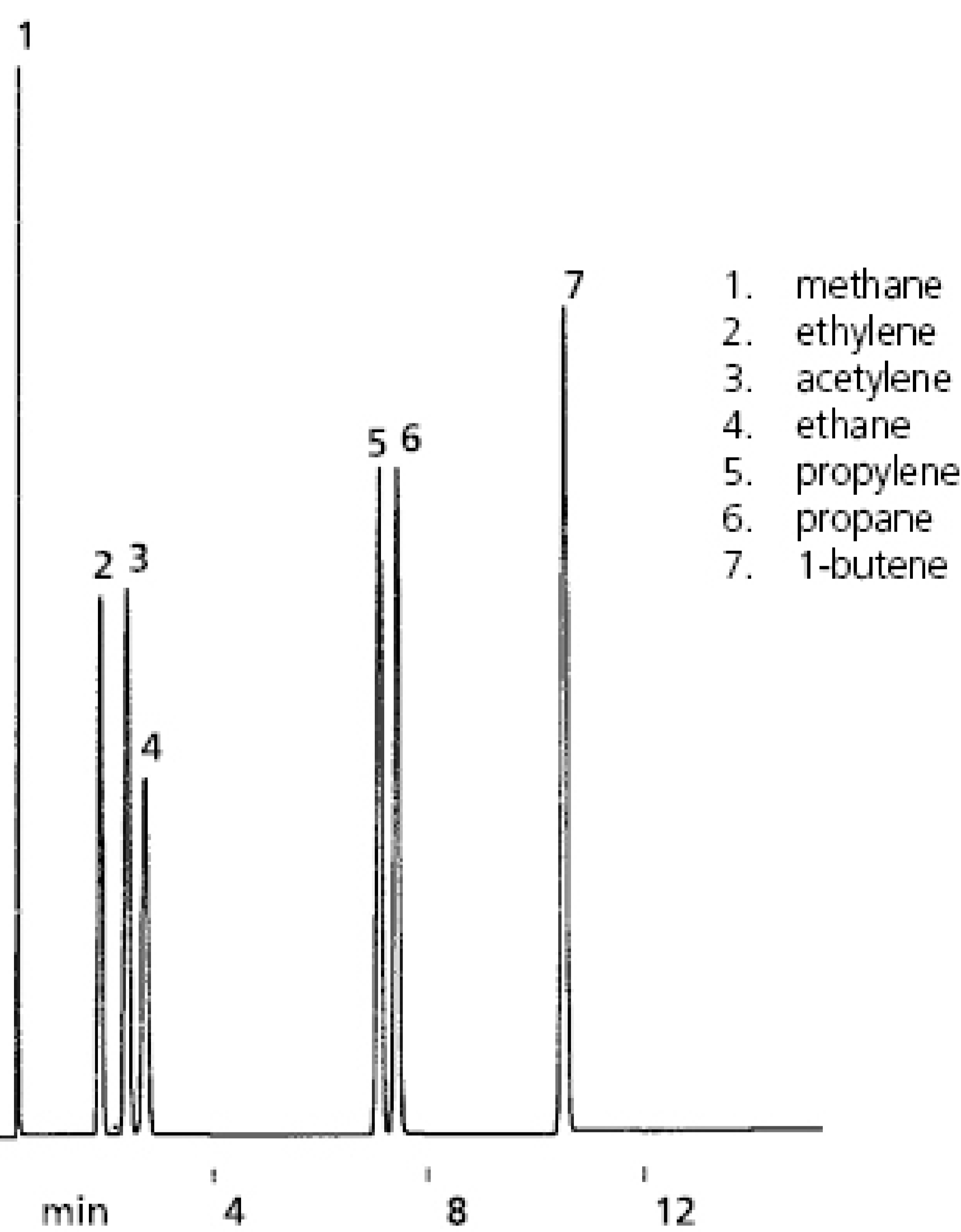


# GC Packed Columns

## Micropacked GC Columns

Micropacked columns are highly efficient and provide good sample capacity, resulting in a powerful tool for solving many difficult application problems. The unsurpassed inertness of SilcoSmooth tubing is based on Siltek deactivation, which allows the column to be flexed and coiled without any fear of chipping or cracking the inert surface.

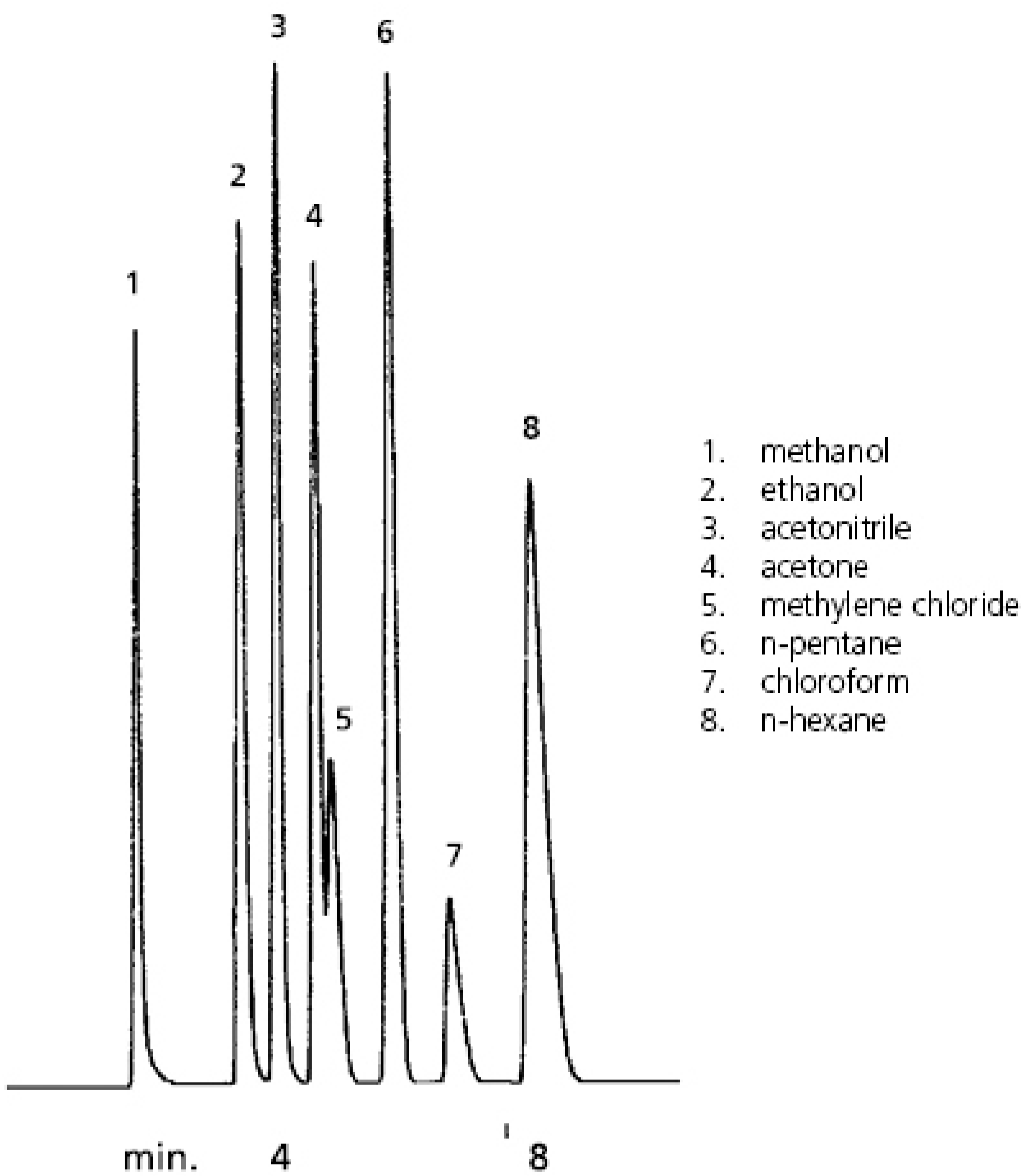
### Hydrocarbon Gases HayeSep® S (micropacked)



2m, 0.75mm ID HayeSep S micropacked column  
500µL split injection of a light hydrocarbon gas mixture

Oven temp. : 40°C (hold 3 min.) to 150°C @ 15°C/min. (hold 5 min.)  
Inj. & det. temp. : 220 °C  
Carrier gas : helium  
Flow : 20mL/min. set @ 40 °C  
FID sensitivity : 32 x 10-11 AFS  
Split ratio: : 10:1

### Solvents HayeSep® Q



2m, 1mm ID HayeSep® Q  
1µL direct injection of a neat solvent mixture

Oven temp. : 80°C to 180°C @ 16°C/min. (hold 5 min.)  
Inj. & det. temp. : 200 °C  
Carrier gas : helium  
Flow : 20mL/min. set @ 40 °C  
FID sensitivity : 512 x 10-11 AFS

Types of micropacked columns available:

Mesh	Packing material
80/100	HayeSep Q
	Molesieve 5A
	Molesieve 13X
	ShinCarbon ST
100/120	HayeSep Q
	HayeSep R
	HayeSep N
	Rt-XLSulfur Micropacked Column
20% TCEP on 80/100 Chromosorb PAW	

For availability and ordering information on custom columns, please contact your representative direct sales/distributors.

# Rt-XLSulfur Columns (Packed and Micropacked)

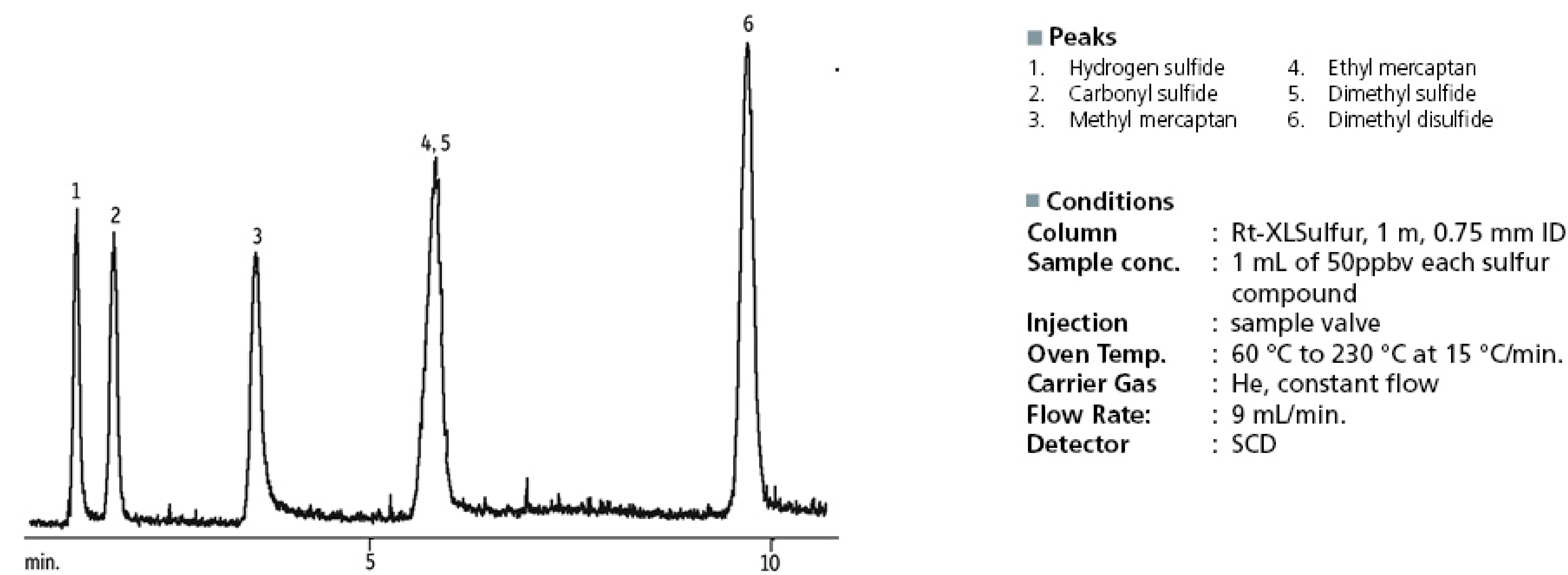
Rt-XLSulfur packed and micropacked columns are designed for ppb-level sulfur analysis. Every component of the sample pathway is treated to provide the highest degree of inertness for reactive, low-level sulfur compounds. The porous polymer phase features a unique surface modification, which results in excellent peak symmetry and thermal stability to 300 °C.

The high performance and reproducibility of the Rt-XLSulfur column enables resolution and quantitation of COS, H<sub>2</sub>S, SO<sub>2</sub>, CH<sub>3</sub>SH, (CH<sub>3</sub>)<sub>2</sub>S<sub>2</sub> at low ppb concentrations. These sulfur compounds typically are found in pulp mill byproducts, natural gas, and petroleum products.

## ■ Features:

- Optimized columns for low ppbv sulfur analyses.
- Eliminate the need for PTFE tubing.
- Column and end-fittings are Sulfinert® treated for maximum inertness.

**Figure 1** The Rt-XLSulfur column analyzes 50 ppb levels of sulfur compounds, providing low bleed and good symmetry.



Column	OD	ID / mm	Length / m
Rt-XLSulfur Columns (packed)	1/8"	2.0	1.0
			2.0
	1/16"	3.2	1.0
			2.0
Rt-XLSulfur Columns (micropacked)	1/16"	1.0	1.0
			2.0
	0.95mm	0.75mm	1.0
			2.0

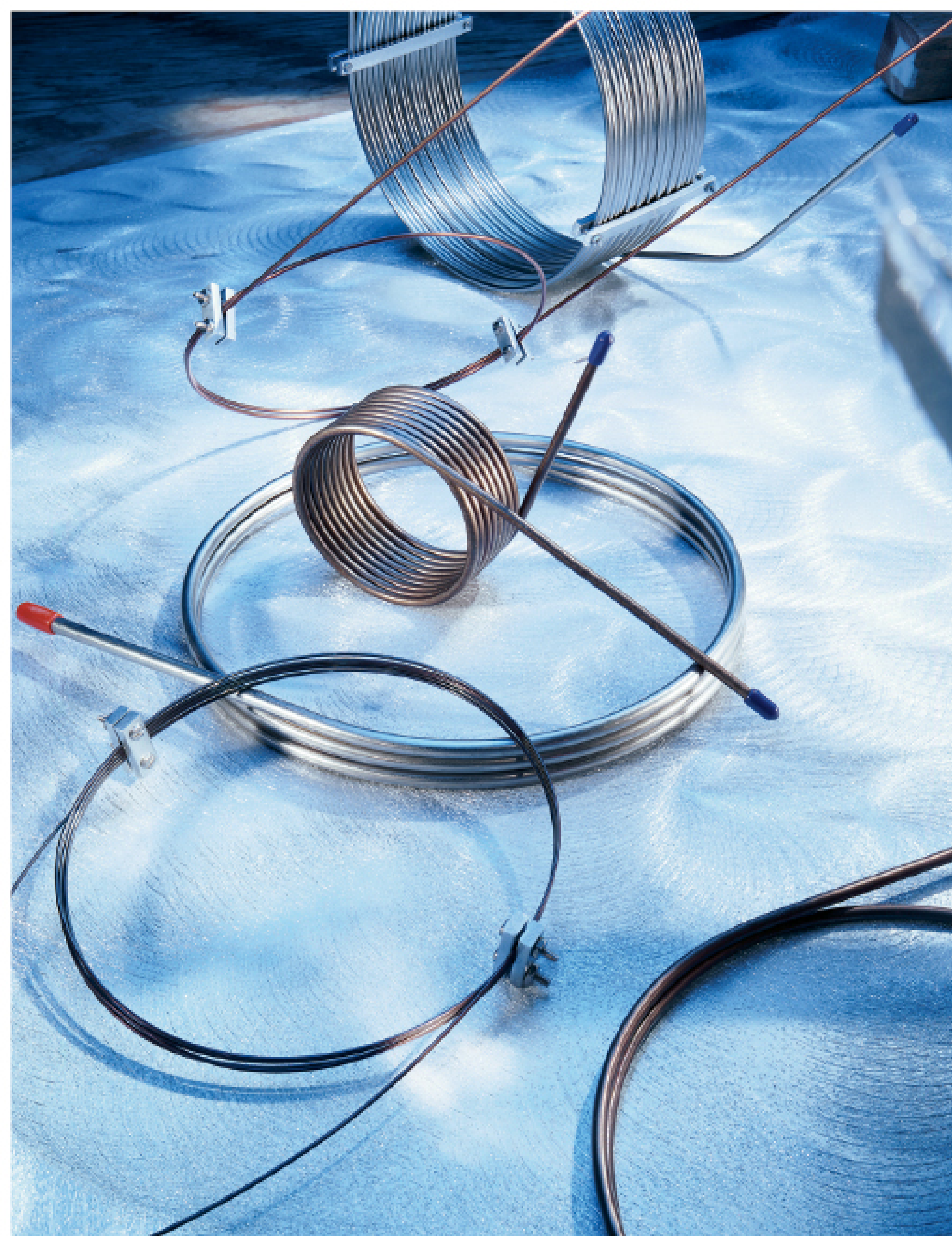
For availability and ordering information on custom columns, please contact your representative direct sales/distributors.

## GC Packed Columns

### Porous Polymer Columns (Packed)

#### ■ Types of packing material available:

- Activated Charcoal
- HayeSep A
- HayeSep C
- HayeSep D
- HayeSep N
- HayeSep Q
- HayeSep T
- Porapak Q
- Porapak QS
- Porapak R
- Porapak N
- Porapak T
- Shimalite Q
- Silica Gel



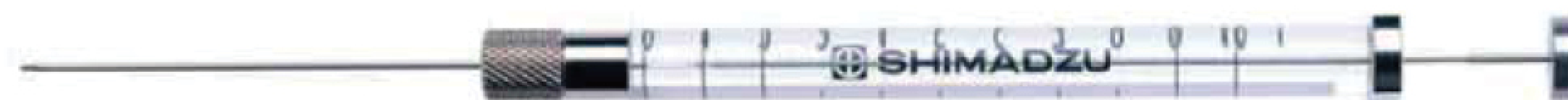
Available in both glass and stainless steel tubing.

For availability and ordering information on custom columns, please contact your representative direct sales/distributors.

# Syringe

## SAMPLE INTRODUCTION – Syringes

Shimadzu Diamond syringes are the result of technological advancements in materials, design, and engineering. Designed to meet the ever increasing levels of sensitivity required by today's analyses, Shimadzu Diamond syringes give you a new level of accuracy and precision.



### LONGER LIFE

Shimadzu Diamond syringes have a longer life. The improved solvent resistance and maximized operational temperature range along with the smoothest available internal glass surface ensure you receive the longest lifetime from your Shimadzu syringe.

### SUPERIOR PERFORMANCE AND ROBUSTNESS

Shimadzu Diamond syringes have superior performance and robustness with unsurpassed levels of operational strength and durability. Potential for contamination is significantly reduced by the near-zero syringe dead volume and minimized adhesive in the flow path.

### REDUCED CARRYOVER

Engineering enhancements have eliminated areas where fluid can become trapped and potentially cause carryover, improving accuracy, precision and analysis results.

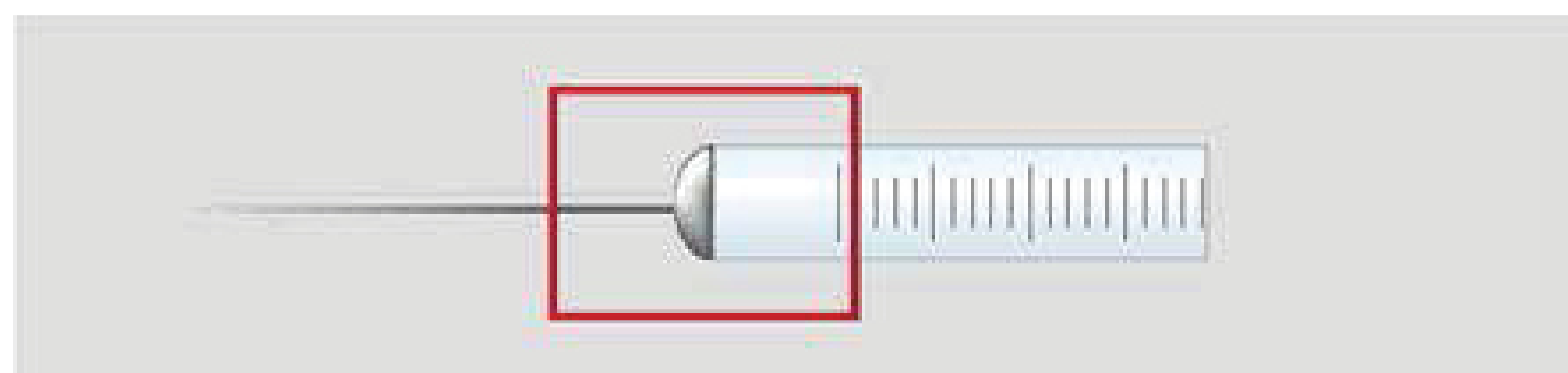
# Syringe

## Syringe Selection Guide

If a syringe is being used by hand, a manual syringe should be selected. If a syringe is installed in an AOC autosampler, then choose the appropriate syringe and volume to suit your instrument and application.

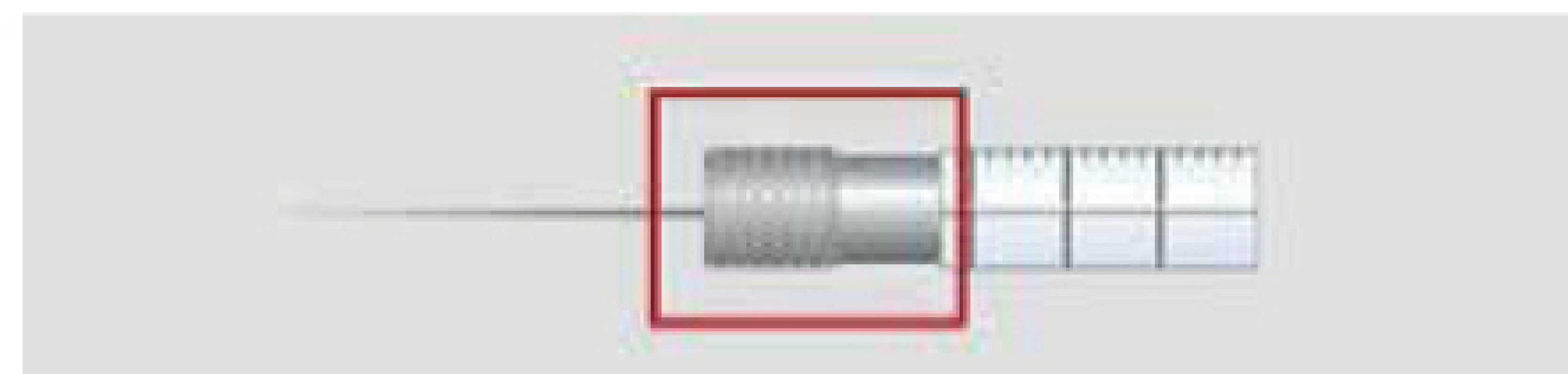
## Syringe Style

### Fixed Needle



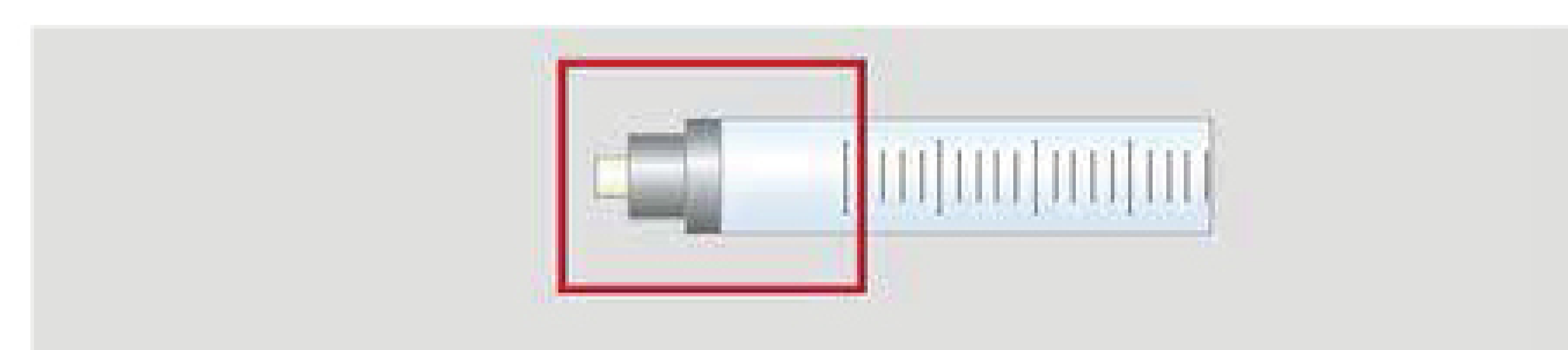
- Better option for experienced users or for applications requiring trace sample levels
- Recommended for use with an autosampler because the probability of needle bending is minimal
- Minimal sample carryover

### Removable Needle



- Better option for inexperienced users
- Reduce cost if used in precipitation of salts or in situations in which it may bend easily (such as thick septum ) Available for many methods by changing needles

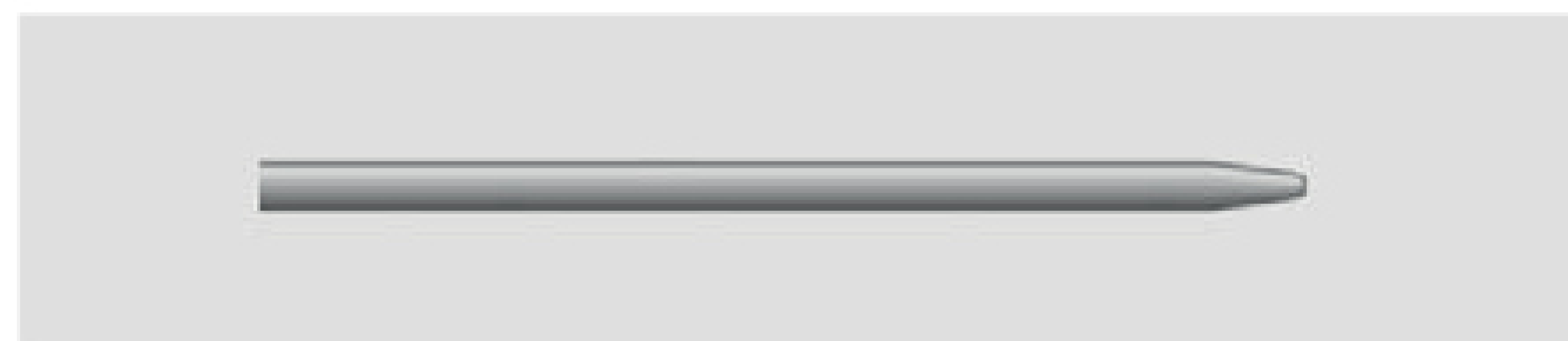
### Gas Tight



- For Luer Lock needles and fittings
- Specifically designed to install and secure Luer Lock needles easily

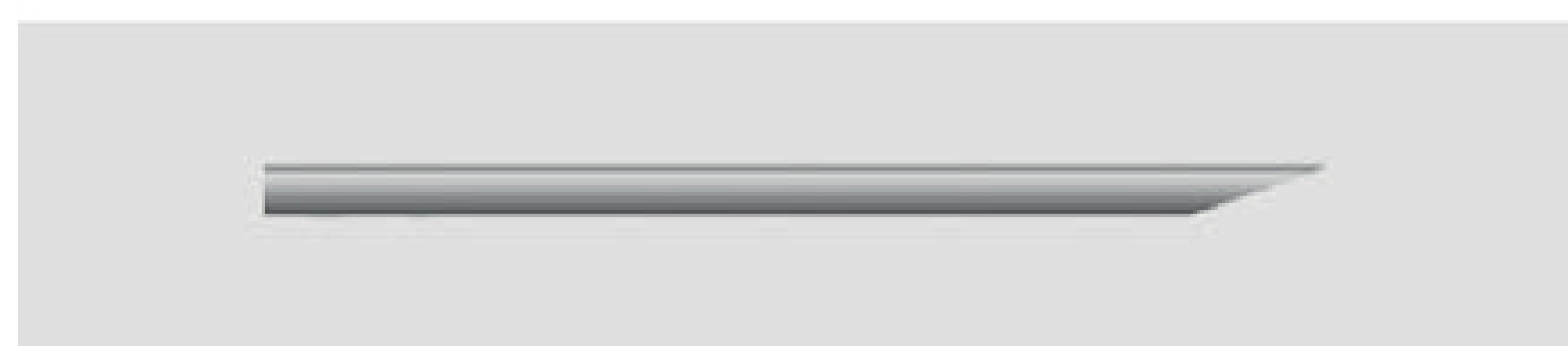
## Needle Tip Style

### Cone: Autosampler



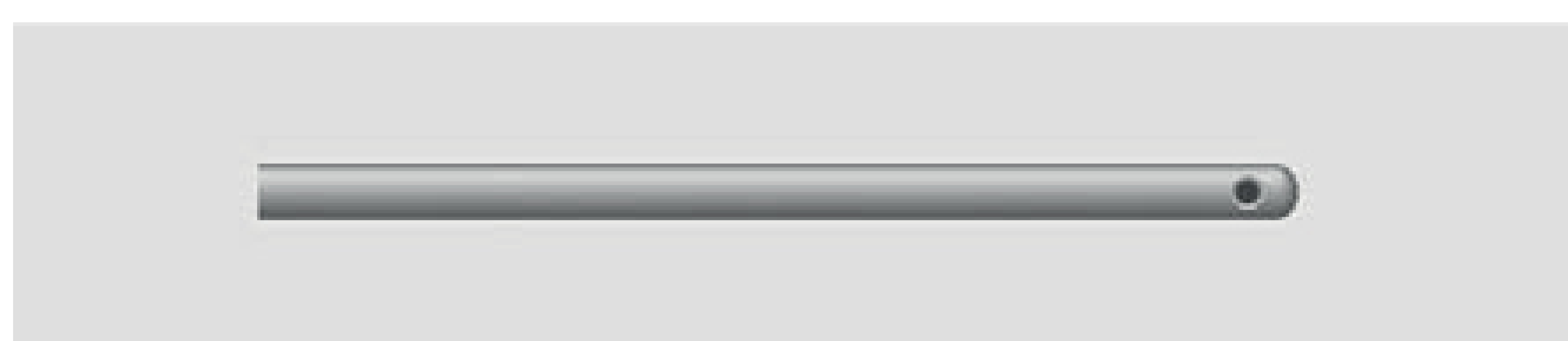
The cone-shaped needle tip is specially developed to withstand multi-injection demands and improve septum lifetime when used with an autosampler. The cone design effectively "parts" the septum during piercing instead of cutting it, as would a bevel needle.

