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BIOAEROSOL RESEARCH AND TECHNOLOGY

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Certification of Collection Performance of SAS Family of Bioaerosol Samplers

The Bioaerosol Research and Technology Laboratory at Rutgers, The State University of New Jersey, investigated the physical and biological efficiencies of SAS-100 and SAS-180 bioaerosol samplers manufactured by VWR international s.r.l., the Italian subsidiary of Avantor group.

Physical efficiency testing. The main focus was to determine whether the samplers' physical performance conforms with EN 17141 and ISO 14698, especially with the EN 17141 guideline that bioaerosol samplers have a cut-off size (i.e., size at which 50% of the particles are collected, d_{50}) of 2 µm or lower. The samplers' physical efficiencies were determined by challenging them with polydisperse sodium chloride aerosols and measuring particle concentration upstream and downstream of the samplers through isokinetic probes using an Aerodynamic Particle Sizer (APS 3321, TSI Inc., Shoreview, MN).

Biological efficiency testing. Biological efficiency was determined relative to a reference sampler with a cut-off size of 0.65 µm. *Staphylococcus epidermidis* (ATCC® 12228) bacteria were used in biological efficiency tests.

Findings on physical efficiency:

Samplers SAS-180 with Petri dishes as collection medium (sampling heads 710-2155 and 710-0878), SAS-100 with Petri dish as collection medium (sampling heads 710-2155 and 710-0878), and sampler SAS-180 with contact plate as sampling medium (sampling head 710-0880) all had their physical cut-off sizes, or d_{50}, below 2 µm. **Therefore, since the investigated sampler configurations showed $d_{50} < 2$ µm, they comply with EN 17141 requirement regarding the samplers' cut-off size, d_{50}.**

Findings on biological efficiency

Biological efficiency of samplers SAS-180 with Petri dishes from VWR-Italy and VWR-USA as collection medium (sampling heads 710-0878 and 710-0880) and SAS-100 with Petri dish from VWR-Italy as collection medium (710-0878) and sampler SAS-180 with a contact plate from VWR-Italy as sampling medium (sampling head 710-0880) largely followed their physical efficiency curve. The cut-off size for the biological efficiency was close to 2 µm.

The investigated SAS samplers comply with ISO14698 and EN17141 for all collection aspects described therein. In addition, derivative samplers that use investigated sampling heads (i.e., dual head samplers) based on design comparison and functional specification equivalence analysis are expected to comply with the standards.

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