



# Focus On SILICA SAMPLING

**OSHA Aligns with Global Sampling Criteria in the Final Rule on Respirable Crystalline Silica!** On March 25, 2016, U.S. OSHA published its new silica rule to take effect on June 23, 2016. This effective date was revised to implement deadlines of September 23, 2017 for the construction industry and June 23, 2018 for general industry and maritime. Following is a brief summary of this significant regulation.

- Sets a lower ( $50 \mu\text{g}/\text{m}^3$ ) permissible exposure limit (PEL) for all industries covered by the regulation and abandons the previous silica PEL formula
- Adopts the more conservative ISO 7708/CEN criteria of a 4- $\mu\text{m}$  50% cut-point for respirable dust samplers, aligning OSHA with NIOSH, ACGIH, and most other global occupational hygiene organizations
- Notes that any sampler conforming to ISO 7708/CEN criteria can be used, including specific examples of the SKC samplers listed in this brochure

*See the new rule in its entirety at [www.osha.gov/silical/](http://www.osha.gov/silical/).*

SKC is proud of its contributions to this important movement forward in protecting worker health.

**See inside for respirable dust samplers listed in OSHA's final rule.**

- Aluminum Cyclone
- GS-3 Cyclone
- PPI Impaction-based Samplers



## SKC Respirable Dust Cyclones Meet New OSHA Criteria

SKC offers two respirable dust cyclones to meet the performance criteria set forth by OSHA in its final silica rule (final rule pages 16439, 16441, and 16453). Both cyclones are designed for superior performance compared to other cyclones on the market.



**SKC Aluminum Cyclone** meets ISO 7708/CEN criteria at a flow rate of 2.5 L/min. Performance data relative to the ISO/CEN standard adopted by OSHA, ACGIH, and other international agencies can be found in the *Journal of Aerosol Science*. See Reference 1 at bottom left.



**SKC GS-3 Cyclone** meets ISO 7708/CEN criteria at a flow rate of 2.75 L/min. Performance data relative to the ISO/CEN criteria is available in the *Journal of Aerosol Science*. See Reference 2 at bottom left.



### Respirable Dust Cyclone Features/Advantages

- Conductive aluminum or plastic construction eliminates electrostatic effects
- Used with an open-face 3-piece cassette for even particle deposition on the filter
- Available in 25 or 37 mm
- Aluminum Cyclone has an easy-to-use calibration adapter accessory
- GS-3 Cyclone features three inlet slits that eliminate the ambient wind speed and orientation bias found with the 10-mm nylon cyclone

### Ordering

Sampler		Cat. No.
Aluminum Cyclone with grit pot, requires a 3-piece cassette	25 mm	225-01-01
	37 mm	225-01-02
GS-3 Cyclone with bowl adapter, cassette adapter, and grit pot, requires a 3-piece cassette	25 mm	225-103
	37 mm	225-100

Sampling Media		Cat. No.
PVC Filters, GLA-5000, 37 mm, 5.0- $\mu$ m pore size, includes support pads, pk/100		225-5-37-P
Cassette Blanks, SureSeal certified leak-free, 37 mm, 3-piece, clear styrene, pk/50; require SureSeal Cassette Opener accessory		225-3050LF
Preloaded PVC Filters, GLA-5000, 37 mm, 5.0- $\mu$ m pore size with supports, preloaded into a 3-piece clear styrene cassette, banded, pk/50; require SureSeal Cassette Opener accessory		225-803
Preweighed PVC Filters in Cassettes, GLA-5000, 37 mm, 5.0- $\mu$ m pore size filter with supports, preweighed, 5 decimal; preloaded into a 3-piece clear styrene cassette, banded	pk/12	225-8208
	pk/100	225-8209

Accessories	Cat. No.
Calibration Adapter for Aluminum Cyclone, 25/37 mm	225-01-03
Standard Calibration Jar for GS-3 Cyclone, 25/37mm	225-111
Filter Cassette/Cyclone Holder, 25/37 mm	225-1
SureSeal Cassette Opener, 25/37 mm	225-13-5A

Visit [www.skcltd.com](http://www.skcltd.com) and search on "cyclone" for more information.