### Bevel: Manual Injection



The standard general-purpose needle tip style supplied with many syringes is a 20 ° bevel tip. It is the preferred option for manual injection when piercing the septum in exactly the same place is difficult. The bevel tip is designed for optimum septum penetration and prevention of septum coring.

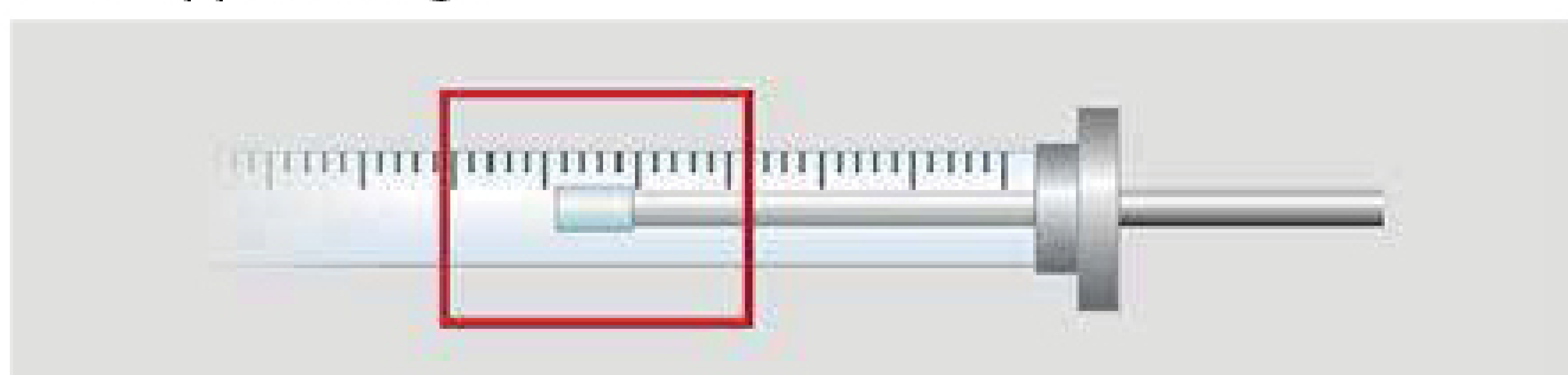
### Side Hole Dome



Samples are filled and dispensed through the side hole, eliminating septum plugging of the needle. Ideal for large-volume gas injections. The solid domed tip minimizes septum damage.

## Plunger Style

### PTFE Tipped Plunger



- PTFE Tip enables gastight analysis
- Suitable for both liquid and gas samples
- Ideal for analysis of highly viscous liquid because it reduces the possibility of the plunger sticking due to micro particles (samples should have no effects with PTFE)
- Plunger is replaceable

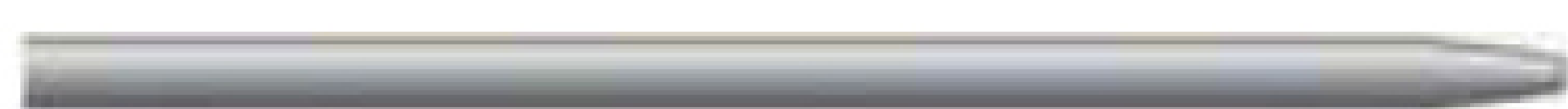
# Manual Autosampler or Instrument Syringes

If a syringe is being used by hand, a manual syringe should be selected. If a syringe is installed in an AOC autosampler then choose the appropriate syringe and volume to suit your instrument and application.

Shimadzu autosampler syringes are specifically designed to meet instrument dimensional specifications, have an accuracy of better than  $\pm 1\%$  and are designed for precise, worry-free overnight sampling.

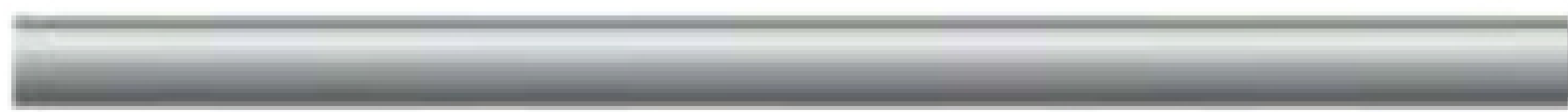
## Needle Tip Styles

Cone: GC Autosampler



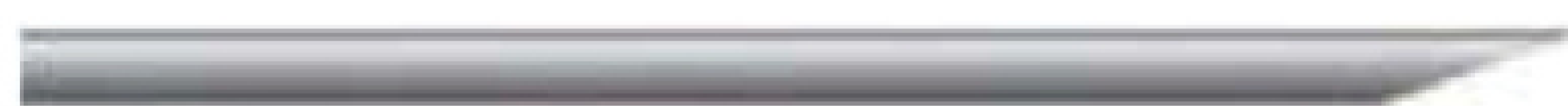
The cone shaped needle tip is specially developed to withstand multi injection demands and improve septum lifetime when used with the AOC autosampler. The cone design effectively “parts” the septum during piercing instead of cutting it, as would a bevel needle.

LC: HPLC



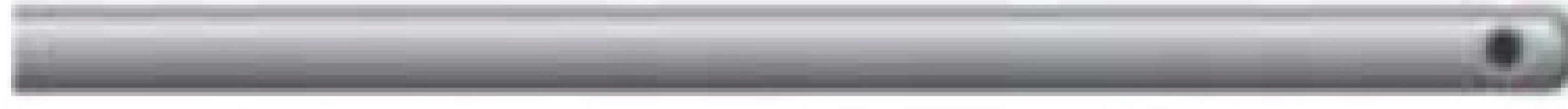
These needles are used for LC and HPLC valve injection and have a 90 ° square tip with rounded and polished edges. This eliminates damage to the valve's rotor seal and stator face. This needle tip style is a good choice for general liquid dispensing.

Bevel: Manual GC



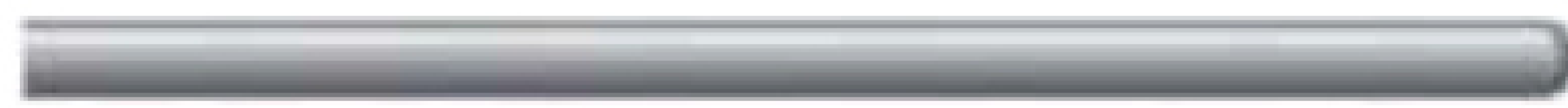
The standard general purpose needle tip style supplied with many Shimadzu syringes is a 20 ° bevel tip. It is the preferred option for manual injection where piercing the septum in exactly the same place is difficult. The bevel tip is designed for optimum septum penetration and prevention of septum coring.

Side Hole Dome:



Samples are filled and dispensed through the side hole eliminating septum plugging of the needle. Ideal for large volume gas injection. The solid domed tip minimizes septum damage.

Dome:



This style needle is recommended for use with predrilled septa. The tip is rounded and polished to help septum penetration.

## Valves



OPEN ↔ CLOSED

The push-button valve attaches directly to any luer lock 1 mL – 100 mL Shimadzu syringe.



OPEN ↔ CLOSED

The push-button valve attaches to any luer lock 5 mL – 100 mL Shimadzu syringe.

## Syringe

### Syringe for AOC-20i/20s and AOC-20i Plus / 20s Plus

Syringe Volume	PTFE Tipped Plunger	Needle Length (mm)	Needle Gauge	Needle OD (mm)	Needle Tip	Needle ID (mm)	P/N	Replacement Plunger P/N	Replacement Needle P/N
5 µL	–	42	23	0.63	Cone	0.11	221-75173	–	–
10 µL	✓	42	23	0.63	Cone	0.11	221-74469	–	–
10 µL	–	42	23	0.63	Cone	0.11	221-34618	–	–
10 µL	✓	42	23	0.63	Cone	0.11	221-75174	221-75174-02	221-75174-01
50 µL	–	42	23	0.63	Cone	0.11	221-45243	–	–
250 µL	✓	42	23	0.63	Cone	0.11	221-45244	221-45244-01	–



Description	P/N	Syringe Volume
Syringe for OCI	221-37282-02	10 µL

### Syringe for AOC-5000 Plus

Syringe Volume	PTFE Tipped Plunger	Needle Length (mm)	Needle Gauge	Needle OD (mm)	Needle ID (mm)	Needle Tip	P/N
10 µL	–	50	26	0.47	0.11	Cone	221-75175
10 µL	–	50	23	0.63	0.11	Cone	221-75175-01
10 µL	–	80	26	0.47	0.11	Cone	221-75176
10 µL	–	80	23	0.63	0.11	Cone	221-75176-01
10 µL	✓	50	26	0.47	0.11	Cone	221-75175-02
10 µL	✓	50	23	0.63	0.11	Cone	221-75175-03
25 µL	✓	50	23	0.63	0.24	Cone	221-75177
1 mL	✓	50	26	0.47	0.15	Side Hole Dome	221-75178
1 mL	✓	50	23	0.63	0.15	Side Hole Dome	221-75178-01
2.5 mL	✓	50	26	0.47	0.15	Side Hole Dome	221-75179
2.5 mL	✓	50	23	0.63	0.15	Side Hole Dome	221-75179-01

### Xtra Life Micro Syringe for AOC-30i / AOC-20s

Fixed needle syringe with super flexible titanium alloy plunger. They are resistant to bending and sliding friction for extended lifetime, even with water soluble samples. Plunger and barrel are machined for an exact fit, so they are not interchangeable with another syringe if either part is damaged.

Syringe Volume	PTFE Tipped Plunger	Needle Length (mm)	Needle Gauge	Needle OD (mm)	Needle ID (mm)	Needle Tip	P/N
5 µL	0.1 µL	43	23	0.64	0.15	Cone	227-35401-01
10 µL	0.2 µL	43	23	0.64	0.15	Cone	227-35400-01

## Syringe for AOC-6000

Syringe Volume	PTFE Tipped Plunger	Needle Length (mm)	Needle Gauge	Needle OD (mm)	Needle Tip	P/N
1 µL	-	57	23	0.63	Cone	225-19744-01
5 µL	-	57	26	0.47	Cone	225-19744-02
5 µL	-	57	23	0.63	Cone	227-37166-01
5 µL	-	85	23	0.63	Cone	227-37160-01
10 µL	-	57	26	0.47	Cone	225-19744-03
10 µL	√	57	26	0.47	Cone	225-19744-04
10 µL	-	57	23	0.63	Cone	227-37167-01
10 µL	-	85	23	0.63	Cone	227-37161-01
25 µL	√	57	26	0.47	Cone	225-19744-05
50 µL	√	57	26	0.47	Cone	225-19744-06
100 µL	√	57	26	0.47	Cone	225-19744-07
250 µL	√	57	26	0.47	Cone	225-19744-08
500 µL	√	57	26	0.47	Cone	225-19744-09
1 mL	√	57	23	0.63	Side Hole Dome	225-19744-10
2.5 mL	√	65	23	0.63	Side Hole Dome	225-19744-11

## Gastight Syringe for AOC-6000

Syringe Volume	Needle Length (mm)	Needle Gauge	Needle OD (mm)	Needle Tip	P/N
10 µL	85	23	0.63	Cone	227-37162-01
10 µL	57	23	0.63	Cone	227-37168-01
25 µL	85	23	0.63	Cone	227-37163-01
50 µL	85	23	0.63	Cone	227-37164-01
100 µL	57	23	0.63 (ID 0.11)	Cone	227-37169-01
100 µL	85	23	0.63	Cone	227-37165-01
250 µL	57	23	0.63	Cone	227-37170-01

# Syringe

## Manual Syringe

Shimadzu manual syringes are available from 5µL to 500µL, and can be widely used in your laboratory work.



### Fixed Needle Style

Syringe Volume	PTFE Tipped Plunger	Needle Length (mm)	Needle Gauge	Needle OD (mm)	Needle ID (mm)	Needle Tip	P/N	Replacement Plunger	
								P/N	Qty
5 µL	–	50	26	0.47	0.11	Bevel	221-75170	–	–
10 µL	–	50	26	0.47	0.11	Bevel	670-12552-01	–	–
10 µL	√	80	26	0.47	0.11	Bevel	221-75170-01	221-75170-02	2
25 µL	–	80	25	0.5	0.2	Bevel	670-12510-31	–	–
25 µL	√	50	25	0.5	0.2	Bevel	221-75171	221-75171-01	1
50 µL	–	50	25	0.5	0.2	Bevel	670-12510-36	–	–
50 µL	√	50	25	0.5	0.2	Bevel	221-75172	221-75172-03	1
100 µL	–	50	25	0.5	0.2	Bevel	670-12510-18	–	–
100 µL	√	50	25	0.5	0.2	Bevel	221-75172-01	221-75172-04	1
250 µL	–	50	25	0.5	0.2	Bevel	670-12510-19	–	–
250 µL	√	50	25	0.5	0.2	Bevel	221-75172-02	221-75172-05	1
500 µL	–	50	25	0.5	0.2	Bevel	670-12510-20	–	–
10 µL	–	51	22	0.028"	0.17	LC	670-12554-01	–	–
25 µL	–	51	22	0.028"	0.37	LC	670-12554-02	–	–
50 µL	–	51	22	0.028"	0.37	LC	670-12554-03	–	–
100 µL	–	51	22	0.028"	0.37	LC	670-12554-04	–	–
250 µL	–	51	22	0.028"	0.37	LC	670-12554-05	–	–
500 µL	–	51	22	0.028"	0.37	LC	670-12554-06	–	–



### Removable Needle Style

Syringe Volume	PTFE Tipped Plunger	Needle Length (mm)	Needle Gauge	Needle OD (mm)	Needle Tip	P/N	Replacement Plunger P/N	Replacement Needle P/N
10 µL	√	50	26	0.47	Bevel	670-12553-21	670-12553-33	670-12510-95
25 µL	–	50	25	0.5	Bevel	670-12510-74	–	670-12510-96
50 µL	–	50	25	0.5	Bevel	670-12510-75	–	
100 µL	–	50	25	0.5	Bevel	670-12510-76	–	
250 µL	–	50	25	0.5	Bevel	670-12510-77	–	
500 µL	–	50	25	0.5	Bevel	670-12510-78	–	

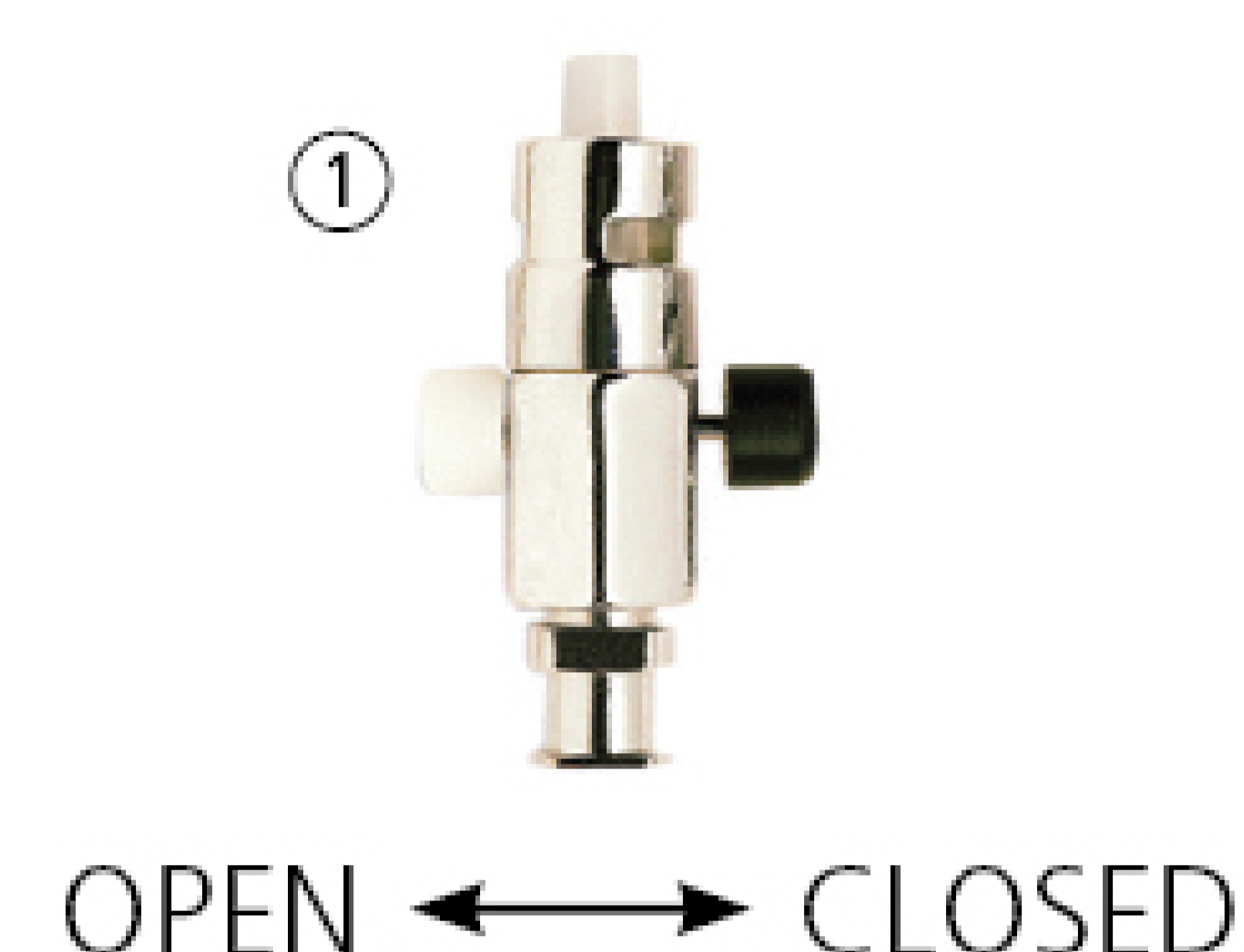
## Syringe for Gas Analysis

### Luer Lock Needle Style

Syringe Volume	PTFE Tipped Plunger	P/N	Replacement Plunger P/N
1 mL	✓	221-54778-01	221-54778-11
5 mL	✓	221-54778-02	221-54778-12
10 mL	✓	221-54778-03	221-54778-13
25 mL	✓	221-54778-04	221-54778-14
50 mL	✓	221-54778-05	221-54778-15
100 mL	✓	221-54778-06	221-54778-16

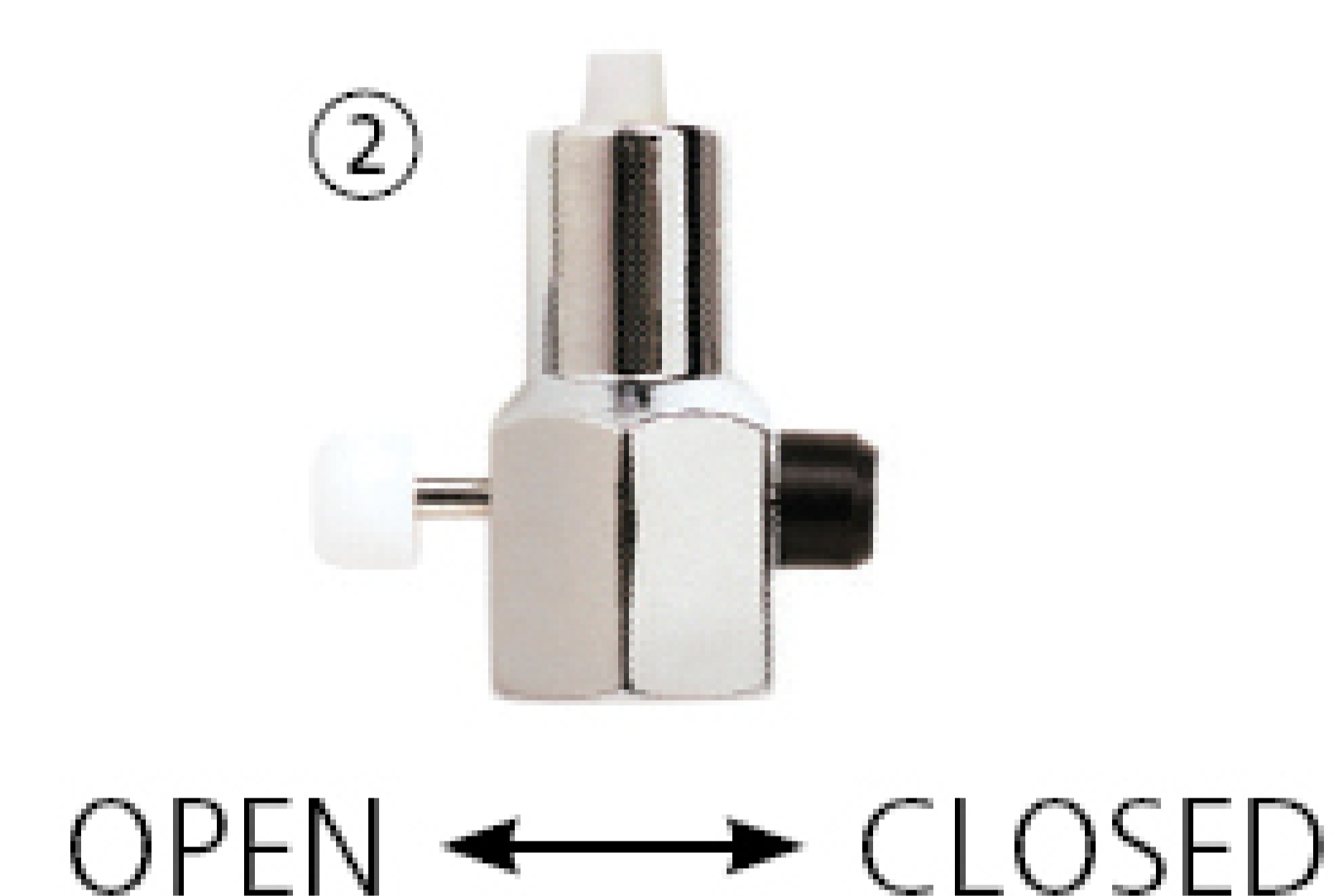
### Luer Lock Needle

Needle Length (mm)	Needle Gauge	Needle OD (mm)	Needle Tip	Qty	P/N
50	23	0.63	Bevel	5	221-54778-51
50	19	1.07	Bevel	5	221-54778-52
50	14	2.1	Bevel	5	221-54778-54



### Syringe Valve

Diag. #	Syringe Volume	Description	Qty	P/N
①	5 mL to 2 L	Push Button Valve for Luer Lock Needle	1	221-54778-49
②	50 µL to 2 L	Push Button Valve for Luer Lock Needle and Tip Syringe	1	221-54778-50



### Removable Needle Style

Gastight syringes with a capacity of milliliter quantity level. The needle is 30mm long and is of a screw-in type, which ensures an easy exchange.

Description	Syringe Volume	P/N	Replacement Needle P/N
MS-GAN025	0.25 mL	670-12504-28	670-12504-85 (5 pcs)
MS-GAN050	0.5 mL	670-12504-29	
MS-GAN100	1 mL	670-12504-30	
MS-GAN250	2.5 mL	670-12504-31	
MS-GAN500	5 mL	670-12504-32	
MS-GANX00	10 mL	670-12504-33	



### PIN Style Microsyringe

Plunger-in-needle style. The plunger goes into the needle tip to eliminate dead volume. Ideal for highly precise analysis of micro-volume samples.

Description	P/N	Syringe Volume
0.5BR-7	670-12510-71	0.5 µL
1BR-7	670-12510-72	1 µL
5BR-7	670-12510-73	5 µL



# Syringe

## Microsyringe with Plunger Guide

This type of microsyringe has an extended barrel (120 mm long) to prevent the plunger from bending.

Description	P/N	Syringe Volume	Replacement Needle P/N	Qty
10R-GP	670-12510-80	10 µL	670-12510-95	5
5R-GPS	670-12510-86	5 µL	670-12510-94	5



## Elastic Plunger Style Microsyringe

These syringes use a titanium alloy plunger, which is highly flexible and corrosion resistant. The high flexibility of the plunger ensures stable injection of samples as small as 5 µL. The needle is 0.41 mm in tip diameter, which is suitable for on-column injection into a capillary column.

Description	P/N	Syringe Volume	Replacement Needle P/N
MS-E05-CS	670-12580-21	5 µL	Fixed Needle
MS-E10-CS	670-12580-22	10 µL	
MS-NE05-CS	670-12580-25	5 µL	670-12580-31 (5 pcs)
MS-NE10-CS	670-12580-26	10 µL	



## Microsyringe with Guide Bar

A guide bar is installed parallel to the plunger, which prevents the plunger from bending. A stopper is also provided to allow a preset amount of sample to be injected accurately without reading the scale in each run.

Description	P/N	Syringe Volume	Replacement Needle P/N
MS-G10	670-12504-25	10 µL	Fixed Needle
MS-NG10	670-12504-22	10 µL	670-12504-86 (5 pcs)



## Micro Solid Phase Extraction Syringe MEPS™

MEPS™ is Micro Extraction by Packed Sorbent and is used for sample preparation and handling. MEPS is the miniaturization of conventional SPE packed bed devices from milliliter bed volumes to microliter volumes. The MEPS approach to sample preparation is suitable for reversed phases, normal phases, mixed mode or ion exchange chemistries. MEPS is available in a variety of common SPE phases.

### Meps Barrel Insert And Needle



#### SAMPLE SIZE AND SENSITIVITY

Sample volumes may be as little as 10  $\mu\text{L}$ , or by taking multiple aliquots of 100  $\mu\text{L}$  or 250  $\mu\text{L}$ , samples of 1 mL or larger may be concentrated.

#### AUTOMATION

Extract samples and make injections on-line using a single device, reducing sample processing times and the need for operator intervention.

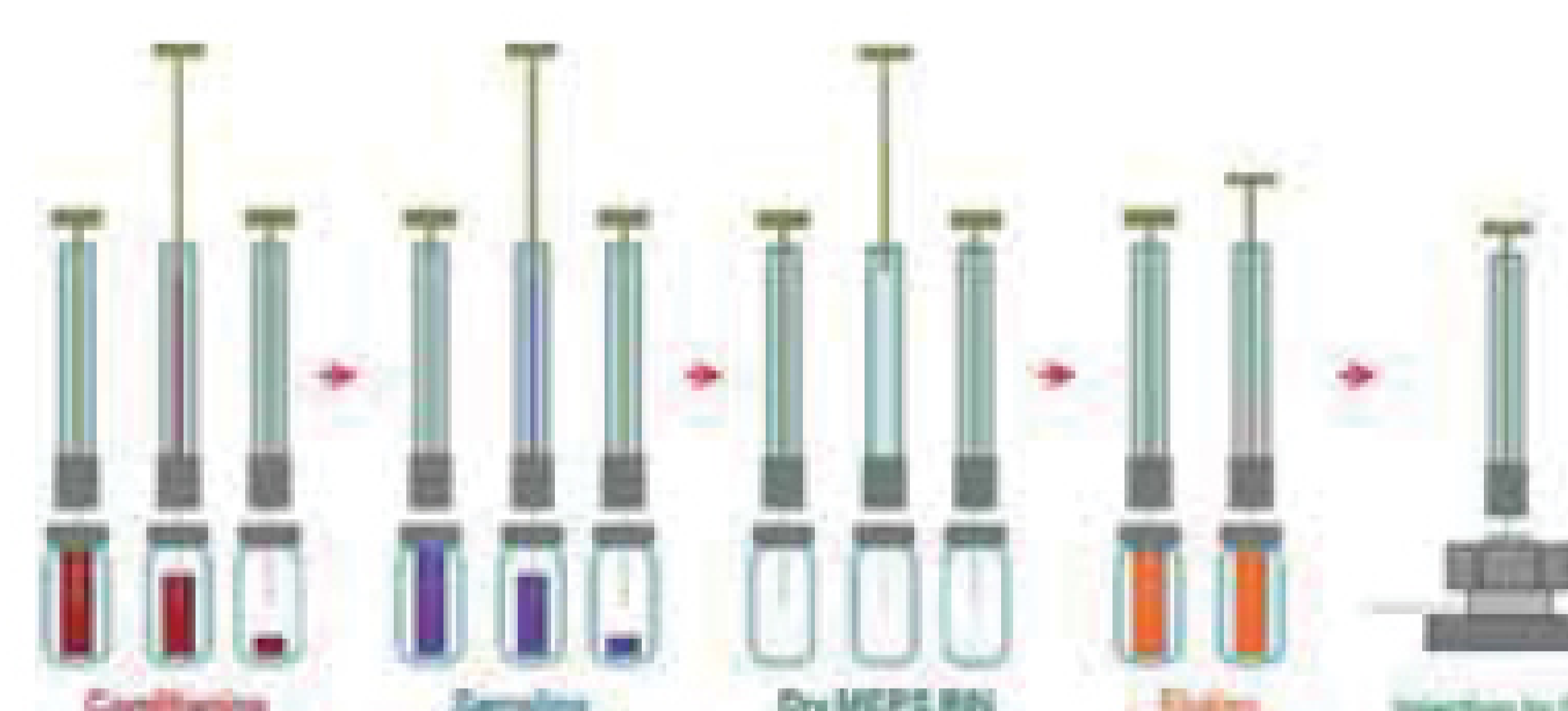
#### SORBENT LIFE

BIN life is dependent on the specific matrix being analyzed. For example, C18 analysis of whole plasma samples is conservatively 25-100 samples before the BIN needs to be changed. BIN life of cleaner samples is significantly longer.

#### FLEXIBLE AND EASY TO USE

The dimensions of the sorbent bed ensure performance remains identical to conventional SPE devices when used for extraction of similar samples. The AOC-MEPS system was developed to incorporate MEPS into a process automation workflow, combining sample preparation and analysis in a single platform.

