

# CASCADE IMPACTOR INSTRUCTION SHEET

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## Removal and Installation of Sample Rings and Ring Supports –

PIXE International Cascade Impactors are shipped with one set of unprepared Sample Rings and Ring Supports installed. To remove, turn Sample Ring and Ring Support until notches in Rings align with mounting posts, then gently pull upward to remove Sample Ring and Support. To install, place prepared Sample Ring on top of Ring Support with the 3 notches in the edges aligned. Insert the Sample Ring and Support onto the 3 mounting posts with the impaction surface (coated Kapton – part PR-1K) facing toward the impactor orifice. Twist the Rings 60 degrees to lock them in place. The after filter stage is loaded with a Sample Ring with 0.4  $\mu\text{m}$  PCTE (Nuclepore – Part PR-1N) filter material and held in place by a retaining ring. The Kapton rings can be identified by the yellowish color of the Kapton, while the Nuclepore is white.

## Vacuum Requirements –

PIXE Cascade Impactors are designed for a 1.0 liter/minute +/- 10% flow rate and a vacuum of 483 mm (19 inches) of mercury for model I-1 or 648 mm (25.5 inches) of mercury for model I-1L. Several commercially available diaphragm pumps that operate at a variety of voltages satisfy these requirements. Proper flow rate can be obtained using a valve or regulator between the vacuum pump and impactor. Connections are made with 3/16 to 7/32 inch (4.8 to 5.6 mm) inside diameter vacuum hose that is readily available (for example automobile vacuum hose).

## Setup and testing –

Using a vacuum insert (part V-1) the vacuum between stages can be checked before placing an impactor in operation. This is most important for the lower stages with small orifices which could become clogged. Flow rate can be measured using a flow rate meter (part FM-5) inserted either in the vacuum line to the pump or on the exhaust port of a diaphragm pump (may require a length (~8 m) of vacuum hose as a “ballast” to dampen pump fluctuations) or before sampling using an adapter (part A-1) connected to the air intake of the impactor. Attaching a vacuum gauge to the air intake using the adapter provides a good test to ensure that the impactor is vacuum tight.

## Mounting –

For ease in mounting the optional base (part B-1) has both a standard photographic tripod screw mount (1/4-20 female thread) and a 1/2 inch NPT female thread on the side. The base allows use of our small folding tripod (part T-1) the legs of which can be extended using readily available pipe. For extended outdoor use we recommend a weather cover (part W-17 or W-19) for protection from UV light and inclement weather.

## Operation –

In outdoor sampling, impactors are usually operated in the “inverted” position with the air inlet facing downward so that rain, snow or coarse, wind-borne debris (e.g. leaves) do not clog the inlet. For indoor sampling, in a relatively clean environment, the operating position is less important, but the “inverted” position is still recommended. PIXE impactors are designed to



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operate at a flow rate of one liter/minute to achieve the specified particle-diameter cut points. Because the cut points vary with the square root of the flow rate, small (<10%) deviations in flow rate result in very small (< 3%) changes in the cut-point. Operation at other than sea-level atmospheric pressure will also alter the aerodynamic cut-off diameters.

### **Cleaning –**

We recommend cleaning the impactor with alcohol. **Never** use any cleaners containing ketones or aromatic hydrocarbons (such as benzene, toluene, xylene, etc.)

The impactor orifices (especially for the smallest stages) should be cleaned by inserting a fine wire. One strand of braided electronic hook-up wire is usually small enough for this purpose.

### **Lubrication –**

Keep all o-rings well lubricated with petroleum jelly.

### **Ring Supports (Part RS-1) –**

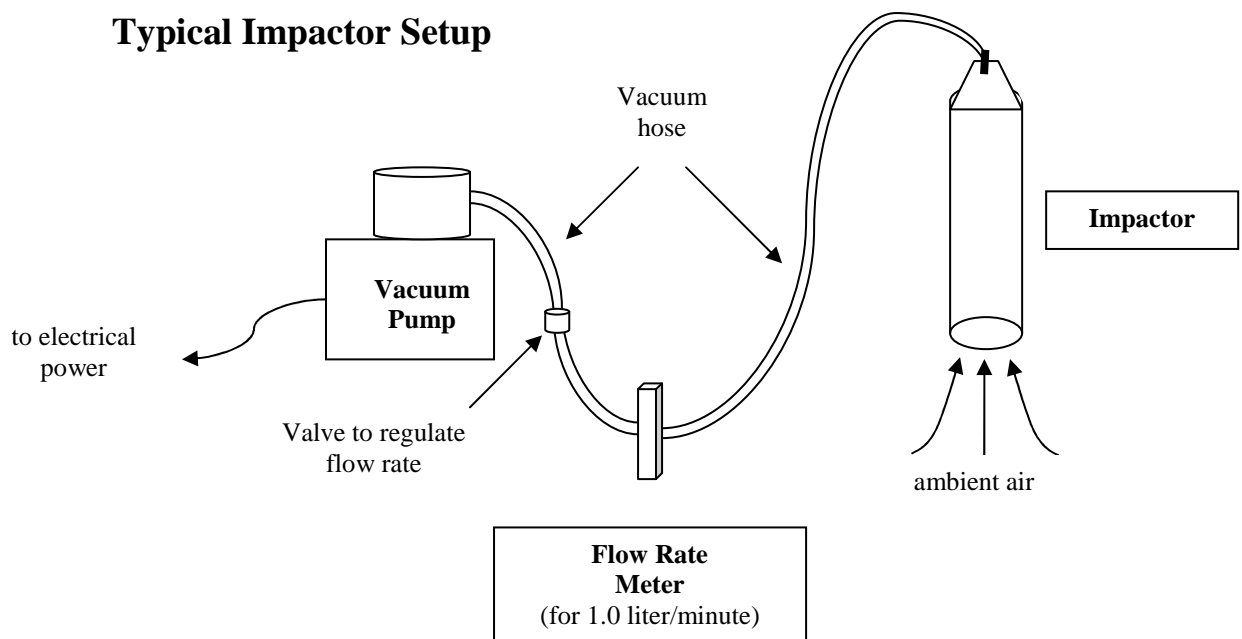
Ring Supports are intended for reuse. Only one Ring Support is required per impactor stage.

### **Sample Rings (Part R-1) –**

We sell unprepared sample rings for those who prefer to prepare their own backings or for use in preparing special backings by gluing a sheet of material to the ring. The impaction surfaces must be coated with a very thin layer of (thinned) petroleum jelly or paraffin so that particles will stick.

### **Warranty –**

Any defect in material or workmanship will be repaired or replaced for 90 days from delivery date.



1.0 +/- 0.1 liter/minute