### Performance Profile

#### Flow Rate:

Aluminum Cyclone: 2.5 L/min

GS-3 Cyclone: 2.75 L/min

### Filters/Cassettes

Require a 37-mm, 3-piece cassette loaded with 5.0- $\mu$ m PVC filter

### Recommended Sample Pump and Calibrator



Programmable AirChek **TOUCH** with touch screen operation

See page 6.



chek-mate Calibrator

#### References

<sup>1</sup> Harper, M., et al., "Calibration of the SKC, Inc. Aluminum Cyclone ..." *Jnl. of Aer. Sci.*, Vol. 29, (Suppl. 1), 1998, pp. S347-S348

<sup>2</sup> Gautam, M. and Sreenath, A., "Performance of a Respirable Multi-inlet Cyclone," *Jnl. of Aer. Sci.*, Vol. 28, No. 7, 1997, pp. 1265-1281 ([dx.doi.org/10.1016/S0021-8502\(96\)00472-7](https://doi.org/10.1016/S0021-8502(96)00472-7))



# SM-4000 Personal Silica Monitor

## Complementary Monitoring for Silica Mitigation

Silica Monitor SM-4000 is a direct-reading personal dust monitor optimized for the measurement of silica levels specified in the OSHA final silica rule. Calibrated to a known amount of silica dust, SM-4000 provides direct readings for determination of peak silica concentrations for mitigation and lower TWAs. The SM-4000 internal pump and gravimetric filter cassette (directly behind the sensor) provide for concurrent collection of a gravimetric sample for silica analysis and cross-calibration.


Use the SM-4000 for:


- Perimeter monitoring of regulated areas with user-set alarms
- Evaluation of controls and worker activities
- Recording time history of dust levels
- Filter sampling for lab analysis
- Task monitoring
- Selecting PPE

### SM-4000 Features/Advantages

- Low sensing range down to 1 µg/m<sup>3</sup>
- High precision of ± 3 µg/m<sup>3</sup>
- Readings display in µg/m<sup>3</sup> – no conversions needed
- Comes standard with GS-3 Cyclone that conforms to ISO 7708/CEN criteria (see page 2 for details)
- Concurrent filter sampling option for lab analysis and/or cross-calibration to displayed results
  - Gravimetric filter cassette located directly behind the sensor for maximum particle deposition
  - Internal pump samples at 2.75 L/min (user adjustable)
- Sensor and filter cassette clips directly in the breathing zone
- Datalogging
  - DustComm Software allows for graphical analysis and comprehensive time history reporting

### Ordering

Description	Cat. No.
<b>SM-4000 Personal Silica Monitor Kit</b> includes SM-4000 Monitor, GS-3 respirable cyclone, 37-mm in-line filter cassette, serial computer cable, serial to USB adapter cable, battery charger, HAZ-DUST zeroing filter, media CD with instruction manual and DustComm Pro Software (compatible with Windows XP, 7, 8, and 10), and carry case 	110-240V 770-700
<b>Accessories</b>	
<b>Calibration Standard for Monitor</b> , for verifying span and optical sensor performance	770-710
<b>Calibration Jar</b> , for calibrating and setting pump flow when using a respirable cyclone	225-112
<b>Cleaning Kit</b> , for cleaning SM-4000 Monitor	770-305
<b>Replacement Battery Pack</b>	770-4105

 Requires calibration with equipment sold separately.

Contact your SKC Representative for more information.



The SM-4000 looks like a HAZ-DUST IV but is uniquely optimized for measuring silica at the new PEL.