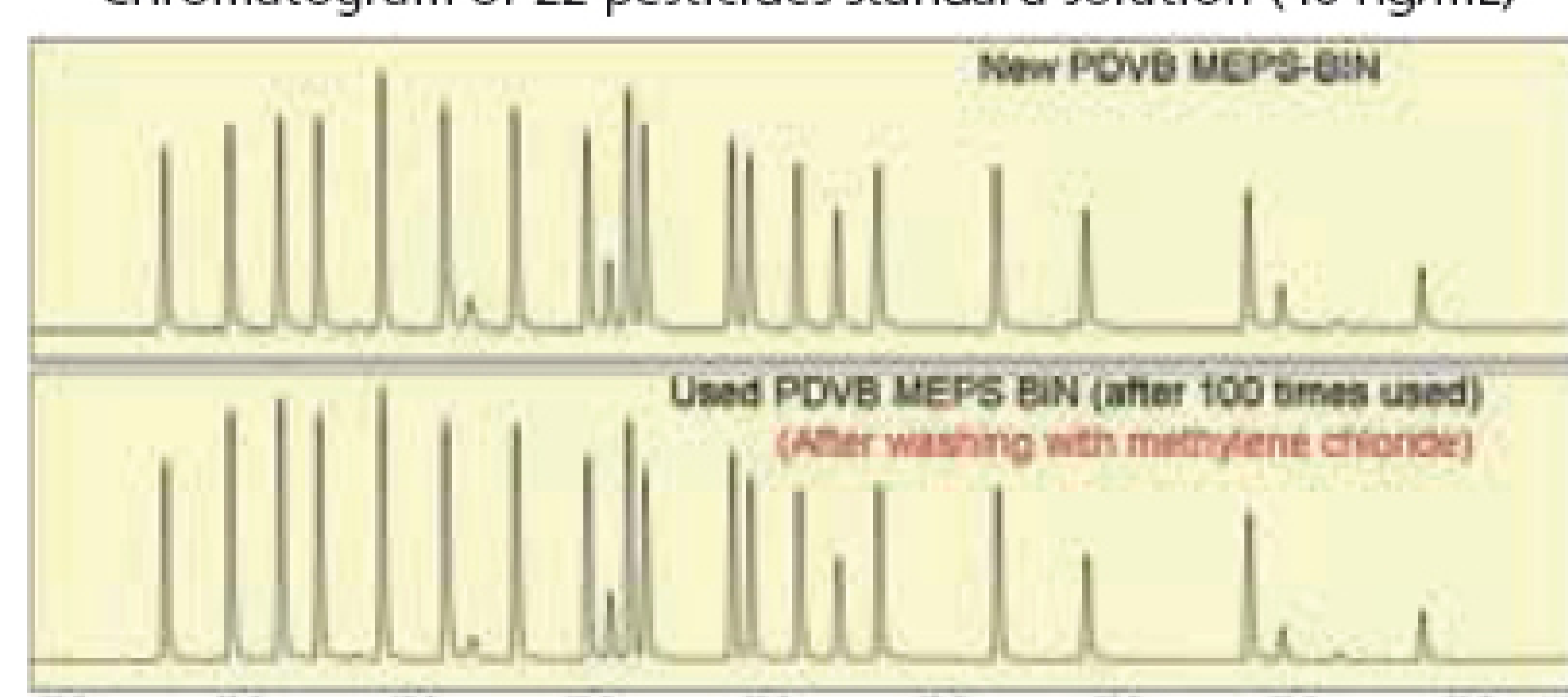
#### AOC-MEPS System



When automated by an AOC-MEPS system, the injection volume is much larger compared to the commonly used GC injection volumes of 1 - 2  $\mu\text{L}$ . With AOC-MEPS, the typical injections are 50 to 200  $\mu\text{L}$  of elution solvent.

A large volume injection technique that removes the solvent volume from inside the injector unit while condensing the target compounds should be employed.

Chromatogram of 22 pesticides standard solution (40 ng/mL)



#### CARRYOVER

The small quantity of phase in the MEPS BIN is easily and effectively washed between samples to reduce the possibility of carryover. This washing process is not practical with off-line SPE devices. With automated MEPS, washing occurs while the previous sample is running.

## Syringe

### MEPS™ Syringe for AOC-20i/20s and AOC-20i Plus/ AOC-20s Plus

Syringe Volume	PTFE Tipped Plunger	P/N	Replacement Plunger	
			P/N	Qty
100 µL	√	221-74830-01	221-74830-10	1

Base	P/N	Qty
C18	221-74830-03	5
Silica	221-74830-04	5
C8 + SCX	221-74830-05	5
C2	221-74830-06	5
C8	221-74830-07	5
PDVB	221-74830-02	5
SDVB	221-74830-11	5
HDVB	221-74830-12	5
Development Kit	221-74830-08	1 each of C18, C8, Silica, C8+SCX, C2

### MEPS™ Syringes for AOC-5000 Plus

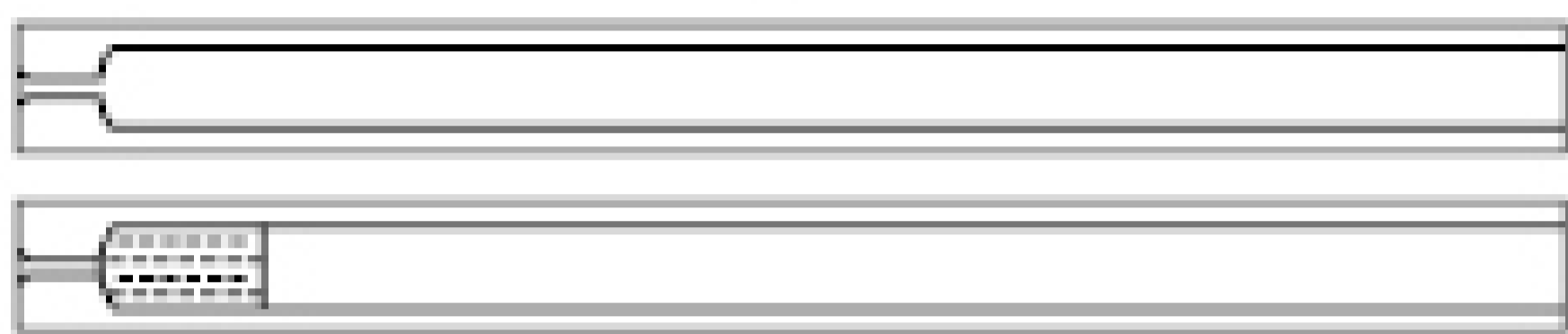



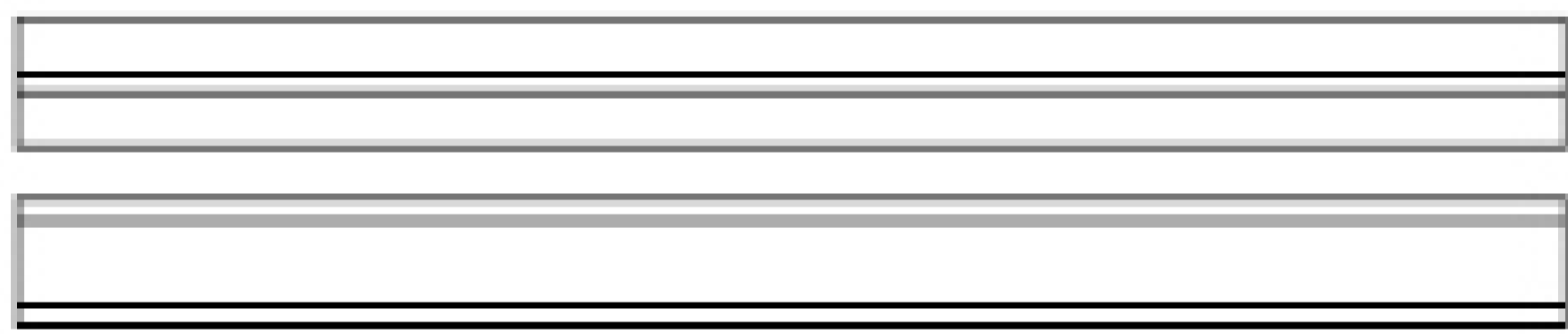
Syringe Volume	PTFE Tipped Plunger	P/N	Replacement Plunger	
			P/N	Qty
100 µL	√	221-75202-01	221-75202-03	1
250 µL	√	221-75202-02	221-75202-04	1

Phase	Qty	P/N for 100 µL syringe	P/N for 250 µL syringe
C18	5	221-75198-01	221-75199-01
Silica	5	221-75198-02	221-75199-02
C8 + SCX	5	221-75198-03	221-75199-03
C2	5	221-75198-04	221-75199-04
C8	5	221-75198-05	221-75199-05
Development Kit	1 each of C18, C8, Silica, C8+SCX, C2	221-75198-06	221-75199-06

## GC Glass Insert

The GC inlet functions as the interface between the syringe and the GC capillary column, where the sample is introduced, vaporized, mixed with carrier gas and transferred to the column. Shimadzu instruments offer several types of inlets - split, splitless, programmable temperature vaporization (PTV) and on-column.

The glass insert prevents the sample contacting the metal walls of the injector block. Glass insert geometry and packing materials enable the glass insert to achieve greater heated surface area; this additional surface area can often improve sample vaporization. Conversely, choosing the wrong glass insert geometry can significantly decrease the reproducibility and quality of analysis.

Injection Technique	Sample Types	Glass insert Geometry	Function
Splitless	Trace Level Analyses/ Active Compounds	<p>Taper</p> 	A bottom taper focuses sample onto the head of the column and minimizes sample contact with metal parts of the inlet. The addition of quartz wool to your glass insert promotes mixing of analytes, aids the vaporization of liquid samples, and works as a trap to collect non-volatile residue in the sample (i.e. protects capillary column from 'dirty' samples).
Split	General Purpose/ Concentrated Samples/ Dirty Samples	<p>FocusLiner™</p> 	Ensures quartz wool remains in the correct position in the liner. Excellent reproducibility results from the wiping of the sample from the syringe needle and the prevention of droplet formation. Minimizes high molecular weight discrimination.
Splitless	Trace Level Analyses/ Dirty Samples/ Wide Boiling Point Range	<p>Taper FocusLiner™</p> 	Bottom taper focuses sample onto the head of the column and minimizes contact with metal parts of the inlet. Excellent reproducibility results from the wiping of the sample from the syringe needle and the prevention of droplet formation. Minimizes high molecular weight discrimination.
Direct	Trace Level Analyses/ Active Compounds	<p>Direct Taper</p> 	Direct glass inserts facilitate maximum transfer of sample by connecting directly to the GC column and inhibiting sample degradation due to hot metal components inside inlet.
Split/Splitless	General Purpose/ Concentrated Samples/ Dirty Samples (only if quartz wool is present)/ Gaseous Samples (also purge & trap, headspace)	<p>Straight</p> 	Straight glass inserts facilitate higher split flows. Narrow bore straight glass inserts facilitate fast GC work. Small injection volumes of less than 0.5 µL are best used with a narrow bore. Narrow bore straight glass inserts improve focussing of gaseous samples (purge, trap & headspace).

## Glass Insert Deactivation
























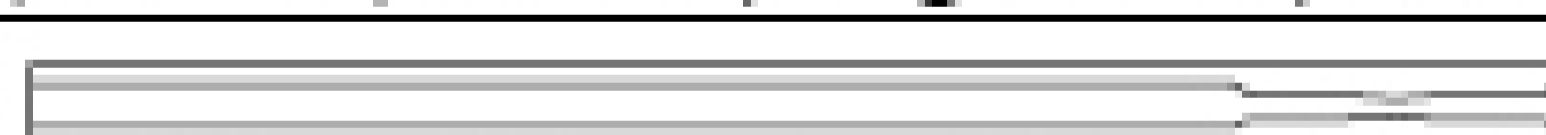





Every batch of glass inserts are tested for inertness using the EPA 8081B method. This standard method ensures that each batch of glass inserts has less than 3 % Endrin breakdown from a 1 ppm injection.

# GC Glass Insert

## Glass Insert for Capillary Column Analysis

Glass insert is very important to prevent the column from being contaminated by sample components. Please choose an appropriate insert according to your system model, injection port and injection method, and exchange it regularly to avoid poor reproducibility and peak shape caused by the crossover of residual samples, etc.

S: Standard; O: Option

			P/N	Specification	Nexis GC-2030	GC-2010 Plus GC-2010 GC-2025	GC-2014	GC-17A ver. 1-3 GC-1700 GC-18A	GC-14A GC-14B	GC-8A
				Injection Unit →	SPL-2030	SPL-2010 Plus SPL-2010 SPL-2025	SPL-2014	SPL-17	SPL-14	SPL-G9
Injection Port Side	Split/Splitless Injection Method	For Split	221-41444	 (ID 3.5mm; OD 5mm; Length 95mm)	O	O	S	S		
			221-41444-01	 (ID 3.5mm; OD 5mm; Length 95mm)	O	S		O		
			221-37574-01	 (99mm)					S	
			221-25822-03	 (87mm)						S
			227-35007-01	 (ID 3.4mm; OD 5mm; Length 95mm, Deactivated, with wool, 5pcs)	S	O	O	O		
		For Splitless	221-48335-01	 (ID 3.5mm; OD 5mm; Length 95mm)		S	S	O		
			221-41544	 (95mm)		O	O	S		
			221-75192	 (ID 3.4mm; OD 5mm; Length 95mm, Deactivated, 5pcs)		O	O			
			221-32544	 (99mm)					S	
			221-25944-03	 (87mm)						S
			227-35008-01	 (ID 3.4mm; OD 5mm; Length 95mm, Deactivated, with wool*2, 5pcs)	S	O	O	O		
		For Split and Splitless	221-75187	 (ID 3.4mm; OD 5mm; Length 95mm, Deactivated, with wool, 5pcs)	O	O	O			
			221-75188	 (ID 3.4mm; OD 5mm; Length 95mm, Deactivated, needle onto wool, 5pcs)	O	O	O			
			221-75189	 (ID 3.4mm; OD 5mm; Length 95mm, Deactivated, needle into wool, 5pcs)	O	O	O			
			221-75190	 (ID 3.4mm; OD 5mm; Length 95mm, Deactivated, Straight Through, 5pcs)	O	O	O			
			221-75191	 (ID 3.4mm; OD 5mm; Length 95mm, Deactivated, needle into wool, 5pcs)	O	O	O			
			221-75193	 (ID 3.4mm; OD 5mm; Length 95mm, Deactivated, with wool, 5pcs)	O	O				
			221-75194	 (ID 3.4mm; OD 5mm; Length 95mm, Deactivated, 5pcs)	O	O				
			221-41444-05	 (ID 3.4mm; OD 5mm; Length 95mm, Deactivated, 5pcs)			O			
			221-41544-05	 (ID 2.6mm; OD 5mm; Length 95mm, Deactivated, 5pcs)			O			
			221-75195	 (ID 3.4mm; OD 5mm; Length 95mm, Deactivated, with wool, 5pcs)			O			
				Injection Unit →	WBI-2030	WBI-2010 Plus WBI-2010	WBI-2014	WBI-17		
	Direct Injection Method (WBI)		221-41599	 (95mm)	O	O	O	S		
			221-48335-01	 (ID 3.5mm; OD 5mm; Length 95mm)	S	S (WBI-2010)	S	O		
			221-75197	 (ID 3.4mm; OD 5mm; Length 95mm, Deactivated, with wool*2, 5pcs)		O	O			
			221-41599-05	 (ID 2.6mm; OD 5mm; Length 95mm, Deactivated, for 0.53mmID column, 5pcs)			O			
		P/N	Specification	Nexis GC-2030	GC-2010 Plus GC-2010 GC-2025	GC-2014	GC-17A ver. 1-3 GC-1700 GC-18A	GC-14A GC-14B	GC-8A	
			Injection Unit →	SPL-2030	SPL-2010 Plus	SPL-2014	SPL-17	SPL-14	SPL-G9	
	For SPME	221-75196*	 (ID 0.75mm; OD 5mm; Length 95mm, Deactivated, 5pcs )	O	O	O				
	For HS 10	221-76863-73	 (ID 1.2mm; OD 5mm, Length 95mm, Deactivated, 5pcs)	S	S	S				
	WBC Attach- ment	221-38107 *1	 (139mm)			S		S		
		221-39148	 (86 mm)						S	



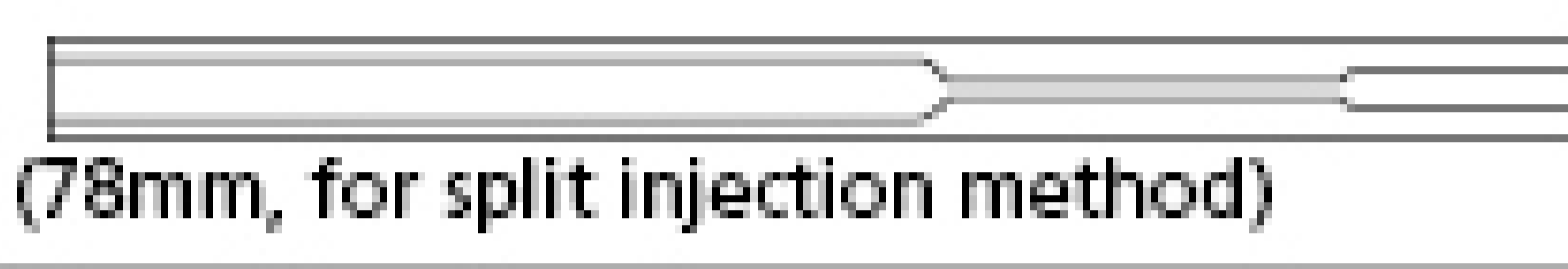

\*1 Required if the WBC Attachment is used for a packed column injection in GC-2014, Insert for GC-14 septum purge unit is P/N: 221-38151-04

\*2 Wool is 25mm from the top of insert.

\* Can be used for AOC-6000 SPME

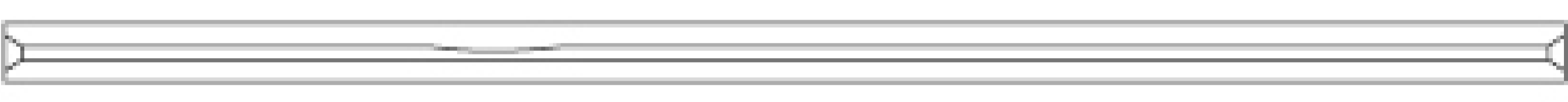
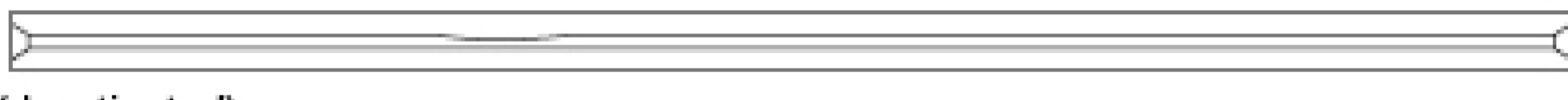
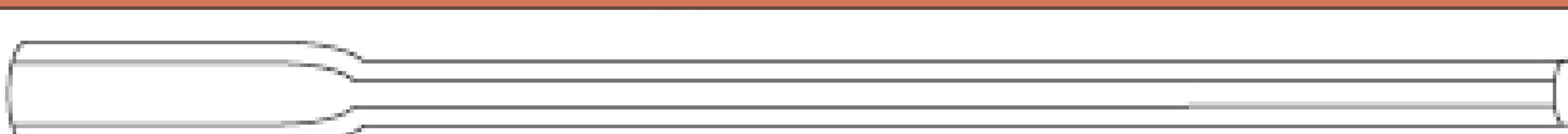
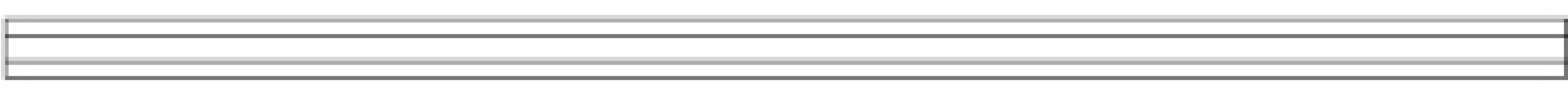
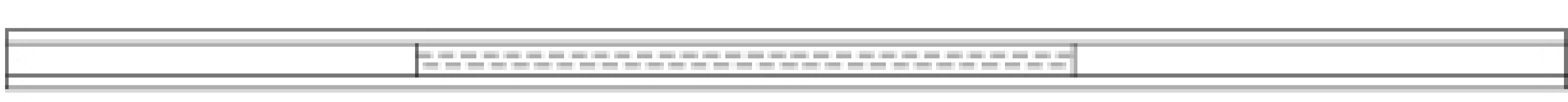
## Glass Insert for Capillary Column Analysis

S: Standard; O: Option

			Injection Unit →	WBI-2030	WBI-2010 Plus WBI-2010	WBI-2014	WBI-17	SPL-14	SPL-G9
For CLH-14	Injection Port Side	221-32998-01	 (123mm)					S	
	Detector Side	221-33000	 (71mm)					S	
For CLH-800	Injection Port Side	221-18384-04	 (78mm, for split injection method)						S
	Detector Side	221-18756-02	 (78mm)						S

## Glass Insert for OCI / PTV

S: Standard; O: Option

	P/N	Injection Unit →	Nexis GC-2030	GC-2010 / GC-2010 Plus	GC-17
			OCI-2030	OCI/PTV-2010 * <sup>1</sup>	OCI/PTV-17 * <sup>2</sup>
Simple On-column Injection Method	221-49381-01		O	O	
	221-49381-02	 (deactivated)	O	O	
	P/N	Specification Injection Unit →	PTV-2030	OCI/PTV-2010* <sup>1</sup>	OCI/PTV-17* <sup>2</sup>
PTV Injection Method	221-42223				S
	221-49300	 (ID 1.5mm; OD 3.5mm; Length 95mm, quartz)	S	S	
	221-74830-09	 (for AOC-MEPS™ system, deactivated, with wool, 5 pcs)	O	O	

\*<sup>1</sup> GC-2010 OCI requires an additional adapter (P/N: 221-49298-91).

\*<sup>2</sup> GC-17 OCI requires an additional adapter (P/N: 221-42222-91).






## Glass Insert for Packed Column Analysis

When using a glass column, one may add a glass insert to prevent the column from accumulating non-volatile components. Please choose a proper insert according to the inner diameter of the glass column.

When using a stainless column, it is necessary to connect a glass insert to a 3.0 mmID column at the side of the injection unit. Please exchange it regularly to avoid poor reproducibility and peak shape caused by the crossover of residual sample, etc.

Note: Glass insert cannot be used in a GC-8A Series instrument when using glass columns.

S: Standard; O: Option

	P/N	Specification	GC-2014	GC-17A ver. 1-3	GC-14A/B
Injection Port Side	221-41484			O	
	221-14093	 (for 3.0 mmID column)	S		S
	221-14093-84	 (for 3.0 mmID column, 5 pcs)	O		O
	221-14094	 (for 2.6 mmID column)	S		S
	221-14094-84	 (for 2.6 mmID column, 5 pcs)	O		O

\* GC for packed column analysis includes one insert for a 3.0 mmID column and one insert for a 2.6 mmID column as standard accessories.





# Ferrules

Ferrules are available in a variety of different materials, shapes and sizes depending on their use, the instrument and the size of the capillary column being used. Probably the most important but difficult aspect of choosing a ferrule is the selection of the material type. The table below will help you choose the appropriate ferrule material for your application.

When choosing ferrules ensure you consider the following:

- 1) The material that best suits your application.
- 2) The connection type you want.

The following selection table will assist with your decision.

Ferrule Material Type	Graphite	Graphite Vespel®	SiITite™ Metal	ClickTek Ferrule
				
Features	<ul style="list-style-type: none"> <li>• Easy to use.</li> <li>• Forms a stable seal.</li> <li>• Soft material.</li> <li>• Porous to oxygen.</li> <li>• Can be reused.</li> <li>• Forms a soft grip with capillary column.</li> <li>• Low emissions.</li> </ul>	<ul style="list-style-type: none"> <li>• A composite of graphite and Vespel®.</li> <li>• Mechanically robust.</li> <li>• Hard material, long lifetime.</li> <li>• Forms a strong grip with capillary column.</li> <li>• Cannot be reused with another capillary column.</li> <li>• Requires re-tightening.</li> </ul>	<ul style="list-style-type: none"> <li>• Specifically developed to overcome the problems associated with the use of 100% graphite and composite ferrules.</li> <li>• Strong seal on capillary columns.</li> <li>• Leak free - The ferrule and nut expand and contract at the same rate eliminating any chance of leaks with temperature cycling.</li> <li>• Nut does not need re-tightening after initial temperature cycles.</li> </ul>	<ul style="list-style-type: none"> <li>• Easy to use</li> <li>• Leak free</li> <li>• Specially designed to use with ClickTek Connector on Nexis GC-2030</li> <li>• Cannot be reused with another capillary column</li> <li>• Not suitable for stainless steel column</li> </ul>
Suitable Uses	<ul style="list-style-type: none"> <li>• Column to injector connection.</li> <li>• Non-mass spectrometer detectors (FID, TCD, FTD, FPD, ECD, BID).</li> </ul>	MS interfaces, although even with a good seal will leak air compared to SiITite™ ferrules.	Ideal for MS interfaces and advanced flow technology due to leak-free	<ul style="list-style-type: none"> <li>• Column to injector connection</li> <li>• Non-mass spectrometer detectors (FID, TCD, FTD, FPD, ECD, BID).</li> </ul>
Not Suitable For	Connecting columns to mass spectrometers, as porous to oxygen.	High temperature applications.	–	–
Risks	<ul style="list-style-type: none"> <li>• Can leave residue inside your column.</li> <li>• Can extrude into the injector or detector if it is over-tightened.</li> </ul>	If not re-tightened after installation and temperature cycles of the GC, air may enter the column or detector decreasing sensitivity of the analysis and possibly degrading the column as well as components of the system.	Over-tightening of the seal can introduce leaks into the system. Follow the recommended installation instructions to avoid this problem.	–
Operating Temperature	Upper limit of 450 °C	Upper limit of 325 °C	No temperature limit in GC use.	–

Description	Specification	P/N
Graphite Ferrule (10 pcs)	For 5 mmOD packed columns	221-75182
Graphite Ferrule (10 pcs)	For 0.25 - 0.32 mmID columns	227-35006-01
Graphite Ferrule (10 pcs)	For 0.53 mmID columns	227-35009-01
Graphite Vespel® Ferrule (10 pcs)	No hole	670-15003-01
Graphite Vespel® Ferrule (10 pcs)	For 0.32 mmID columns	670-15003-04
Graphite Vespel® Ferrule (10 pcs)	For 0.53 mmID columns	670-15003-07
Graphite Vespel® Ferrule (10 pcs)	For 0.05 - 0.25 mmID columns	670-15003-03
SilTite™ Metal Ferrule (10 pcs)	For 0.05 - 0.25 mmID columns	221-72563-04
SilTite™ Metal Ferrule (10 pcs)	For 0.32 mmID columns	221-72563-05
SilTite™ Metal Ferrule (10 pcs)	For 0.53 mmID columns	221-72563-08
SilTite™ Metal Ferrule (10 pcs)	For 1/32" ID columns	221-75200-04
SilTite™ Kit (10 pcs ferrules, 2 pcs nuts)	For 0.05 - 0.25 mmID columns	221-75200
SilTite™ Kit (10 pcs ferrules, 2 pcs nuts)	For 0.32 mmID columns	221-75200-01
SilTite™ Kit (10 pcs ferrules, 2 pcs nuts)	For 0.53 mmID columns	221-75200-02
SilTite™ Kit (10 pcs ferrules, 2 pcs nuts)	For 1/32" ID columns	221-75200-03
SilTite™ Nut 10/32" 0.8 mm ID Column (5 pc)	–	221-75186
ClickTek Ferrule Kit	Narrow bore 0.43, includes 6 ferrules and prefixing tool (for 0.05 - 0.25 mmID columns)	221-81162-01
ClickTek Ferrule Kit	Middle bore 0.50, includes 6 ferrules and prefixing tool (for 0.32 mmID columns)	221-81162-02
ClickTek Ferrule Kit	Wide bore 0.73, includes 6 ferrules and prefixing tool (for 0.53 mmID columns)	221-81162-03
ClickTek Ferrule	No Hole (for blinding)	221-81162-00

Other Accessories	
Description	P/N
Capillary Ceramic Tube Cutter (3 pc)	221-75181
Stainless Steel Nut/ SSNE-16-012S (Pk 5)	670-11009
O-ring for insert, Max. Temp. 350 °C (10pcs)	227-35005-01
Filter for split, for Nexis GC-2030	221-77580-42



