

Size-selective inlets

For use with the Ultrasonic Personal Air Sampler

Revision 2.0
June 24, 2022

Four interchangeable size-selective particulate matter sampling inlets are available for the Ultrasonic Personal Air Sampler (UPAS): $PM_{2.5}$ @ 1 L min^{-1} , $PM_{2.5}$ @ 2 L min^{-1} , respirable @ 2 L min^{-1} , and PM_{10} /Thoracic @ 2 L min^{-1} . All inlets are compatible with both the UPAS v2 and UPAS v2+.

$PM_{2.5}$

1 L min^{-1}



$PM_{2.5}$

2 L min^{-1}

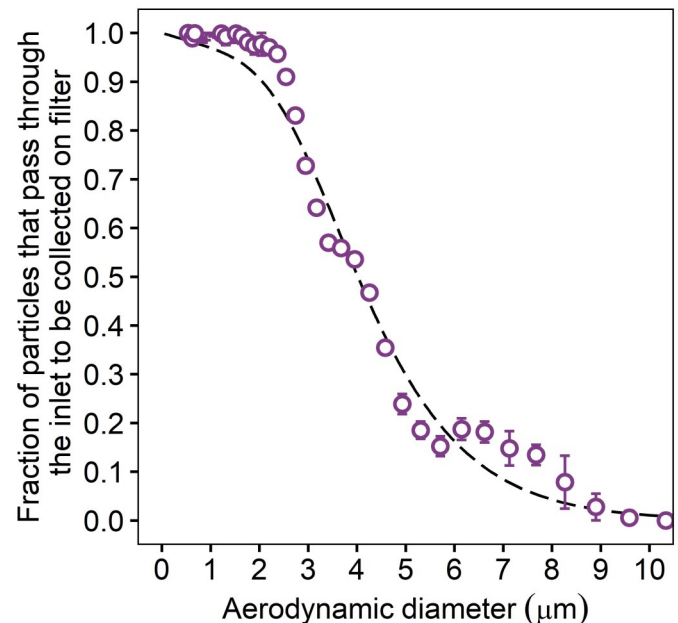


These inlets are designed to allow particles to pass through and reach the filter in a manner consistent with the U.S. Environmental Protection Agency (EPA) definition of $PM_{2.5}$. Each inlet is designed to have 50% penetration efficiency at an aerodynamic diameter of $2.5\text{ }\mu\text{m}$.

For additional information on the design and performance of these inlets, see: Volckens, J., Quinn, C., Leith, D., Mehaffy, J., Henry C.S., Miller-Lionberg, D. Development and evaluation of an ultrasonic personal aerosol sampler, *Indoor Air*, 2017, 27(2), 409-416, <https://doi.org/10.1111/ina.12318>

Respirable, 2 L min^{-1}

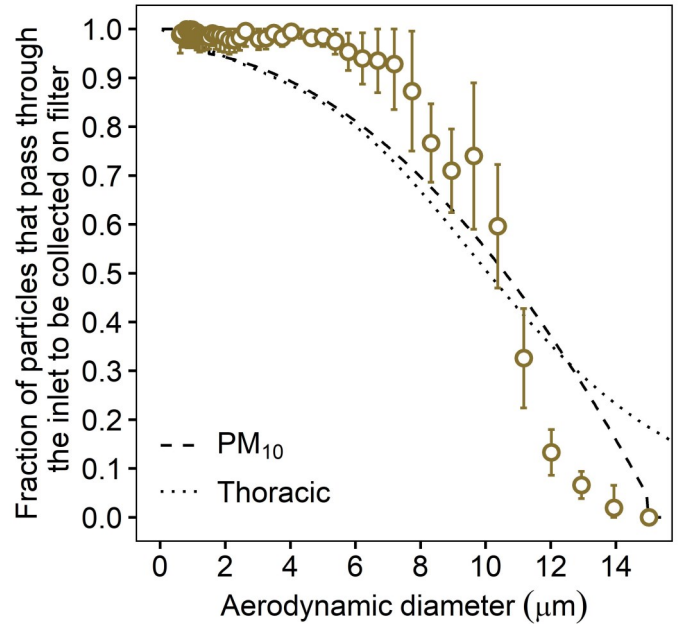
50% penetration efficiency at an aerodynamic diameter of $4\text{ }\mu\text{m}$ when operated at 2 L min^{-1}



The penetration efficiency of the respirable inlet (points) compared to the ACGIH and ISO definition of respirable dust (dashed line).

PM₁₀ / Thoracic, 2 L min⁻¹

50% penetration efficiency at an aerodynamic diameter of 10 μm when operated at 2 L min⁻¹



The penetration efficiency of the PM₁₀ / Thoracic inlet (points) compared to the U.S. EPA definition of PM₁₀ (dashed line) and the ACGIH definition of the thoracic fraction (dotted line).

For additional information on the design of the prototype respirable and PM₁₀/thoracic inlets, see: Leith, D., L'Orange, C., Mehaffy, J., Volckens, J. Design and performance of UPAS inlets for respirable and thoracic mass sampling, *Journal of Occupational and Environmental Hygiene*, 2020, 17(6), 274-282, <https://doi.org/10.1080/15459624.2020.1741595>

Accessories and related items

Filter cartridge

All of the “2nd generation” inlets shown on this sheet are used with the same 37-mm filter cartridge (right; actual size).



Open-faced inlet and filter cartridge

Want to sample onto an open-faced inlet and filter cartridge? That's also an option! Like our size-selective inlets, the open-faced inlet is compatible with the calibration adapter.



Calibration adapter

Place this adapter (left) over any of the inlets shown here and connect a flow meter (e.g., Alicat Scientific MWB-5SLPM-D) to confirm that the volumetric flow rate through the inlet and filter matches the target value.

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