### Performance Profile

**Sensor:** Light scattering

**Flow Rate:** 2.75 L/min (user adjustable)

**Sensing Range:** 1 to 20,000 µg/m<sup>3</sup>  
(0.001 to 20 mg/m<sup>3</sup>)

**Precision:** ± 3 µg/m<sup>3</sup> (0.003 mg/m<sup>3</sup>)

**Display:** Concentration in µg/m<sup>3</sup>, TWA, STEL, MIN, and MAX

**Accuracy:** ± 10% to filter gravimetric SAE fine test dust

**Gravimetric Filter Sampling Requirements:**  
37-mm PVC filter for the supplied 37-mm in-line cassette (25-mm filter and cassette options are available)

## SKC Parallel Particle Impactors (PPIs) Listed in the OSHA Silica Rule



### PPI Features/Advantages

- Collection efficiency precisely matches ISO 7708/CEN criteria adopted in the OSHA final silica rule\*
- Two sampler configurations are available
  - Reusable conductive aluminum
  - Disposable anti-static plastic, designed for one-time use
- Disposable PPI Sampler options
  - Preloaded with filter preweighed by SKC or not preweighed
  - Empty for filter loading by a laboratory or the user
  - All Disposable PPI Samplers are preloaded with pre-oiled impaction substrates in the inlet section
- Performance published in *Journal of Physics* and referenced in the OSHA final silica rule
- Calibration adapter for Disposable PPI eliminates need for a calibration jar
- No tipping hazard! Invert PPI without large particles invalidating the sample

PPI Model Flow Rate	Fraction	Application
2 L/min	Respirable	8-hour TWA sampling
4 L/min	Respirable	TWA sampling for $\geq 4$ hours
8 L/min	Respirable	Short-term sampling

### Performance Profile

**Flow Rate:** 2, 4, or 8 L/min (4- $\mu$ m 50% cut-point); model dependent, to meet ISO/CEN criteria in OSHA final silica rule\*

**Principle of Operation:** Impaction separation of particles according to aerodynamic diameter

**Sampling Media:** 37-mm PVC filter/support

#### Dimensions (Plastic and Aluminum):

**Height** (clip to exhaust): 4.25 in (10.8 cm)

**Diameter:** 1.8 in (4.6 cm)

**Depth:** 1.2 in (3 cm)

#### Weight: Plastic

1.1 oz (31.2 gm)

#### Aluminum

3.3 oz (93.6 gm)

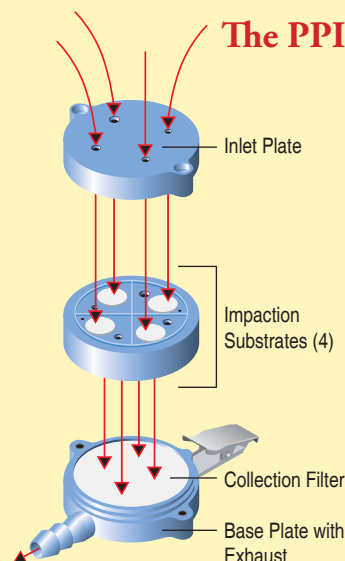
\* PPI performance data from a peer-reviewed journal article and part of the OSHA docket used to develop the OSHA final silica rule

#### References

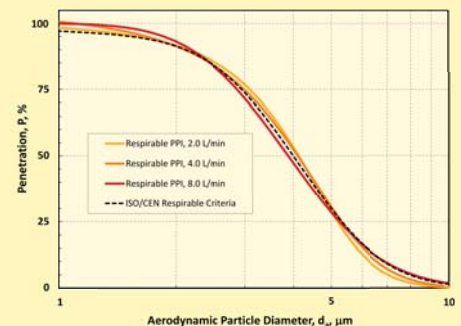
Trakumas, S. and Salter, E., "Parallel Particle Impactor – Novel Size-selective Particle Sampler for Accurate Fractionation of Inhalable Particles," *Journal of Physics: Conference Series*, 151 012060, <http://doi.org/fbccwk>

SKC Sampling Solutions for Respirable Crystalline Silica, <http://www.skinc.com/pdf/safety/solutions/1881.pdf>

### The PPI 4-in-1 Advantage



The patented\* PPI features **four** uniquely sized inlets (mini impactors), each achieving a specific cut-point that matches its corresponding part of the ISO 7708/CEN efficiency curve. Dust on the final filter closely matches the entire curve.