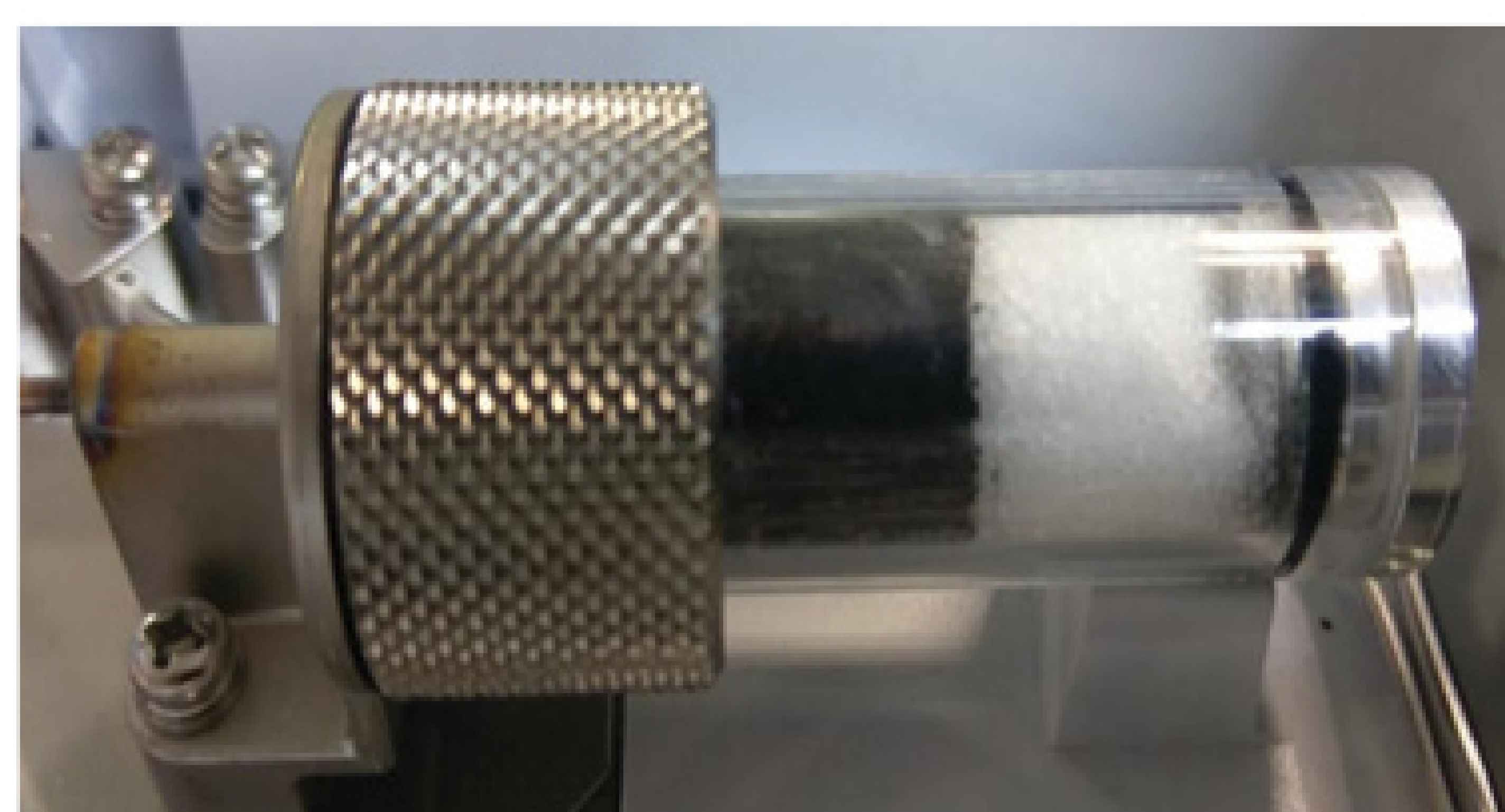
O-ring for insert



Capillary Ceramic tube cutter



Stainless Steel Nut



Filter for split, for Nexis GC-2030

# Septums

## Injection Port Septum

Description	P/N	Color	Description
Standard type (20 pcs) 	201-35584	White	<ul style="list-style-type: none"> <li>General-purpose septum</li> <li>Maximum temperature (INJ setting temperature): 250 °C</li> </ul>
LL Septum (long life type, 20 pcs) 	221-48972-91	Blue	Provides significant durability improvements compared to a conventional low-bleed septum, offering both low bleed and long life.  The problem of sticking to the vaporizing chamber during continuous use at high temperatures experienced with a conventional septum has also been eliminated. <ul style="list-style-type: none"> <li>Suitable for high-sensitivity analysis</li> <li>Maximum temperature (INJ setting temperature): 450°C</li> </ul>
HT Septum (high temp type, 20 pcs) 	221-48398-91	Brown	Using this septum alleviates the problem of reduced durability when the vaporizing chamber is used continuously at 450°C. Compared to the LL septum, the increase in bleed when used at high temperatures is kept at a lower level.  The problem of sticking to the vaporizing chamber during continuous use at high temperatures experienced with a conventional septum has also been eliminated. <ul style="list-style-type: none"> <li>Suitable for high-sensitivity analysis at high temperatures</li> <li>Maximum temperature (INJ setting temperature): 450°C</li> </ul>
Low-bleed Septum (25 pcs) 	221-76650-01	Green	This septum is least influenced by a plasticizer. Better prevents septum coring & <ul style="list-style-type: none"> <li>Low-bleed, suitable for high-sensitivity analysis</li> <li>Maximum temperature (INJ setting temperature): 340°C</li> </ul>
Enduro Blue Septum (50 pcs) 	221-75180	Light Blue	<ul style="list-style-type: none"> <li>Low-bleed, suitable for high-sensitivity analysis at high temperatures</li> <li>Maximum temperature (INJ setting temperature): 350°C</li> </ul>
Premium Green Septa (50 pcs) 	227-35004-01	Light green	<ul style="list-style-type: none"> <li>Low bleed, highly robust (max. usable temp. 350°C)</li> <li>High durability, proper sealing and good resistance to most chemical solvents.</li> <li>Useful for trace analysis and other applications where high sensitivity is critical</li> </ul>
Perforated septum for HS-10 	221-76863-96	White	<ul style="list-style-type: none"> <li>For HS-10 only</li> <li>To ensure cleanliness and inertness</li> <li>Maximum temperature (INJ setting temperature): 250 °C</li> </ul>

Low-bleed septum is not completely free of bleeding. The type of bleeding that occurs varies with the septum, and results in different patterns on chromatograms. In the case of high-sensitivity analysis, it is necessary to select a septum whose bleeding will not occur at a point that interferes with the peak of the target compound. Conditioning for several hours between 200°C and 250°C after extraction with hexane may help to reduce bleeding.

In the case of using a syringe for AOC, it is recommended to exchange the septum after about 100 injections. If the outside diameter of a needle of a gastight syringe is thick, it is recommended to exchange after about 50 injections.

## Shimadzu SPME Arrow

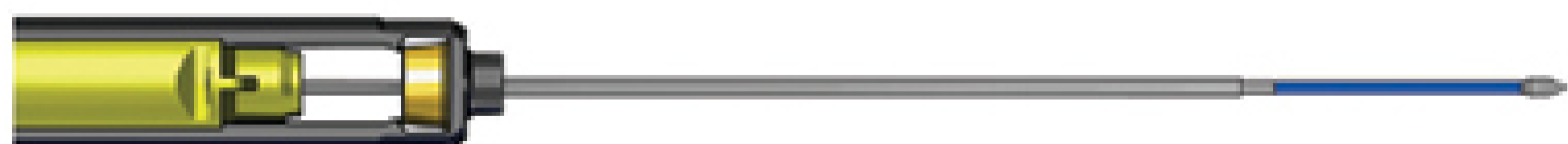

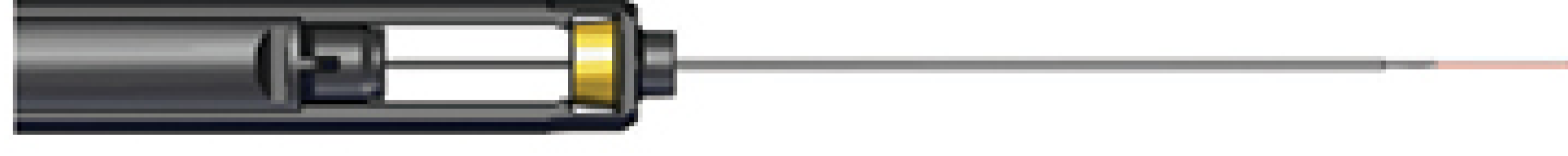
Ferrules are available in a variety of different materials, shapes and sizes depending on their use, the instrument and the size of the capillary column being used. Probably the most important but difficult aspect of choosing a ferrule is the selection of the material type. The table below will help you choose the appropriate ferrule material for your application.

### ■ Features:

- Each SPME Arrow is equipped with its unique Smart chip containing parameters, ranges and usage history.
- Automatic application of the correct parameters for the individual Smart Arrow.
- Color Code for easy optical identification of coating type and thickness
- Rugged stainless-steel construction ensures longer lifetimes.
- Faster extraction means higher sample throughput.
- Better sensitivity allows lower LODs.



The table below shows the dimension of a Shimadzu SPME Arrow 1.5 mm (a), 1.1 mm (b) and a SPME Fiber (c) in comparison:

		Sorption Phase Surface	Sorption Phase Volume
a		62.8 m <sup>2</sup>	11.8 µL
b		44.0 m <sup>2</sup>	3.8 µL
c		9.4 m <sup>2</sup>	0.6 µL

Stationary Phase	Color Code	Thickness (µm)	O.D. (mm)	Analytes	Set of 1 Part Number	Set of 3 Part Number	Set of 5 Part Number
Acrylate (Polyacrylate)	Grey	100	1.1	Polar, semivolatile, 80–300 g/mol	227-35301-01**^	227-35301-03	227-35301-05
Carbon WR/PDMS (Carbon Wide Range)	Light Blue	120	1.1	Highly volatile, 30–225 g/mol	227-35302-01**^	227-35302-03	227-35302-05
			1.5		227-35306-01	227-35306-03	227-35306-05
PDMS (Polydimethylsiloxane)	Red	100	1.1	Volatile, 60–275 g/mol	227-35305-01**^	227-35305-03	227-35305-05
			1.5		227-35309-01	227-35309-03	227-35309-05
	Black	250	1.5	Volatile, 60–275 g/mol (high capacity)	227-35310-01*	227-35310-03	227-35310-05
DVB/PDMS (Divinylbenzene)	Violet	120	1.1	Amines and polar compounds, 60–300 g/mol	227-35303-01**^	227-35303-03	227-35303-05
			1.5	Aromatic semi-volatile, 60–300 g/mol	227-35308-01	227-35308-03	227-35308-05
DVB/Carbon WR/PDMS (Divinylbenzene)	Dark Grey	120	1.1	Volatile and semi-volatile, 40–275 g/mol	227-35304-01^	227-35304-03	227-35304-05
			1.5		227-35307-01	227-35307-03	227-35307-05
Shimadzu SPME Arrow Selection5-Set1 Set of 5; includes 1pc of each type listed above with a *							227-35311-01
Shimadzu SPME Arrow Selection5-Set2 Set of 5; includes 1pc of each type listed above with a ^							227-35312-01

All Shimadzu SPME Arrows have a phase length of 20mm bonded onto stainless steel.  
Recommended maximum GC inlet pressure is 50 psi or less.

## Shimadzu SPME Arrow glass insert

Part number	Inner diameter (mm)	Injection method	GC Model	Pack size
227-35327-03	1.3	Split/Splitless	2010	3
227-35328-03	1.7	Split/Splitless	2010	3

# Shimadzu SPME Fiber

SPME is a very effective way of automated sample preparation. It is used for extracting organics from a matrix (solid, liquid or gaseous) into a stationary phase immobilized on a fiber. The analytes are thermally desorbed directly in the injector of a gas chromatograph.

Shimadzu SPME fibers are suitable for a wide range of analyte chemistries and sample matrices. Choose the best SPME fiber for your application based on the properties of your target compounds.

## ■ Typical Applications:

- Trace analysis in food
- Drugs and pharmaceuticals
- Herbicides/pesticides
- Medical diagnostics
- Organics in water
- Trace impurities in polymers and solid samples
- Solvent residues in raw materials



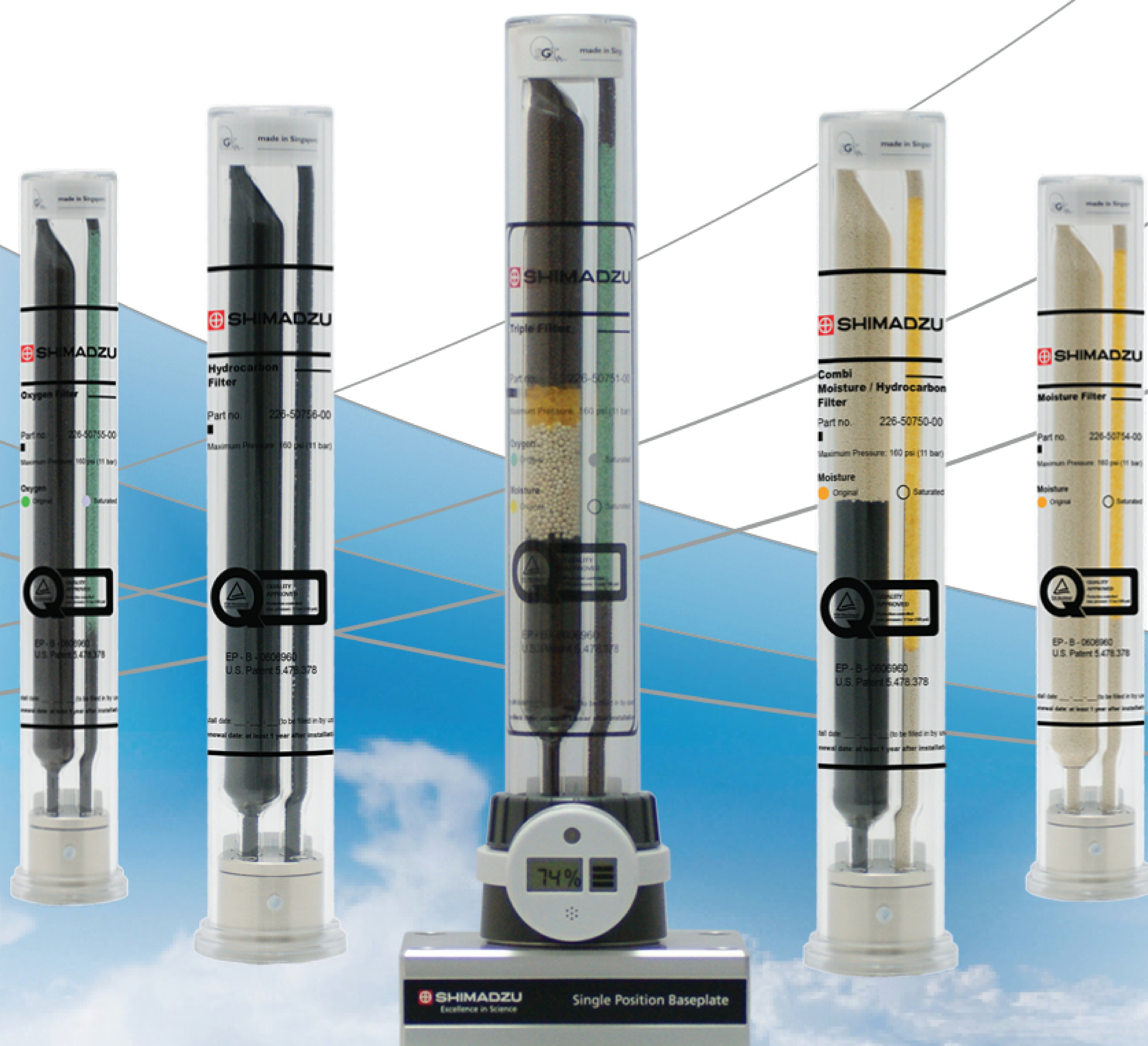
Stationary Phase	Color Code	Thickness (μm)	Analytes	Set of 1 Part Number	Set of 3 Part Number	Set of 5 Part Number
PDMS (Polydimethylsiloxane)	Green	7	Non-polar, 125 - 600 g/mol	227-35313-01*	227-35313-03	227-35313-05
	Gold	30	Non-polar semi-volatiles, 80 – 500 g/mol	227-35314-01*	227-35314-03	227-35314-05
	Red	100	Volatiles, 60 – 275 g/mol	227-35315-01*^	227-35315-03	227-35315-05
DVB/Carbon WR/PDMS (Divinylbenzene)	Dark grey	80	Volatile and semi-volatile, 40-275 g/mol	227-35316-01^	227-35316-03	227-35316-05
DVB/PDMS (Divinylbenzene)	Violet	65	Aromatic, semi-volatile, 50-300 g/mol	227-35317-01^	227-35317-03	227-35317-05
Carbon WR/PDMS (Carbon Wide Range)	Dark Blue	95	Gases and low molecular weight compounds, 30 – 225 g/mol	227-35318-01*^	227-35318-03	227-35318-05
Acrylate (Polyacrylate)	Grey	85	Polar semi-volatiles, 80 -300 g/mol	227-35319-01*^	227-35319-03	227-35319-05
Shimadzu SPME Fiber Selection5-Set1 Set of 5; includes 1pc of each type listed above with a *						227-35320-01
Shimadzu SPME Fiber Selection5-Set1 Set of 5; includes 1pc of each type listed above with a ^						227-35321-01

All Shimadzu SPME fibers have a phase length length of 10 mm, gauge 23 and the core material is fused silica. They can be used for a wide range of GC injector models. Recommended maximum GC inlet pressure is 50 psi or less.

## Shimadzu SPME Fiber Glass Insert

Part number	Inner diameter (mm)	Injection method	GC Model	Pack size
227-35322-01	0.8	Split/Splitless	2010	1
227-35322-03		Split/Splitless	2010	3

# Gas Filtration



## Gas Filtration

### Ensuring a Super-Clean Analytical Journey

Impurities in gases, such as hydrocarbons, moisture and oxygen, can contaminate the gas line and instrument, cause column degradation and affect the accuracy of your analysis results, which may lead to instrument downtime. Even though high-purity gases are used, contaminants may result from pressure regulators or other parts of the gas line. Therefore, an additional gas filter is essential.

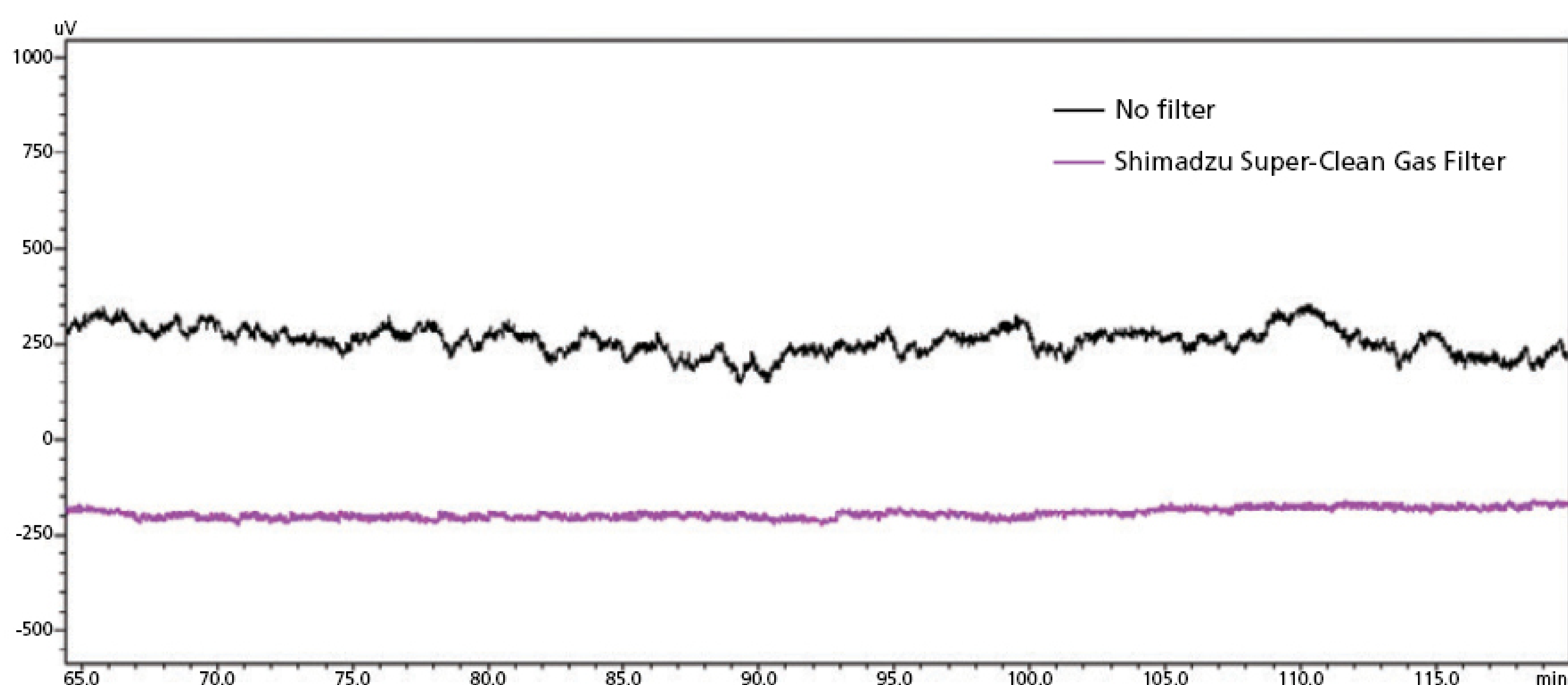
Introducing the *Shimadzu Super-Clean Gas Filter!*



Example of Shimadzu Gas Filter Kit for GC-FID

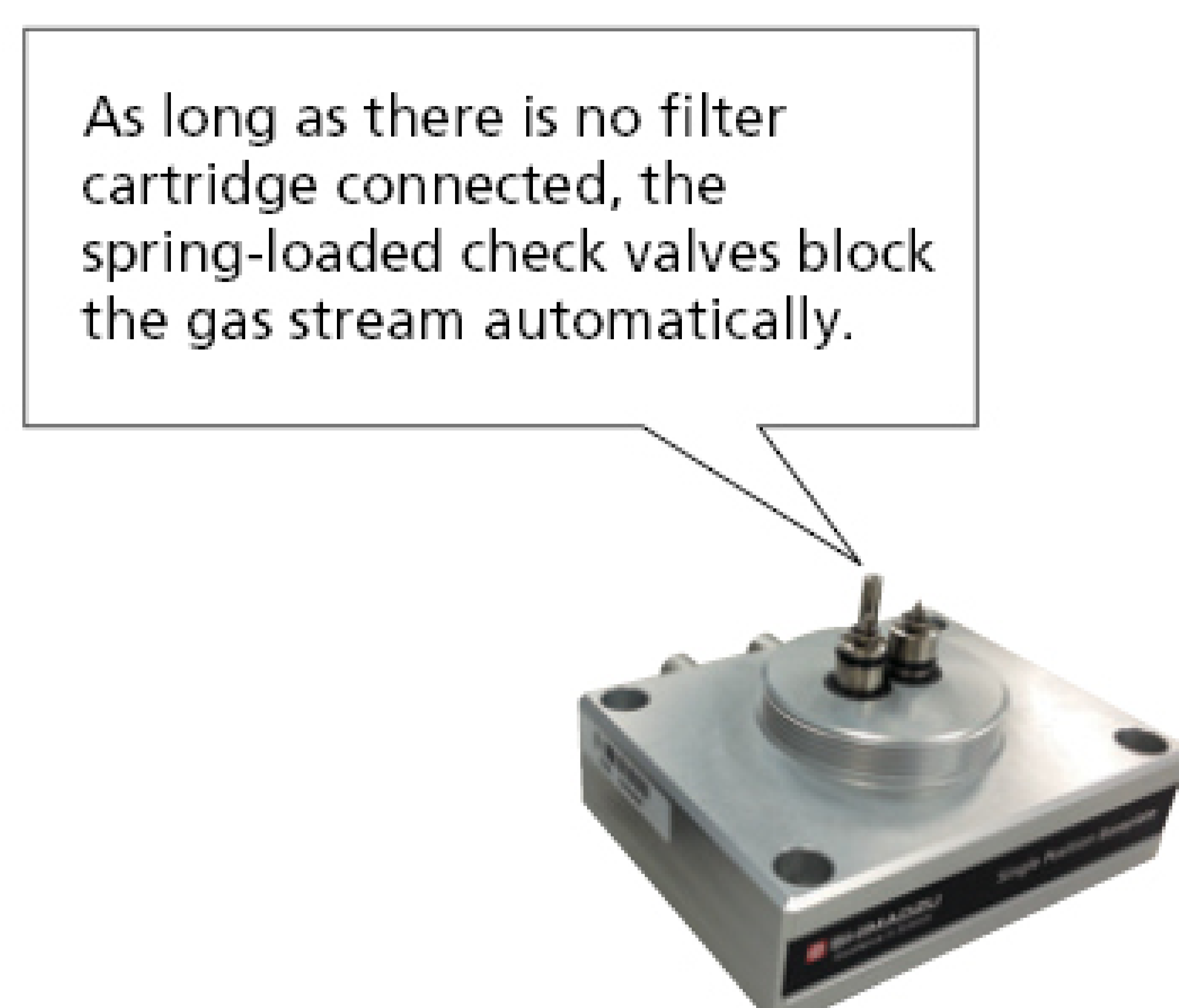
### Ensure High-purity Gas

The Shimadzu Super-Clean Gas Filter can remove the impurities (hydrocarbons, moisture and oxygen) and outlet 99.9999% pure gas. The use of high-purity and contaminant-free gases reduces column degradation, prevents ghost peaks and baseline fluctuations, eliminates excessive detector noise, and keeps your instrument in good working performance.



Using the Shimadzu Super-Clean Gas Filter results in significantly lower detector noise.

## Easy and Leak-tight Replacement



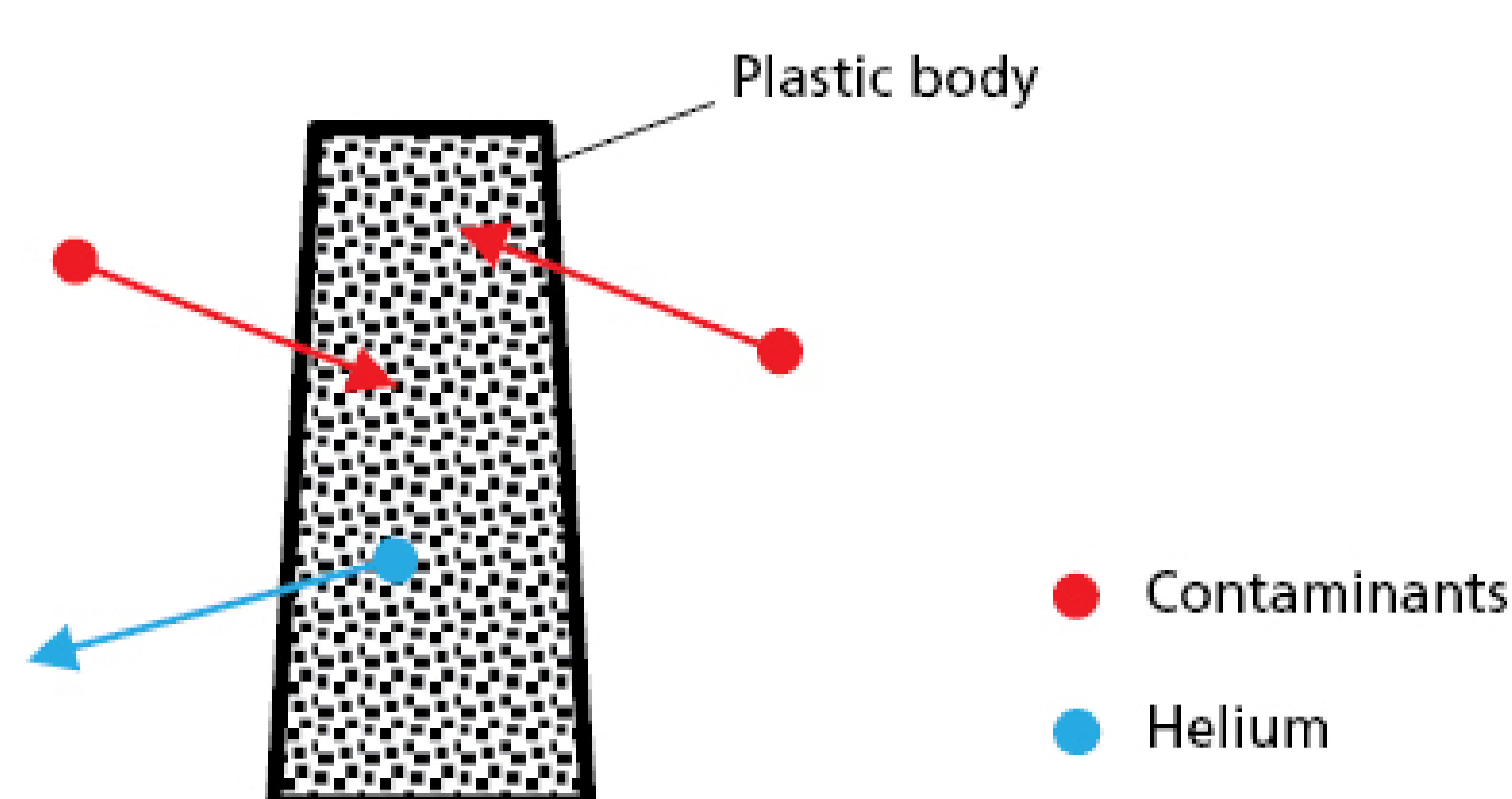
Installing the filter

The design of the Shimadzu Super-Clean Gas Filter makes it possible to replace filter cartridges quickly and easily without any tools. Spring-loaded check valves seal when a cartridge is removed and open only when a new cartridge has been locked in place, which prevents contamination of the system during the replacement process.

