ANALYT MESSTECHNIK



INSTRUCTIONS FOR USE

SKC Reusable Parallel Particle Impactors (PPI)

Loading, flow rate verification, sampling and cleaning of the reusable aluminium SKC Parallel Particle Impactors for respirable dust at 2, 4 or 8 L/min and thoracic dust at 2 L/min.

AMTC-IN-0024

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About this document

The SKC Reusable Parallel Particle Impactor (PPI™) is an impaction-based filter sampler for the respirable or the thoracic fraction of airborne dust. Its body is made of conductive aluminium and is used again and again: before each sample you load a 37 mm filter on its support and four fresh impaction substrates, and after sampling you take them out and send the filter to the laboratory.

These instructions cover the four models: the respirable PPIs 225-380 (2 L/min), 225-382 (4 L/min) and 225-383 (8 L/min), and the thoracic PPI 225-381 (2 L/min). The single-use Disposable PPIs, made of plastic, have their own operating manuals.

Start with Product and supplied items (p. 4) to choose the model, filter and pump, then follow Before use (p. 5) (with Verifying the flow rate (p. 7)) and Procedure (p. 8) in that order. After use and sample handling (p. 10) covers unloading and sending the sample. Cleaning (p. 10) keeps the sampler in condition. Analyt-MTC supplies and supports the samplers; for questions and orders see Service and contacts (p. 13).

Keep these instructions for the lifetime of the product. The current revision is on the product page at analyt-mtc.com.

How these instructions mark information

Note
Information that helps understanding; never a hazard.

Document information

Title	SKC Reusable Parallel Particle Impactors (PPI) — Instructions for use
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Manufacturer	SKC Inc.

Revision history

Rev.	Date	Change
2	October 2026	Quality programme: new document type, number and identity pages.
1	October 2026	First issue.

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CHAPTER 1

Product and supplied items

Each PPI separates one dust fraction — respirable or thoracic — at one flow rate. Choose the model by the fraction your method asks for and the flow your pump can deliver, then choose the filter by the analysis your laboratory will run.

Models

The colour of the body tells the models apart. Every model is supplied without sample media: filter, support and impaction substrates are ordered separately (see Ordering information (p. 12)).

Reusable PPIs

Order code	Fraction	Colour	Nominal flow	Recommended flow	Pump
225-380	Respirable	Gold	2 L/min	2 L/min	SKC AirChek TOUCH series
225-382	Respirable	Orange	4 L/min	**4.3 L/min**	SKC AirChek TOUCH series
225-383	Respirable	Red	8 L/min	**8.6 L/min**	SKC Leland Legacy
225-381	Thoracic	Blue	2 L/min	2 L/min	SKC AirChek TOUCH series

Note
Based on tests by the Department of Environmental Sciences of Rutgers, The State University of New Jersey, SKC recommends a flow rate of 4.3 L/min for the 4 L/min PPI and 8.6 L/min for the 8 L/min PPI. For the test reports and published data see references 10 and 11 in References (p. 11).

The higher flow rates collect more dust in the same time, which helps where the limit value is low or the task is short. The respirable fraction is available at all three rates, the thoracic fraction at 2 L/min only.

Filter and support

The PPI takes one 37 mm collection filter on a 37 mm support. Choose the filter for your method and analysis:

- **PVC, 5.0 µm pore size.**
- **PTFE, 2.0 µm pore size**, unlaminated — the filter of NIOSH Method 5524 for metalworking fluids.
- **MCE (mixed cellulose ester), 0.8 µm pore size.**

Place the filter on either a cellulose support pad or a stainless steel support screen. Four pre-oiled porous plastic impaction substrates are needed for each sample.

Note
The back pressure of PTFE filters can vary from filter to filter, even within one lot.

How the PPI separates the dust

The inlet plate holds four small impactors side by side, each with its own 50 % cut-point. Each impactor is tuned to one quarter of the ISO/CEN sampling curve, so that together they follow the whole curve closely.

The pump draws air through the nozzle of each impactor. Particles larger than that impactor's cut-point cannot follow the air stream: they strike the porous, oiled impaction substrate below the nozzle and stay there. The oil keeps them from bouncing off. The smaller particles pass on to the 37 mm collection filter, which is analysed.

