



AIR SAMPLING SOLUTIONS & EXPERTISE

To: SKC Product Users

From: Lucinette Alvarado, CIH  
Corporate CIH/Technical Services Manager

Saulius Trakumas, PhD, Particle Physics  
Product Development Manager

Date: August 6, 2020

Re: Third-party Validation of SKC PPI Impactor Performance

SKC Inc. recently engaged Rutgers University for a project to evaluate the performance of the SKC PPI Impactor.

The project objective is outlined below:

The goal of this project was to evaluate the performance ability of these PPI models to follow the ISO 7708/CEN criteria for respirable particles as designed.

- **Disposable respirable SKC PPI impactors operating at 2 and 4 L/min**  
*(referred to in the report as 2-L/min-PPI and 4-L/min-PPI, respectively)*
- **Reusable respirable SKC PPI Impactors operating at 2 and 4 L/min**  
*(referred to in the report as 2-L/min-Re-PPI and 4-L/min-Re-PPI, respectively)*

The following impactor performance parameters were determined:

1. Penetration efficiency as a function of aerodynamic particle diameter when challenged with polydisperse and monodisperse aerosol particles
2. Cut-off size ( $d_{50}$ ) when challenged with polydisperse and monodisperse aerosol particles
3. Bias map for the investigated samplers

In summary, the Rutgers University study results indicate the following:

**Both disposable PPIs and the 2 L/min reusable PPI** have a cut-off size very close to the expected value of 4.0  $\mu\text{m}$  and a bias within  $\pm 5\%$  for the vast majority of aerosols when operated at their recommended respective flow rates (2 and 4 L/min).

The cut-off size of the **4 L/min reusable PPI** at the recommended 4 L/min flow rate was found to be 4.27  $\mu\text{m}$  with a bias above the recommended +10% for aerosols with large MMAD; however, when used at 4.3 L/min this sampler has a  $d_{50}$ =3.96 and an average bias of +1.6%.

PPI Samplers can operate in any orientation and their ability to follow the respirable convention does not depend on orientation when operated in calm air conditions (wind velocity < 0.5 m/s).

*The complete report is available upon request.*

Based on these findings, we encourage the identified **reusable PPI Sampler (part number 225-382) be used at 4.3 L/min until further notice.**



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Please note that if results obtained using part number 225-382 at the previously recommended 4.0 L/min were in compliance with regulations, they will stay in compliance at the newly recommended flow rate since using the sampler at a higher flow rate will lead to lower respirable mass collected.

If you have any questions, please contact SKC technical support at [skctech@skcinc.com](mailto:skctech@skcinc.com).

Sincerely,

A handwritten signature in blue ink that reads "Lucinette Alvarado". The signature is fluid and cursive.

Lucinette Alvarado, CIH

A handwritten signature in black ink that reads "Saulius Trakumas". The signature is cursive and somewhat stylized.

Saulius Trakumas, PhD, Particle Physics