SKC

Operating Instructions

863 Valley View Road, Eighty Four, PA 15330
724-941-9701 • www.skcinc.com

IMPACT Sampler

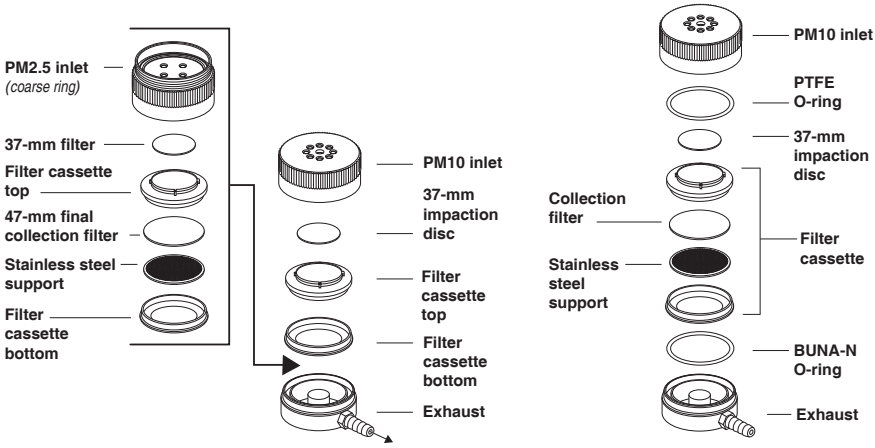
The IMPACT Sampler is an inertial impactor designed to remove particles larger than its cut-point by capturing them on a disposable oiled impaction disc that reduces particle bounce. Particles that are smaller than the cut-point are collected on a 47-mm filter. The IMPACT Sampler mounts easily and makes media changes fast and simple with its convenient removable filter cassette.

The IMPACT Sampler is also part of a cost-effective portable particulate sampling system that ensures the ability to monitor particulate matter in indoor and outdoor environments and in urban, industrial, or rural settings. *See Ordering Information for details on the DPS System or visit www.skcinc.com and search on 100-3901.*

Performance Profile

Flow Rate:	10 L/min
50% Cut-point:	2.5 µm or 10 µm (model dependent)
Impaction Discs:	• **Recommended impaction disc to reduce particle bounce:** 37-mm disposable pre-oiled porous plastic disc • **For chemical analysis of larger particles:** 37-mm filter (quartz or PTFE)
Collection Filter:	47-mm filter, select material based on application
Impactor Material:	Aluminum (inlet) with brass barbed fitting for 3/8-in ID tubing
Dimensions:	2.6 dia. x 1.8 H x 3.8 L in (7 x 5 x 10 cm)
Weight:	0.5 lb (0.23 kg)

Principle of Operation



Exploded view of IMPACT PM Coarse Sampler
(O-rings not shown)

Exploded view of IMPACT PM10 Sampler

Inertial impaction is employed to separate airborne particles according to their aerodynamic diameter. A sample pump draws particle-laden air at a flow rate of 10 L/min through an inertial impactor to separate airborne particles according to their aerodynamic diameter. Airflow enters the impactor through eight nozzles on top of the sampler. The inlet nozzles are sized to operate at a 10 L/min flow rate causing eight airjets to impinge onto the impaction disc positioned below the inlet nozzles. Particles larger than the sampler cut-point with enough inertia to cross the airstream lines impact on the impaction substrate. The airflow, containing smaller particles, makes a sharp turn, passes through the openings in the top of the filter cassette, and follows through to a 47-mm filter where the smaller particles collect.

The top of the filter cassette accommodates the impaction disc. For optimum impactor performance, a 37-mm oiled porous plastic disc is recommended as disposable impaction substrate. If chemical analysis of the larger particles is desired, a 37-mm filter (quartz or PTFE) may be used.

To sample PM Coarse$_{(PM10-2.5)}$, a coarse ring accessory can be added to an IMPACT PM10 Sampler or an IMPACT PM Coarse Sampler may be selected *(see Ordering Information)*. Additional impaction and collection media are required for PM Coarse sampling.

Media Preparation

Collection Filters: Equilibrate and preweigh filters in a clean environment according to appropriate procedures. Record the weight as the pre-sample weight.

Impaction Disc: *Ready-to-use pre-oiled disposable plastic impaction discs are available as SKC Cat. Nos. 225-395 and 225-395A. See Ordering Information.* Using an oiled impaction disc reduces particle bounce.

37-mm filters (quartz or PTFE) may be used if chemical analysis of larger particles is desired.

Impactor Preparation

Cleaning

For optimum performance, the IMPACT Sampler inlet, exhaust, and filter cassette should be cleaned after five runs or upon a noticeable buildup of material. This will remove oil buildup from the top of the filter holder and other residue built up from frequent sampling. Disassemble the impactor and wash parts in water with a liquid detergent or soap. Rinse and air-dry all parts thoroughly in a clean environment.

Caution: Do not place any mechanical object in the inlet nozzles.