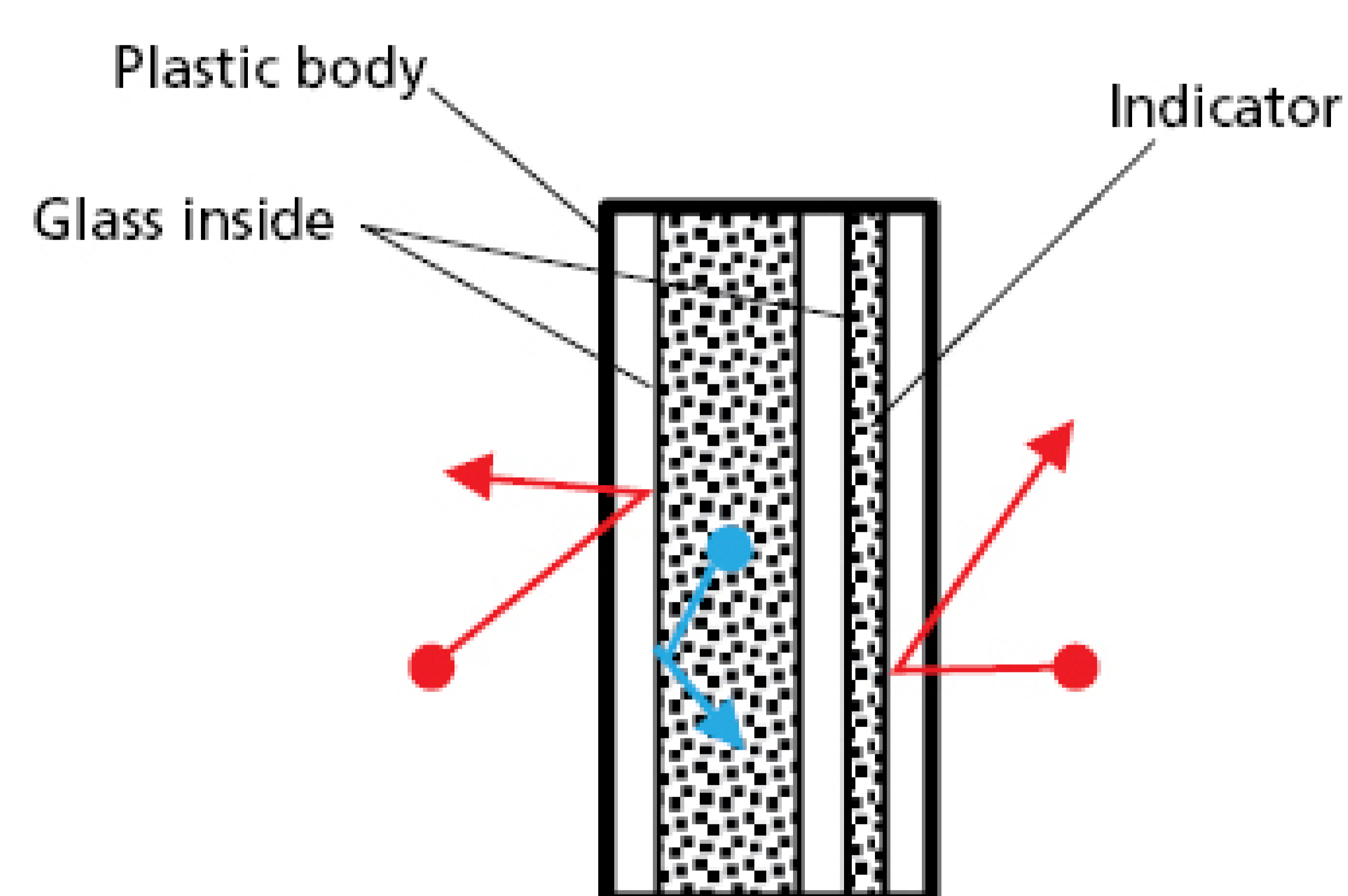
Swagelok connector can be connected directly to the Shimadzu gas supply pipe, ensuring a leak free and completely clean gas line

## Unique Body Design

A plastic body helps with checking the indicators and replacing the filter cartridges. However, it also allows contaminants to diffuse into the instrument and cause helium to leak. To address this issue, the Shimadzu Super-Clean Gas Filter has been designed to pack the absorbents in glass inside the plastic body, thereby preventing diffusion.



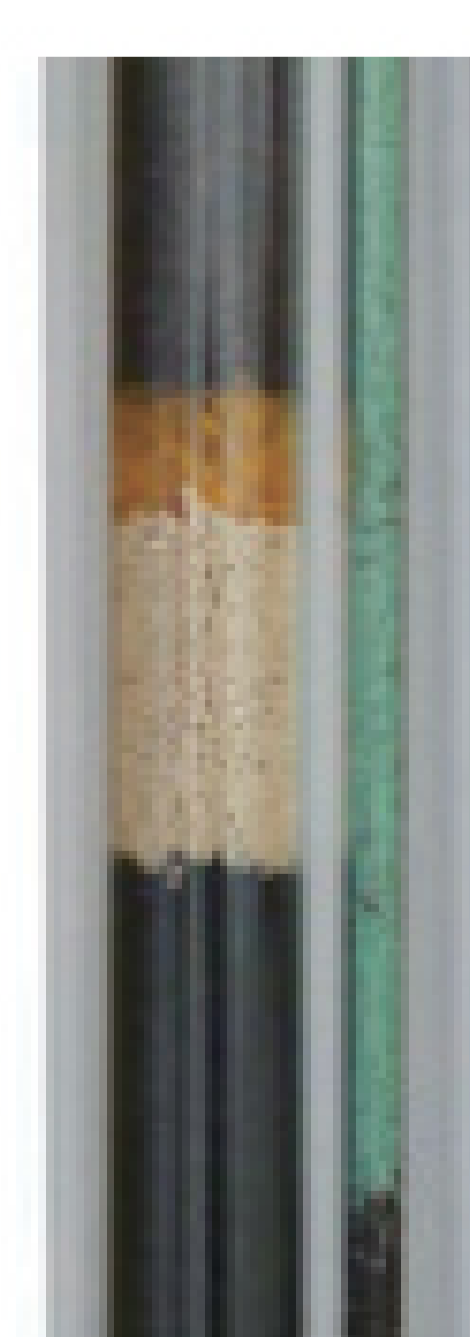
Other filter with plastic body



Shimadzu Super-Clean Gas Filter

## Easy-to-read Indicator

The Shimadzu Super-Clean Gas Filter is designed with an easy-to-read indicator. It changes color when the absorbent is saturated, indicating when filter cartridges should be replaced.



Before using



If absorbent is saturated, the indicator changes color

# Gas Filtration

## Connection Diagrams

### ■ GC / MS (ITD/MSD)



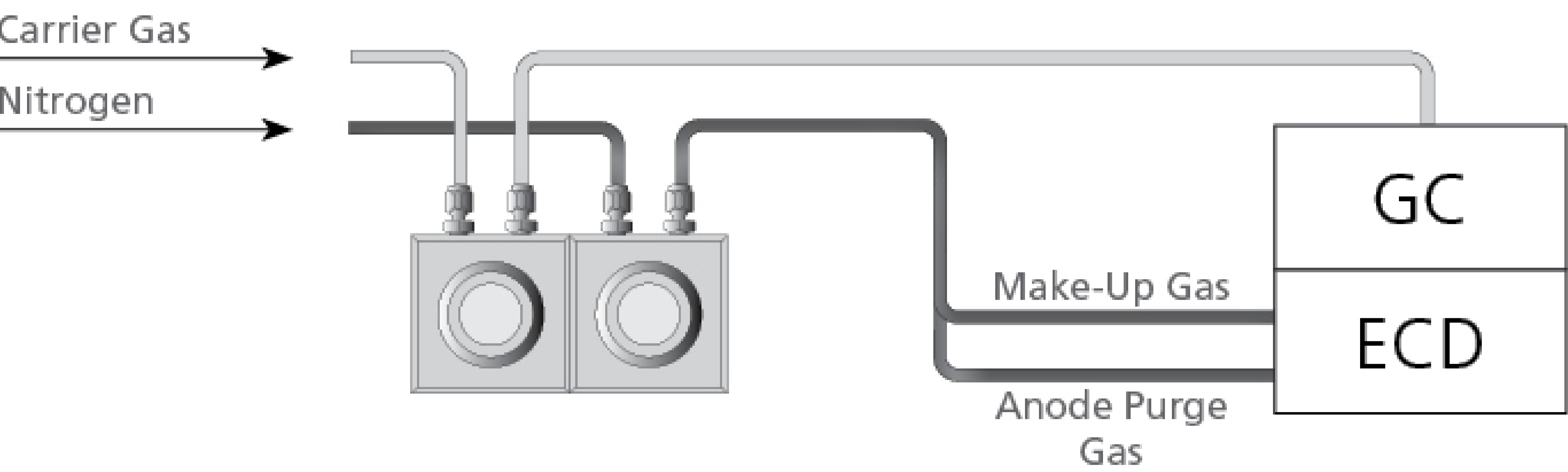
Product	Part No.	Qty
Triple Filter	226-50751-00	1
1 Position Base plate	226-50771-00	1
Kit Part Number	226-50710-00	

### ■ TOC Analyzer



Product	Part No.	Qty
CO <sub>2</sub> / Moisture Filter	226-50759-00	1
1 Position Base plate	226-50771-00	1
Kit Part Number	226-50779-00	

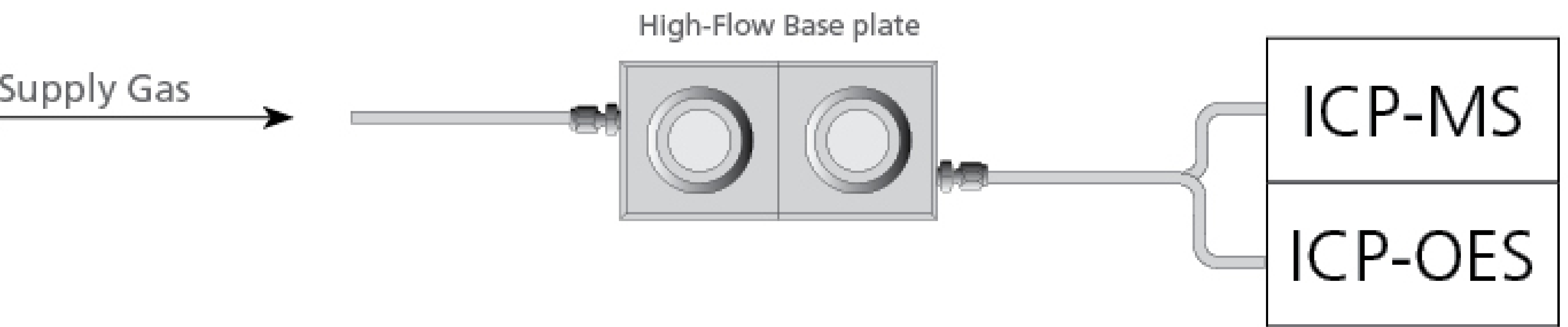
### ■ GC / ECD



Product	Part No.	Qty
Triple Helium Filter	226-50752-00	1
Oxygen/Moisture Filter	226-50758-00	1
2 Position Base plate	226-50772-00	1
Kit Part Number	226-50780-00	

### ■ ICP-OES / ICP-MS

Plasma Gas = Nebulizer Gas

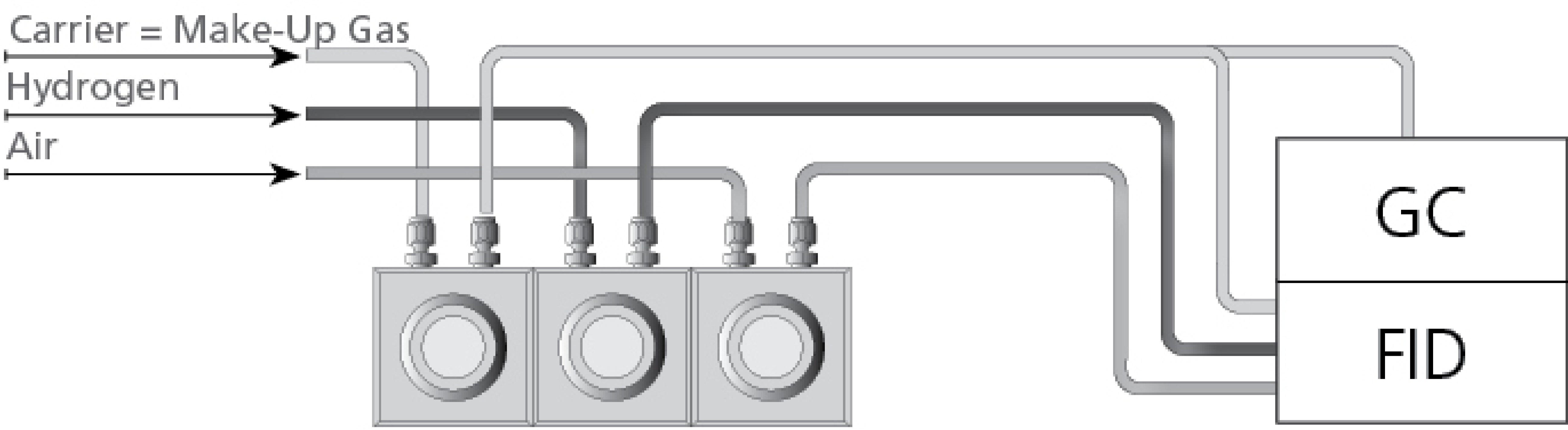


Product	Part No.	Qty
High Flow Oxygen/Moisture Filter Bundle	226-50766-00	1
ICP-MS Base plate	226-50776-00	1
Kit Part Number	226-50767-00	

# Connection Diagrams

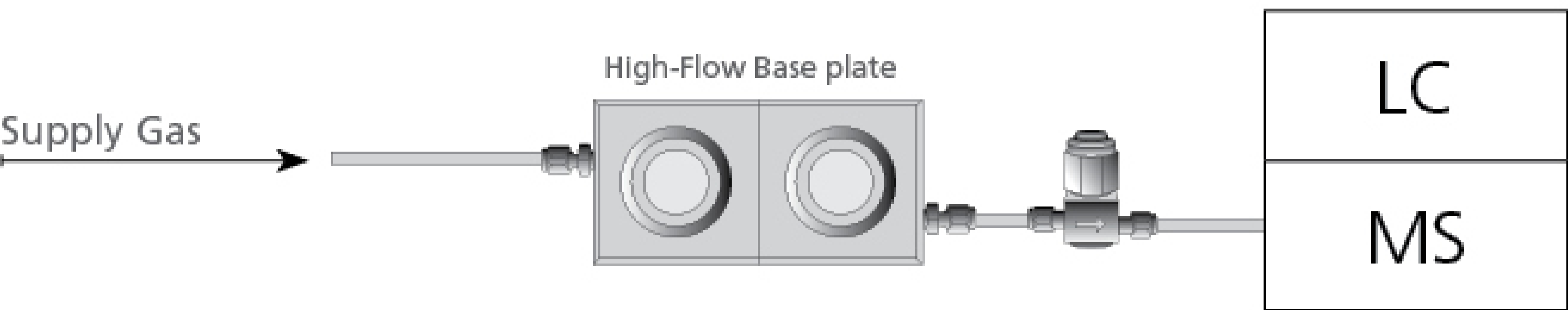
## GC / FID

GC/FID Solution 2 (Carrier Gas = Make-Up Gas)

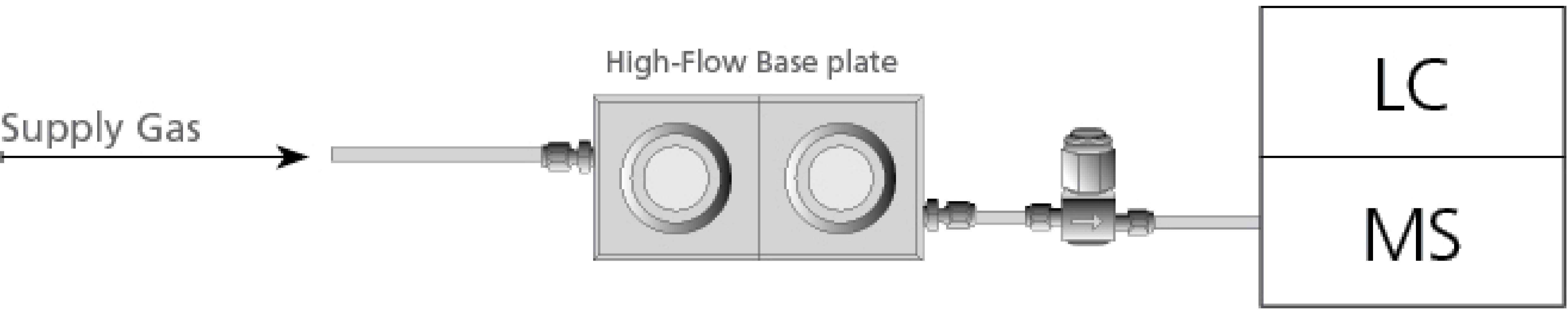


Product	Part No.	Qty
Triple Filter	226-50751-00	1
Hydrocarbon/ Moisture Filter	226-50750-00	2
3 Position Base plate	226-50773-00	1
Kit Part Number	226-50730-00	

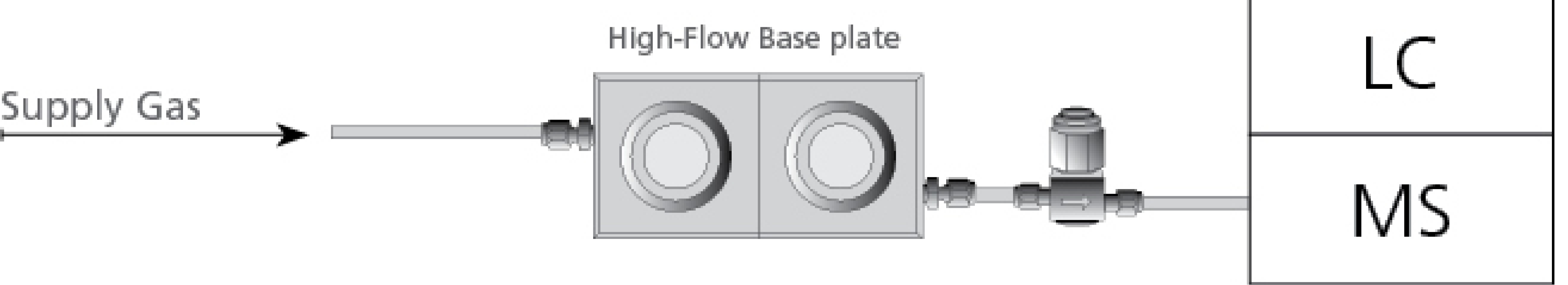
## LC/MS



Product	Part No.	Qty
High Flow Hydrocarbon Filter Bundle	226-50760-00	1
Particle Filter	226-50794-01	1
High Flow Base plate	226-50775-01	1
Kit Part Number	226-50720-00	



Product	Part No.	Qty
High Flow Moisture Filter Bundle	226-50762-00	1
Particle Filter	226-50794-01	1
High Flow Base plate	226-50775-01	1
Kit Part Number	226-50722-00	

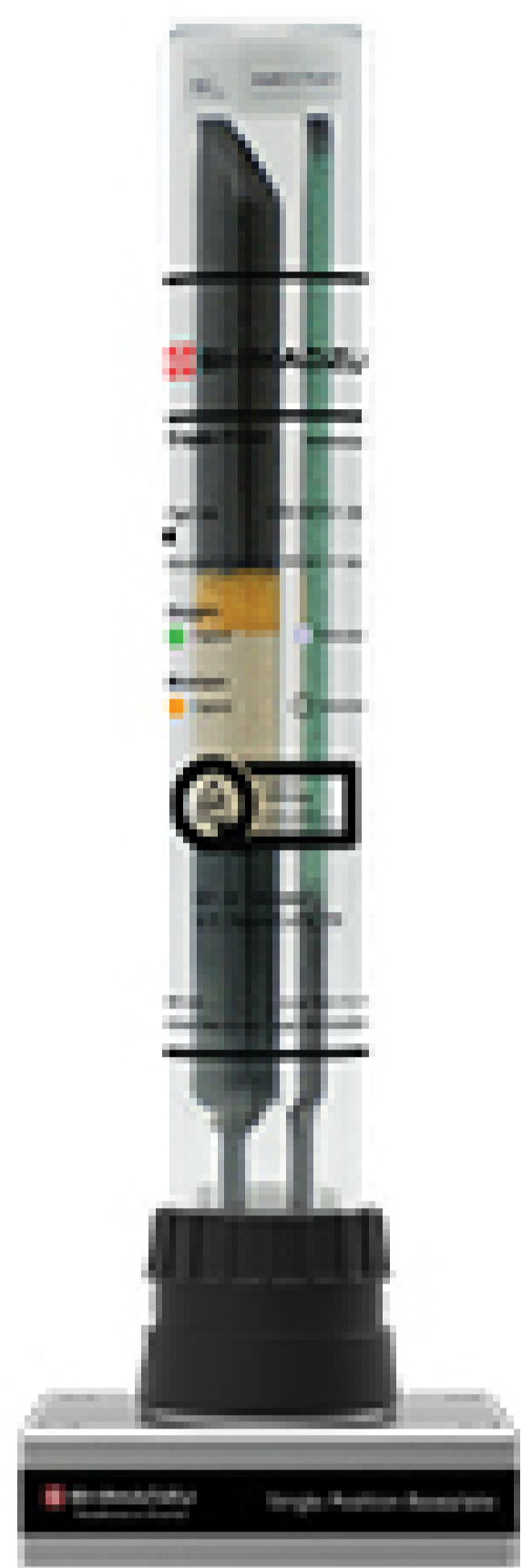


Product	Part No.	Qty
High Flow Hydrocarbon/ Moisture Filter Bundle	226-50764-00	1
Particle Filter	226-50794-01	1
High Flow Base plate	226-50775-01	1
Kit Part Number	226-50724-00	

# Gas Filtration

## Installation Kits

Catalog No.	226-50710-00 226-50712-00 (Helium)
Usable for	Benefit
GC/MS	Higher data accuracy and less maintenance
GC/TCD	Greater sensitivity and less maintenance



### GC/MS TRIPLE FILTER KIT

The triple combination filter kit is ideal for purifying GC/MS carrier gases. It contains oxygen, moisture and hydrocarbon scrubbers in one easy to change economical cartridge

Catalog No.	226-50779-00
Usable for	Benefit
TOC Analyzer	Greater sensitivity
Zero-Air generator	Cleaner gas



### TOC CO2/MOISTURE FILTER KIT

The carbon dioxide/moisture combination filter kit is ideal for TOC analysers and Zero-Air generators. It removes both carbon dioxide and moisture from gas streams.

Catalog No.	226-50780-00
Usable for	Benefit
GC/ECD	Greater sensitivity



### GC/ECD FILTER KIT

Removes oxygen, moisture and hydrocarbons from the carrier gas and removes moisture and oxygen from the make-up and purge gas.

Catalog No.	226-50767-00
Usable for	Benefit
ICP-MS	Greater sensitivity
ICP-OES	Greater sensitivity



### ICP-MS MOISTURE/OXYGEN FILTER KIT

Removes Oxygen and Moisture from gas streams.

# Installation Kits

Catalog No.	226-50730-00
Usable for	Benefit
GC/FID	Greater sensitivity



**FID  
3 POSITION KIT**

The FID Filter kit is the perfect all-in-one solution for purifying flame ionization detector (FID) fuel gases together with the carrier gas. This kit removes hydrocarbons, moisture and oxygen from the carrier gas and removes both moisture and hydrocarbons from the Hydrogen and Air fuel gases.

Catalog No.	226-50720-00
Usable for	Benefit
LC/MS	Greater sensitivity



**LC/MS  
HYDROCARBON KIT**

Up to 20 L/min. of hydrocarbon-free nitrogen per minute with this LC/MS High Flow Kit

Catalog No.	226-50722-00
Usable for	Benefit
LC/MS	Greater sensitivity



**LC/MS  
MOISTURE KIT**

Up to 20 L/min. of moisture-free nitrogen per minute with this LC/MS High Flow Kit

Catalog No.	226-50724-00
Usable for	Benefit
LC/MS	Greater sensitivity



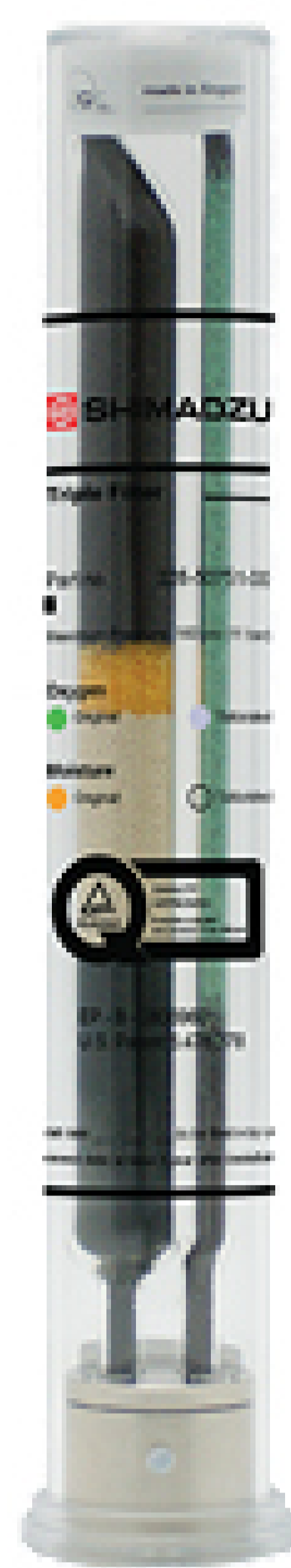
**LC/MS COMBI  
(HYDROCARBON/MOISTURE)  
KIT**

Removes Moisture and Hydrocarbons from high flow gas streams.

# Gas Filtration

## Replacement Filters

Replacement Filter for	GC/MS Triple Filter Kit (226-50710-00)
Catalog No.	226-50751-00 226-50752-00 (Helium) 226-50752-10 (Hydrogen)

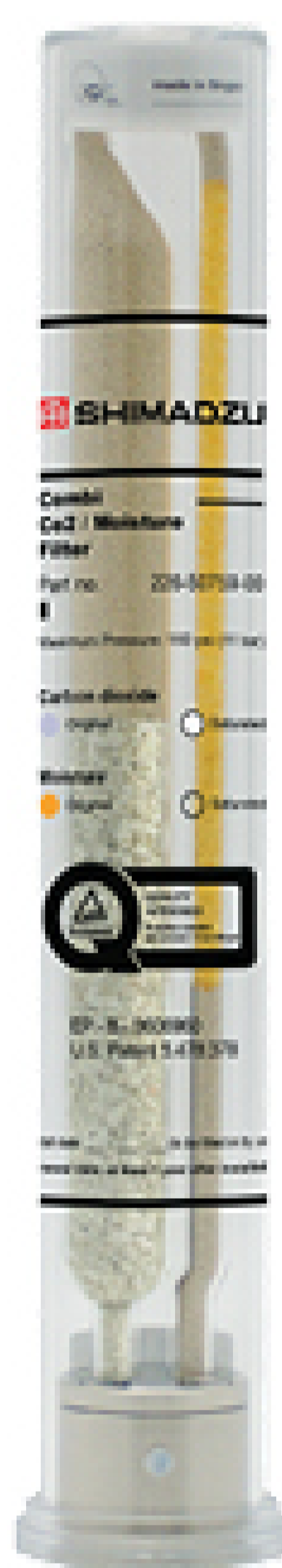


### GC/MS TRIPLE (OXYGEN/MOISTURE/ HYDROCARBON) FILTER

The Triple trap is ideal for purifying carrier gas. It contains oxygen, moisture and hydrocarbon scrubbers in one easy to change economical cartridge

Capacity	
H <sub>2</sub> O	1.8 g
O <sub>2</sub>	75 mL
HC	4 g (as n-butane)

Replacement Filter for	TOC CO <sub>2</sub> /Moisture Filter Kit (226-50779-00)
Catalog No.	226-50759-00

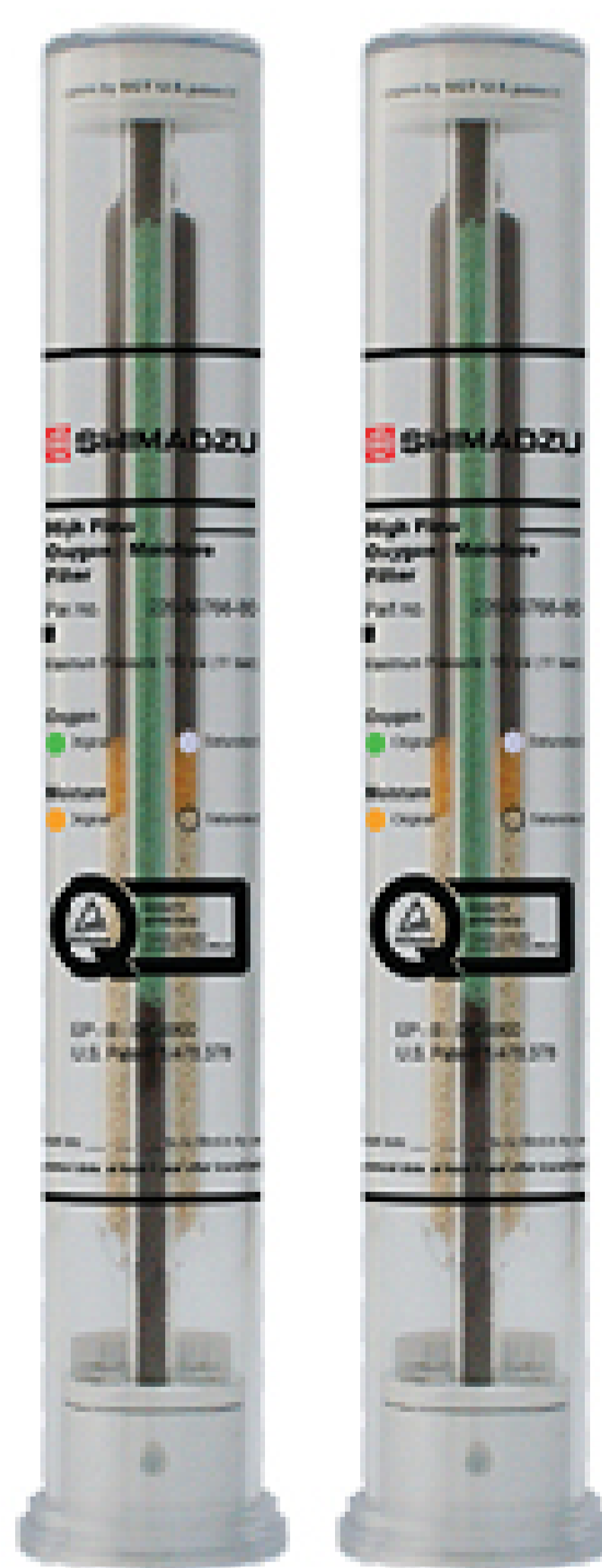


### TOC COMBI (CARBON DIOXIDE/ MOISTURE) FILTER

Removes carbon dioxide and moisture from gas streams.

Capacity	
H <sub>2</sub> O	3.5 g
CO <sub>2</sub>	6 g

Replacement Filters for	ICP-MS Moisture/Oxygen Filter Kit (226-50767-00)
Catalog No.	226-50766-00



### ICP-MS COMBI (OXYGEN/MOISTURE) FILTER BUNDLE

Removes Oxygen and Moisture from the ICP-MS supply gas stream. To be used in combination with a high flow ICP-MS base plate.

Capacity	
H <sub>2</sub> O	7.2 g
O <sub>2</sub>	150 mL

Replacement Filters for	GC/ECD Filter Kit (226-50780-00)
Catalog No.	226-50781-00 includes: (1) 226-50752-00 and (1) 226-50758-00



### GC/ECD FILTER BUNDLE

Removes oxygen, moisture and hydrocarbons from the carrier gas and removes moisture and oxygen from the make-up and purge gas.

