

BSC MythBusters: Can multiple people work safely in a BSC?

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Kara Held, Ph.D.
Science Director



BSC MythBusters

- There are a lot of rules, “guidelines”, rumors, and myths for using a Biosafety Cabinet.
- Which are true?
- Which are not?
- WHY?



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*Baker is not affiliated with this TV show!

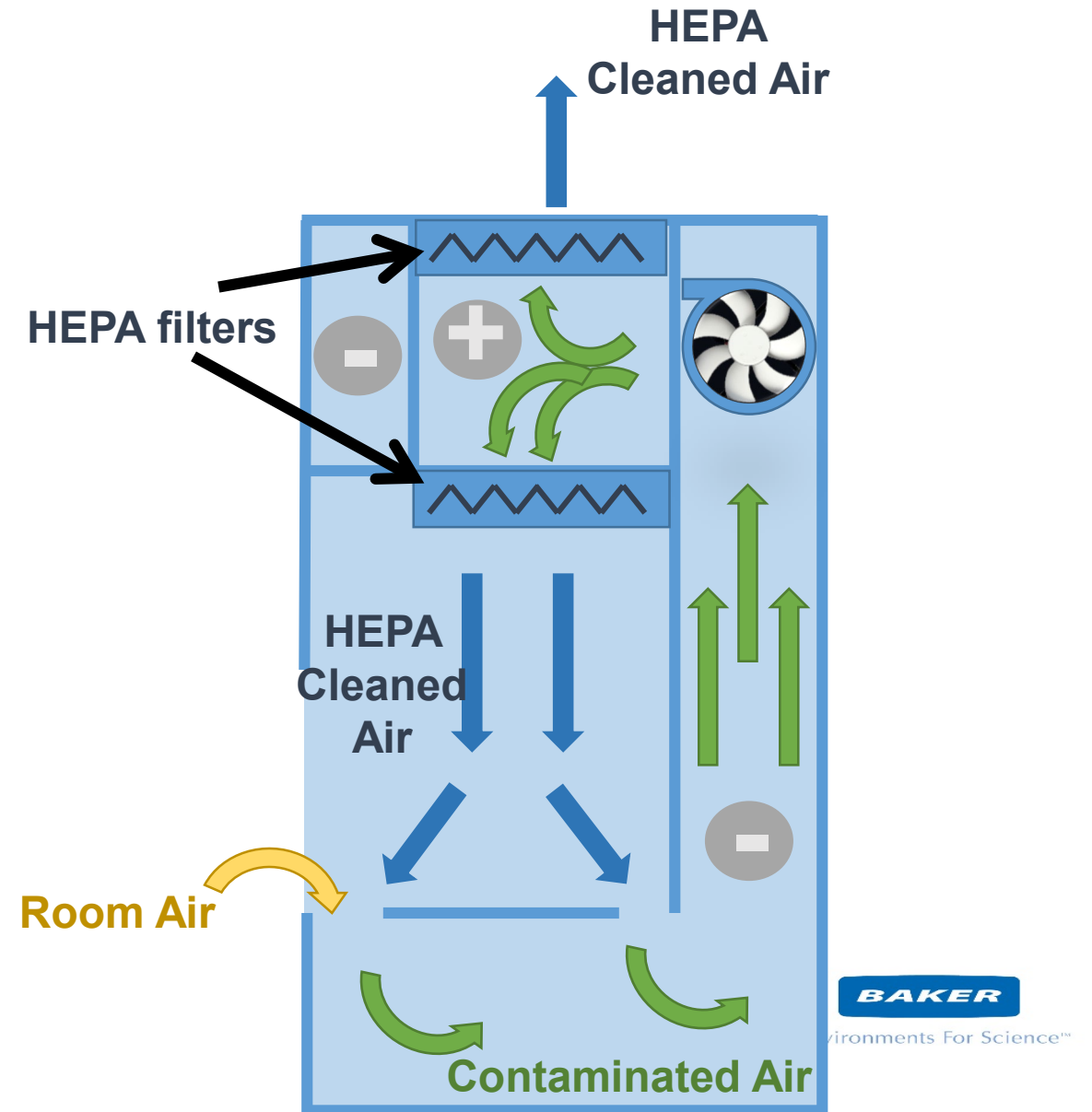
Biosafety Cabinets (BSCs)

