



# Elemental Scientific Semiconductor Catalog for PerkinElmer Elan



## Ordering Information

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### PFA-Pt kit for PE Elan

Complete high purity sample introduction system for PE ELAN and ELAN DRC ICPMS. All wetted surfaces Teflon and Pt. Used by the majority of PE Elan semiconductor labs worldwide for the analysis of semiconductor grade chemicals and Si wafer samples. Includes 2 PFA MicroFlow Nebulizers, PureCap PFA endcap with additional gas port, PFA spray chamber, Pt injector and quartz torch.

**Bayonet Torch Mount**

- O-ring free PFA-Pt Kit: **ES-2171-1472**
- Standard PFA-Pt Kit: **ES-2171-0472**

**Cassette Torch Mount\***

- O-ring free PFA-Pt Kit: **ES-2171-2472**
- Standard PFA-Pt Kit: **ES-2171-3472**



ES- 2171-1472 (nebulizer not shown)

### ELAN PFA Endcap and Spraychamber

PFA spray chamber and PureCap endcap delivers low blanks. Operates at low sample flow rates. Features secure, o-ring free seals for low maintenance and long life-time. Second orthogonal gas port for adding an additional or mixed gas to spray chamber. Interfaces with any 6mm nebulizer. Includes addition gas line and drain line.



- 47mm PFA PureCap endcap: **ES-5010-0470**
- PFA Spray Chamber: **ES-2100-0471**
- Endcap and spray chamber: **ES-2100-5472**

### Platinum injector

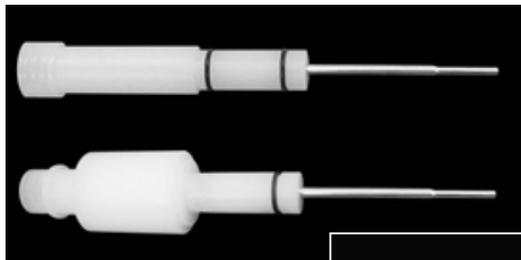
Precision injector mounted in a PFA base for precise alignment of torch and injector. Low aluminum blanks even when high concentrations of HF are analyzed.

**2mm Pt injector (Bayonet Mount)**

- for O-ring free torch: **ES-1113-1200**
- for standard torch: **ES-1113-0200**

**2mm Pt injector (Cassette Mount\*)**

- for O-ring free torch: **ES-1113-2200**
- for standard torch: **ES-1113-3200**



O-ring-free seal for reduced contamination and easy maintenance

Many sizes of sapphire and quartz injectors are available.

### Quartz torch

Precision alignment of torch and injector eliminates injector wobble and off-axis deflection. Direct replacement for the standard PE Elan torch.



- O-ring free torch: **ES-1102-1000**
- Standard torch: **ES-1102**

Standard vs. O-ring free injectors



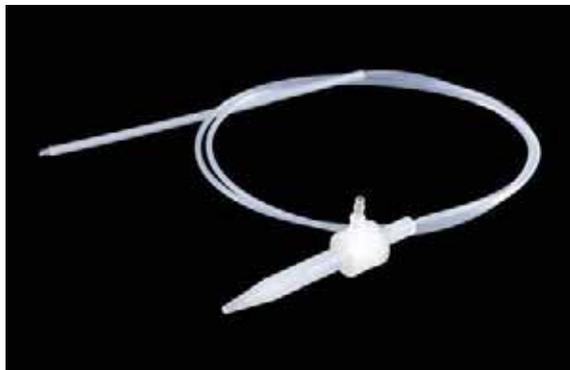
**\*Cassette mount injectors are found on PE Elans newer than mid-2005.**

## High Efficiency PFA MicroFlow Nebulizers

PFA MicroFlow nebulizers are constructed entirely from chemically resistant fluoropolymers, ideal for strong acids, alkalis, organics, high salt solutions, and high solid concentrations. They are resistant to clogging, are reliably self-aspirated or pumped, and produce a fine aerosol for high transport efficiency and high sensitivity.