Comparison of PPI Samplers' performance with ISO 7708/CEN respirable criteria




† U.S. Patent No. 7,073,402

# Parallel Particle Impactors (PPIs)

## Available in Reusable Aluminum or Disposable Plastic

### Reusable Aluminum PPI Samplers

Select a PPI based on application (see p. 4) and order impaction substrates, filters, and supports.

Description	Cat. No.
<b>Reusable PPI Samplers, require substrates, filters, and supports</b>	
Respirable PPI (red), 8 L/min, aluminum 	225-383
Respirable PPI (orange), 4 L/min, aluminum 	225-382
Respirable PPI (gold), 2 L/min, aluminum 	225-380
<b>Impaction Substrates for Reusable Aluminum PPI, four required for each sample</b>	
Porous Plastic Discs, 3/8-inch diameter, pre-oiled, ready to use, disposable, pk/200	225-388
<b>Filters and Supports for Reusable PPI Samplers</b>	
PVC Filters, 37 mm, 5.0-µm pore size, pk/100	225-5-37
Support Pads, cellulose, 37 mm, pk/100	225-27
Stainless Steel Screen, 37 mm, wide mesh, ea	225-26

### Preloaded Disposable Plastic PPI Samplers\*\*

Select a PPI based on application (see p. 4).

Now available with  
preweighed filter!




Description	Cat. No. (not preweighed)	Cat. No. (preweighed*)
<b>Preloaded Disposable PPI Samplers</b> contain four porous plastic disc impaction substrates, one 37-mm cellulose support, and one 5.0-µm PVC collection filter as noted		
Respirable PPI (red), 8 L/min, plastic	225-3841	225-3841-PW
Respirable PPI (orange), 4 L/min, plastic	225-3871	225-3871-PW
Respirable PPI (gold), 2 L/min, plastic	225-3851	225-3851-PW

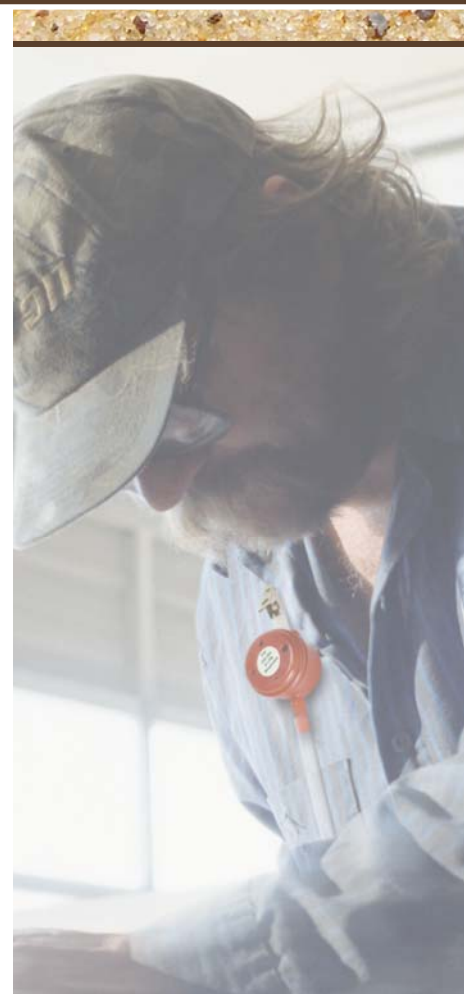
\* Prewighed to 5 decimals

\*\* Designed for one-time use

### User-loaded Disposable Plastic PPI Samplers\*\*

Select a PPI based on application (see p. 4) and order supports and filters.