- A ventilated enclosure for work with biohazard agents assigned to biosafety levels 1 through 4.
- Provides 3 types of **CONTAINMENT**:
 - Personnel protection
 - Product protection
 - Environmental protection
- All BSCs contain: 1+ HEPA filters & motor/blower



Class II Type A2 BSCs

- Personnel, Product and, Environmental Protection from particulates and aerosols.
- Minimum 100 fpm intake air
- Partial recirculation



Normal BSC Operation

1. Strong front intake air
2. Side suction slots
3. Downward HEPA filtered air
4. Smoke split to front and back
5. Momentum Air Curtain
6. ReadySAFE mode
7. Partially recirculating air



MYTH: It's ok for more than one person to use a BSC at a time.



- Theoretical reasoning:
 - All manufacturers recommend one at a time.
 - Cabinets are all tested and certified empty. Adding more users means more potential obstructions.
 - There's an increased potential for cross contamination of experiments.

Determining Airflow Disruption

- Visually
 - Smoke
- BSC performance/Containment
 - Particle Counting
 - NSF International Standard 49 Biological Testing Criteria



Experimental Design

- Test with 2 “people” in front of a cabinet with 8” sash opening
- Test airflow reduction due to the bodies restricting inflow



Ginger and George

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Experimental Design

- Test with 2 “people” in front of a cabinet with 8” sash opening
- Test airflow reduction due to the bodies restricting inflow
- Airflow patterning around front access opening and hands
- Microbiological testing
- Repeat with 3 “people”
- Repeat with 12” sash opening
 - Really tests BSC’s ability to maintain containment

Gene, Ginger, and George



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*Mannequins were spaced equally apart in all scenarios and equipment moved around them for testing and consistency.

“Engineering” a smoke curtain



Biological Testing

- Microbiological aerosol testing in accordance with NSF International Standard 49 testing



NSF 49 Pass/Fail Criteria:

