Biosafety Cabinet (BSC): Use, operation, and decontamination

Purpose

- Outline proper procedures for preparing, working, and maintaining a BSC
- Ensure personnel safety
- Prevent contamination
- Maintain compliance with certification and airflow standards

ATC
ANDY TESTING & CONSULTING

CERTIFICATION REPORT
for BIOLOGICAL SAFETY CABINET

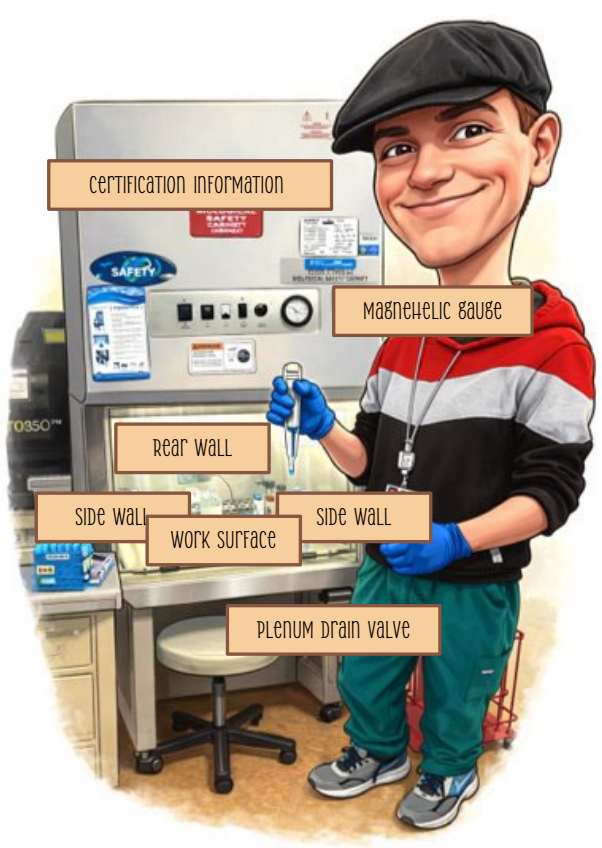
Number: 2505225-A2
Date: 05/22/25
Page: 1 of 2

Cust. # : ID01	Department : Laboratory	D/Rm#.:	
Customer : St. Luke's - Fruitland		Contact : Jessica Mathewson	
Address : 1210 NW 16th Street		Phone : 208/452-9600	
City : Fruitland	State: Idaho	Zip : 83687	

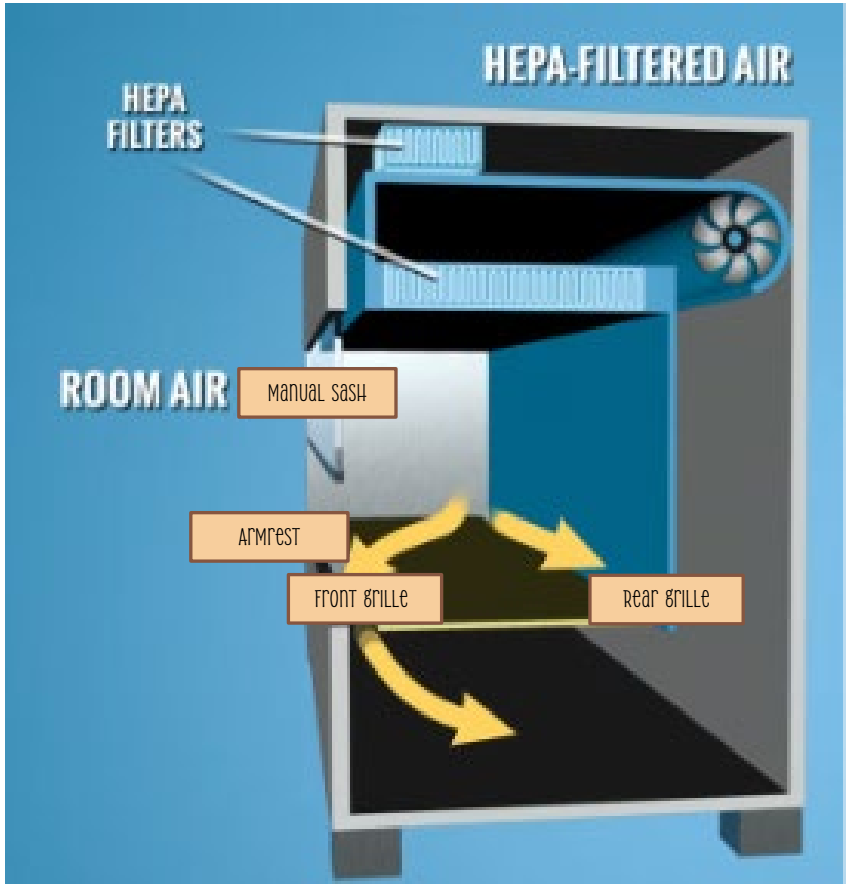
Equipment: BSC, Class II, A2		Model: 425-200	Series:	31	
Manufacturer: NuAire	Tag:	Serial Number: 162191 031314		Mfg: 03/14	
Location: Laboratory		Inventory Number:			

