

### **Overview**

Most biological safety cabinets (BSCs) at Weill Cornell Medical College recirculate air within the cabinet. The use of natural gas or other flammable gases within these BSCs may allow flammable gases to concentrate, potentially leading to an explosive atmosphere. The use of flammable gases within a BSC may also alter the airflow pattern that protects the products and personnel. This Update outlines which BSCs recirculate air and the procedures that should be followed to increase safety and prevent flammable gase explosions within BSCs.

## Applicability

This Update applies to all faculty, staff, students, and visitors working within BSC's with or without natural gas or other flammable gases inside biological safety cabinets that recirculate air. Natural gas within a BSC is typically "house" gas connected directly to the BSC.

## **Responsibilities**

**Environmental Health and Safety (EHS)** provides guidance and information on the safe use of flammable gases within BSCs in compliance with all relevant federal, state, local, and institutional regulations.

**Principal Investigators (PIs) and Laboratory Managers** establish procedures and policies to keep with the information provided in this Update. PIs and Laboratory Managers are also responsible for ensuring that all laboratory personnel are aware of and in compliance with these policies and procedures.

BSC Users are responsible for ensuring that they do not use natural gas or other flammable gases within recirculating BSCs.

**Facilities Management & Campus Operations** will no longer provide maintenance or house natural gas to biological safety cabinets for new projects unless the BSC is verified to be a "total exhaust" cabinet by EHS. Natural gas lines to recirculating BSCs will be turned off as soon as they are discovered. When applicable, natural gas lines to BSCs will be physically disconnected and capped during laboratory renovation projects.

## Procedure

Certain types of BSCs are designed to contain, not exhaust, most of the air within a cabinet. This makes them prone to the buildup of materials within the cabinet. The following 4 types of cabinets are located at WCMC.

BSC Type	Former Name(s)	% Recirculated Air
Class II Type A1	Class II Type A	70
Class II Type A2	Class II Type A/B3	70
Class II Type B1	N/A	30
Class II Type B2	N/A	0

BSCs that recirculate air are commonly found at WCMC. To determine the type of BSC, locate the unique serial number on the cabinet. This label should also contain the BSC type. If unable to locate this information, contact EHS for further assistance.

If a gas leak occurs (e.g., valve left on or tube leak) inside a recirculating biological safety cabinet, over time the gas will become more concentrated and could reach explosive levels. Since it is within a BSC, the user might not detect the leak and, upon ignition, the concentrated gas could explode. Therefore, natural gas or other flammable gases should not be used within recirculating biological safety cabinets.

Additionally, open flames can affect the airflow pattern of a BSC. According to the National Institutes of Health (NIH) and Centers for Disease Control (CDC), "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. However, an open flame in a BSC creates turbulence that disrupts the pattern of HEPA-filtered air supplied to the work surface," leading to potential contamination of materials in the BSC.



#### **Environmental Health and Safety**

TEL 646-962-7233WEB weill.cornell.edu/ehsEMAIL ehs@med.cornell.eduWeill Cornell Medicine402 East 67th Street, Room LA-0020New York, NY 10065



### When possible, consider the following alternatives to using an open flame in a BSC:



Use an <u>Electric Bunsen</u> <u>Burner</u> as it combines the efficiency of a gas burner with the safety and control of an electric heater.

Use a <u>Bact-cinerator</u> to sterilize loops and

needles safely which

also conveniently

prevents infectious

spatter and/or cross

contamination. This

also safeguards

laboratory personnel

from an open flame or

hazardous gas.





#### Use a Bead Sterilizer

to provide a safe, effective and convenient method for sterilizing instruments. Bead Sterilizers ensure instruments are free of pathogens and microbial contaminants without using gases, flames or chemicals.

Use pre-autoclaved forceps, scalpels, etc. in covered autoclavable plastic containers or the special sleeves supplied for this use by various companies.



Use pre-sterilized inoculating loops, spreaders, and needles.

# References

NSF International (NSF); American National Standards Institute (ANSI). NSF/ANSI 49-2018. Biosafety Cabinetry: Design, Construction, Performance, and Field Certification. Ann Arbor (MI): NSF/ANSI; 2018.

https://bakerco.com/images/uploads/assets/Heat-sources-BSC-Comp-Exp-User-Protection-WP.pdf