Personnel

- ≤ 10 CFUs Impingers
- ≤ 5 CFUs Slit samplers
- Control > 300 CFUs

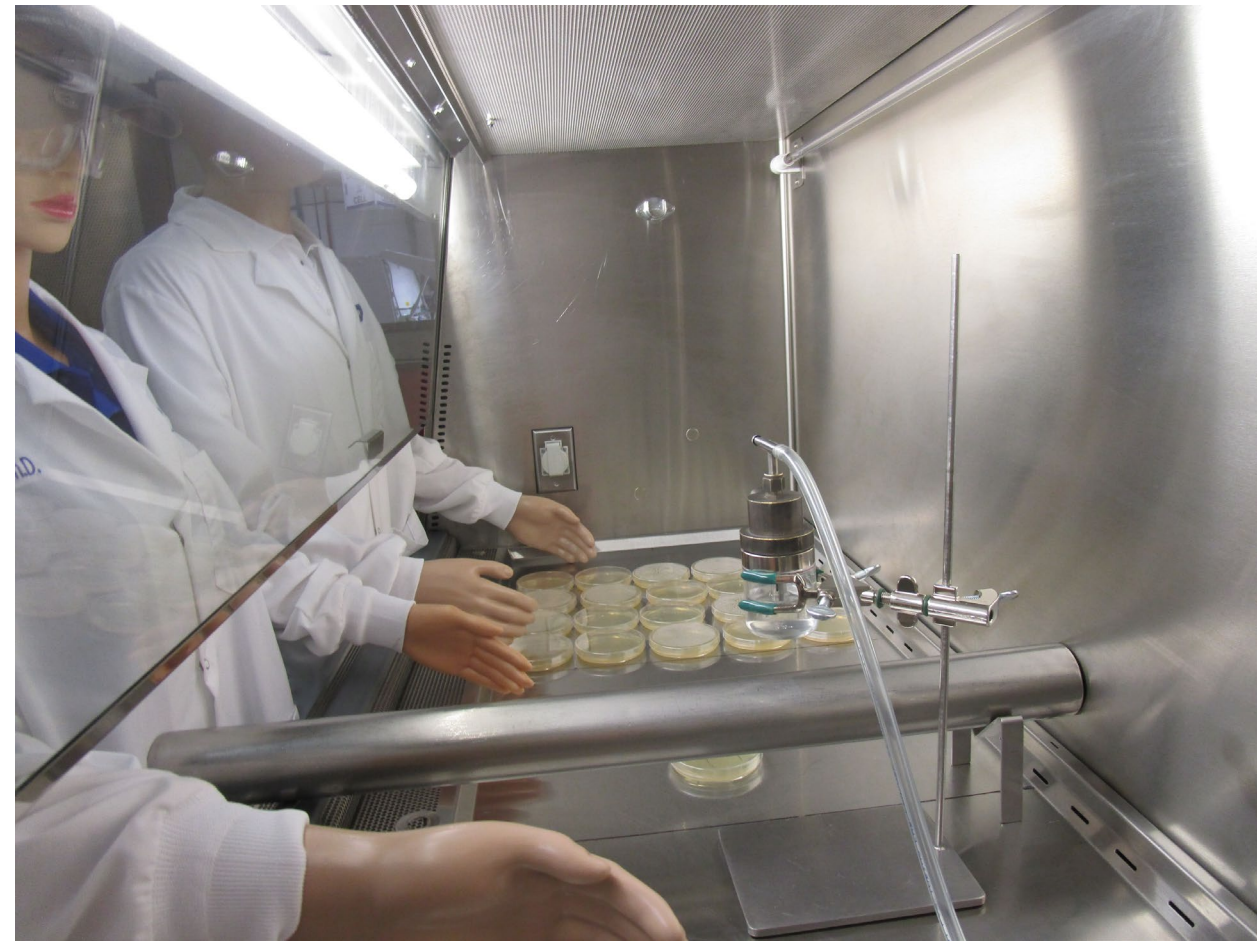
Product

- ≤ 5 CFUs
- Control > 300 CFUs

Cross

- ≤ 2 CFUs 14+” away