Capacity	
H <sub>2</sub> O	1.8 g / 3.5
O <sub>2</sub>	75 mL / 75 mL
HC	4 g (as n-butane)

Replacement Filters

Replacement Filter for	FID 3 Position Filter Kit (226-50730-00)
Catalog No.	226-50761-00 includes: (1) 226-50751-00 and (2) 226-50750-00

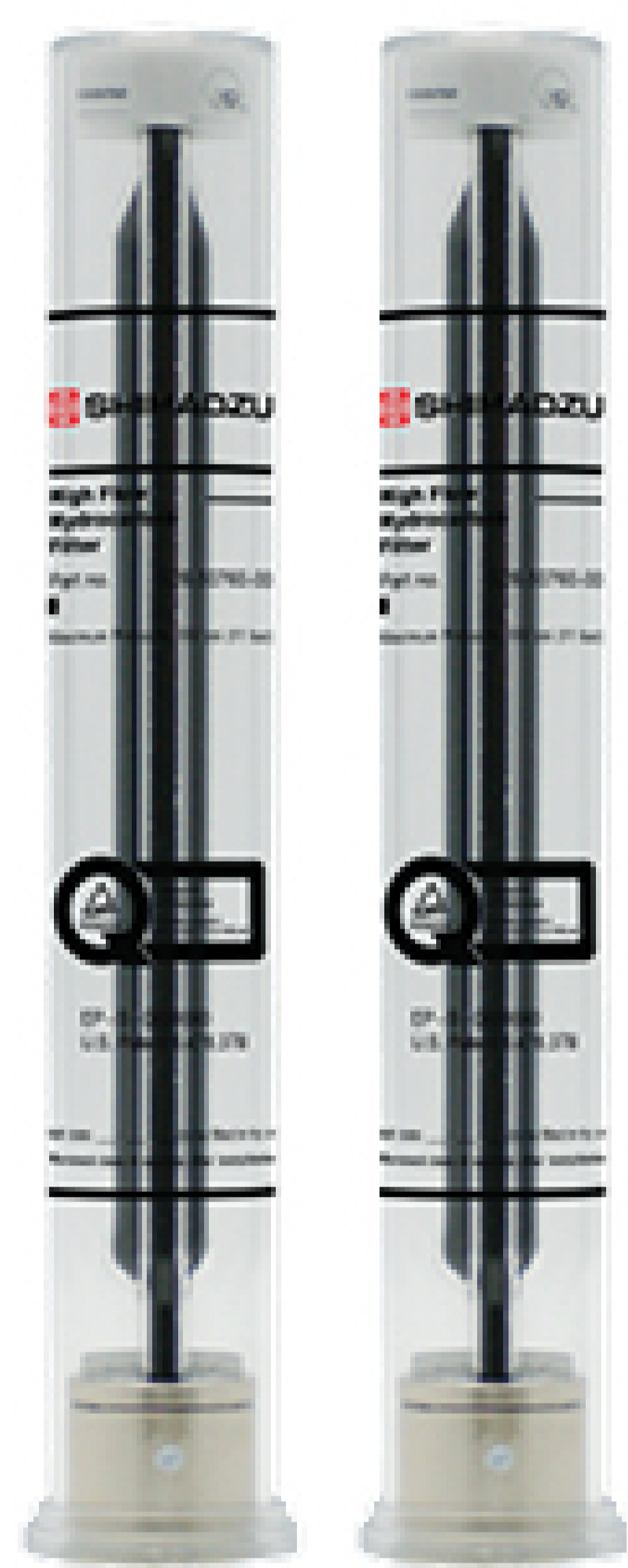


FID  
FILTER BUNDLE OF 3

Removes Oxygen and Moisture from high flow gas streams. To be used in combination with a high flow base plate.

Capacity	
H <sub>2</sub> O	7.2 g
O <sub>2</sub>	150 mL

Replacement Filter for	LC/MS Hydrocarbon Filter Kit (226-50720-00)
Catalog No.	226-50760-00



LC/MS  
HIGH FLOW HYDROCARBON FILTER  
BUNDLE

Up to 20 L/min. of hydrocarbon-free nitrogen per minute. To be used in combination with a high flow base plate.

Capacity	
HC	24 g (as n-butane)

Replacement Filters for	LC/MS Moisture Filter Kit (226-50722-00)
Catalog No.	226-50762-00



LC/MS  
HIGH FLOW MOISTURE FILTER  
BUNDLE

Removes moisture from high flow gas streams. To be used in combination with a high flow base plate.

Capacity	
H <sub>2</sub> O	14.4 g

Replacement Filters for	LC/MS Combi (hydrocarbon/moisture) Filter Kit (226-50724-00)
Catalog No.	226-50764-00



LC/MS  
HIGH FLOW COMBI (HYDROCARBON/  
MOISTURE) FILTER BUNDLE

Removes Moisture and Hydrocarbons from high flow gas streams. To be used in combination with a high flow base plate.

Capacity	
HC	12 g (as n-butane)
H <sub>2</sub> O	7.2 g

# Gas Filtration

## Single Filters

Catalog No.	226-50754-00
Specifications	
Outlet Gas Quality (%)	> 99.9999
Maximum Pressure	11 bar (160 psi)
Maximum Flow	7 L/min.
Usable For	Inert carrier gas, He, H2, N2, AR, Air
Dimensions	24 cm x Ø 4.4 cm
Weight	0.26 Kg
Estimated Lifetime	> 2 years

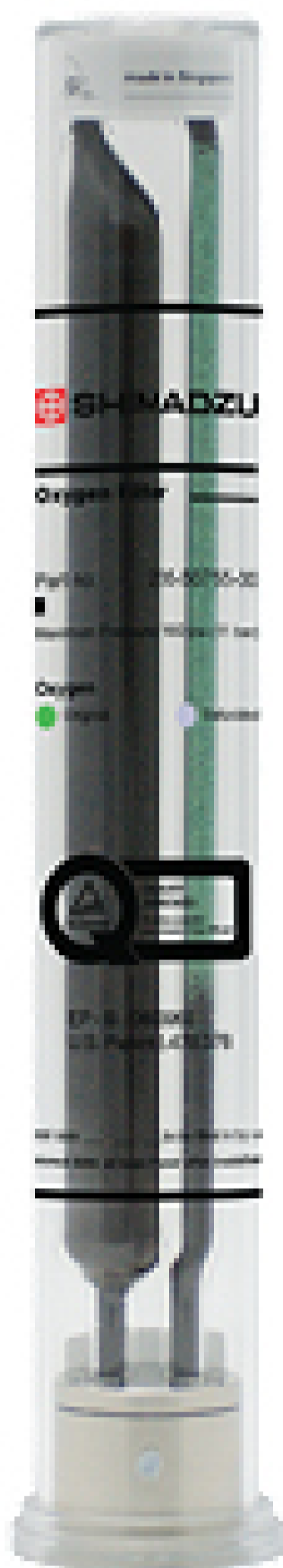


### MOISTURE FILTER

Moisture in carrier gas lines will prematurely degrade oxygen and hydrocarbon traps and increase detector noise. As a precaution, we highly recommend installing a moisture trap before the hydrocarbon and oxygen traps on all carrier gas lines.

Capacity	
H <sub>2</sub> O	7.2 g

Catalog No.	226-50755-00
Specifications	
Outlet Gas Quality (%)	> 99.9999
Maximum Pressure	11 bar (160 psi)
Maximum Flow	7 L/min.
Usable For	Inert carrier gas, He, H2, N2, AR
Dimensions	24 cm x Ø 4.4 cm
Weight	0.26 Kg
Estimated Lifetime	> 2 years

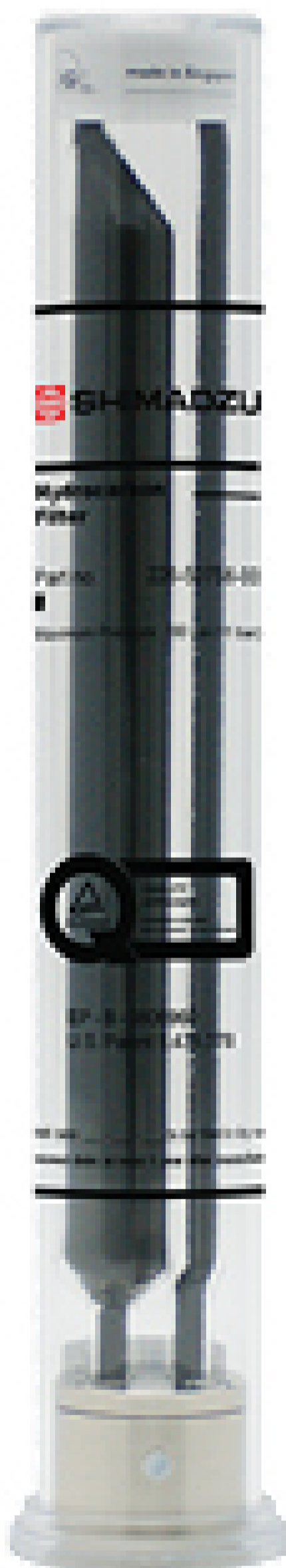


### OXYGEN FILTER

Oxygen is a column killer. It is present even in UHP gases, as minutes leaks at fittings allow oxygen to influx against the concentration gradient. Because oxygen can enter a gas line at any fitting or during gas bottle exchange, the oxygen trap should be the last connection before the gas line enters the chromatograph.

Capacity	
O <sub>2</sub>	150 mL

Catalog No.	226-50756-00
Specifications	
Outlet Gas Quality (%)	> 99.9999
Maximum Pressure	11 bar (160 psi)
Maximum Flow	7 L/min.
Usable For	Inert carrier gas, He, H2, N2, AR, Air
Dimensions	24 cm x Ø 4.4 cm
Weight	0.26 Kg
Estimated Lifetime	> 2 years



### HYDROCARBON FILTER

Use a hydrocarbon trap if your gas has a potential source of hydrocarbon contaminants or if you suspect you are observing carrier gas ghost peaks. Install the hydrocarbon trap after the moisture trap, to prevent moisture from degrading the hydrocarbon-trapping ability of the activated carbon in the hydrocarbon trap.

Capacity	
HC	12 g (as n-butane)

Catalog No.	226-50757-00
Specifications	
Outlet Gas Quality (%)	> 99.9999
Maximum Pressure	11 bar (160 psi)
Maximum Flow	7 L/min.
Usable For	Inert carrier gas, He, H2, N2, AR, Air
Dimensions	24 cm x Ø 4.4 cm
Weight	0.26 Kg
Estimated Lifetime	> 2 years



### CARBON DIOXIDE FILTER

Removes carbon dioxide from gas streams. To be used in combination with a Moisture Filter

Capacity	
CO <sub>2</sub>	12 g

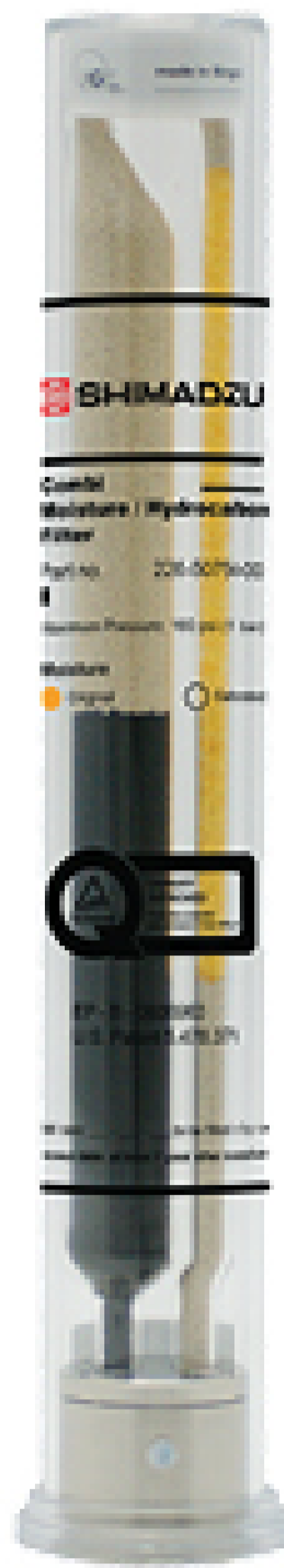
# COMBI Filters

Catalog No.	226-50750-00
Specifications	
Outlet Gas Quality (%)	> 99.9999
Maximum Pressure	11 bar (160 psi)
Maximum Flow	7 L/min.
Usable For	Inert carrier gas, He, H2, N2, AR, Air
Dimensions	24 cm x Ø 4.4 cm
Weight	0.26 Kg
Estimated Lifetime	> 2 years

Catalog No.	226-50758-00
Specifications	
Outlet Gas Quality (%)	> 99.9999
Maximum Pressure	11 bar (160 psi)
Maximum Flow	7 L/min.
Usable For	Inert carrier gas, He, H2, N2, AR
Dimensions	24 cm x Ø 4.4 cm
Weight	0.26 Kg
Estimated Lifetime	> 2 years

Catalog No.	226-50759-00
Specifications	
Outlet Gas Quality (%)	> 99.9999
Maximum Pressure	11 bar (160 psi)
Maximum Flow	7 L/min.
Usable For	Inert carrier gas, He, H2, N2, AR, Air
Dimensions	24 cm x Ø 4.4 cm
Weight	0.26 Kg
Estimated Lifetime	> 2 years

Catalog No.	226-50751-00 226-50752-00 (Helium Specific) 226-50752-10 (Hydrogen Specific)
Specifications	
Outlet Gas Quality (%)	> 99.9999
Maximum Pressure	11 bar (160 psi)
Maximum Flow	7 L/min.
Usable For	Inert carrier gas, He, H2, N2, AR
Dimensions	24 cm x Ø 4.4 cm
Weight	0.26kg
Estimated Lifetime	> 2 years



## COMBI (HYDROCARBON/MOISTURE) FILTER

The Fuel Gas Filter is perfect for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons. Using the Fuel Gas Filter for FID Hydrogen and air will produce a stable baseline, improving overall reproducibility and sensitivity.

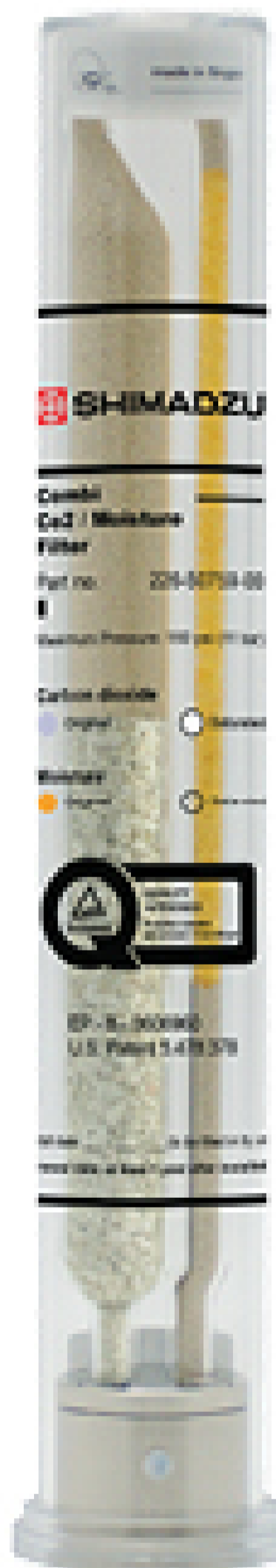
Capacity	
H <sub>2</sub> O	3.5 g
HC	6 g (as n-butane)



## COMBI (OXYGEN/MOISTURE) FILTER

This Combi trap is ideal for purifying carrier gas. It contains oxygen and moisture scrubbers in one easy to change economical cartridge

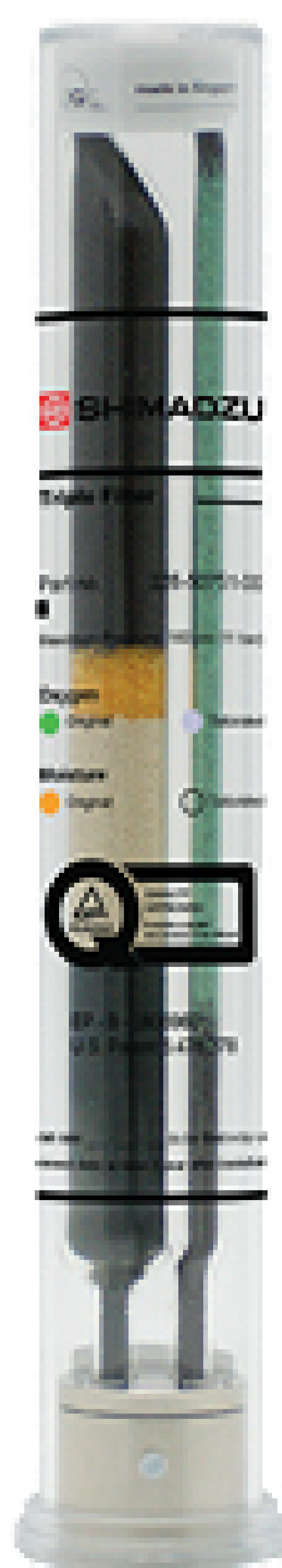
Capacity	
H <sub>2</sub> O	3.5 g
HC	75 mL



## COMBI (CARBON DIOXIDE/MOISTURE) FILTER

Removes carbon dioxide and moisture from gas streams.

Capacity	
H <sub>2</sub> O	3.5 g
HC	6 g



## TRIPLE (OXYGEN/MOISTURE/HYDROCARBON) FILTER

The Triple trap is ideal for purifying carrier gas. It contains oxygen, moisture and hydrocarbon scrubbers in one easy to change economical cartridge

Capacity	
H <sub>2</sub> O	1.8 g
O <sub>2</sub>	75 mL
HC	4 g (as n-butane)

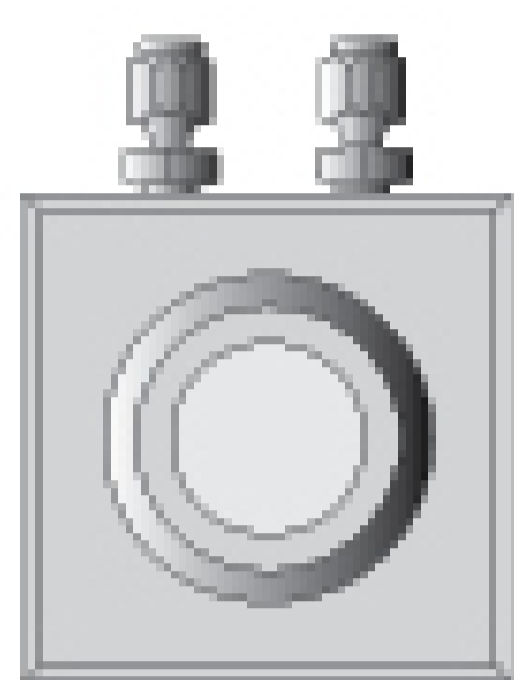
# Gas Filtration

## Base Plates

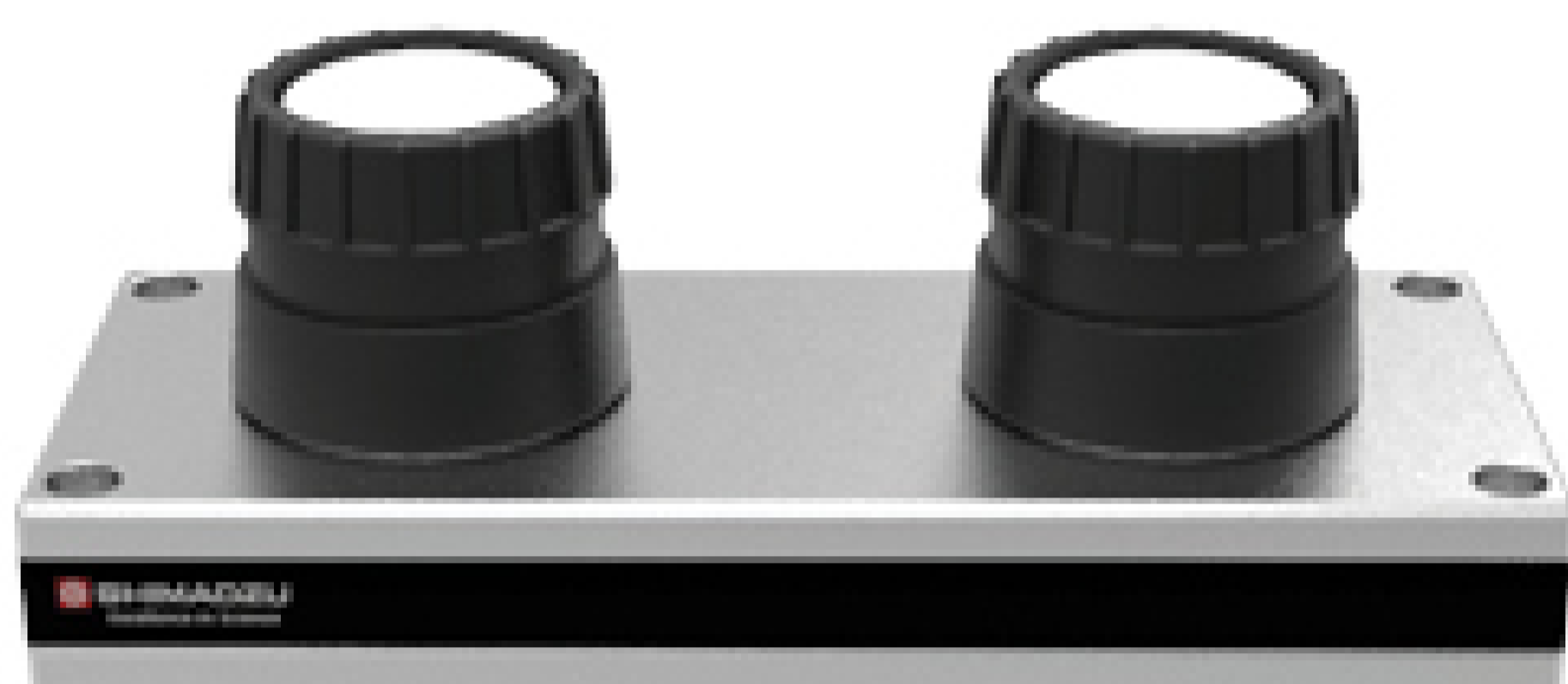
Catalog No.	Fitting Type
226-50771-00	1/8" SS



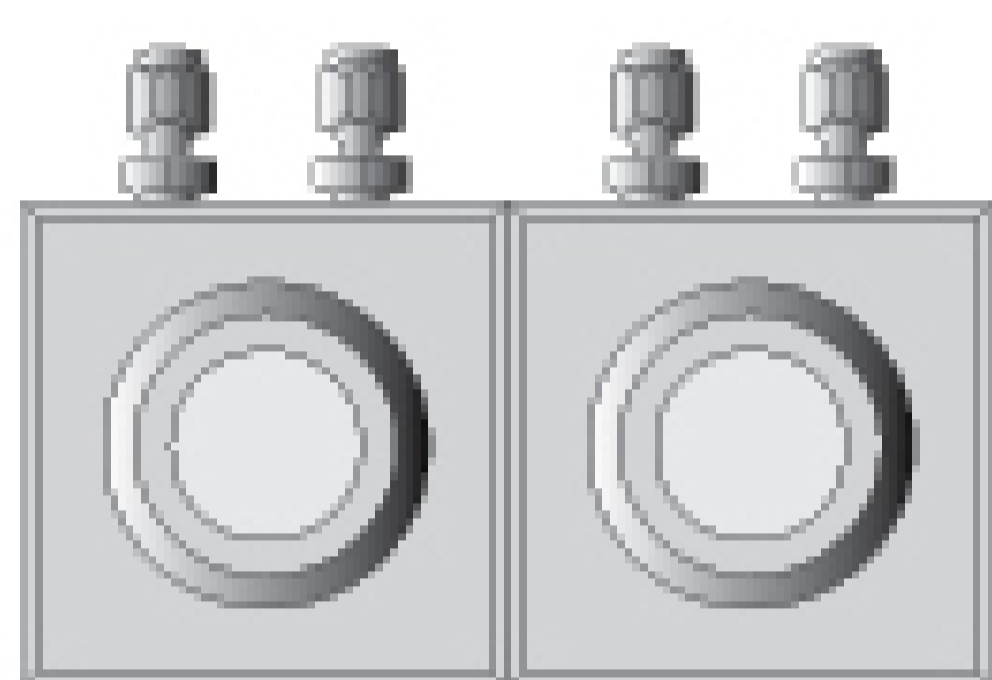
**1 POSITION BASE PLATE**  
Single position base plate



Catalog No.	Fitting Type
226-50772-00	1/8" SS



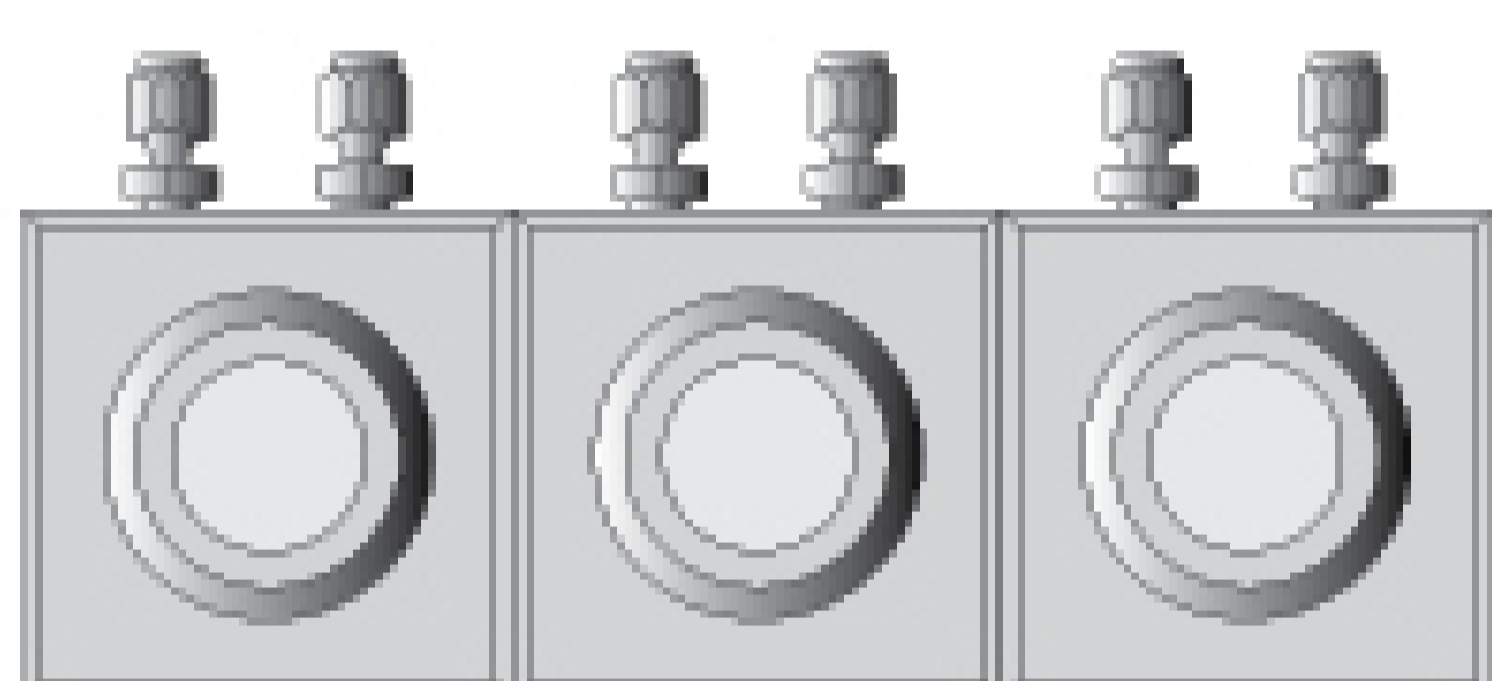
**2 POSITION BASE PLATE**  
Double position base plate



Catalog No.	Fitting Type
226-50773-00	1/8" SS



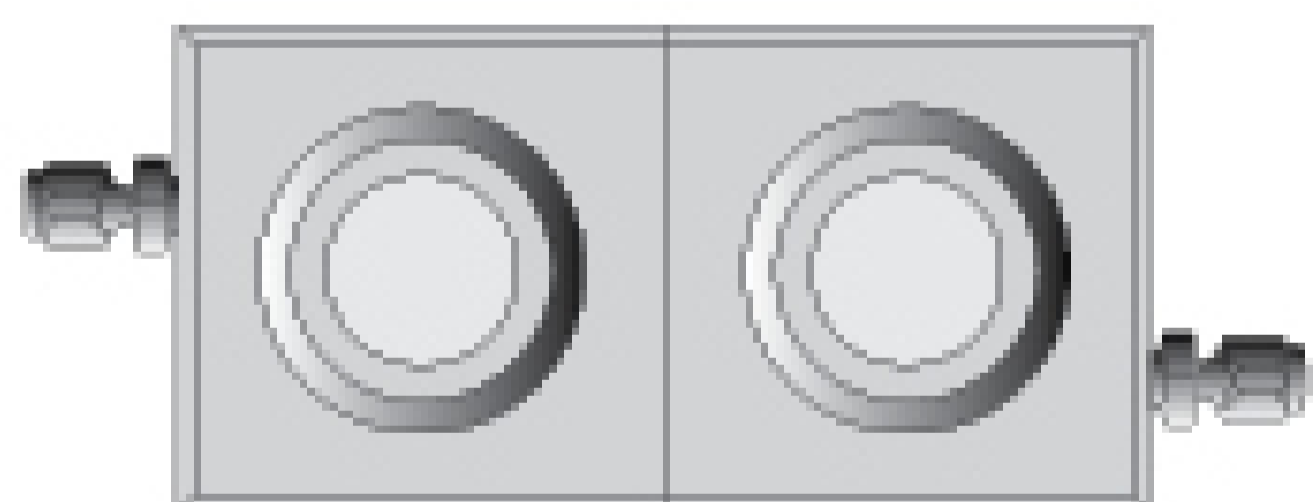
**3 POSITION BASE PLATE**  
Three position base plate



