



SKC 225-380 Reusable Parallel Particle Impactors Instruction Manual

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**225-380 Reusable Parallel Particle Impactors
Instruction Manual**

SKC Reusable Parallel Particle Impactors (PPI)



The patented† impaction-based SKC Reusable Parallel Particle Impactor (PPI®) Samplers are designed to match

precisely the collection efficiency curves for respirable and thoracic dust specified by ISO 7708/ CEN and adopted by ACGIH, CEN, and other occupational hygiene organizations. The performance of the respirable PPI samplers also meets the ISO 7708/CEN criteria included in the OSHA final silica rule. The thoracic model meets the requirements of NIOSH Method 5524 for metalworking fluids and compounds with ACGIH® thoracic TLV®s. Constructed of conductive aluminum, these PPI Samplers may be reused and offer a choice of flow rates for maximum flexibility in pump options, sample duration, and contaminant concentration.

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Performance Profile

Sampling Rate: 2 L/min respirable or thoracic and 4 or 8 L/min respirable

Sample Pump:

- Universal XR or AirChek® Series for 2 and 4 L/min
- Leland Legacy® for 8 L/min

Sample Time: Dependent on the method used. **Note:** SKC tests indicate that a particulate mass of up to 6.8 mg on the four impaction substrates would not affect PPI performance. This amount is equivalent to sampling for 6 hours at 4 L/min in environments where respirable mass concentration is 4.76 mg/m³ and equals 50% of total dust. However, labs have reported to SKC that they prefer no more than 2 mg on the filter for analytical reasons. Therefore, SKC recommends that you work with your lab to determine optimum sample times for your unique sampling conditions.

Sample Media:

37-mm PVC filter, 5.0-µm pore size or

37-mm PTFE filter,* 2.0-µm pore size (NIOSH 5524) or

37-mm MCE filter, 0.8-µm pore size

Use a cellulose pad or stainless steel screen for support.

Impaction Substrate: Four 3/8-in diameter pre-oiled porous plastic discs

Analysis: Gravimetric or chemical

Body Material: Conductive aluminum

Dimensions:

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

Diameter: 1.8 in (4.6 cm)

Depth: 1.2 in (3.0 cm)

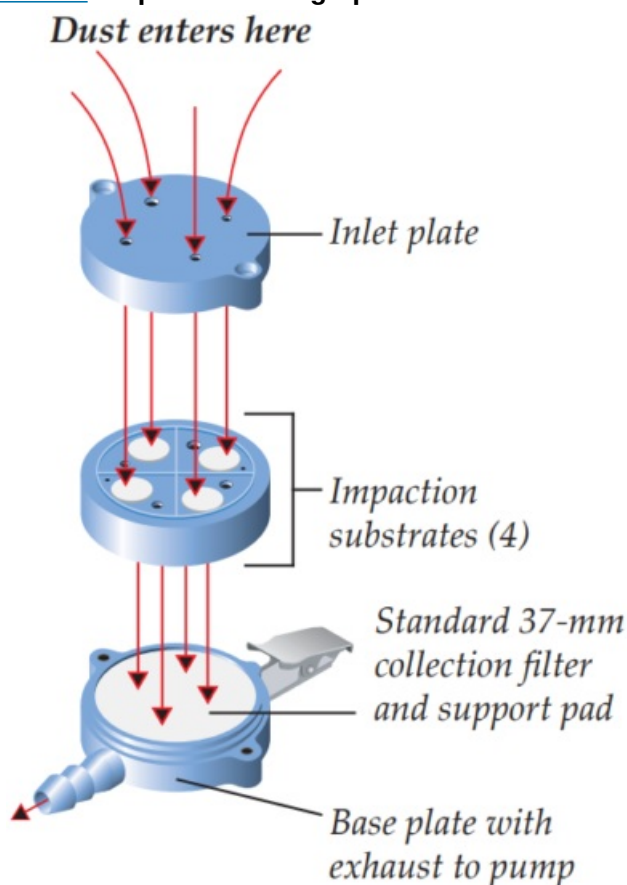
Weight: 3.3 oz (93.6 gm)

† U.S. Patent No. 7,073,402

* Backpressure on PTFE filters can vary within the same lot.

Principle of Operation

SKC Reusable PPI Samplers are impaction-based filter samplers that perform precise size selection for either thoracic or respirable dust, depending on the model. 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 operating at 2, 4, or 8 L/min (2 L/min only for thoracic) 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 by impaction onto the porous oiled impaction substrate contained in each impactor. Smaller particles continue to the standard 37-mm collection filter for analysis. See www.skcinco.com/knowledgecenter for performance graphs.



Media Preparation

Filters: Condition and weigh filters according to the method used. Record the weight as the pre-sample weight.

Impaction Substrate: Using an oiled impaction substrate reduces particle bounce. Replacement pre-oiled disposable porous plastic discs are available as SKC Cat. No. 225-388. See Ordering Information.

Inserting a Collection Filter into the PPI

The PPI will arrive already assembled. Disassemble it to insert the collection filter.

1. Unscrew and remove two screws that hold the inlet plate to the base plate.



2. Liftoff inlet plate to expose impaction plate.



3. Liftoff the impaction plate to expose the base plate.



4. Using forceps, insert a 37-mm support pad and a 37-mm collection filter into the base plate.



Inserting Impaction Substrates into the PPI

1. Ensure a support and collection filter have been loaded into the base plate. See Inserting a Collection Filter into the PPI.
2. Using forceps, insert a pre-oiled impaction substrate into each of the four indentations in the impaction plate.



