

# Reusable Parallel Particle Impactors (PPIs)

Precise Match to ISO 7708/CEN Respirable Criteria

- **Collection efficiency precisely matches ISO 7708/CEN criteria adopted in the OSHA final silica rule**
- **Reusable conductive aluminum – use with any suitable 37-mm filter**
- **Load with disposable pre-oiled impaction substrates**
  - Reduce particle bounce and buildup effects
- **Only 3.3 ounces (93.6 grams) – ideal for both personal and area sampling**
- **Selection of flow rates available to meet specific applications**
  - **8 L/min respirable PPI:** Enhances sensitivity (for short-term and/or low concentration sampling) using high flow pumps; ideal for new lower OSHA PEL for silica
  - **4 L/min respirable PPI:** Enhances sensitivity and can be used with personal pumps; TWA sampling for  $\geq 4$  hours
  - **2 L/min respirable PPI:** 8-hour TWA sampling
- **Disposable plastic PPIs are available ([visit www.skcinc.com](http://www.skcinc.com))**
- **Thoracic model is available ([visit www.skcinc.com](http://www.skcinc.com))**



Reusable conductive aluminum!



SKC Parallel Particle Impactor (PPI®) Samplers are similar to traditional 37-mm filter cassettes in that they collect respirable dust on a standard 37-mm filter. That's where the similarity ends! Impaction-based PPI Samplers are designed to provide a precise match to the new criteria for respirable samplers, and *they do it in a unique way*. See *How PPI Works at right*.

## PPI Samplers Meet Requirements in OSHA Final Rule on Respirable Crystalline Silica

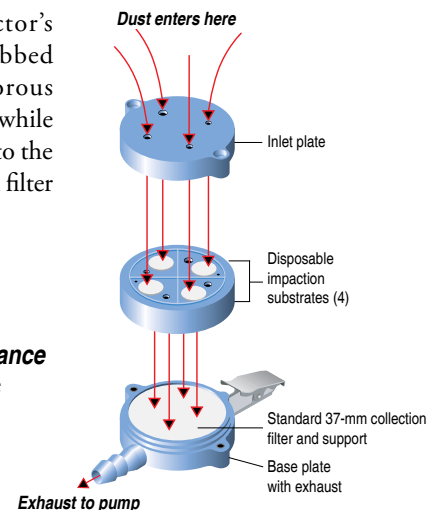
In its final silica rule, OSHA set a new permissible exposure limit (PEL) of  $50 \mu\text{g}/\text{m}^3$  across all industries covered by the rule and abandoned the previous silica PEL formula. In addition, the OSHA final silica rule states that any sampler conforming to the ISO 7708/CEN criteria (50% cut-point of  $4 \mu\text{m}$ ) can be used for workplace silica and lists examples of samplers, including the impaction-based SKC PPI Samplers (final rule page 16439). The ISO 7708 criteria have been adopted by NIOSH, ACGIH, and many other global occupational hygiene organizations. PPI Sampler performance data, relative to the ISO 7708/CEN criteria, was published in the *Journal of Physics*, Conference Series 151, 2009 and was made part of the OSHA Docket used to develop the OSHA final silica rule.

## How PPI Works

Only the patented\* SKC PPI Samplers contain four small impactors in the inlet section of the device. Each impactor features a unique 50% cut-point to target a specific one-quarter segment of the ISO/CEN curve resulting in a precise fit along the entire curve. A sample pump pulls air through the inlet nozzle of each impactor in the inlet plate. Particles larger than each impactor's 50% cut-point are scrubbed and retained on the porous oiled impaction substrate, while smaller particles continue to the standard 37-mm collection filter for analysis.

\* U.S. Patent No. 7,073,402

See comparative performance graph and references on back.

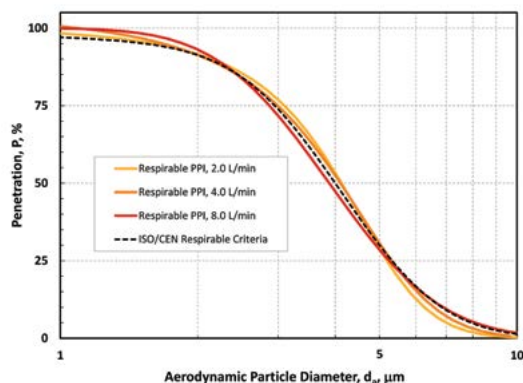


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### SKC PPI Performance

SKC PPI models were evaluated side by side with other size-selective samplers. Potassium sodium tartrate (PST), dioctyl phthalate (DP), glass spheres (GS), and coal mine dust were used as test aerosol. A load of approximately 6.8 mg of coal mine dust on the PPI substrates did not adversely affect PPI performance.