Description	Cat. No.
<b>User-loaded Disposable PPI Samplers</b> contain four porous plastic disc impaction substrates, require collection filter and support; see information below and select based on application	
Respirable PPI (red), 8 L/min, plastic 	225-384
Respirable PPI (orange), 4 L/min, plastic 	225-387
Respirable PPI (gold), 2 L/min, plastic 	225-385
	pk/25 225-385A
<b>Filters and Supports for User-loaded PPI Samplers</b>	
PVC Filters, 37 mm, 5.0-µm pore size, pk/100	225-5-37
Support Pads, cellulose, 37 mm, pk/100	225-27
Stainless Steel Screen, 37 mm, wide mesh, ea	225-26
** Designed for one-time use	
<b>Accessory</b>	
Calibration Adapter, for Disposable PPI Samplers only	225-389



### New! SKC Silica Sampling Kits



Cat. No. 220-5000TC-K-S with AirChek TOUCH pump and chek-mate Calibrator shown. See p. 6 for ordering information.

Compliance monitoring of airborne silica concentrations is easy with an SKC Silica Sampling Kit as your complete silica sampling toolbox. Kits include Preloaded Disposable PPI Respirable Dust Samplers, sample pump, pump charger, certified calibrator or rotameter, and calibration and sampling accessories, all in a convenient tool case. *Deluxe and basic kits are available.*

Visit [www.skcinc.com](http://www.skcinc.com) and search on "PPI" for more information.





## AirChek TOUCH Sample Pump

### Intuitive Touch Screen Navigation

#### AirChek® TOUCH Features/Advantages

- Easiest and most powerful personal pump you will ever use
- Color touch screen navigation, easy programming
- Constant flow to 5 L/min for high dust loadings
- High back pressure compensation up to 50 inches of water at 2 L/min
- Powerful Li-Ion battery for up to 20 hours at 2 L/min
- Corrects flow for changes in temperature and atmospheric pressure
- Screen lock-out feature
- Programmable using touch screen or optional DataTrac® Pro Software and PC
- Small and lightweight
- Interlocking cradles for charging and PC communication
- Automatic flow fault and restart



#### Performance Profile

**Flow Range:** 5 ml/min to 5 L/min

**Power/Run Time:** Li-Ion battery up to 20 hrs (2 L/min, 37-mm, 0.8-µm MCE filter)

**Back Pressure:** Up to 50 inches water at 2 L/min

**Tubing:** 1/4-in ID

**Weight:** 19.4 oz (550 gm)

**Dimensions:** 4.1 x 3.7 x 2.8 in (10.4 x 9.4 x 7.1 cm)

**Calibrator:** SKC chek-mate; see below right

#### Recommended for use with:

Cyclones on pages 2 and 3

2 and 4 L/min PPIs on pages 4 and 5

#### Ordering

Description	Cat. No.
<b>AirChek TOUCH Pump</b> with Li-Ion† battery pack and screwdriver set, <i>requires charging cradle and power supply; see Starter Kit below</i>	220-5000TC
<b>Starter Kit</b> includes pump as described above, Standard Charging Cradle, power supply with cord, 3 feet (0.9 meter) of Tygon tubing, and collar clip with cable tie	100-240 V 220-5000TC-S
<b>Single High Flow Pump Kit</b> includes pump as described above, Standard Charging Cradle, power supply with cord, and filter cassette holder, in a soft-sided nylon carry case	100-240 V 220-5000TC-K
<b>5-pack High Flow Pump Kit</b> includes 5 pumps as described above, 4 Standard Charging Cradles, 1 e-Cradle, power supply with cord, USB cable, and 5 filter cassette holders, in a Pelican carry case	100-240 V 220-5000TC-K5
<b>Deluxe Silica Sampling Kit</b> includes pump as described above, Standard Charging Cradle, power supply with cord, 4 feet (1.2 meters) of Tygon tubing, chek-mate Calibrator, 10 Preloaded Disposable PPIs (225-3851), and PPI calibration adapter, in a hard-sided toolbox	100-240 V 220-5000TC-K-S

*Basic Silica Sampling Kit with AirChek 52 pump is available. See www.skinc.com*

† AirChek TOUCH pumps contain Li-Ion batteries and are subject to special shipping regulations.

