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BSC MYTH BUSTERS

CAN HEPAs FILTER OUT EVERYTHING?

- Researchers have speculated that DNA may not be captured by HEPA filters, allowing for contamination of subsequent experiments by aerosolized DNA.
- What about volatile chemicals?

WITH

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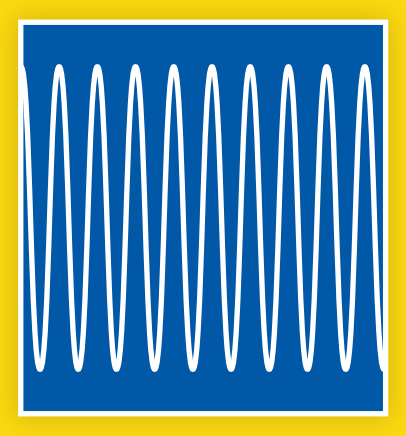
1 HOW HEPAs WORK:

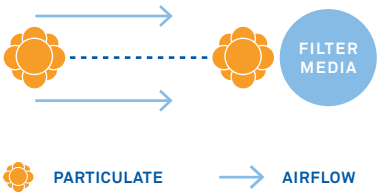
HEPA filters are the main line of defense against contamination in Biosafety Cabinet (BSC) construction. HEPA (High Efficiency Particulate Air) filters are composed of one continuous pleated sheet of borosilicate fibers woven into a crosshatched design.

Read the full White Paper here:
https://bit.ly/2nUUd1d

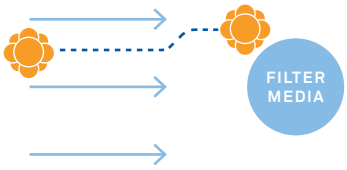


2 HEPA CAPTURE DYNAMICS:

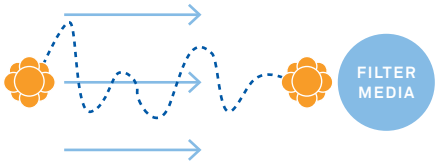
Inertial Impaction uses a rapid change in air direction and the principles of inertia to separate the particulate from the air stream.



Interception involves having the particulate make physical contact and becoming attached to the media fiber.



Diffusion occurs when the random motion of a particle causes that particle to make contact.



Picture credit: www.science101.com

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3 VOLATILE CHEMICALS = **NO!**

Gases and vapors are not captured by HEPA filters and therefore, (according to paper – link listed below), users need to measure how much of a volatile chemical an A2 can handle (see Figure 1).

Download the White Paper here:
https://bit.ly/2PCxdAZ

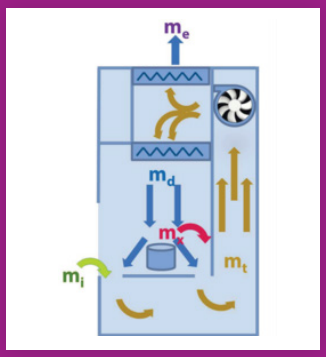

Figure 1. Mass flow rates for specific airflows within a Class II Type A2 BSC diagram.

4 DNA = **YES & NO!**

- All three of the HEPA capture dynamics lead to very high particulate removal of a wide range of sizes, with the most penetrating particle size of 0.21µm. When tested at 0.3µm, near its worst, the HEPA filter still has to remove 99.97% or better of all particulates.
- DNA passage is size dependent (see Figure 2).
- DNA is 0.22 µm – so when dry, up to 0.03% of DNA can pass through HEPA filter.
- DNA can be completely caught by HEPA filters at the site of generation when aerosolized in water droplets.

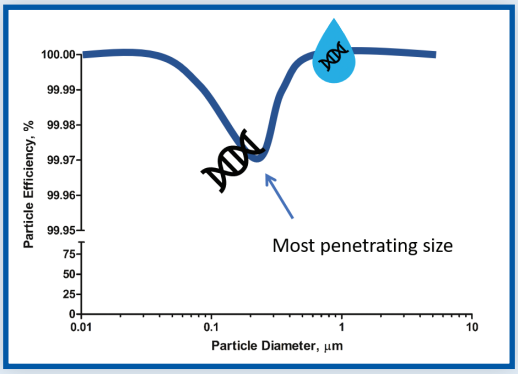

Figure 2.

5 CONCLUSION:

MythBuster Series: Can HEPAs filter out everything?
While they filter out a lot, HEPA filters cannot capture all particulates that try to pass through them, and cannot filter out gases or vapors. They're effective at removing various sizes of contaminants, but certain sizes (whether aerosolized or not), may not be filtered out.

YES?

FINAL ANSWER:
NO

NO?

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