O-ring Care

Visually inspect the condition of the BUNA-N exhaust O-ring (*see illustration on page 2 for location*). Ensure the O-ring surface is smooth (i.e., without cracks, cuts, or other damage). Ensure the O-ring is fitted properly in its channel. Replace the exhaust O-ring if there is apparent damage, stretching, or thinning. It is recommended that the PTFE inlet O-ring (2 in PM Coarse model) be replaced by the manufacturer only.

Inserting a Collection Filter into the IMPACT Sampler

The IMPACT Sampler will arrive already assembled. Disassemble it to insert collection filter.

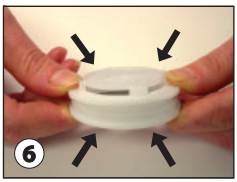
Unscrew inlet from exhaust.

Remove filter cassette.

3a. *Use the filter cassette opener accessory to open filter cassette.*
3b. *Slide the filter cassette horizontally into the "U" of the opener until the two halves of the cassette loosen. Gently pull halves apart.*

Ensure the stainless steel support screen is in place in bottom of filter cassette.

Using forceps accessory, place a preweighed 47-mm filter on the support screen.



Press filter cassette top into filter cassette bottom.

Reinsert cassette into impactor.

When sampling for PM Coarse using the Coarse Ring accessory or IMPACT PM Coarse Sampler, no collection filter or stainless steel support is inserted in the **first** filter cassette. Insert a 47-mm collection filter into the **second** filter cassette (*refer to illustration on page 2*). Proceed to *Inserting an Impaction Disc into the IMPACT Sampler*.

Inserting an Impaction Disc into the IMPACT Sampler

For PM2.5 or PM10 sampling only, insert an impaction disc only after a collection filter has been loaded into the filter cassette.

For PM2.5 or PM10 only, ensure a collection filter has been loaded into the filter cassette (see Inserting a Collection Filter into the IMPACT Sampler).

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Place impaction disc on filter cassette top. The rough side of the impaction disc should face up. SKC-supplied discs are stamped with "UP" on the appropriate side.

Place filter cassette on exhaust and screw impactor inlet and exhaust together just until tight. Further hand-tighten by 1/4 turn only.

Keep sampler upright until the inlet is securely screwed onto the exhaust to prevent the impaction disc from being dislodged.

Do not overtighten impactor inlet and exhaust. Do not use barbed fitting as leverage when tightening.

When sampling for PM Coarse using the Coarse Ring accessory or IMPACT PM Coarse Sampler, *insert the impaction disc onto the* ***first*** *filter cassette as directed in Step 2. Insert a 37-mm collection filter in the impaction disc position on the* ***second*** *filter cassette supplied with the Coarse Ring or the IMPACT PM Coarse Sampler (refer to illustration on page 2). Place the filter cassette assembly on the exhaust and screw impactor inlet and exhaust together just until tight. Further hand-tighten by 1/4 turn only.*

Technical Tidbits:

- Use forceps accessory to carefully insert or remove the collection filter. *See Accessories for forceps.*
- Install provided rain cover on the inlet of the IMPACT Sampler when sampling outdoors.
- SKC recommends using a new impaction disc for each sample.

Flow Rate Verification and Sampling

Note: *As the particle load on the filter increases during sampling, the pressure drop will also increase. Therefore, use a compensating sample pump such as Leland Legacy® SKC Cat. No. 100-3002. The Leland Legacy pump will provide 24 hours of run time at 10 L/min at a maximum pressure drop of 12 inches water.*

Flow Rate Verification

Verify flow rate through the sampling train with the IMPACT Sampler in line (loaded with filter and impaction disc). ***See pump and flowmeter operating instructions.***

Ensure rain cover is removed from inlet and that impactor is loaded and fully assembled (see Inserting a Collection Filter into the IMPACT Sampler and Inserting an Impaction Disc into the IMPACT Sampler).

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Screw calibration adapter onto impactor inlet.

Using flexible tubing, attach pump inlet to outlet of impactor.

Use flow rate verification tubing to connect inlet of calibration adapter to a flowmeter outlet to form a flow rate verification train.*

Verify that flow rate through sampling train is 10 L/min. See sample pump and flowmeter operating instructions.

When flow rate verification is completed, disconnect flowmeter and tubing from adapter. Remove calibration adapter from impactor.

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**If using an SKC High Flow chek-mate Flowmeter Cat. No. 375-50300 series, SKC Pulsation Dampener Cat. No. 375-150 is required in line as shown in steps 4 and 5.*

Sampling

1. If required, replace representative sample media used for flow rate verification with new, preweighed media. *See Media Preparation and Impactor Preparation*.

2. Mount bracket accessory at the desired location and at breathing zone height (6 feet or 2 meters) using wire ties or other fasteners. Mount impactor on mounting bracket accessory by threading clamp knob into bottom of impactor.