The respirable models are designed to match the respirable convention of ISO 7708/CEN, adopted by ACGIH, CEN and other occupational hygiene bodies, and meet the ISO 7708/CEN criteria included in the OSHA final rule on respirable crystalline silica. The thoracic model matches the thoracic convention and meets the requirements of NIOSH Method 5524 for metalworking fluids and of substances with an ACGIH thoracic TLV®.

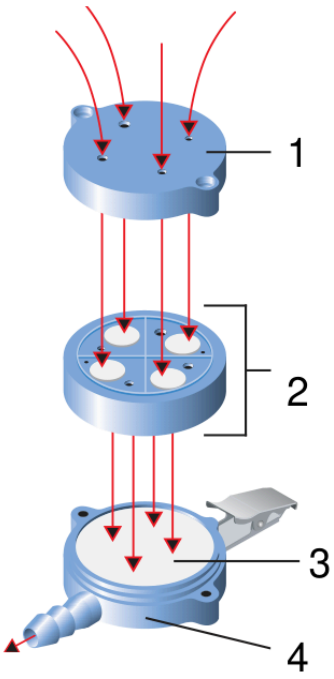


Figure 1-1. Parts of the PPI. Air enters at the top and leaves through the exhaust to the pump.
1 Inlet plate · **2** Impaction plate with four impaction substrates · **3** 37 mm collection filter on its support · **4** Base plate with exhaust to the pump

CHAPTER 2

Before use

The PPI arrives assembled but empty. Before each sample, open it, put in a support and a collection filter, add four new impaction substrates and close it again. Handle filters and substrates with forceps only.

Preparing the media

- **Collection filter:** condition and weigh the filter as your method prescribes, and record the result as the pre-sample weight.
- **Impaction substrates:** use four pre-oiled porous plastic discs, Cat. No. 225-388. The oil keeps large particles from bouncing off the substrate.

> **Note**
> SKC recommends new impaction substrates for each sample period. Use stainless steel forceps with flat, non-serrated tips (Cat. No. 225-8371), to put in and take out the substrates and the filter.

Opening the PPI

1. Undo and remove the two screws that hold the inlet plate to the base plate.
2. Lift off the inlet plate. The impaction plate is now on top.
3. Lift off the impaction plate to uncover the base plate.



Figure 2-1. Remove the screws (step 1).



Figure 2-2. Lift off the inlet plate (step 2).



Figure 2-3. Lift off the impaction plate (step 3).

Inserting the filter

4. With forceps, place a 37 mm support — cellulose pad or stainless steel screen — in the base plate, then the 37 mm collection filter on top of it.



Figure 2-4. Support in the base plate.



Figure 2-5. Collection filter on the support.

Inserting the substrates and closing the PPI

Load the filter first: the substrates go in only when support and filter are already in the base plate.

5. With forceps, place one pre-oiled impaction substrate in each of the four recesses of the impaction plate, **smooth, shiny side down**.

> **Note**
> Each substrate has a smooth, shiny side and a rough, dull side. For the best particle capture, the smooth, shiny side goes down in the impaction plate.

6. Line up the pins of the inlet plate with the holes in the impaction plate and press the two plates together.

> **Note**
> The pins let the plates go together one way only. Do not force them together in any other position.

7. Hold the impaction plate and the inlet plate together, set them on the base plate and turn them until the screw holes line up.
8. Put the two screws back and tighten them to fix the inlet plate to the base plate.



Figure 2-6. Substrates in the impaction plate (step 5).



Figure 2-7. Pins and holes of the two plates (step 6).



Figure 2-8. Turn until the screw holes line up (step 7).

Verifying the flow rate

Verify the flow through the complete sampling train before and after each sample, with a loaded PPI in line: support, filter and four impaction substrates in place, sampler fully assembled.

Pump and flowmeter

> **Note**
> As dust builds up on the filter during sampling, the pressure drop across the sampler rises. Use a flow-compensating pump that holds the flow against this rising resistance: an SKC AirChek TOUCH series pump for 2 and 4 L/min, an SKC Leland Legacy pump for 8 L/min.

Verify the flow at the rate specified for your model. Use these values:

- **2 L/min** for the 2 L/min respirable PPI (225-380, gold) and the thoracic PPI (225-381, blue);
- **4 L/min** for the 4 L/min respirable PPI (225-382, orange), for which SKC recommends 4.3 L/min;
- **8 L/min** for the 8 L/min respirable PPI (225-383, red), for which SKC recommends 8.6 L/min.

