a near microbe-free environment.
- Heated air in the BSC disrupts laminar flow and impacts the HEPA filter/housing, media, cell lines, and workers.
- Questions? Email biosafety@usc.edu.

- Use a Bacti-Cinerator to sterilize loops and needles safely and conveniently while preventing infectious spatter and cross-contamination.
- The Electrical Bunsen Burner combines the efficiency of a gas burner with the safety and control of an electric heater. It is ideal for sterilizing inoculating needles and loops, and for heating small flasks, test tubes, and beakers.
- The Bead Sterilizer provides a safe, effective, and convenient method for sterilizing small instruments without using flames, gases, or chemicals.



REFERENCES

[Biosafety in Microbiological and Biomedical Laboratories \(BMBL\) 5th edition.](#)

[WHO Biosafety Manual 3rd Edition, WHO 2004](#)

[Sterile disposable loops](#) (Fisher Scientific catalog #22-363-596)

[Bacti-Cinerator](#) (VWR catalog #101412-622)

[Electrical Bunsen Burner](#) (Daigger Scientific catalog #EF3540)

[Instrument Micro Bead Sterilizer](#) (Kent Scientific Corporation)

