

SmartNotes

Q
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What is the best way to monitor airflows in a biological safety cabinet (BSC) to provide greater assurance of performance?

While optimal flow monitoring requires measurement of overall inflow and downflow, many BSCs use technologies falling short of the ideal. The Thermo Scientific™ Herasafe™ 2030i Biological Safety Cabinet uses flow measurements in the throat of the fan to provide an adequate measurement of flow that is not dependent on the pressure differential across the filter.

Monitoring the inflow and downflow to assure proper velocities is important to users who rely on their BSC to provide protection to themselves and their work. In the past, BSC users had to choose between measuring pressure differentials across the filter which provided a good measurement of overall flow, but needed adjustment as the filter loaded OR individual velocity probes that measured air velocity after the filter, but were exposed to potential damage and only give the velocity of a single location. These systems had diminishing validity and value over time and required regular reassessment.



Pressure differential across the filters

This approach measures the pressure difference across the downflow or exhaust filter. When the filters are new, airflow through the filter is associated with a specific pressure value. As the filter loads, the pressure increases and the flow of air through the filter is assumed to be proportionally less. However, modern fans adjust speed to maintain flows and do not remain constant. Proper compensation for filter loading needs to be integrated into flow monitoring to keep BSC users well informed and systems that measure pressures across the filters need regular adjustment.

Air velocity probes

This approach uses the change in electrical resistance across a wire according to changing temperature from air velocity. Thermal anemometers are the recommended tool to measure downflow velocity, but struggle to maintain proper flow monitoring. This technology measures airflow at a single point next to either the downflow or exhaust filter. The critical balance of inflow and downflow at the front opening is a function of the overall downflow and inflow, which can not be accurately determined by the speed of air through a non-representative location next to the filter.

Summary

Herasafe 2030i BSC monitors airflow using a new approach that accurately measures flow without the weaknesses of the traditional approaches which measure the pressure across the filters or the velocity at a single point.



Figure 1: Herasafe 2030i Biological Safety Cabinet

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