Accessories	Cat. No.
<b>DataTrac Pro for AirChek TOUCH Hardware Accessory Kit</b> includes e-Cradle, free software download, USB cable, and single power supply	877-93
<b>Protective Pouch</b> , nylon, with adjustable waist belt and shoulder strap, black	224-911
<b>chek-mate Calibrator</b> , 0.75 to 5 L/min flow range, includes 9-volt alkaline battery and NIST-traceable calibration certificate	375-07550N
<b>Rotameter</b> , 0.4 to 5.0 L/min, 4-inch scale	320-4A5

Visit [www.skinc.com/touch.asp](http://www.skinc.com/touch.asp) for more information.

# Leland Legacy Sample Pump

## Higher Flows for Enhanced Detection

### Leland Legacy® Features/Advantages

- Constant flow from 5 to 15 L/min
- Smallest high flow pump available for personal sampling
- Up to 24-hour run times on one battery charge
- Corrects flow for changes in temperature and atmospheric pressure
- Programmable using keypad or optional DataTrac Software and PC
- Automatic flow fault and restart
- Perfect partner for SKC 8 L/min Respirable PPI Sampler or higher flow cyclones

### Ordering

Description		Cat. No.
<b>Leland Legacy Starter Kit</b> includes pump, $\Sigma^{+*}$ charger (100-240 V), 3 feet (0.9 meter) of Tygon tubing, and collar clip with cable tie	100-240 V	100-3002-S
<b>Single Pump Kit</b> includes pump $\Sigma^{+*}$ and single charger, in a Pelican carry case	100-240 V	100-3002K
<b>5-pack Pump Kit</b> includes 5 Leland Legacy pumps, $\Sigma^{+*}$ one Take Charge 5 Multi-charger, and DataTrac Software, in a Pelican carry case	100-240 V	100-3002K5

$\Sigma$  Use in non-explosive environments only. Not UL Listed for intrinsic safety

$\dagger$  Leland Legacy pumps contain Li-Ion batteries and are subject to special shipping regulations.

$*$  Leland Legacy is not recommended for high back pressure applications such as asbestos clearance sampling.

Accessories		Cat. No.
<b>DataTrac Software for Leland Legacy</b> includes software on CD and USB cable		877-92
<b>Noise-reducing Pump Pouch</b> , black nylon, reduces pump noise from 62.5 to 52 dB $\Delta$		224-89
<b>TSI 4146 Airflow Calibration Kit</b> , flow measurement from 0.01 to 20 L/min, includes calibrator, soft-sided case, mounting lugs, 1/4-inch ID tubing, battery pack, 6 AA batteries, inlet filter, dampening module, NIST certificate, and manual		740-4146
<b>Rotameter</b> , 2 to 20 L/min, 4-inch scale		320-4A20L

$\Delta$  Measured 39 inches (1 meter) from pump operating at 10 L/min without media



### Performance Profile

**Flow Range:** 5 to 15 L/min

**Power/Run Time:** Li-Ion battery/Up to 24 hrs (depending on dust load)

**Back Pressure:** Up to 12 inches water at 10 L/min

**Tubing:** 3/8-in ID

**Weight:** 1 kg (36 oz)

**Dimensions:** 8 x 3.9 x 2.6 in (20 x 10 x 7 cm)

**Calibrator:** TSI 4146; see left

### Recommended for use with:

8 L/min PPI on pages 4 and 5

Visit [www.skcinc.com/pumps/100-3000.asp](http://www.skcinc.com/pumps/100-3000.asp) for more information.

# SKC chek-mate<sup>®</sup> Calibrator

- Two models available — call for details
- High certified volumetric accuracy
- Certified NIST traceable
- Only 242 grams!
- 9-volt battery operation, auto shut-off
- Easy one-button operation



CE

RoHS

**Get fast, easy, and accurate pump calibration.**

**Contact your SKC distributor today!**