> **Note**
> If you verify with an SKC High Flow chek-mate Flowmeter, also put a Pulsation Dampener, Cat. No. 375-150, in line between the pump and the flowmeter. For the settings, follow the operating instructions of the pump and of the flowmeter.

Verifying with the calibration jar

The Multi-purpose Calibration Jar (Cat. No. 225-111) encloses the PPI, so the flowmeter measures the flow through the complete sampling train.

1. Check that the PPI is loaded with support, filter and impaction substrates and fully assembled (see Before use (p. 5)).
2. Unscrew the lid of the calibration jar and take it off.
3. Push the soft tubing end of the adapter supplied with the jar onto the outlet of the PPI. Push the rigid end of the adapter onto the Luer fitting in the centre of the jar lid, on its inner side.
4. With the PPI hanging from the lid, put the lid on the jar and screw it down tight.
5. Connect the centre tubing on the outside of the lid to the pump inlet.
6. Connect the flowmeter to the barbed elbow fitting on the outside of the lid, with 1/4 in tubing.



Figure 2-9. Verification train with the calibration jar: flowmeter, jar with the PPI inside, pump.

7. Check that the pump delivers the specified flow (see Pump and flowmeter (p. 7)) and adjust it if it does not, as described in the pump and flowmeter instructions.
8. When the flow is right, disconnect the tubing and remove the calibration jar and the flowmeter.



Figure 2-10. Steps 2 to 5, from left to right: unscrew the lid (step 2); the adapter on the outlet of the PPI and on the Luer fitting of the lid (step 3, two views); the lid with the PPI screwed onto the jar (step 4); the centre tubing to the pump (step 5).

Verifying without the jar (chek-mate only)

With an SKC chek-mate flowmeter you can verify the flow without the calibration jar.

1. Check that the PPI is loaded and fully assembled.
2. Connect the pump to the outlet (suction port) of the chek-mate.
3. Connect the PPI to the inlet of the chek-mate with the shortest tubing you can.
4. For the 8 L/min PPI with the High Flow chek-mate, put the Pulsation Dampener, Cat. No. 375-150, in line between the pump and the flowmeter.
5. Verify the flow as described in the pump and flowmeter instructions, then disconnect the tubing.



Figure 2-11. Verification without the jar: PPI, chek-mate flowmeter and pump.

CHAPTER 3

Procedure

Sample with the PPI you verified, loaded with fresh media. After sampling, check the flow once more, then unload the filter for the laboratory.

Sample time and dust loading

The sample time depends on the method you follow. Two loading limits also apply:

- **Impaction substrates:** in SKC's tests, up to 6.8 mg of dust on the four substrates did not affect the PPI's performance. That corresponds, for example, to 6 hours at 4 L/min in air with a respirable dust concentration of 4.76 mg/m³ that makes up 50 % of the total dust.
- **Collection filter:** laboratories have told SKC that, for analytical reasons, they prefer no more than 2 mg on the filter.

Note
Agree the sample time with your laboratory before you sample, taking into account the dust levels you expect, so that neither limit is exceeded.

Taking the sample

1. If your method requires it, replace the media used for flow rate verification with new, preweighed media (see Before use (p. 5)).
2. Write the start time on the sample label.
3. Clip the PPI to the worker's collar or lapel, in the breathing zone — or place it in the area to be sampled.
4. Clip the pump to the worker's belt, or place it close to the PPI.
5. Connect the outlet of the PPI to the pump inlet with flexible tubing.
6. Switch the pump on.
7. Record the sample data you need.
8. When the sample time is up, switch the pump off.
9. Record the stop time.
10. Set up the verification train again and verify the flow rate as in Verifying the flow rate (p. 7).
11. Disconnect the pump and the tubing from the PPI.

CHAPTER 4

After use and sample handling

Unloading and sending the sample

1. Undo and remove the two screws that hold the inlet plate to the base plate (Figure 2-1 (p. 6)).
2. Lift off the inlet plate (Figure 2-2 (p. 6)).
3. Lift the four impaction substrates out of the impaction plate with a thin, flat tool and discard them.
4. Lift off the impaction plate to uncover the base plate (Figure 4-1 (p. 10)).
5. With forceps, take out the collection filter and put it in a suitable container for shipping to the laboratory — for example a Filter-Keeper (Cat. No. 225-8303A).
6. Pack the samples together with the blanks so that nothing is lost or contaminated on the way, and send them to an accredited laboratory for gravimetric or chemical analysis.