Catalog No.	Fitting Type
226-50776-00	1/8" SS



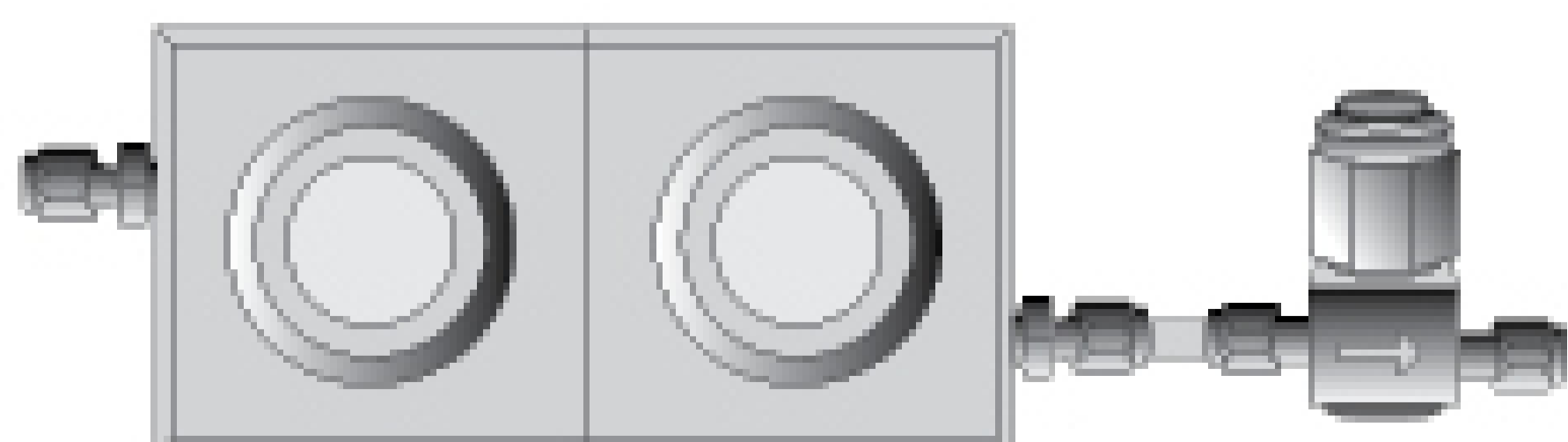
**ICP-MS  
HIGH FLOW BASE PLATE**  
High Flow Base plate for ICP-MS  
(in parallel)



Catalog No.	Fitting Type
226-50775-01	1/4" Brass
226-50775-00	1/4" SS

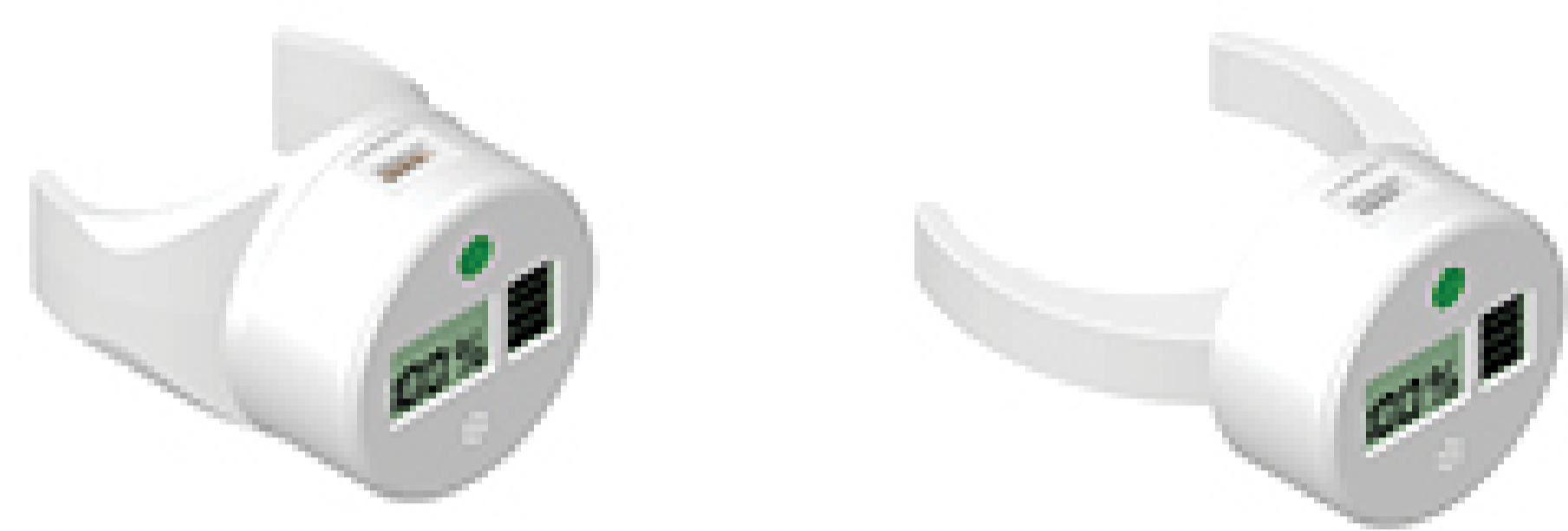


**LC/MS  
HIGH FLOW BASE PLATE**  
High Flow double position base  
plate (in parallel)



# Base Plate Accesories

Catalog No.	Clip Type
226-50798-00	Filter Cartridge
226-50797-00	Universal Ring Nut
Usable for	
All base plates with Universal Ring Nut	



**ELECTRONIC INDICATOR**  
Electronic Maintenance Indicator device warns when scheduled filter replacement or base plate maintenance is due.

Catalog No.	226-50799-00
Usable for	
All base plates	



**UNIVERSAL RING NUT**  
Universal Ring Nut to mount a filter or flush-cap on a base plate.

Catalog No.	226-50770-00
Usable for	
All base plates	



**O-RING REPLACEMENT SET**  
O-ring replacement set for replacing the O-rings on the in- and outlet valves on a base plate.

Catalog No.	226-50790-00
Usable for	
All base plates	



**WALL-MOUNT BRACKET SET**  
Wall mounting brackets to mount a Base plate on a wall.

Catalog No.	226-50796-00
Usable for	
All base plates	



**UNIVERSAL FLUSH-CAP SET**  
Flush-cap that mounts on a base plate , and allows the gas to pass through the base plate without a filter attached.

Catalog No.	Connection Type
226-50792-01	1/4" Brass
226-50791-01	1/8" Brass
226-50792-00	1/4" SS
226-50791-00	1/8" SS
Usable for	
1, 2, 3 and 4 position base plates	



**STANDARD BASE PLATE CONNECTOR SET**  
Replacement connectors for standard base plates.

Catalog No.	Connection Type
226-50793-01	1/4" Brass
226-50793-00	1/4" SS
Usable for	
High flow base plates	



**HIGH FLOW BASE PLATE CONNECTOR SET**  
Replacement connector for high flow base plates.

Catalog No.	Description
226-50794-01	0.5 Micron Particle Filter (1/4" Brass)
226-50795-00	0.5 Micron Particle Filter Cup Replacement Pack



**PARTICULATE FILTER**  
Particulate filter for high flow base plates.

# Gas Filtration

## Capillary Column Cutters

Catalog No.	226-50700-00
<b>Specifications</b>	
Usable For	Fused Silica Capillary Column Ø 0.5 Use with 0.25mm ID to 0.53mm ID tubing (0.78mm OD maximum).
Dimensions	9.2 cm x 1.7 cm x 1.7 cm
Weight	94 g



### SHORTIX™ GC

In Gas chromatography, the Glass Quick-Fit connection is often used (e.g. for Retention Gaps, Guard Columns). This connection will only be leak-tight when the column is cut extremely straight and without any damage to the fused-silica column wall.

Catalog No.	226-50700-01
<b>Specifications</b>	
Usable For	Fused Silica Capillary Column Ø 0.25micron
Dimensions	9.7 cm x 1.7 cm x 1.7 cm
Weight	94 g



### SHORTIX™ CE-CEC

For CE/CEC analyses, a clean and straight cut of the capillary column is needed to assure symetrical Field-Strength over the inlet of the column. When there is no symetrical Field-Strength, the analytical results will be non-reproducible.

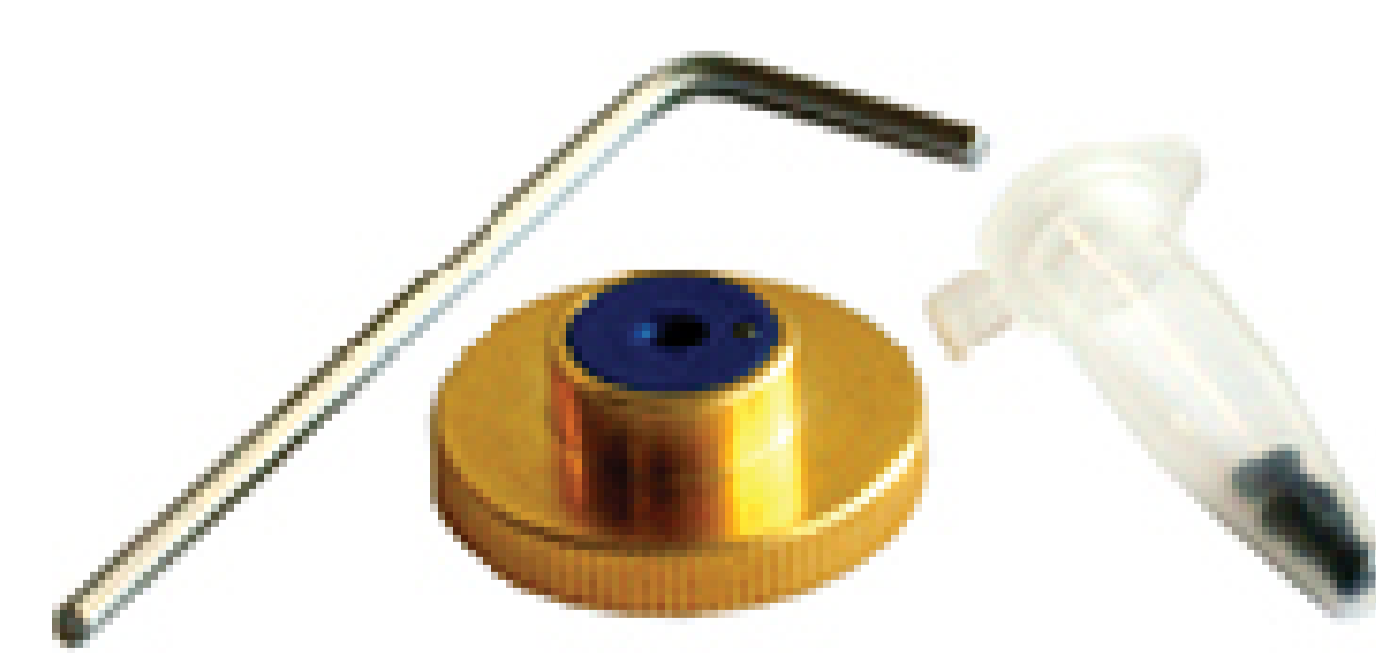
Catalog No.	226-50700-10
<b>Specifications</b>	
Usable For	Shortix™ GC



### MAINTENANCE KIT FOR SHORTIX™ GC

Includes diamond cutting wheel, O-rings and a tool to open the column cutter.

Catalog No.	226-50700-11
<b>Specifications</b>	
Usable For	Shortix™ CE-CEC



### MAINTENANCE KIT FOR SHORTIX™ CE-CEC

Includes diamond cutting wheel, O-rings and a tool to open the column cutter.

# Gas Filter System Components



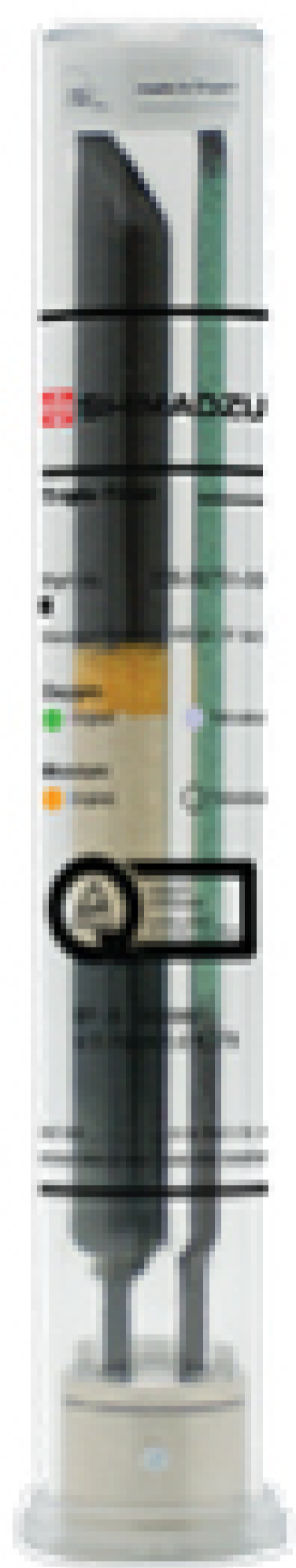
## Base Plate

Connecting unit with in- and outlet connectors for the gas line and two spring-loaded check valves that automatically start the flow of gas once a filter is installed.



## Filter Cartridge

The filter cartridges are made of glass to prevent diffusion, and protected by a plastic housing for safety. The PTFE seals at the base of the Filter will only be punctured during installation on the base plate.



## Universal Ring Nut

The Universal Ring Nut is used for mounting a filter cartridge or flush-cap to a base plate. It can also serve as a mounting point for the Electronic Maintenance Indicator device.



## Electronic Indicator

Optional Electronic Maintenance Indicator device warns when scheduled replacement or maintenance is due.



## Wall Mount Bracket Set

Optional wall mounting brackets to mount a base plate to a wall.





# Spectrum Consumables



# UV Cells

The following table shows the wavelength range and tolerance for different window materials:

Window Material	Path lengths	Wavelength Range	Tolerance
Quartz	0.5 to 30mm	200 nm – 2500 nm	± 0.01mm
	40 to 100mm		± 0.02mm
Glass	up to 20mm	320 nm – 2500 nm	± 0.01mm
	30 to 100mm		± 0.02mm

## ■ Standard cell with PTFE Lid

- Open top, comes with either non-sealing PTFE cover or a stopper providing a liquid-tight seal.
- Two polished windows.
- Walls polished internally, fine ground externally.
- Suitable for use with all standard cell holders.

### Cell with PTFE Lid

Light path /mm	Maximum Vol/μL	External Dimension (L x W x H) / mm	Quartz cell		Glass cell
			Single Cell	Matched Pair	Single cell
1	400	3.5 x 12.5 x 45	226-85101-01	226-85102-01	226-85111-01
2	700	4.5 x 12.5 x 45	226-85101-02	226-85102-02	226-85111-02
5	1700	7.5 x 12.5 x 45	226-85101-05	226-85102-05	226-85111-05
10	3500	12.5 x 12.5 x 45	226-85101-10	226-85102-10	226-85111-10
20	7000	22.5 x 12.5 x 45	226-85101-20	226-85102-20	226-85111-20
40	14000	42.5 x 12.5 x 45	226-85101-40	226-85102-40	226-85111-40
50	17500	52.5 x 12.5 x 45	226-85101-50	226-85102-50	226-85111-50
100	35000	102.5 x 12.5 x 45	226-85101-00	226-85102-00	226-85111-00



10mm Quartz Cell,  
226-85101-10

### Cell with stopper

Light path /mm	Maximum Vol/μL	External Dimension (L x W x H) / mm	Quartz cell	Glass cell
1	400	3.5 x 12.5 x 55	226-85201-01	226-85211-01
2	700	4.5 x 12.5 x 55	226-85201-02	226-85211-02
5	1700	7.5 x 12.5 x 48	226-85201-05	226-85211-05
10	3500	12.5 x 12.5 x 48	226-85201-10	226-85211-10
20	7000	22.5 x 12.5 x 48	226-85201-20	226-85211-20
40	14000	42.5 x 12.5 x 48	226-85201-40	226-85211-40
50	17500	52.5 x 12.5 x 48	226-85201-50	226-85211-50
100	35000	102.5 x 12.5 x 48	226-85201-00	226-85211-00



10mm Quartz Cell with stopper,  
226-85201-10

## ■ Semi-Micro cell with PTFE Lid, Single cell

- Reduced nominal volume to <50% of Standard rectangular.
- Open top, comes with non-sealing PTFE cover.
- Two polished windows.
- Walls polished internally, fine ground externally.
- Suitable for use with all standard cell holders.
- Self-masking solid black walls enhance sensitivity and improve linearity at higher absorbances.

Light path /mm	Maximum Vol/ $\mu$ L	External Dimension (L x W x H) / mm	Quartz cell	Glass cell	Black Quartz cell
5	700	7.5 x 12.5 x 45	226-85301-05	226-85311-05	226-85401-05
10	1400	12.5 x 12.5 x 45	226-85301-10	226-85311-10	226-85401-10
20	2800	22.5 x 12.5 x 45	226-85301-20	226-85311-25	226-85401-20
40	5600	42.5 x 12.5 x 45	226-85301-40	226-85311-40	226-85401-40
50	7000	52.5 x 12.5 x 45	226-85301-50	226-85311-50	226-85401-50



10mm Semi-Micro Quartz cell, 226-85301-10



10mm Semi-Micro Quartz Black cell, 226-85401-10

## ■ Semi-Micro cell with PTFE Lid Black, Single cell – Lower sample volume

\*9mm thick base, not suitable for an instrument with an 8.5mm 'Z' dimension

Light path /mm	Maximum Vol/ $\mu$ L	External Dimension (L x W x H) / mm	Quartz cell
10	1160	12.5 x 12.5 x 45	226-85401-99



10mm Semi-micro Quartz Black cell, 226-85401-99

## ■ Semi-Micro cell with PTFE Lid, Single cell – Lower sample volume

\*9mm thick base, not suitable for an instrument with an 8.5mm 'Z' dimension

Light path /mm	Maximum Vol/ $\mu$ L	External Dimension (L x W x H) / mm	Quartz cell
10	1160	12.5 x 12.5 x 45	226-85501-10



10mm Semi-micro Quartz cell, 226-85501-10

## ■ Micro cells

- Reduced nominal volume to <20% of Standard rectangular.
- Open top, comes with non-sealing PTFE cover or a stopper providing a liquid-tight seal.
- Two polished windows.
- Walls polished internally, fine ground externally.
- Suitable for use with all standard cell holders.

### Cell with PTFE Lid

Light path /mm	Maximum Vol/ $\mu$ L	External Dimension (L x W x H) / mm	Quartz cell	Glass cell
5	350	7.5 x 12.5 x 45	226-85601-05	226-85611-05
10	700	12.5 x 12.5 x 45	226-85601-10	226-85611-10
20	1400	22.5 x 12.5 x 45	226-85601-20	226-85611-20
40	2800	42.5 x 12.5 x 45	226-85601-40	226-85611-40
50	3500	52.5 x 12.5 x 45	226-85601-50	226-85611-50



10mm Micro Quartz cell, 226-85601-10

# UV Cells

## ■ Micro cells

Cell with stopper

Light path /mm	Maximum Vol/ $\mu$ L	External Dimension (L x W x H) / mm	Quartz cell	Glass cell	Black Quartz cell
5	350	7.5 x 15.5 x 48	226-86301-05	226-86311-05	226-85001-05
10	700	12.5 x 12.5 x 48	226-86301-10	226-86311-10	226-85001-10
20	1400	22.5 x 12.5 x 48	226-86301-20	226-86311-20	226-85001-20
40	2800	42.5 x 12.5 x 48	226-86301-40	226-86311-40	226-85001-40
50	3500	52.5 x 12.5 x 48	226-86301-50	226-86311-50	226-85001-50

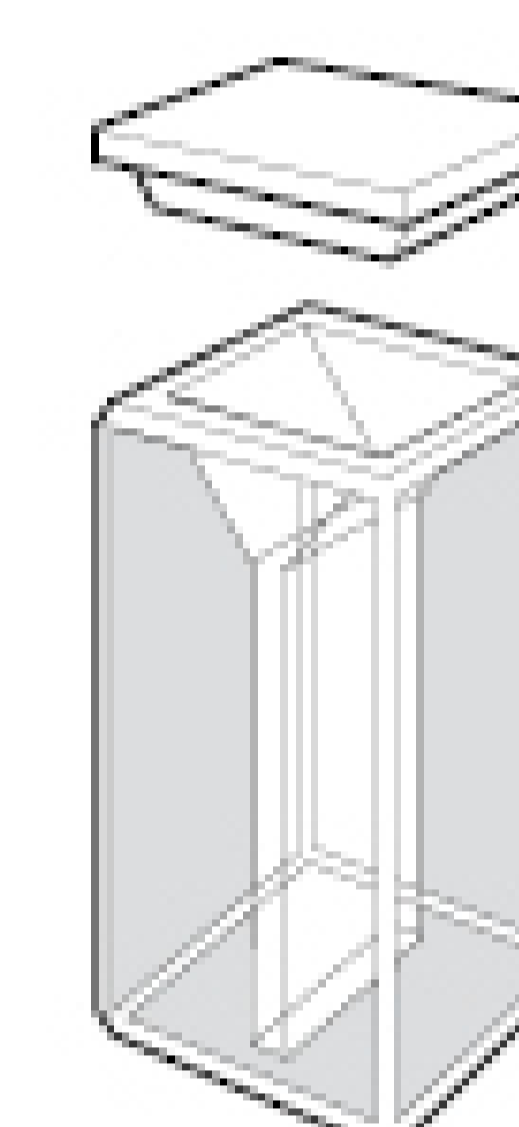


10mm Micro Quartz Cell with stopper, 226-85001-10

## ■ Micro short cell

- Two polished windows.
- Open top, comes with non-sealing PTFE cover.
- Walls polished internally, fine ground externally.

Light path /mm	Maximum Vol/ $\mu$ L	External Dimension (L x W x H) / mm	Type	Quartz cell
5	200	7.5 x 12.5 x 25	Clear	226-86101-05
10	400	12.5 x 12.5 x 25	Clear	226-86101-10
5	200	7.5 x 12.5 x 25	Black	226-89029-05
10	400	12.5 x 12.5 x 25	Black	226-89002-10



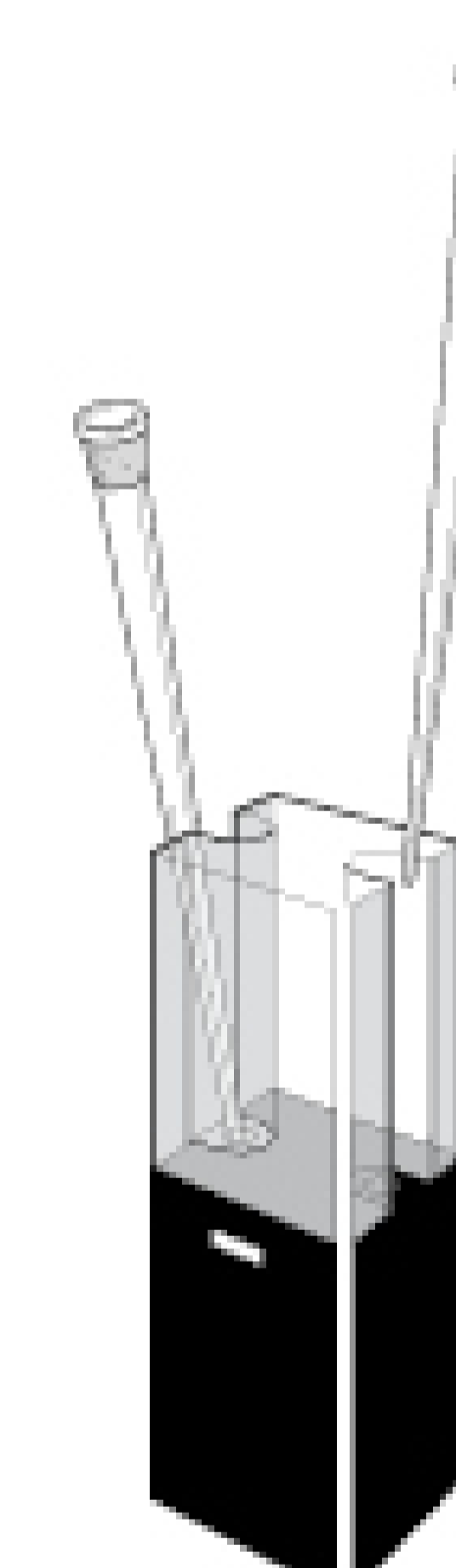
10mm Micro short Quartz Cell 226-86101-10

## ■ Ultra-micro lens cell

- Ultra-micro volume ranges from 0.5 $\mu$ l to 10 $\mu$ l.
- Two polished windows.
- Sample inserted and retrieved with micro pipette tip.
- Two micro pipette tips provided with each cell.

Light path /mm	Maximum Vol/ $\mu$ L	External Dimension (L x W x H) / cm	Z Height	Quartz cell
0.1	0.5	12.5 x 12.5 x 45	15	226-89031-01
1	5	12.5 x 12.5 x 45	15	226-86201-01
5	2.5	12.5 x 12.5 x 45	15	226-86201-05
5	5	12.5 x 12.5 x 45	15	226-89001-05*
10	5	12.5 x 12.5 x 45	15	226-86201-10

\*Has integral focusing lens which increases the energy entering the sample



0.1mm Ultra-micro Lens Quartz Cell, 226-89031-01

## ■ Cylindrical Cell, single cell

- Two polished windows.
- Closed by PTFE stopper, providing a liquid-tight seal.
- 10 & 20 mm cell closed by a single PTFE stopper
- 50 & 100 mm cell closed by two PTFE stoppers
- Internal diameter = 19mm

Light path /mm	Maximum Vol/ $\mu$ L	External Dimension (Dia. x L) / mm	Quartz cell	Glass cell
10	2800	22 x 12.5	226-85701-10	226-85711-10
20	5600	22 x 22.5	226-85701-20	226-85711-20
50	14100	22 x 52.5	226-85701-50	226-85711-50
100	28200	22 x 102.5	226-85701-00	226-85711-00



10mm Cylindrical Quartz Cell,  
226-85701-10

## ■ Standard Fluorescence Cell with PTFE Lid, Single cell

- Open top, with non-sealing PTFE cover.
- Four windows and base polished.

Light path /mm	Maximum Vol/ $\mu$ L	External Dimension (L x W x H) / mm	Quartz cell	Glass cell
5	1700	7.5 x 12.5 x 45	226-85801-05	226-85811-05
10	3500	12.5 x 12.5 x 45	226-85801-10	226-85811-10
20	7000	22.5 x 12.5 x 45	226-85801-20	226-85811-20
40	14000	42.5 x 12.5 x 45	226-85801-40	226-85811-40



10mm Fluorescence Cell,  
226-85801-10

## ■ Micro Fluorescence Cell with PTFE Lid, Single cell

- Four windows and base polished.
- Comes with non-sealing PTFE cover.
- Base thickness - 3mm
- Suitable for use with all standard cell holders.

Light path /mm	Maximum Vol/ $\mu$ L	External Dimension (L x W x H) / mm	Quartz cell
10	700	12.5 x 12.5 x 45	226-85901-10

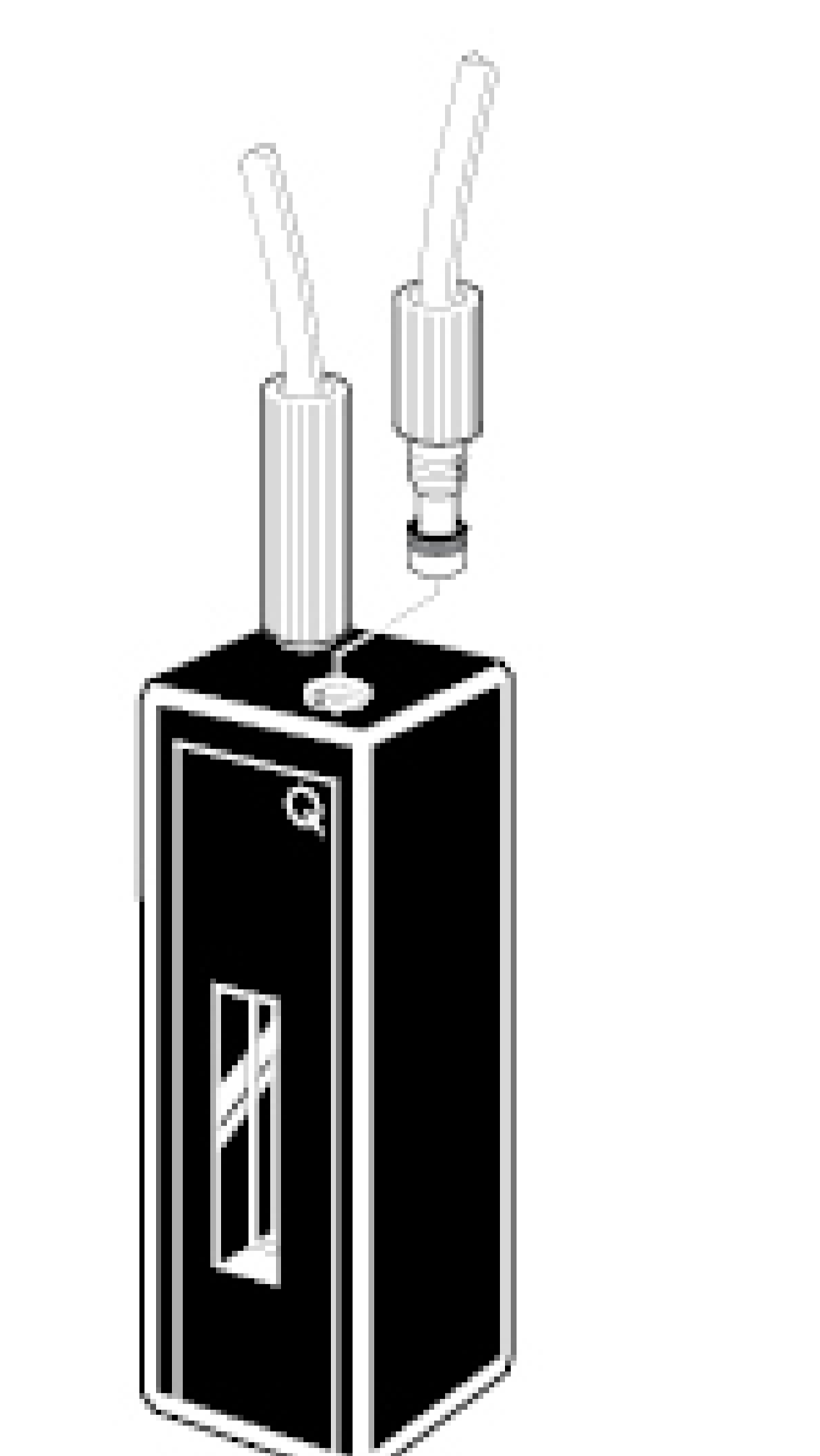


Micro Fluorescence Cell,  
226-85901-10

## ■ Flow cells

- Two polished windows, long aperture.
- Path lengths of 0.5mm or less incorporate by-pass tubes to avoid back pressure and assist laminar flow through the sample compartment.
- M6 Screw-in connections.
- Profiled sample compartment to optimize flow characteristics, reduces carry over and bubble retention.