### PFA Nebulizers with Integrated Capillaries

These nebulizers allow self-aspiration at low sample consumption rates. The unique design eliminates connectors between the sample and the nebulizer, minimizing contamination and dead volume. Since the sample contacts only Teflon®, the PFA MicroFlow nebulizer is the cleanest, most chemically resistant nebulizer available.



Model	Part Number	Measured self- aspiration rate (@ 1L/m Ar)
PFA-20	ES-2020-0002	20 µL/min
PFA-50	ES-2000-0002	50 µL/min
PFA-100	ES-2002-0002	100 µL/min
PFA-200	ES-2003-0002	200 µL/min
PFA-400	ES-2005-0002	400 µL/min

For custom flow rates, please contact ESI.

### PFA-ST Nebulizer

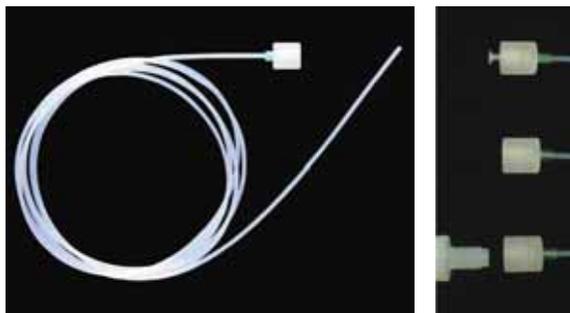
High purity, HF-resistant, high performance self-aspirating nebulizer with detachable sample capillary. May be pumped from 0.1 to 2.0 ml/min. Many types of optional Teflon sample capillaries and autosampler probes are also available for the PFA-ST Nebulizer.



PFA-ST Nebulizer:    **ES-2040-28**

### Sample Capillaries for ST Nebulizers

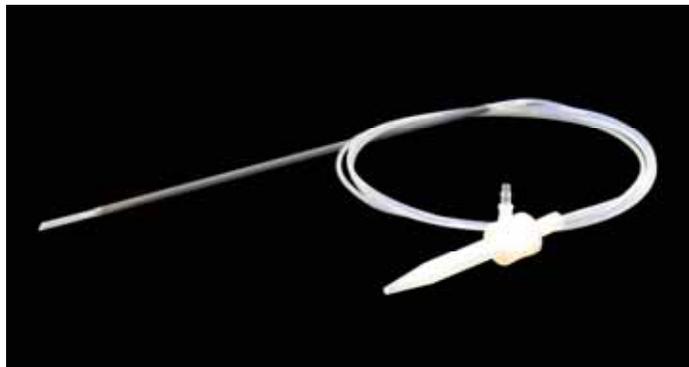
i.d.	Part Number	Measured self-aspiration rate (@1L/m Ar)
0.15 mm	ES-2045	20 µL/min <span style="color: red;">■</span> (red)
0.2 mm	ES-2043	50 µL/min <span style="color: purple;">■</span> (purple)
0.25 mm	ES-2042	100 µL/min <span style="color: green;">■</span> (green)
0.5 mm	ES-2041	400 µL/min <span style="color: orange;">■</span> (orange)
0.8 mm	ES-2044	700 µL/min <span style="color: blue;">■</span> (blue)



## High Efficiency PFA MicroFlow Nebulizers

### PFA Nebulizers with Integrated Sampling Probes

These nebulizers allow self-aspiration at low sample consumption rates with any autosampler while providing the same benefits of the PFA MicroFlow nebulizer. The integrated sampling probe is constructed by encapsulating a rigid support material between layers of Teflon to provide a chemically resistant probe that is mechanically stable and resilient.



**LLL** = distance from nebulizer to the probe support (cm). Standard lengths are 80 cm (-080), 100 cm (-100), 120 cm (-120), 150 cm (-150). Probes can be custom-made to your specifications of length and materials at no extra charge.