3. Insert screw on rain cover into screw hole in top of impactor inlet and rotate cover until tight.

4. Turn on pump and record sample start time and other pertinent data.

> ***Note:*** *If using the Leland Legacy Sample Pump, sample start time and duration can be programmed in advance and sampling started manually or automatically.*

5. After the desired sample time has elapsed, turn off the pump and record sample stop time and other pertinent data.

6. Remove rain cover, reinstate flow rate verification train, and verify flow rate. *See Flow Rate Verification*.

7. Remove pump and tubing from the impactor.

IMPACT Sampler used with DPS System Cat. No. 100-3901. See Ordering Information for details.

Technical Tidbit:

- The supplied rain cover should be used for all outdoor sampling.

Sample Removal, Shipping, and Analysis

Removing the Collection Filter and Impaction Disc

Unscrew impactor inlet from exhaust.

Locate recessed area on filter cassette top and remove impaction disc. If chemical analysis of larger particles is desired, place in appropriate container for shipping to a laboratory for analysis. See Ordering Information, Accessories for Glass Jars.

Gently lift filter cassette from exhaust.

4a. Use the filter cassette opener to separate the two halves.

4b. Slide the filter cassette horizontally into the "U" of the opener until the two halves of the cassette loosen. Gently pull halves apart.

Use forceps to remove collection filter and place in appropriate container for shipping to a laboratory.

When sampling for PM Coarse using the Coarse Ring accessory or IMPACT PM Coarse Sampler, follow the instructions in Steps 1 through 5 for the **second filter cassette only**. Insert media in separate containers, and ship to a laboratory for analysis. The impaction disc from the first filter cassette may be shipped to a laboratory for analysis of larger particles if desired.

Shipping Samples

Package and transport samples and blanks in a manner that will prevent sample loss and contamination. *See Ordering Information, Accessories for the Petri Dish Slide for transporting samples.*

Analysis

Gravimetric and/or chemical by an accredited laboratory.

Ordering Information

Description		Cat. No.
IMPACT Samplers include sampler inlet and body, filter cassette, calibration adapter, and rain cover; *require impaction substrate and collection filters below*		
	PM10	**225-390**
	PM2.5	**225-392**
	PM Coarse includes 2 filter cassettes	**225-3911**
SKC DPS System∞**∑ includes a Leland Legacy Sample Pump with connection case, charger (100-240 V), 2 external battery assemblies with adapters (packaged separately), IMPACT Sampler, 2 filter cassettes, calibration adapter, rain cover, 25 disposable impaction discs, filter cassette opener, tubing with quick-connect fitting, tubing for flow verification, and mounting bracket, in a heavy-duty lockable carry case		
	PM10	**100-3901**
	PM2.5	**100-3903**
Recommended Collection Filters,‡ *required for each sample; select filters based on your applications*		
Quartz Filters, 47 mm, Tissuquartz™, 432 µm thick, pk/25		**225-1823**
PTFE Filters,#† 47 mm, 2.0 µm, with PMP support ring, pk/50		**225-1747**
Impaction Substrate for IMPACT Sampler, *required for each sample, select an impaction substrate based on your application*		
Recommended to Reduce Particle Bounce		
Impaction Discs, 37 mm, pre-oiled, ready to use, disposable		
	pk/10	**225-395B**
	pk/25	**225-395**
	pk/50	**225-395A**
For Chemical Analysis of Larger Particles		
Quartz Filters, 37 mm, Tissuquartz, 432 µm thick, pk/25		**225-1822**
PTFE Filters, 37 mm, 0.3 µm, laminated, without support pad, pk/100		**225-1722**
Accessories		
PM Coarse Ring, adapts IMPACT PM10 to an IMPACT PM Coarse, includes filter cassette		**225-3912**
Mounting Bracket		**225-399**
Forceps, stainless steel		**225-8371**
Petri Dish Slides, for filter transport, pk/100		**225-2-01**
Glass Jars for Chemical Analysis	pk/8	**225-8376**
	pk/36	**225-8377**
Filter Cassette Opener		**225-397**
Replacement Parts		
IMPACT Sampler Inlets only, interchangeable on IMPACT body		
	10 µm	**P54202**
	2.5 µm	**P54204**
IMPACT Sampler Exhaust		**P21279**
IMPACT Sampler Exhaust O-ring		**P31988**
Rain Cover		**225-398**
Calibration Adapter		**225-394**
Filter Cassette		**225-396**
Stainless Steel Support		**225-2647A**

∞ *Provides data similar to data from Federal Reference Method samplers. The DPS System is not a U.S. EPA reference or equivalent method for compliance sampling.*

** *DPS Systems with pumps contain Li-Ion batteries and may be subject to special shipping regulations.*

‡ *Recommended filters for use with Leland Legacy Sample Pump*

Back pressure on PTFE filters can vary within the same lot.

† *Maximum operating temperature is 464 F (240 C) based on the PMP support ring.*

∑ *Use in non-explosive environments only. Not UL Listed for intrinsic safety.*

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 www.skcinc.com/warranty-information.

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