Recirculation System for Aerosol Collectors Maximizes Particle Concentration for Improved Pathogen Detection

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Collection of Targeted Aerosols is Currently Limited

Typical aerosol wet sampling collection systems (e.g., wetted wall aerosol sampling cyclones) inject clean collection buffer into the aerosol collection device for the duration of the collection cycle. This is a one-way collection buffer, and the concentration of target particles in the aerosol is limited by the minimum flowrate of liquid from the syringe pump.

Improve Detection with Recirculated Collection Buffer

Collecting a higher concentration of target aerosol particles improves pathogen detection after collection. This innovative recirculation technology maximizes target particle concentration and can be tailored to fit existing off-the-shelf aerosol collection systems. The technologyâ??s two-pump system continuously circulates buffer fluid to concentrate particles in the hydrosol solution. The system allows users to increase the buffer volume during collection without interrupting recirculation. Recirculating the collection buffer enables the capture of very small numbers of bacteria entering an area.

Summary Bullets

- **Enhanced detection:** Continuously recirculated collection buffer increases the concentration of targeted particles collected and improves detection of pathogens
- **Increased sampled air volume:** Recirculating the buffer enables running the system for longer periods of time and with larger volumes of air to improve pathogen detection in entire buildings
- **Increased control:** Users have active control of the volume of fluid introduced during collection via the systemâ??s recharge pump

Solution Advantages

- **Enhanced detection:** Continuously recirculated collection buffer increases the concentration of targeted particles collected and improves detection of pathogens

- **Increased sampled air volume:** Recirculating the buffer enables running the system for longer periods of time and with larger volumes of air to improve pathogen detection in entire buildings
- **Increased control:** Users have active control of the volume of fluid introduced during collection via the systemâ??s recharge pump
- **Tailored application:** Can be modified to fit any system that uses a liquid collection buffer to collect and concentrate aerosols for detection

Potential Commercial Applications

Improved detection of aerosolized pathogens for:

- Hospital settings (e.g., hospital rooms of COVID-19 patients)
- Government buildings
- Military complexes
- Agricultural settings (e.g., monitoring airborne pathogens to prevent spread of disease in livestock areas)
- Businesses
- Other public areas

Inventors

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Publications

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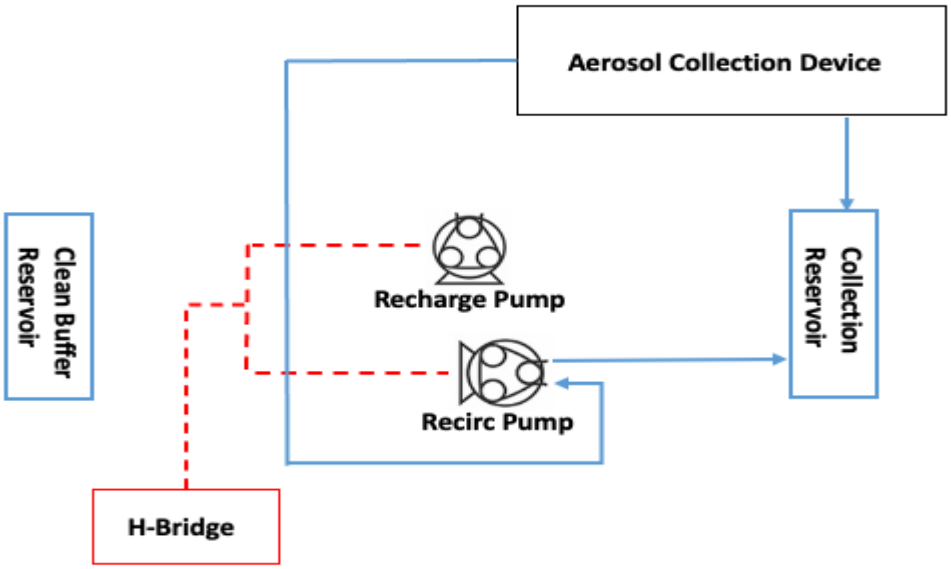
Images



The two-pump system continuously circulates the buffer fluid to concentrate particles. The H-bridge is used to reverse the polarity to drain the fluid lines into the collection reservoir at the end of the cycle.

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