#### Carbon Fiber support

Model	ESI SC-series	PE AS-9x	ASX-100	ASX-500	Manual probes
PFA-20	ES-2020-3503-LLL		ES-2020-0103-LLL		ES-2020-0203-LLL
PFA-50	ES-2000-3503-LLL	ES-2000-9503-LLL	ES-2000-0103-LLL	ES-2000-0503-LLL	ES-2000-0203-LLL
PFA-75	ES-2001-3503-LLL	ES-2001-9503-LLL	ES-2001-0103-LLL	ES-2001-0503-LLL	ES-2001-0203-LLL
PFA-100	ES-2002-3503-LLL	ES-2002-9503-LLL	ES-2002-0103-LLL	ES-2002-0503-LLL	ES-2002-0203-LLL
PFA-200	ES-2003-3503-LLL	ES-2003-9503-LLL		ES-2003-0503-LLL	ES-2003-0203-LLL
PFA-400	ES-2005-3503-LLL	ES-2005-9503-LLL		ES-2005-0503-LLL	ES-2005-0203-LLL

#### PEEK support

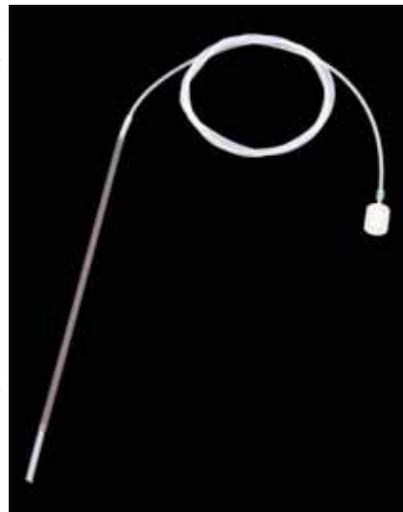
Model	ESI SC-series	PE AS-9x	ASX-100	ASX-500	Manual probes
PFA-20	ES-2020-3500-LLL		ES-2020-0100-LLL		ES-2020-0200-LLL
PFA-50	ES-2000-3500-LLL	ES-2000-9500-LLL	ES-2000-0100-LLL	ES-2000-0500-LLL	ES-2000-0200-LLL
PFA-75	ES-2001-3500-LLL	ES-2001-9500-LLL	ES-2001-0100-LLL	ES-2001-0500-LLL	ES-2001-0200-LLL
PFA-100	ES-2002-3500-LLL	ES-2002-9500-LLL	ES-2002-0100-LLL	ES-2002-0500-LLL	ES-2002-0200-LLL
PFA-200	ES-2003-3500-LLL	ES-2003-9503-LLL		ES-2003-0500-LLL	ES-2003-0200-LLL
PFA-400	ES-2005-3500-LLL	ES-2005-9503-LLL		ES-2005-0500-LLL	ES-2005-0200-LLL

#### Ultem support

Model	ESI SC-series	PE AS-9x	ASX-100	ASX-500	Manual probes
PFA-20	ES-2020-3505-LLL		ES-2020-0105-LLL		ES-2020-0205-LLL
PFA-50	ES-2000-3505-LLL	ES-2000-9505-LLL	ES-2000-0105-LLL	ES-2000-0505-LLL	ES-2000-0205-LLL
PFA-75	ES-2001-3505-LLL	ES-2001-9505-LLL	ES-2001-0105-LLL	ES-2001-0505-LLL	ES-2001-0205-LLL
PFA-100	ES-2002-3505-LLL	ES-2002-9505-LLL	ES-2002-0105-LLL	ES-2002-0505-LLL	ES-2002-0205-LLL
PFA-200	ES-2003-3505-LLL	ES-2003-9503-LLL		ES-2003-0505-LLL	ES-2003-0205-LLL
PFA-400	ES-2005-3505-LLL	ES-2005-9503-LLL		ES-2005-0505-LLL	ES-2005-0205-LLL

## Autosampler Probes for ST Nebulizers

ST Nebulizer probes connect directly to any ST-type nebulizer. The 1/4-28 threaded fitting provides a secure, zero-dead-volume connection with no additional fittings required.