THE NUAIRE BSC CLASS II A2 IS CONSIDERED A MONOLITHIC DESIGN WHICH MEANS IT HAS NO JOINTS AND THE INNER SKIN IS ONE PIECE (MINIMIZES CONTAMINATION)

Deconstructing the BSC

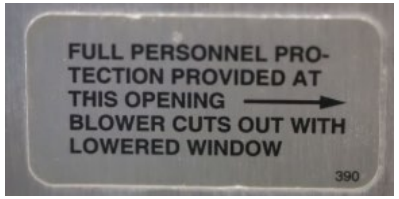


- The pressure gauge should never be at zero while in use
- Gradual changes in pressure overtime due to filter loading is normal
- A sudden pressure change can show a block or breach
- Make sure the plenum drain valve is perpendicular to the ground (closed)

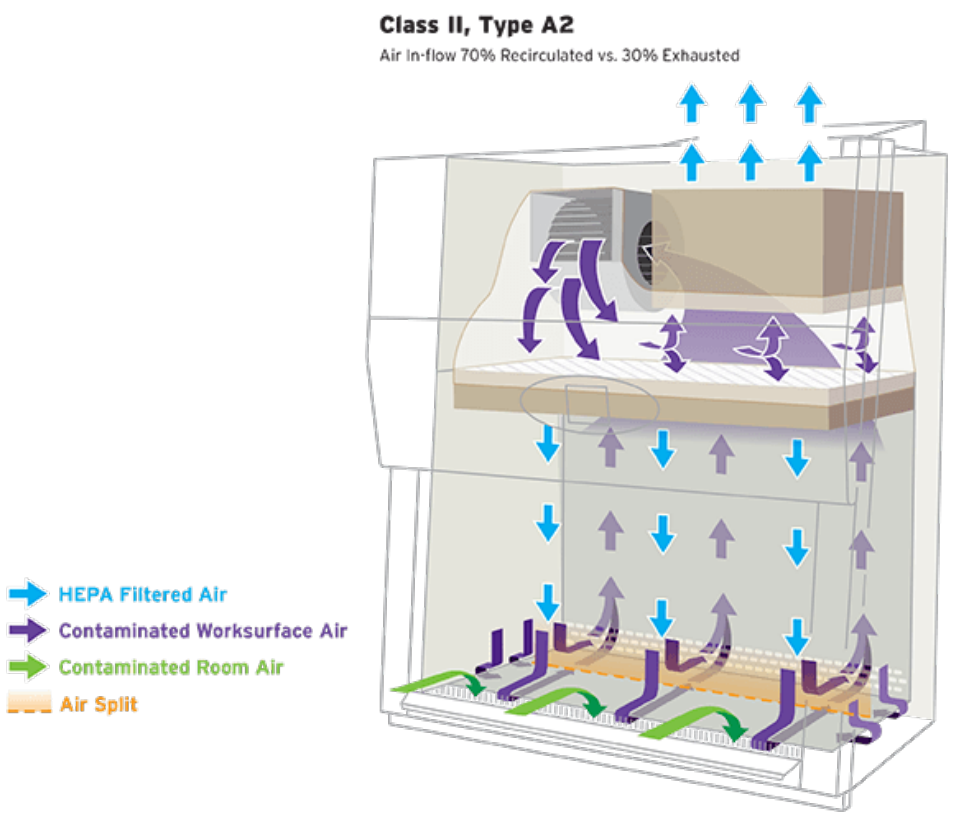


Core components continued

- Intended to keep room air and cabinet air separated
- Downward air is cleaned through a high efficiency filter
- Placing a BSC next to a doorway can draw air out of the cabinet
- Placing a BSC too close to an HVAC supply vent can interfere with containment
- Proper sash height is critical to maintain inward airflow
- Proper sash height shown on the BSC (~254 mm)
  - Too low
    - Onward air velocity increases at the opening
  - Too high
    - Onward air velocity slows down