Figure 4-1. Lift off the impaction plate: the collection filter lies in the base plate (step 4).

Cleaning

Oil from the substrates and fine residue build up in the PPI with use. Clean the inlet plate, the impaction plate and the base plate after every five runs, or sooner if you see material building up.

Cleaning the PPI

1. Take the PPI apart as in Unloading and sending the sample (p. 10), and remove any filter, support and substrates.

   Note
   Never put any mechanical object in the inlet nozzles.

2. Wash the parts in water with a liquid detergent or soap.
3. Rinse them.
4. Let all parts air-dry completely in a clean place before you reassemble the PPI.

Disposal

Dispose of the PPI under local regulations; separate metal, glass and plastic parts for recycling where possible.

CHAPTER 5

Specifications

Sampling

Fractions	Respirable or thoracic, depending on the model; ISO 7708/CEN conventions
Flow rate	Respirable 2, 4 or 8 L/min (SKC recommends 4.3 and 8.6 L/min for the 4 and 8 L/min models); thoracic 2 L/min
Sample pump	Flow-compensating: SKC AirChek TOUCH series (2, 4 L/min), SKC Leland Legacy (8 L/min)
Impaction substrate loading	Up to 6.8 mg on the four substrates without effect on performance (SKC tests)
Analysis	Gravimetric or chemical

Sample media

Collection filter	37 mm PVC, 5.0 µm pore size; or 37 mm PTFE, 2.0 µm pore size (NIOSH 5524)*; or 37 mm MCE, 0.8 µm pore size
Filter support	37 mm cellulose support pad or 37 mm stainless steel support screen
Impaction substrates	Four pre-oiled porous plastic discs, 3/8 in diameter; SKC recommends new substrates for each sample

* The back pressure of PTFE filters can vary within one lot.

Physical data

Body material	Conductive aluminium; reusable
Dimensions and weight	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 g)

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CHAPTER 6

Ordering information

Order from Analyt-MTC with the order codes.

The PPIs are supplied without sample media: for each sample you need one collection filter, one support and four impaction substrates.

Samplers

Description	Order code
Respirable PPI (gold), 2 L/min, aluminium	225-380
Respirable PPI (orange), 4 L/min, aluminium	225-382
Respirable PPI (red), 8 L/min, aluminium	225-383
Thoracic PPI (blue), 2 L/min, aluminium	225-381

Sample media

Description	Order code
COLLECTION FILTERS, 37 MM — ONE PER SAMPLE; CHOOSE BY APPLICATION	
PVC filters, 5.0 µm pore size, pack of 100	225-5-37
PTFE filters*, 2.0 µm pore size, unlaminated, for metalworking fluids (NIOSH 5524), without support pads, pack of 100	225-17-33
MCE filters, 0.8 µm pore size, without support pads, pack of 100	225-1939
FILTER SUPPORTS, 37 MM — ONE PER SAMPLE; CELLULOSE OR STAINLESS STEEL	
Support pads, cellulose, pack of 100	225-27
Support screen, stainless steel, wide mesh, each	225-26
IMPACTION SUBSTRATES — FOUR PER SAMPLE	
Porous plastic discs, 3/8 in diameter, pre-oiled, ready to use, disposable, pack of 200	225-388

* The back pressure of PTFE filters can vary within one lot.

Accessories

Description	Order code
Multi-purpose Calibration Jar	225-111
Pulsation Dampener, needed in line with the SKC High Flow chek-mate Flowmeter	375-150
Forceps, stainless steel, flat non-serrated tips	225-8371
Filter-Keeper, for transporting and storing 37 mm filter samples, pack of 10	225-8303A

CHAPTER 7

Service and contacts

The SKC Reusable PPI is made by SKC Inc. Analyt-MTC is your contact for everything concerning the Reusable PPI: choosing the model and the filter for your method, orders of samplers, media and accessories, technical questions and complaints. Warranty and returns follow Analyt-MTC's terms and conditions of sale.

Contact

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Before you contact Analyt-MTC

Have the following at hand so Analyt-MTC can help you quickly:

- the catalogue number of the sampler, for example 225-382;
- the filter and support you sample with;
- the pump and flowmeter you use, and the flow rate you verified.

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