**LLL** = distance from flanged fitting to the probe support (cm).

- 80 cm (-080)
- 100 cm (-100)
- 120 cm (-120)
- 150 cm (-150)

Probes can be custom-made to your specifications of length and materials at no extra charge.

### Carbon Fiber Support

Probe I.D.	ESI-SC	PE AS-9x	ASX-100	ASX-500	Manual probes
0.15mm	ES-5037-3150-LLL	ES-5037-9150-LLL	ES-5036-0150-LLL	ES-5037-0150-LLL	ES-5036-2150-LLL
0.20mm	ES-5037-3200-LLL	ES-5037-9200-LLL	ES-5036-0200-LLL	ES-5037-0200-LLL	ES-5036-2200-LLL
0.25mm	ES-5037-3250-LLL	ES-5037-9250-LLL	ES-5036-0250-LLL	ES-5037-0250-LLL	ES-5036-2250-LLL
0.30mm	ES-5037-3300-LLL	ES-5037-9300-LLL	ES-5036-0300-LLL	ES-5037-0300-LLL	ES-5036-2300-LLL
0.50mm	ES-5037-3500-LLL	ES-5037-9500-LLL		ES-5037-0500-LLL	ES-5036-2500-LLL
0.80mm	ES-5037-3750-LLL	ES-5037-9750-LLL		ES-5037-0750-LLL	ES-5036-2750-LLL

### PEEK Support

Probe I.D.	ESI-SC	PE AS-9x	ASX-100	ASX-500	Manual probes
0.15mm	ES-5017-3150-LLL	ES-5017-9150-LLL	ES-5036-0150-LLL	ES-5017-0150-LLL	ES-5016-2150-LLL
0.20mm	ES-5017-3200-LLL	ES-5017-9200-LLL	ES-5036-0200-LLL	ES-5017-0200-LLL	ES-5016-2200-LLL
0.25mm	ES-5017-3250-LLL	ES-5017-9250-LLL	ES-5036-0250-LLL	ES-5017-0250-LLL	ES-5016-2250-LLL
0.30mm	ES-5017-3300-LLL	ES-5017-9300-LLL	ES-5036-0300-LLL	ES-5017-0300-LLL	ES-5016-2300-LLL
0.50mm	ES-5017-3500-LLL	ES-5017-9500-LLL		ES-5017-0500-LLL	ES-5016-2500-LLL
0.80mm	ES-5017-3750-LLL	ES-5017-9750-LLL		ES-5017-0750-LLL	ES-5016-2750-LLL

### Ultem Support

Probe I.D.	ESI-SC	PE AS-9x	ASX-100	ASX-500	Manual probes
0.15mm	ES-5057-3150-LLL	ES-5057-9150-LLL	ES-5056-0150-LLL	ES-5057-0150-LLL	ES-5056-2150-LLL
0.20mm	ES-5057-3200-LLL	ES-5057-9200-LLL	ES-5056-0200-LLL	ES-5057-0200-LLL	ES-5056-2200-LLL
0.25mm	ES-5057-3250-LLL	ES-5057-9250-LLL	ES-5056-0250-LLL	ES-5057-0250-LLL	ES-5056-2250-LLL
0.30mm	ES-5057-3300-LLL	ES-5057-9300-LLL	ES-5056-0300-LLL	ES-5057-0300-LLL	ES-5056-2300-LLL
0.50mm	ES-5057-3500-LLL	ES-5057-9500-LLL		ES-5057-0500-LLL	ES-5056-2500-LLL
0.80mm	ES-5057-3750-LLL	ES-5057-9750-LLL		ES-5057-0750-LLL	ES-5056-2750-LLL

## Apex High Sensitivity Inlet System

Fully-integrated, high-sensitivity sample introduction systems for ICP spectroscopy. Designed to increase signal intensity while reducing relative background contamination for ICPMS analyses. When combined with a self-aspirating MicroFlow PFA nebulizer even aggressive and concentrated chemicals may be analyzed at very high sensitivity with low blank contamination.