Food for thought



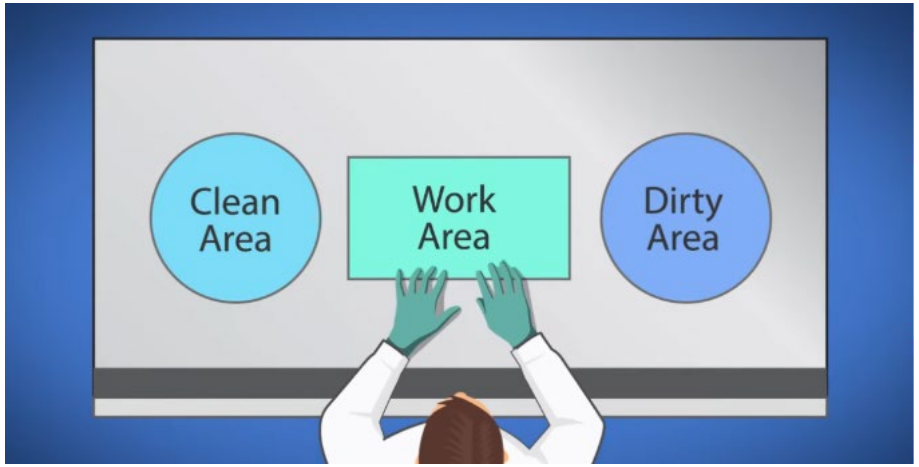
- Work surface lip created to hold spillage
- One motor system
  - Sealed from the X plenum motor to the filter
  - Consistent down flow
    - Allows an independent certifier to certify
- Night mode
  - Sash is completely closed
  - Operate at 30% fan speed

Prior to use

- Certification current
- UV light OFF
- Blower & fluorescent light ON
- Sash alarm functional; sash at correct height
- Plenum drain valve CLOSED (perpendicular to the ground)
- Run hood 4 minutes before work (if turned off)
- Record pressure gauge findings (never zero during use)

Working in the hood

- Bring all needed supplies; disinfect before entry
- Arms at 90°, face above sash; use armrest
- Place sharps & biohazard bins on dirty side
- Keep back grille clear; vortex on dirty side
- Move arms straight in/out
- Minimize traffic near BSC
- Only one user unless hood ≥ 6 ft