Comparison of PPI Samplers' performance with respirable conventions

### References

Trakumas, S., Hall, P., *Personal Respirable Sampler Containing Four Impactors Arranged in Parallel*, Abstracts of 23rd Annual AAAR Conference, Atlanta, GA, 2004, p. 78

Trakumas, S., Salter, E., "Parallel Particle Impactor - Novel Size-selective Particle Sampler for Accurate Fractioning of Inhalable Particles," *Journal of Physics: Conference Series 151* (2009), 16 pp., 012060, [www.skinc.com/instructions/Parallel Particle Impactor Paper.pdf](http://www.skinc.com/instructions/Parallel%20Particle%20Impactor%20Paper.pdf)

Reference 2 is an author-created, non-copyrighted version of an article accepted for publication in the *Journal of Physics: Conference Series 151*. IOP Publishing Ltd. is not responsible for any errors or omissions in this version of the manuscript or any version derived from it. The definitive publisher authenticated version is available online. Go to <http://dx.doi.org>, enter doi: 10.1088/1742-6596/151/1/012060.

Trakumas, S., "High-flow Personal Respirator Dust Sampler for Increased Sensitivity," Poster 261, AIHce 2010, Denver, CO

Trakumas, S., "High-flow Personal Sampler to Monitor Exposure to Respirable Crystalline Silica at New Lower TLV," IOHA 2010 8th Conference Book of Abstracts, Rome, p. 59

Trakumas, S., Salter, E., "High-Flow Personal Sampler to Monitor Exposure to Respirable Crystalline Silica at New Lower TLV" PowerPoint Presentation

ISO 7708:1995 (2008), *Air Quality — Particle Size Fraction Definitions for Health-related Sampling*, [www.iso.org](http://www.iso.org), search on 7708

OSHA Final Rule on Respirable Crystalline Silica, [www.osha.gov/silical](http://www.osha.gov/silical)

Stacey, P., Thorpe, A., and Ecbt, A., "Performance of High Flow Rate Personal Respirable Samplers When Challenged with Mineral Aerosols of Different Particle Size Distributions," *Ann. Occup. Hyg.*, 60, 2016, pp. 479-492, <http://annhyg.oxfordjournals.org/content/60/4/479.full.pdf>

### Performance Profile

- Sampling Rate:** 2 L/min respirable, 4 L/min respirable, or 8 L/min respirable
- Sample Pump:** Universal XR or AirChek® for 2 and 4 L/min, Leland Legacy® for 8 L/min
- Sample Time:** Dependent on method used
- Sample Media:** 37-mm, 5.0- $\mu\text{m}$  PVC filter
- Tubing:** 1/4-in ID
- Impaction Substrate:** Four 3/8-in diameter pre-oiled porous plastic discs
- Analysis:** Gravimetric or chemical
- Body Material:** Conductive aluminum
- Dimensions:** Height (clip to exhaust): 4.25 in (10.8 cm)  
Diameter: 1.8 in (4.6 cm)  
Depth: 1.2 in (3.0 cm)
- Weight:** 3.3 oz (93.6 gm)

### Ordering Information

Each PPI sample requires:

- 1 filter
- 1 support
- 4 impaction substrates

All items are available separately.



Reusable PPI Samplers, require filter, substrates, and support	Cat. No.
Respirable PPI (gold), 2 L/min, aluminum	225-380
Respirable PPI (orange), 4 L/min, aluminum	225-382
Respirable PPI (red), 8 L/min, aluminum	225-383

Recommended Collection Filters for PPI, required for sampling Select a filter based on your application.	
PVC Filters, 37 mm, 5.0 $\mu\text{m}$ , pk/100	225-5-37
PTFE Filters, 37 mm, 2.0- $\mu\text{m}$ pore size, unlaminated, for MWF, pk/50	225-37-07

Filter Supports, required for sampling Select either cellulose or stainless steel.	
Support Pads, cellulose, 37 mm, pk/100	225-27
Stainless Steel Support Screen, 37 mm, wide mesh	225-26

Impaction Substrates, four required for each sample	
Porous Plastic Discs, 3/8-inch diameter, pre-oiled, ready to use, disposable, pk/200	225-388

Accessories	
Multi-purpose Calibration Jar	225-111
Forceps, stainless steel, with non-serrated flat tips	225-8371
Filter-Keeper™, for transport and storage of 37-mm filters, pk/10	225-8303A

Learn more at [www.skinc.com](http://www.skinc.com)!

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