### Apex Q for PE Elan

High-sensitivity, low-flow sample introduction system for ICPMS. Improves sample transport efficiency while maintaining low blanks. Recommended to be used with the Apex Shelf. Includes PFA-100 and PFA-ST nebulizers, integrated peristaltic drain pump, and connectors to adapt to the PE ELAN.

Apex Q for ELAN: **ES-4354**



### Apex HF for PE Elan

All PFA sample flow path. High-sensitivity, low-flow HF-resistant sample introduction system for ICPMS. Recommended to be used with the Apex shelf. Includes PFA-100 and PFA-ST nebulizers, integrated peristaltic drain pump, and connectors to adapt to the PE ELAN.

Apex HF for ELAN: **ES-4454**



### Spiro Teflon Membrane Desolvator

Designed for use with or without the Apex system. Innovative design allows for direct analysis of a variety of samples, including high concentration Si samples and volatile organic solvents. The Spiro is an extremely stable membrane desolvator compatible with many types of high dissolved solids samples. The Spiro removes Si on-line as  $\text{SiF}_6$  after addition of HF to the sample, allowing the determination of trace metal impurities in Si matrices without ICPMS cone clogging or off-line sample preparation. The Spiro combined with the Apex system is useful for direct analysis of neat organic chemicals, such as methanol, acetone and other solvents. Since the Spiro removes volatile species from the sample aerosol stream, it is not recommended for the determination of volatile analytes, including boron.

Spiro Membrane Desolvator: **4599-3000**



The Spiro attaches directly to the Apex.

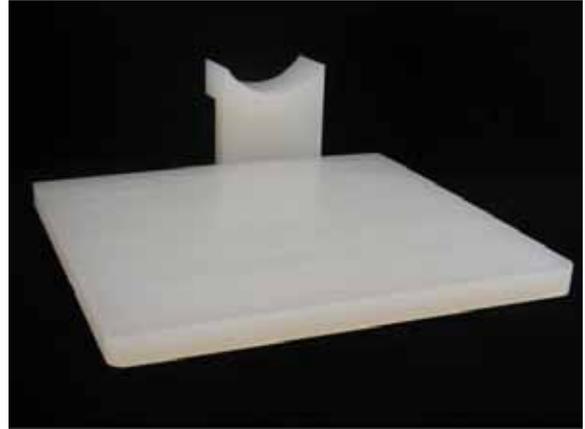


## **Apex Shelves for Elan ICPMS**

Polypropolyne shelves for direct mounting of the Apex system to the Elan ICPMS injector. A notch in the bottom of each shelf fits directly over the ridge in the built-in Elan tray.

### **Apex Shelf for PE Elan with bayonet torch**

for PE Elan 6100, DRC,  
9000 before mid-2005: **ES-2999-5431**



### **Apex Shelf for PE Elan with cassette torch**

for PE Elan newer  
than mid-2005: **ES-2999-5421**



## PC<sup>3</sup> Peltier Cooler for Cyclonic Spray Chambers

The PC<sup>3</sup> is a small and robust Peltier cooler for ICPMS cyclonic spray chambers. The cyclonic spray chamber offers the advantages of low-memory effects, fast rinse-out, and higher sample transport efficiency. The PC<sup>3</sup> cools the outer walls of the cyclonic spray chamber to a constant temperature enhancing long-term signal stability, reducing polyatomic ion interferences, such as oxides, and reducing solvent loading when volatile organic solvents are analyzed.

PC<sup>3</sup> kit with Quartz spray chamber and addition gas port: **ES-4152-1111**

PC<sup>3</sup> kit with Polypro spray chamber and addition gas port: **ES-4152-2111**



The PC3 can be adapted to a wide variety of ICP injectors, including ESI PFA injector base and quartz ball joint injector. The PC3 shown here is connected to the ELAN injector normally used with the PE Ryton spray chamber.