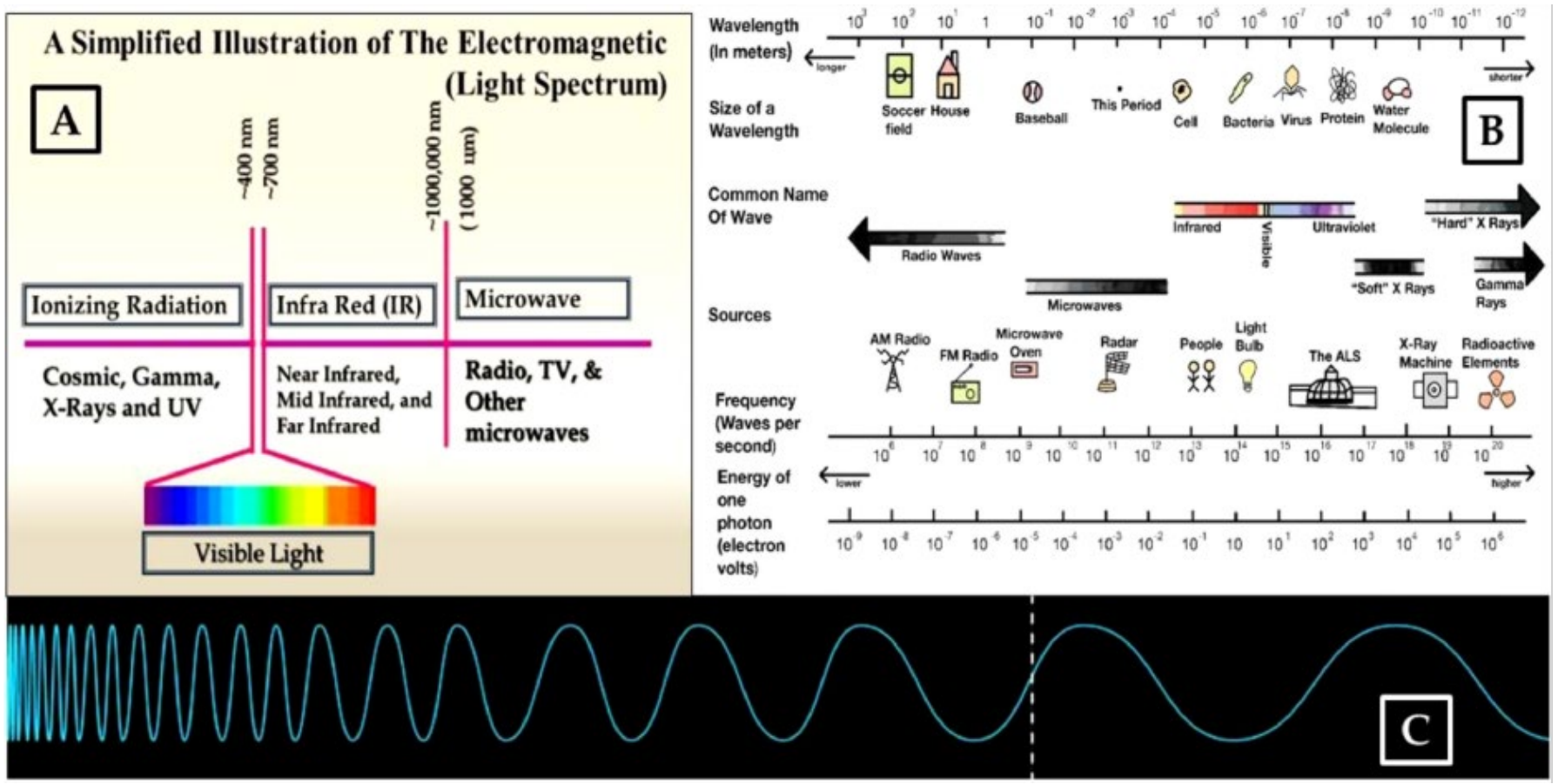
Avoid…

- Overloading the cabinet or blocking grilles
- Using open flames
- Spraying disinfectant inside the hood
- Inserting your head into hood
- Utilizing only bleach to clean work surfaces
  - Causes pitting of the 304-electrode polished stainless steel

Something to consider

- Ultraviolet light has germicidal properties
  - Limited and should not substitute thorough cleaning
- To activate the UV light the sash must be lowered to the work surface
- UV-C light (253.7nm) disrupts microbial DNA which makes it difficult for organisms to replicate
  - Less effective in the presence of humidity and shadows
    - Moisture absorbs UV light
    - Most effective in dry, controlled environments for surface only disinfection
  - Harmful to human skin and eyes
  - Prolonged exposure can degrade polymers and plastics in the work zone
- Regular bulb replacement and monitoring needed
- Weekly bulb cleaning recommended to ensure best performance
- Light rays cannot penetrate layers

UV-C radiation



CLEANING UP A SPILL

Don/doff proper PPE and consult SDS and SOP.

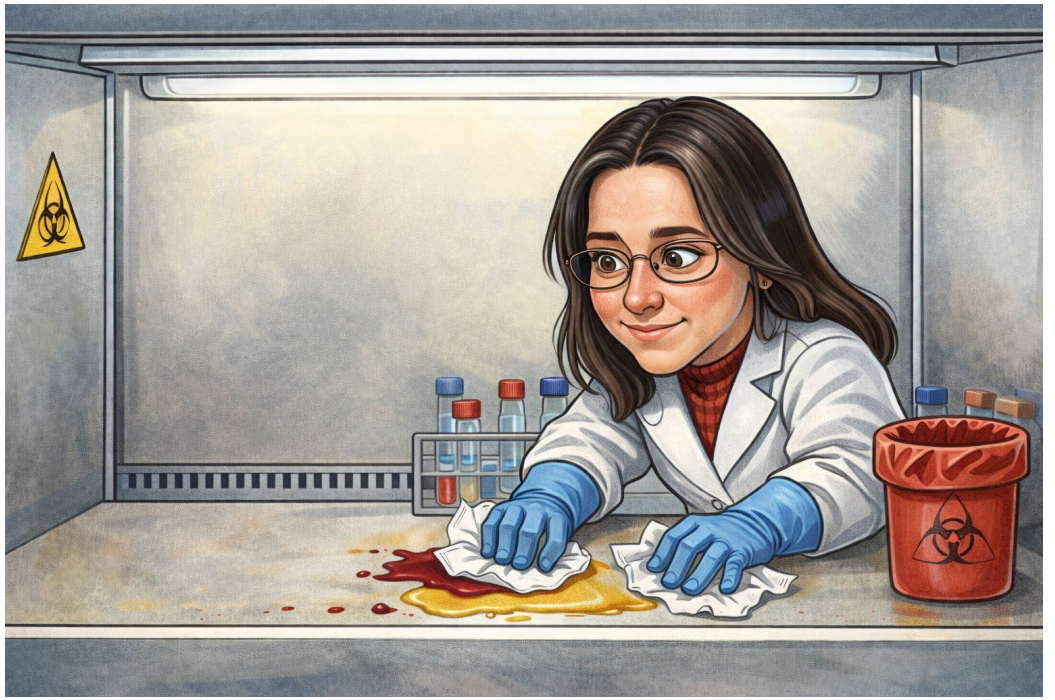
Cover the spill with absorbent material.