NSF Aerosol Microbiological testing



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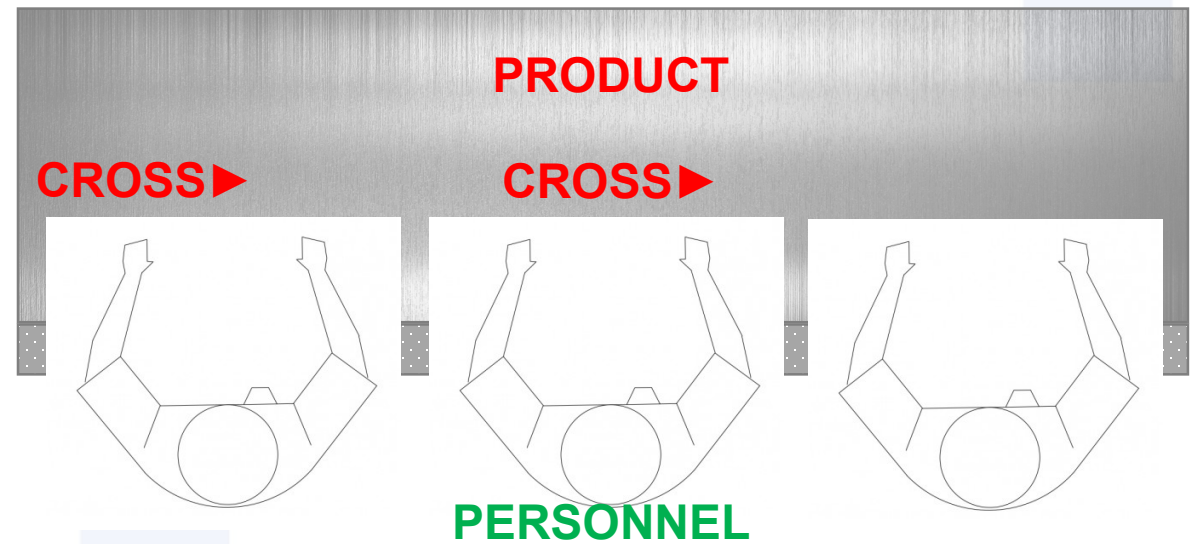
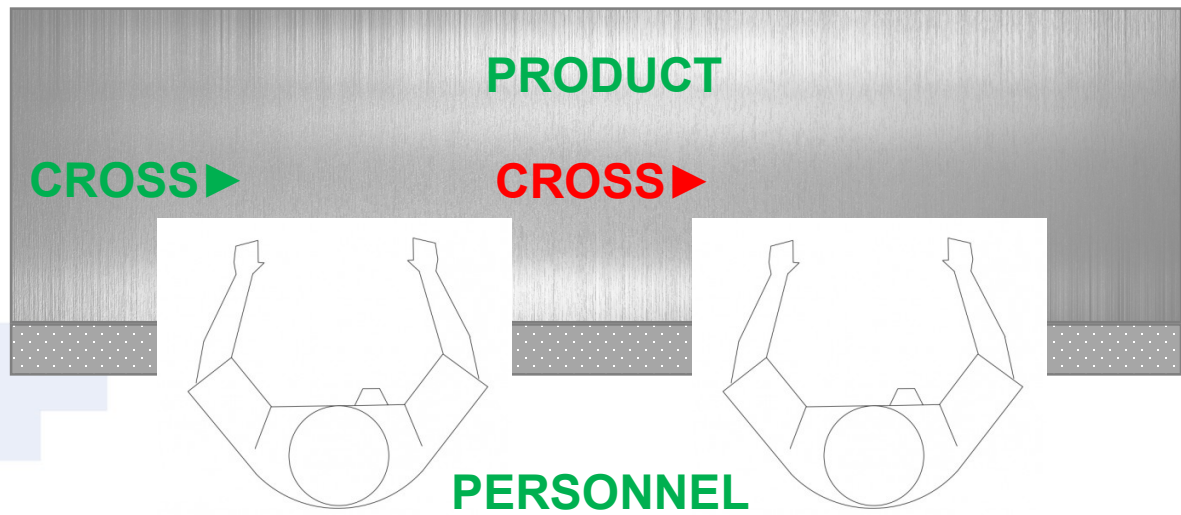
NSF Aerosol Microbiological testing