## O-ring-free Cyclonic Spray Chambers

Cyclonic spray chambers offer the advantages of low-memory effects, fast rinse-out, and higher sample transport efficiency. O-ring free connections to the nebulizer and injector eliminate a possible source of contamination. These spray chambers can be used with any 6mm nebulizer, including MicroFlow PFA Nebulizers, PolyPro Nebulizers, and glass concentric nebulizers.

Quartz spray chamber with addition gas port: **ES-4152-1111**

Polypro spray chamber with addition gas port: **ES-4152-2111**



A one piece ferrule nut holds any 6mm nebulizer in place

\*PC<sup>3</sup> cyclonic spray chambers may be used alone or with the PC<sup>3</sup> Peltier Cooler.

## SC-2 Ultraclean Optically Encoded Autosampler

Automatic sampling while maintaining sample integrity and purity. Improved control of self-aspiration, reducing "vapor-locks" and useful for low flow applications and organic solvents analysis. Demonstrably improves rinse-out and background over any other autosampler available for the PE Elan. Recently improved for chemical resistance to high acid concentrations in enclosed environments. Fully compatible with ELAN and Optima software.

SC-2 Autosampler  
with IEEE converter: **SC-8102C**



### **SC-FAST high purity sample injection**

The SC-FAST integrates fully with the SC-2 autosampler to ensure the fastest sample throughput of any commercial sample introduction system. Through use of an injection valve system, most of the uptake and rinse time can be eliminated, increasing throughput up to 2—3 fold without loss of analytical performance.

SC-FAST upgrade: **SC-0500-03**



SC-FAST can be integrated to the bottom of the SC-2 for PE Elan ICPMS.

### **Semiconductor rinse stations and delivery**

Dual pressurized containers deliver the rinse solution to the SC Autosampler dual-flowing rinse stations without the use of a peristaltic pump, eliminating a source of contamination. All wetted parts are made from PFA Teflon to ensure the cleanest possible rinse.

PFA Rinse Delivery System: **SC-0304**



## Upgrade options for SC-2 Autosampler

### Sample enclosure for SC-2 autosampler

Controls evaporation and environmental contamination. Only the sample area is enclosed allowing free access to the rest of the instrument. The large flexible door opens easily for access to the sample racks and locks securely closed.

Sample enclosure:     **SC-1207**

Please contact ESI if you are interested in HEPA / ULPA filtered sample environments for the SC Autosampler



### SC-2 STAND

The combination of the SC-2 autosampler with STAND option provides an optimized sample changer for the Elan ICPMS. The stand positions the SC-2 at an ideal height next to the Elan ICPMS, minimizing the distance between the sample and the nebulizer for faster uptake and rinse-out. The SC-2 STAND also eliminates the need for a separate autosampler table and includes two shelves with storage space.

SC-2 STAND:     **SC-1210**



The STAND option can be used either with the SC-2 autosampler along or combined with the SC-FAST sample injection system.

### Sample Racks for SC-2



MR-21-14 21 position 3x7 mini rack. For "GFAA" style vials.



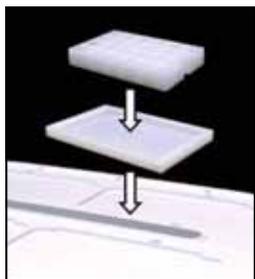
MR-00-01 Cover for Micro Racks.



MT-24G 24 position 4x6 GeMeTec rack. Compatible with GeMeTec automated VPD system.

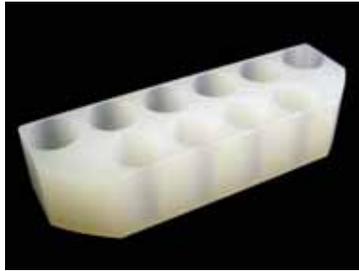


MT-24G-AP GeMeTec adapter plate. Adapts GeMeTec rack to microtiter plate locations on the SC-2 autosampler.