Apply disinfectant in a circular pattern from the perimeter inward.

Remove materials and dispose of them in the biohazard waste container.

Repeat with fresh towels to meet the required contact time.

Disinfect all items that contacted the spill.



Why should I care?

Aseptic technique is essential to prevent cross contamination and ensure accurate, reliable cultures. High-quality microbiology data supports antimicrobial stewardship by reducing unnecessary workups, expediting results, and guiding timely susceptibility testing-helping clinicians confidently de-escalate or initiate therapies such as vancomycin.

Combating the rapid evolution of resistance

St Luke's

2025 SYSTEM ANTIBIOGRAM - PERCENT SUSCEPTIBILITY

GRAM POSITIVE ORGANISMS	#	AMP	A/S	OXA	PCN	CTX	CLN	DPT[1]	ERY	GEN	LEV	LZD	RIF	TCN	T/S	VAN	NIT[2]
Relative Drug Cost		$$	$$	$$	$	$	$	$$$$	$	$	$	$	$	$	$	$	$
MSSA	1904	-	-	100	-	-	82	100	73	98	-	100	100	96	98	100	100
MRSA 18%	424	-	-	-	-	-	83	100	18	96	-	100	99	88	92	100	100
Staphylococcus (coag neg)	383	-	58	58	-	-	66	98	45	96	85	99	97	71	-	100	100
Staphylococcus lugdunensis	179	-	97	97	-	-	89	100	91	99	100	100	100	95	-	100	-
Enterococcus faecalis	1463	100	-	-	99	-	-	99	-	-	94	99	-	-	-	99	100
Enterococcus faecium	139	57	-	-	53	-	-	97	-	-	65	96	-	53	-	85	-
Streptococcus mitis	129	-	-	-	67	96	85	-	-	-	90	100	-	-	-	100	-
Strep. agalactiae (GBS)	169	-	-	-	93	93	53	-	-	-	99	100	-	16	-	99	-
Strep. pneumoniae[3]	48	-	-	-	85	100	92	-	79	-	100	100	-	92	79	100	-

AMP-Ampicillin **CTX**-Ceftriaxone **GEN**-Gentamicin **NIT**-Nitrofurantoin **RIF**-Rifampin **VAN**-Vancomycin
A/S-Unasyn **DPT**-Daptomycin **LEV**-Levofloxacin **OXA**-Oxacillin **T/S**-Bactrim
CLN-Clindamycin **ERY**-Erythromycin **LZD**-Linezolid **PCN**-Penicillin **TCN**-Tetracycline

[1]**Daptomycin NOT indicated for treatment of pneumonia**
[2]**Indicated for UTI only**
[3]**Blood Isolates only**

Strongly Favored - Susceptibility 90-100%
Less Favored - Susceptibility 80-89%
"-" = Not reported **Not Recommended - Susceptibility <80%**

Contact: Infectious Disease Pharmacist in Voalte

- AMR is a global threat
- Commonly resistant pathogens include
  - Pseudomonas aeruginosa
    - CRPA
      - Resistant to carbapenems and beta lactams
  - Acinetobacter baumannii
    - CRAB
  - Enterobacter
  - Enterococcus
    - VRE
  - Staphylococcus aureus
    - VRSA
    - MRSA

Resources

NuAire. (2024, June 14). *How a Class II, Type A2 biosafety cabinet works*. NuAire. https://www.nuaire.com/resources/class-ii-type-a2-biosafety-cabinet-how-it-works-article

Centers for Disease Control and Prevention. (n.d.). *Fundamentals of working safely in a biological safety cabinet (BSC)*. REACH CDC. https://reach.cdc.gov/course/fundamentals-working-safely-biological-safety-cabinet-bsc

Centers for Disease Control and Prevention. (n.d.). *Fundamentals of working safely in a biological safety cabinet (BSC): Completing work in a BSC* [Video]. YouTube. https://www.youtube.com/watch?v=ZrD3BPYwwG8

Centers for Disease Control and Prevention. (n.d.). *Fundamentals of working safely in a biological safety cabinet (BSC): Preparing for work in a BSC* [Video]. YouTube. https://www.youtube.com/watch?v=3vF5ZJi462Q