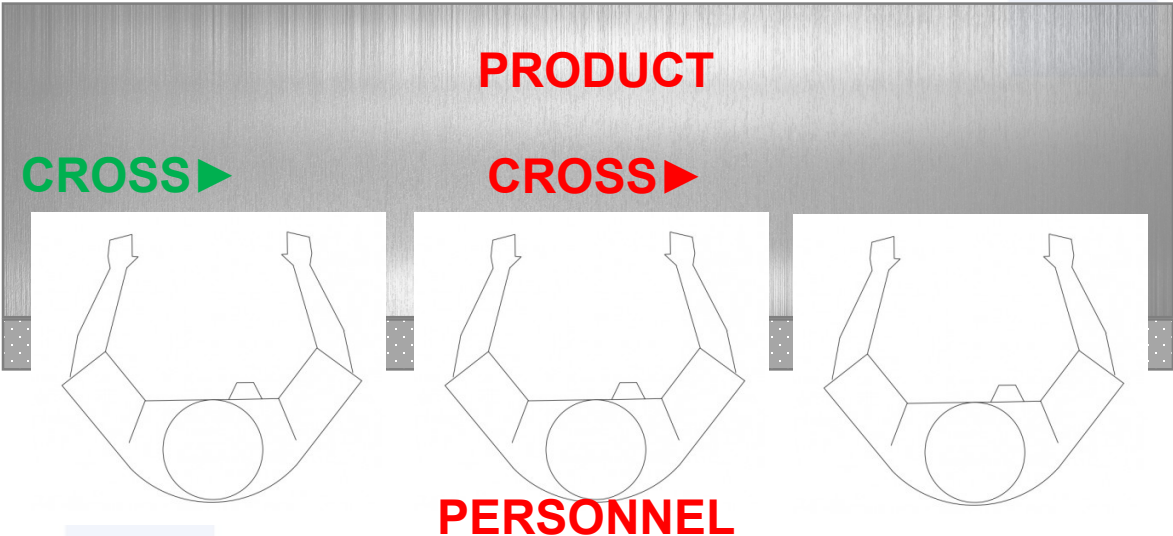
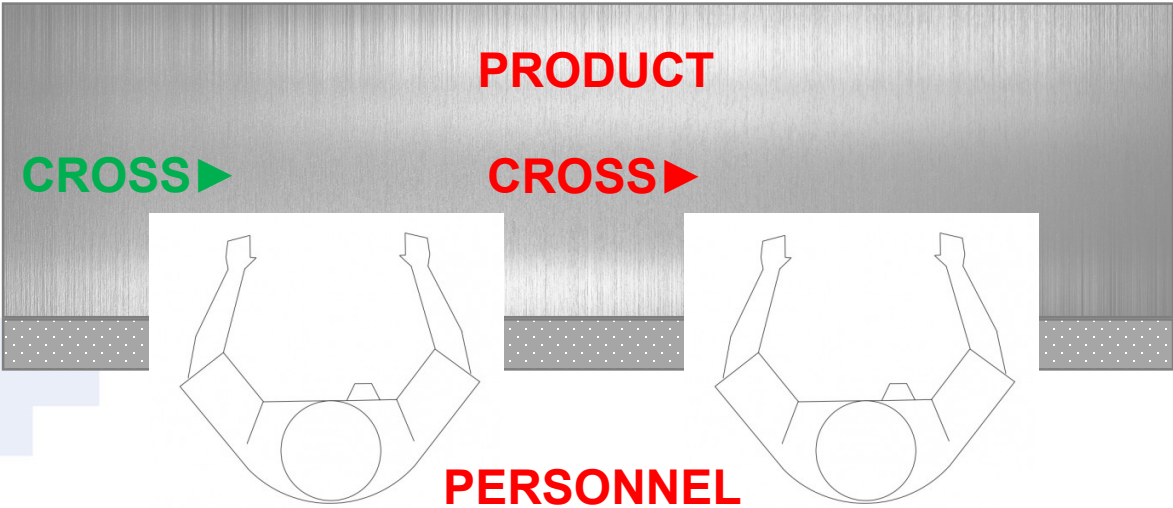
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8" Sash Opening on a 6 ft Class II Type A2 BSC



12" Sash Opening on a 6 ft Class II Type A2 BSC



Busted or not?

“It’s ok for more than one person to use a BSC at a time.”

To guarantee full **CONTAINMENT**, do not use more than 1 person at a time.

- Cross contamination will occur.
- Personnel protection is maintained with 8” sash but lost at 12” sash.
- Product protection is lost with 3 people and with 12” sash

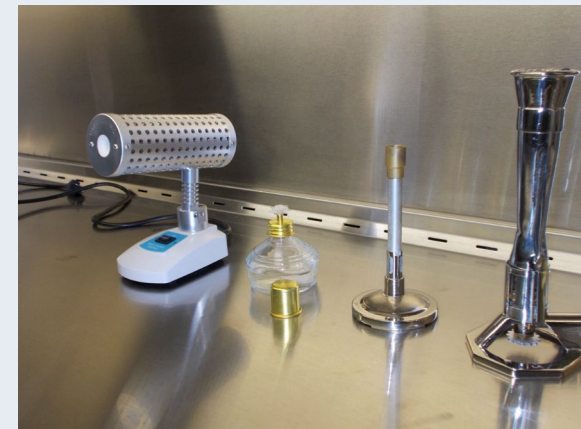


RECOMMENDATION:

BSCs should be used by a single person. If you must, 2 people is a maximum with an 8” sash opening, but a proper risk assessment must be done to ensure personnel safety and try to minimize cross contamination.

Current BSC MythBusters

- How much is “overloaded”?
- Disinfectants to use in a BSC
- Can you use volatile chemicals in an A2 BSC?
- How effective is a UV in a BSC?
- Can you use heat (like a Bunsen burner) in a BSC?
- Do HEPA filters filter out everything?





If you have BSC myths you want tested, send them to me!
We'll get some answers.

mythbusters@bakerco.com