Tip Impaction substrates have a smooth/shiny side and a rough/dull side. For optimum particle capture efficiency, place substrate smooth/shiny side down in the impaction plate.

3. Align pins in inlet plate with holes in impaction plate and press together.



Pins will allow the impactor to be assembled one way only.



4. Grip impaction plate and inlet plate together and twist on base plate until screw holes are aligned.



5. Replace and tighten two screws to secure the inlet plate to the base plate.



Tips

- Use forceps to carefully insert or remove the impaction substrate and collection filter. See Accessories for forceps.
- SKC recommends using new impaction substrates for each sample period.

Calibration and Sampling

Tip As the particle load on the filter increases during sampling, the pressure drop will also increase. Therefore, use a compensating sample pump such as the AirChek Series or Leland Legacy depending on flow rate requirements.

Calibration

Calibrate pump flow rate with the PPI (support, filter, and impaction substrates loaded) in line. Note: If using SKC High Flow chek-mate Calibrator, Pulsation Dampener Cat. No. 375-150 is also required in line. **See pump and calibrator operating instructions.**

1. Ensure the impactor is loaded with support, collection filter, and impaction substrates and that it is fully assembled. See Inserting a Collection Filter into the PPI and Inserting Impaction Substrates into the PPI.
2. Use a calibration jar to calibrate the pump flow rate. **Note:** For jawless calibration (chek-mate Calibrator only), see Jarless Calibration Method on page 5.
 - a. Unscrew jar lid and remove.



b. Using supplied adapter, attach soft tubing end to PPI outlet. Attach the rigid end of the adapter to Luer adapter in the center of the jar lid.



c. With PPI attached, place the lid on the jar and screw it down until tight.



d. Attach center tubing on the outside of jar lid to pump inlet.



- e. Use 1/4-inch tubing to attach calibrator to barbed elbow fitting on outside of jar lid.
3. Calibrate the sample pump to the specified flow rate. See sample pump and calibrator operating instructions.



4. Disconnect tubing and remove calibration jar and calibrator when calibration is completed.

Jarless Calibration Method: Attach the sample pump to the chek-mate Calibrator outlet (suction port). Attach the PPI to the chek-mate inlet using the shortest length of tubing possible. If using High Flow chek-mate Calibrator for 8 L/min PPI, place Pulsation Dampener Cat. No. 375-150 inline between pump and calibrator. Proceed with calibration per pump and calibrator operating instructions.



Sampling



SKC tests indicate that a particulate mass of up to 6.8 mg on the four impaction substrates would not affect PPI performance. This amount is equivalent to sampling for 6 hours at 4 L/min in environments where respirable mass concentration is 4.76 mg/m³ and equals 50% of total dust. However, labs have reported to SKC that they prefer no more than 2 mg on the filter for analytical reasons. Therefore, SKC recommends that you work with your lab to determine optimum sample times for your unique sampling conditions.

1. If required, replace representative sample media used for calibration with new, preweighed media. See Media Preparation.
2. Record sample starts time on the label.
3. Clip PPI onto a worker's collar or lapel in the breathing zone or in the area to be sampled.
4. Clip sample pump at the worker's waist or close to the PPI.
5. Use flexible tubing to attach the PPI outlet to the inlet of the sample pump.
6. Turn on the pump and record pertinent sample data.
7. After the desired sample time has elapsed, turn off the pump and record the sample stop time.
8. Reinstall calibration train and verify flow rate. See Calibration.
9. Remove the pump and tubing from the impactor.

Removing the Collection Filter and Impaction Substrates

1. Unscrew and remove the two screws that hold the inlet plate to the base plate.



2. Liftoff the inlet plate to expose the impaction plate.



3. Use a thin, flat implement to remove impaction substrates and discard them.



4. Liftoff the impaction plate to expose the base plate.



5. Use forceps to remove the collection filter and place it in an appropriate container for shipment to a laboratory.



Transporting Samples and Analysis

Package and transport samples and blanks in a manner that will prevent sample loss and contamination and send them to an accredited laboratory for gravimetric or chemical analysis.

Cleaning

For optimum performance, the PPI inlet and the impaction and base plates should be cleaned after five runs or upon a noticeable buildup of material to remove oil and other residue built up from frequent sampling. Disassemble the PPI and wash parts in water with a liquid detergent or soap. Rinse and air-dry all parts thoroughly in a clean environment.



Do not place any mechanical object in the inlet nozzles.

References

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Ordering Information

PPI Samplers , require filters, substrates, and support	Cat. No.
Respirable PPI (gold) , 2 L/min, aluminum	225-380
Thoracic PPI (blue) , 2 L/min, aluminum	225-381
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-µm pore size, pk/100	225-5-37
PTFE Filters ,* 37 mm, 2.0-µm pore size, unlaminated, no support pad included, for metalworking fluids (NIOSH 5524), pk/50	225-37-07
MCE Filters , 37 mm, 0.8-µm pore size, pk/100	225-1939
Filter Supports are required for sampling. Select either cellulose or stainless steel.	
Support Pads , cellulose, 37 mm, pk/100	225-27
Support Screen , stainless steel, 37 mm, wide mesh, ea	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 transporting and storing 37-mm filter samples. pk/10	225-8303A

* Backpressure on PTFE filters can vary within the same lot.

SKC Limited Warranty and Return Policy

SKC products are subject to the SKC Limited Warranty and Return Policy, which provides SKC's sole liability and the buyer's exclusive remedy. To view the complete SKC Limited Warranty and Return Policy, go to skcinc.com/warranty.

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