The SC autosampler readily accommodates a wide variety of sample racks for both small and large volume sample analysis. Many other sizes and types of racks are available. Please contact ESI for racks compatible with vials that you prefer to use.

## Sample Racks for SC-2



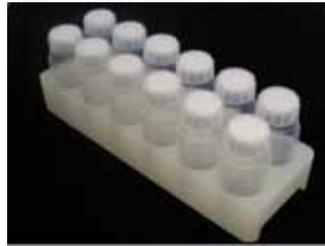
ST10-28 10 position standards rack. For 25 mL PFA bottles.



SR2-21-27 21 position 3x7 super rack. For 25 ml PFA bottles



SR2-12-50 12 position 2x6 super rack. For 125 ml PFA bottles



The SC autosampler readily accommodates a wide variety of sample racks for both small and large volume sample analysis. Many other sizes and types of racks are available. Please contact ESI for racks compatible with vials that you prefer to use.

**Sample Vials and Bottles for SC-2**



V-14-0311C 1.5mL PFA "GFAA" style vial  
(press-on cap not included)



V-14-0312C 2mL PFA "GFAA" style vial  
(press-on cap not included)



V-14-0314C 4mL PFA "GFAA" style vial,  
(press-on cap not included)



V-14-0310 PFA push on cap for "GFAA" style vials.



V-27-0360 25mL PFA bottle with PFA seal and PFA screw cap



V-50-0360 125mL high purity PFA bottle with seal and screw cap.  
Recommended for DI water and high purity semiconductor-grade chemicals due to favorable sample volume to surface area ratio.

### ICPMS Cones for PE Elan

#### **Platinum Cones**

- ES-3000-1711 Pt Sampler cone
- ES-3000-1712 Pt Skimmer cone

#### **Nickel Cones**

- ES-3000-1709 Ni Sampler cone
- ES-3000-1710 Ni Skimmer cone

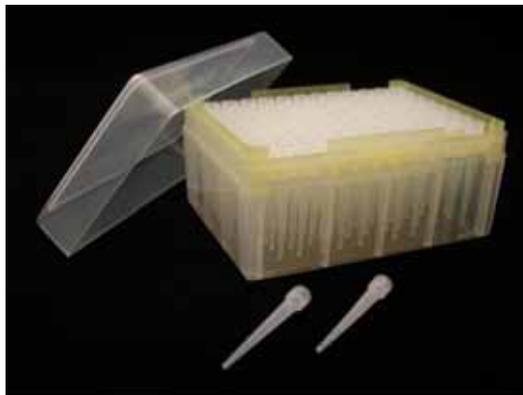


Elan 6000/6100/9000/DRC Cones

### PFA Pipette Tips for Eppendorf type Pipettors

#### **100 µl PFA Pipette Tips**

- Quantity of 10, pre-cleaned: **ES-7000-0101**
- Quantity of 96, pre-cleaned: **ES-7000-0111**



#### **1000 µl PFA Pipette Tips**

- Quantity of 10, pre-cleaned: **ES-7000-1001**
- Quantity of 60, pre-cleaned: **ES-7000-1011**





If a standard part doesn't meet your requirements, EPOND has the resources to develop a customized solution ... the '**SEDNA**' uptake meter – shown above – is an example of a novel EPOND device that solves a frequently-encountered problem in a simple and cost-effective package – *fast and volumetric flow measurements*.

Most of the parts in this booklet can be used with other ICP-MS and optical ICP instruments that are made by leading manufacturers such as Agilent, Finnigan, GBC, Jobin-Yvon, Leeman, Shimadzu, Sieko, Spectro, Thermo, Varian and VG.

Complete lists of accessories for every ICP-OES or ICP-MS instrument, with their prices, are available from EPOND - **email us** with the names of the instrument types for which you want information.

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