Light path /mm	Maximum Vol/ $\mu$ L	External Dimension (L x W x H) / mm	Z Height	Quartz cell
0.1	41	12.5 x 12.5 x 45	15	226-89021-01
0.2	47	12.5 x 12.5 x 45	15	226-89022-02
0.5	95	12.5 x 12.5 x 45	15	226-89023-05
1	120	12.5 x 12.5 x 45	15	226-89024-10



0.5mm Flow Cell,  
226-89023-05

# Spectrum Consumables

## Certified Glass Filter



■ **Shimadzu Glass Filters are accepted by the following bodies:**

- United States Pharmacopeia
- American Society for Testing and Materials
- Therapeutic Goods Administration (Australia)
- British Pharmacopoeia

■ **Characteristics:**

- Each glass filter is individually certified.
- Certificate of Calibration and Traceability are provided

Material	Part number	Wavelength range	Usage
Didymium	226-85009-01	430 nm to 890 nm	For wavelength analysis
Holmium Oxide	226-85009-02	240 nm to 640 nm	
Didymium Oxide/Neutral Density	226-85009-21	430 nm to 890 nm	For wavelength and absorbance analysis
Holmium Oxide/Neutral Density	226-85009-22	360 nm to 640 nm	

## Accessories

Part Number	Description
226-80001-00	KBr Agate Mortar and Pestle, 5cm
226-89001-00	UV 10mm matched pair cell GSKit

# Nano Stick - S

The optimized nano cuvette for concentration and purity measurements of DNA, RNA, oligonucleotides and proteins

## ■ Features:

- Dedicated cell for micro volume of sample
- Compatible with any kind of UV-Vis. Spectrophotometer
- No need for any special cell holder.
- Easy to use and clean

## ■ Specifications:

Pathlength	0.5 mm
Physical Dimensions	12.5 x 12.5 x 60 mm (WDH)
Beam Height (Z-Dimension)	15 or 8.5mm types
Minimum Sample Volume	2 uL
Recommended Sample Volume	2.5 – 3 uL
DNA Detection Limit	1.1 ng/uL
DNA Maximum Concentration	3000 ng/uL
DNA Reproducibility at 100 ng/uL	±1.0 ng/uL
DNA Reproducibility at 1000 ng/uL	±3.0 ng/uL
Protein Detection Limit	0.06 mg/ml
Protein Maximum Concentration	100 mg/ml
Protein Reproducibility at 2 mg/ml	±0.02 mg/ml
Protein Reproducibility at 10 mg/uL	±0.05 mg/ml

## ■ Application:

- Nucleic Acid concentration measurement
- Nucleic Acid purity measurement
- Protein concentration measurement (Direct UV method)
- Bio / Life Science
- Medical
- Environmental / Agriculture
- Food / Beverage

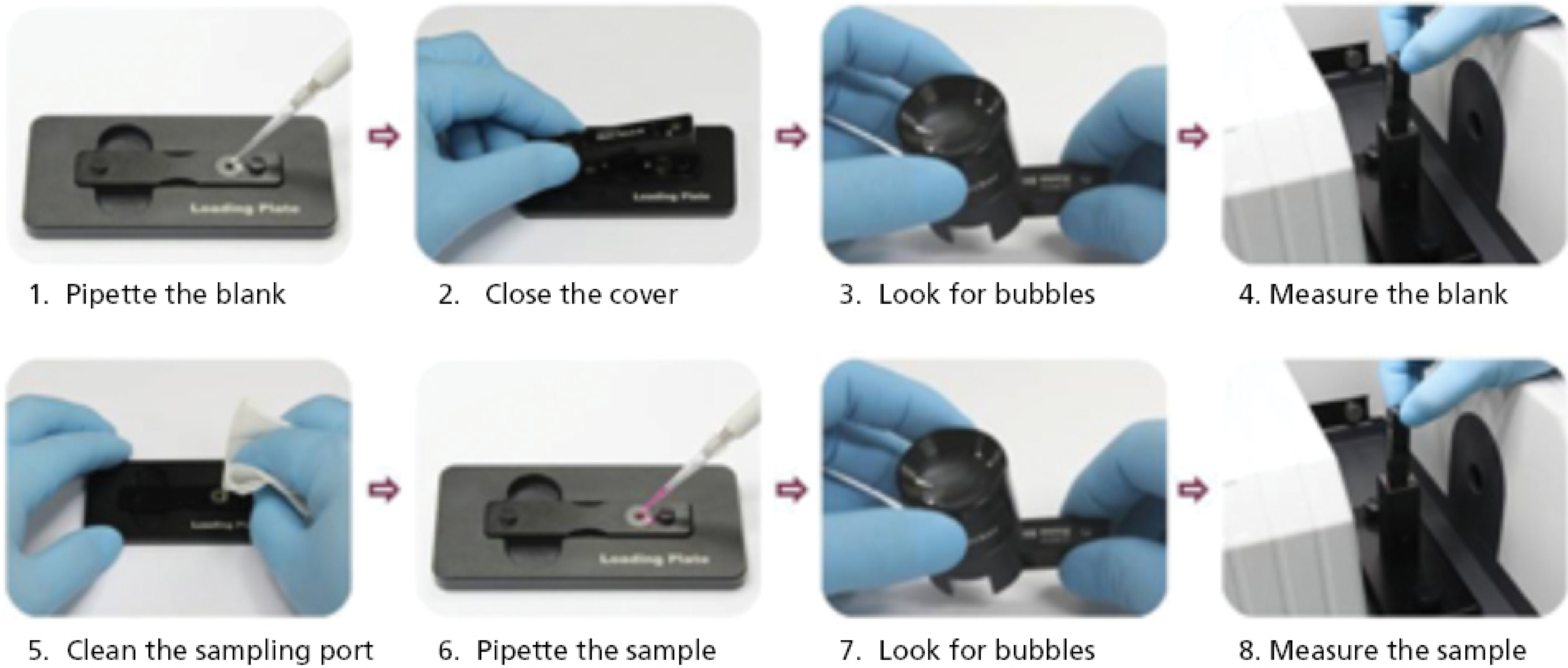


# Spectrum Consumables

## ■ Nano Stick – S Components (Red) :



## ■ How to use:



■ For next sample measurement, repeat the procedures 5~8.

Part number	Path Length	Description
226-80002-03	0.5 mm	NanoStick-S, Single Port, Z-height 15 mm, Black, one cell
226-80002-02	0.5 mm	NanoStick-S, Single Port, Z-height 15 mm, Red, one cell

# Autosampler vials for AAS, ICPE, ICPMS

## ■ Features:

- Easy to use, pre-calibrated for make-up volume
- Made of polypropylene to avoid contamination
- Cost-effective
- Suitable for sample storage (comes with lid)

## ■ Autosamplers:

- ASC-6880/7000 for Flame AAS
- AS-10/ ASX-280/560 for ICP/ICPMS
- Available in economy pack of 500 vials



15mL vial



50mL vial

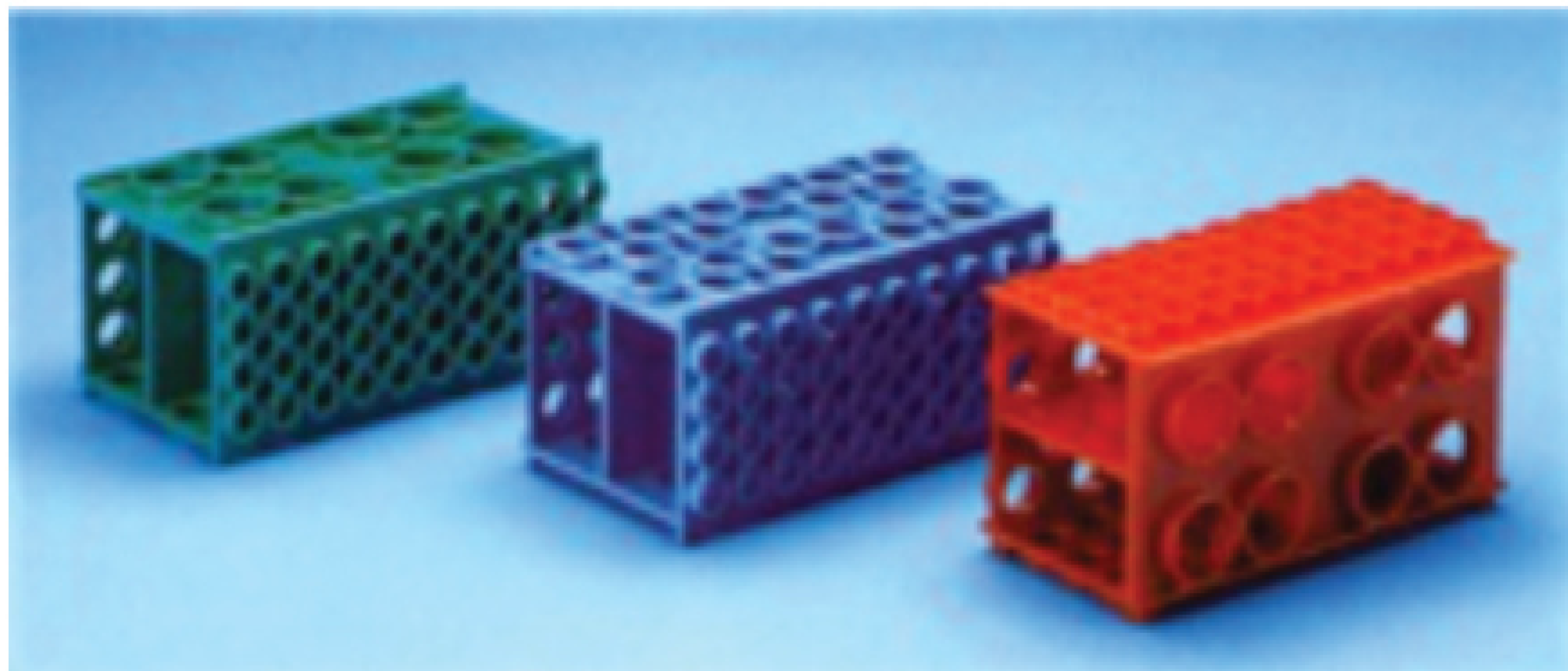
Part number	Description	Pack Size
226-89902-01	15ml Autosampler vials for AAS, ICPE, ICPMS	500 pcs
226-89902-02	50ml Autosampler vials for AAS, ICPE, ICPMS	500 pcs

# PP Test Tube Rack for Autosampler vials

## Features:

- PP Stand for 15 ml and 50 ml autosampler vials
- 4-way rack for to suit different size vials
- Suitable for sample make-up and storage
- Facilitates manual mode analysis

Part number	Description	Pack Size
226-89903-01	4 way PP Test Tube Rack, Natural	4 pcs



Appendix I

Septa

Septa Selection Guide

Septum Material	Description	Temperature (°C)
PTFE/Red Rubber	Most popular and economical choice for general GC and HPLC applications. Used for routine analysis in GC with FID, TCD and FPD detectors or HPLC with UV/Vis and RI detectors. They offer moderate resealability and excellent chemical inertness prior puncture. Low durometer of rubber allows ease of needle penetration. PTFE/Red Rubber septa are not recommended for multiple injections or storage of samples.	-40 to 110
PTFE/Silicone	Ideal for use in GC and HPLC applications for its high resealability even after repeated punctures. Good for sensitive analysis (lower background) and storage of samples. PTFE/Silicone septa are soft and more easily punctured, and protects the needle in autosampler.	-60 to 200
PTFE/Silicone, pre-slit	Share the same chromatographic characteristics, physical and chemical property as non-slit PTFE/Silicone septa. The cross-slit aid in needle penetration for low coring, and prevent formation of vacuum when multiple injection or large volume of sample is withdrawal from vial. However, the pre-slit septa are not recommended for storage of samples due to evaporation of volatile organic solvents through the slit.	-60 to 200
PTFE/Silicone/PTFE	Recommended for ultra trace analysis, or where there is a longer time between injections. PTFE liners on both sides of Silicone resist coring during penetration, and protects Silicone from chemical attacks.	-60 to 200
Butyl/PTFE	The PTFE barrier provides excellent chemical resistance to most solvents. Butyl/PTFE septa has good resealability and suitable for gas sampling due to low permeability.	-40 to 120

Physical Characteristic and Solvent Compatibility of Materials used for Caps and Septa.

The chart below displayed the physical characteristic and solvent compatibility of materials used for caps and septa. You might want to test your product under actual conditions of use as there are many factors that can affect chemical resistance.

Physical Characteristic of Caps and Septa

Code	Description	Appearance	Temp. MAX °C	Temp. MIN °C	Autoclavable	Dry Heat	Gamma	Microwavable	Ethylene Oxide	Analytical Purity	Fragmentation*	Hardnes†	Resealability‡
PP	Polypropylene	Translucent	135	-20	Yes	No	No	Yes	Yes	Method Dependent	Low	Medium hard	No resealability
PTFE	Polytetra-fluorethylene	White	260	-200	Yes	Yes	Yes	Yes	Yes	Very high	Low	Very hard (Very thin)	No resealability
RR	Synthetic Red Rubber/PTFE	Red/beige	110	-30	No	No	No	No	No	Medium	Medium	Medium hard	Medium
Butyl	Grey Butyl	Opaque grey	125	-20	Yes	No	Yes	Yes	Yes	Method Dependent	Low to Medium	Soft to medium	Highly resealable
T/S	Silicone/PTFE	White/Red	200	-60	Yes	Yes	Yes	Yes	Yes	High	Low to Medium	Soft	Highly resealable
T/S/T	PTFE/Silicone/PTFE	Red/White/Red	200	-60	Yes	Yes	Yes	Yes	Yes	High	Very low	Soft	Good

\* Due to hardness and molecular structure (coring)

† Needle penetration

‡ In case of multiple injection

Chemical Resistance of Vials and Caps

Chemical	Glass	PP	Chemical	Glass	PP	Chemical	Glass	PP
1,2-Dichloroethane	EE	NN	Diacetone	EE	GF	n-Amyl Acetate	EE	GF
1,2,4-Trichlorobenzene	EE	NN	Diacetone Alcohol	EE	EF	n-Butanol	EE	EE
1,4-Dioxane	EE	GF	Dibutylphthalate	EE	NN	n-Butyl Acetate	EE	GF
2,2,4-Trimethylpentane	EE	FN	Diethyl Benzene	EE	NN	n-Decane	EE	FN
2,4 Dichlorophenol	EE	NN	Diethyl Ether	EE	NN	n-Heptane	EE	FF
2-Butanol	EE	EE	Diethyl Ketone	EE	GG	Nitric Acid, 10%	EE	EE
2-Methoxyethanol	EE	EE	Diethyl Malonate	EE	EE	Nitric Acid, 20%	EE	FF
2-Propanol	EE	EE	Diethylamine	EE	GN	Nitric Acid, 50%	EE	FN
Acetaldehyde	EE	GN	Diethylene Dioxide	EE	GF	Nitric Acid, 70%	EE	NN

## Appendix I

Acetamide, Sat.	EE	EE	Diethylene Glycol	EE	EE	Nitrobenzene	EE	NN
Acetic Acid, 5%	EE	EE	Dimethyl Acetamide	EE	EE	Nitromethane	EE	FN
Acetic Acid, 50%	EE	EE	Dimethyl Formamide	EE	EE	n-Octane	EE	EE
Acetic Acid, Glacial	EE	EG	Dimethylsulphoxide (DMSO)	EE	EE	o-Dichlorobenzene	EE	FN
Acetic Anhydride	EE	GF	Dioxane	EE	GF	Oil, Mineral	EE	EE
Acetone	EE	EG	Dipropylene Glycol	EE	EE	Oxalic Acid, 10%	EE	EE
Acetonitrile	EE	FN	Ether	EE	NN	Ozone	EE	EG
Acetophenone	EE	FN	Ethyl acetate	EE	EG	p-Chloroacetophenone	EE	EE
Acrylonitrile	EE	EE	Ethyl Alcohol (Absolute)	EE	EG	p-Dichlorobenzene	EE	GF
Adipic Acid	EE	EE	Ethyl Alcohol, 40%	EE	EG	Perchloric Acid	EE	GN
Allyl Alcohol	EE	EE	Ethyl Alcohol, 96%	EE	EE	Perchloric Acid, 70%	EE	GN
Aluminum Hydroxide	SS	EG	Ethyl Benzene	EE	NN	Perchloroethylene	EE	NN
Amino Acids	EE	EE	Ethyl Benzoate	EE	GF	Phenol, 100%	EE	NN
Ammonia	SS	EE	Ethyl Butyrate	EE	GN	Phenol, 50%	EE	NN
Ammonia, 25%	SS	EE	Ethyl Chloride	EE	FN	Phenol, Crystals	EE	GN
Ammonium Glycolate	EE	EG	Ethyl Chloride, Liquid	EE	FN	Phenol, Liquid	EE	NN
Ammonium Hydroxide, 30%	SS	EG	Ethyl Cyanoacetate	EE	EE	Phosphoric Acid, 5%	EE	EE
Ammonium Hydroxide, 5%	SS	EE	Ethyl Lactate	EE	EE	Phosphoric Acid, 85%	EE	EG
Ammonium Oxalate	EE	EG	Ethylene Chloride	EE	FN	Picric Acid	EE	NN
Ammonium Salts	EE	EE	Ethylene Glycol	EE	EE	Potassium Hydroxide, 1%	SS	EE
Amyl Alcohol	EE	EE	Ethylene Oxide Gas	EE	FF	Potassium Hydroxide, 30%	SS	EE
Amyl Chloride	EE	NN	Ethylene Oxide, 100%	EE	FF	Potassium Permanganate	EE	EE
Aniline	EE	GF	Fatty Acids	EE	EG	Propane Gas	EE	NN
Aqua Regia	SS	NN	Fluorine	EE	FN	Propionic Acid	EE	EG
Arsenic Acid	EE	EE	Formaldehyde, 10%	EE	EE	Propylene Glycol	EE	EE
Benzaldehyde	EE	EG	Formaldehyde, 40%	EE	EG	Propylene Oxide	EE	EG
Benzenamine	EE	GF	Formalin, 10%	EE	EE	Pyridine	EE	NN
Benzene	EE	NN	Formalin, 40%	EE	EG	Resorcinol, 5%	EE	EE
Benzoic Acid, Sat.	EE	EG	Formic Acid	EE	EG	Resorcinol, Sat.	EE	EE
Benzyl Acetate	EE	EG	Formic Acid, 100%	EE	EG	Salicylaldehyde	EE	EG
Benzyl Alcohol	EE	NN	Formic Acid, 3%	EE	EG	Salicylic Acid, Sat.	EE	EE
Boric Acid	EE	EE	Formic Acid, 50%	EE	EG	Salt Solutions, Metallic	SS	EE
Bromine	EE	NN	Formic Acid, 85%	EE	EG	Silicone Oil	EE	EE
Bromobenzene	EE	NN	Freon TF	EE	EG	Silver Nitrate	EE	EG
Bromoform	EE	NN	Glutaraldehyde	EE	EE	Sodium Dichromate	EE	EE
Butadiene	EE	NN	Glycerine (Glycerol)	EE	EE	Sodium Hydroxide, 50%	SS	EE
Butyl Acetate	EE	FF	Hexane	EE	GF	Sodium Hydroxide, 1%	SS	EE
Butyl Chloride	EE	NN	Hydrazine	EE	NN	Sodium Hydroxide, 10%	SS	EE
Butyric Acid	EE	NN	Hydrobromic Acid, 4%	EE	EG	Sodium Hypochlorite, 15%	EE	GF
Calcium Hydroxide	SS	EE	Hydrobromic Acid, 48%	EE	EE	Stearic Acid	EE	EE
Calcium Hypochlorite	EE	EE	Hydrobromic Acid, 69%	EE	EG	Sulfur dioxide	EE	NN
Carbazole	EE	EE	Hydrochloric Acid, 20%	EE	EE	Sulfur Dioxide, wet or dry	EE	EE
Carbon Disulphide	EE	NN	Hydrochloric Acid, 35%	EE	EG	Sulfur Salts	FE	FN
Carbon Tetrachloride	EE	GF	Hydrochloric Acid, 5%	EE	EE	Sulfuric Acid, (96%)	EE	FN
Cellosolve Acetate	EE	EG	Hydrogen Peroxide, 3%	EE	EE	Sulfuric Acid, 20%	EE	EG
Chlorine Water	EE	FN	Hydrogen Peroxide, 30%	EE	EG	Sulfuric Acid, 30%	EE	EG
Chlorine, 10% (Moist)	EE	FN	Hydrogen Peroxide, 90%	EE	EG	Sulfuric Acid, 6%	EE	EE
Chlorine, 10% in air	EE	FN	Isobutanol	EE	EE	Sulfuric Acid, 60%	EE	EG
Chlorine, wet gas	EE	FN	Isopropanol, 100%	EE	EE	Sulfuric Acid, 98%	EE	FN
Chloroacetic Acid	EE	EG	Isopropyl Acetate	EE	GF	Tartaric Acid	EE	EE
Chlorobenzene	EE	NN	Isopropyl Benzene	EE	FN	Tetrahydrofuran	EE	GF
Chloroform	EE	NN	Isopropyl Ether	EE	NN	Thionyl Chloride	EE	NN
Chromic Acid, 10%	EE	EE	Lactic Acid, 3%	EE	EG	Tincture of Iodine	EE	GG
Chromic Acid, 20%	EE	GG	Lactic Acid, 85%	EE	EG	Toluene	EE	FN
Chromic Acid, 50%	EE	GF	Mercury	EE	EE	Tributyl Citrate	EE	GF
Chromic:Sulfuric Acid	EE	NN	Methanol, 100%	EE	EE	Trichloroacetic Acid (TCA)	EE	FN
Mixture,96%			Methoxyethyl Oleate	EE	EG	Trichloroethane	EE	NN
Citric Acid, 10%	EE	EE	Methyl Acetate	EE	GF	Trichloroethylene	EE	NN
Cresol	EE	GF	Methyl Ethyl Ketone	EE	EG	Triethylene Glycol	EE	EE
Cyclohexane	EE	FN	Methyl Isobutyl Ketone	EE	GF	Tripropylene Glycol	EE	EE
Cyclohexanone	EE	FN	Methyl Propyl Ketone	EE	GF	Tris Buffer, Solution	EE	EG
Cyclopentane	EE	FN	Methylene Chloride	EE	FN	Urea	EE	EE
Decahydronaphtalene	EE	GF	Methyl-t-Butyl Ether	EE	FN	Xylene	EE	FN

The first character indicates the characteristics of vials and cap at low temperature; the second character indicates the characteristics at high temperature conditions.

# Appendix I

E = No damage after 30 days of constant exposure; G = Little of no damage after 30 days of constant exposure; F = Some effect after 7 days of constant exposure; N = Immediate damage may occur. Not recommended for continuous use; S = Surface.

## Solvent Compatibility of Materials Used for Septa

Solvent	PTFE/Red Rubber	PTFE/Silicone	PTFE/Silicone/PTFE	PTFE/Butyl
Acetic Acid Aqueous	A(A)	A(A)	A(A)	A(A)
Acetone	A(A)	A(A)	A(B)	A(A)
Acetonitrile	A(A)	A(A)	A(–)	A(A)
Alcohols (Aromatic)	A(B)	A(A)	A(–)	A(B)
Alcohols (Aliphatic)	A(A)	A(A)	A(–)	A(A)
Amyl Acetate	A(A)	A(C)	A(D)	A(A)
Aqueous Solution Dilute	A(A)	A(A)	A(–)	A(A)
Benzene	A(D)	A(C)	A(D)	A(D)
Butyl Alcohol	A(B)	A(B)	A(B)	A(B)
Carbon Disulphide	A(D)	A(A)	A(–)	A(D)
Carbon Tetrachloride	A(D)	A(C)	A(D)	A(D)
Chloroform	A(D)	A(C)	A(D)	A(D)
Cyclohexane	A(D)	A(C)	A(D)	A(D)
Cyclohexanol	A(D)	A(B)	A(–)	A(D)
Diethyl Ether	A(D)	A(B)	A(–)	A(D)
Dimethyl Sulphoxide	A(C)	A(A)	A(–)	A(C)
Dioxane	A(B)	A(C)	A(D)	A(B)
Esters	A(B)	A(B)	A(–)	A(B)
Ethyl Acetate	A(B)	A(B)	A(B)	A(B)
Ethyl Alcohol	A(A)	A(A)	A(B)	A(A)
Ethylene Chloride	A(D)	A(C)	A(D)	A(D)
Ethylene Glycol	A(A)	A(A)	A(A)	A(A)
Formaldehyde	A(B)	A(A)	A(B)	A(B)
Glycol	A(A)	A(A)	A(A)	A(A)
Halogenated Hydrocarbons	A(D)	A(A)	A(–)	A(D)
Hexane	A(D)	A(C)	A(D)	A(D)
Hydrochloric Acid Dilute	A(A)	A(A)	A(–)	A(A)
Iso-Octane	A(D)	A(C)	A(D)	A(D)
Ketones	A(A)	A(B)	A(–)	A(A)
MeOH/H <sub>2</sub> O/Acetonitrile	A(A)	A(B)	A(–)	A(A)
Methanol	A(A)	A(A)	A(A)	A(A)
Methyl Chloride	A(C)	A(A)	A(D)	A(C)
Methyl Acetate	A(B)	A(B)	A(D)	A(B)
Methyl Ethyl Ketone	A(A)	A(A)	A(D)	A(A)
Methyl Chloride	A(D)	A(B)	A(–)	A(D)
Nitric Acid Dilute	A(A)	A(B)	A(B)	A(A)
Pentane	A(D)	A(C)	A(–)	A(D)
Petroleum Ether	A(D)	A(C)	A(–)	A(D)
Sodium Hydroxide	A(A)	A(A)	A(B)	A(A)
Sulphuric Acid Dilute	A(D)	A(B)	A(D)	A(D)
Surfactants	A(A)	A(A)	A(–)	A(A)
Toluene	A(D)	A(C)	A(D)	A(D)
Trichloroethylene	A(D)	A(C)	A(D)	A(D)
Water	A(A)	A(A)	A(A)	A(A)

The first character indicates the characteristics of septa prior puncture. The second character indicates the characteristics of septa after puncture.  
A = Recommended; B = Suitable for most purposes; C = Use with care; D = Not advisable; - = Not tested.

### Product Description

#### 1) Seal

A seal is an already assembled closure consisting of a cap and septum.

#### 2) Rubber

Red Rubber/PTFE is a synthetic rubber which is softer and show less fragmentation than Natural Rubber/PTFE. It has better cleanliness and purity than Natural Rubber/PTFE but inferior than Silicone. Nevertheless, it does not have the outstanding resealability property like Natural Rubber for multiple injections.

#### 3) Pre-slit septa

The septa are cross-slit to aid in the needle penetration. The Septa are only cut through the Silicone layer, but not the PTFE layer to avoid the risk of concentration changes due to solvent loss or contamination from the environment.

#### 4) Ultrabond

The Ultrabond seal is that the septa and screw cap form an inseparable unit. The molecular structure of the contact areas of the PP screw cap and the septa are modified such that it requires no glue or adhesive between the two to form a firm unit. The Ultrabond products is recommended over a general cap/septa assembly:

- To avoid pushing the septa into the vial when use with very thick and dull needles
- For screw caps with a wide diameter, where a septum cannot achieve any press-fit in the cap

#### 5) Micro-insert

A Micro-insert is different from a Micro-vial where it cannot be sealed on its own. The diameter of the Micro-insert is depending on the size of vial opening. A Micro-insert reduces the volume of sample needed and allow the needle to pick up even the smallest sample quantities.

Appendix I

Syringe filter order guideline

Choosing the right membrane is important. The wrong membrane could cause loss of valuable samples, time and money. Please use below guideline and chemical compatibility table as reference.

Hydrophilic Nylon	pH 6-13	<ul style="list-style-type: none"><li>Naturally hydrophilic, high protein binding, high dirt-loading, surfactant-free and offer the lowest extractables.</li><li>Filtering of general samples and organic solvents.</li><li>Not recommended for use with acids.</li></ul>
Hydrophilic PVDF (polyvinylidene fluoride)	pH 3-12	<ul style="list-style-type: none"><li>Extremely low protein binding.</li><li>Good chemical compatibility.</li><li>For filtration of non-aggressive aqueous and mild organic solutions, or when maximizing protein recovery is important.</li></ul>
Hydrophilic RC (regenerated cellulose)	pH 3-12	<ul style="list-style-type: none"><li>Hydrophilic membrane with good solvent resistance.</li><li>Low protein binding and extractables.</li><li>Good chemical compatibility with nearly all common HPLC solvents and stable against DMSO.</li><li>Good for general filtration, tissue culture media filtration or life science applications.</li></ul>
Hydrophilic PES (polyethersulfone)	pH 3-12	<ul style="list-style-type: none"><li>Low protein binding and extractables.</li><li>Good for life science applications.</li></ul>
PTFE	pH 1-14	<ul style="list-style-type: none"><li>High chemical compatibility.</li><li>High temperature resistance.</li><li>Good for filtration of gases, aggressive chemicals, and strong acid.</li></ul>
Cellulose Acetate (CA)	pH 4-8	<ul style="list-style-type: none"><li>Low protein binding</li><li>For filtration of aqueous solutions</li><li>Good for applications involving culture media</li></ul>
Mixed Cellulose Ester (MCE)	pH 4-8	<ul style="list-style-type: none"><li>High protein binding</li><li>Good for general filtration of aqueous solutions.</li></ul>

■ Solvent Compatibility:

Solvent	MCE	CA	PES	Nylon	PVDF	PTFE	RC
Acetic Acid (glacial)	X	X	O	X	O	O	LR
Acetone	X	X	X	O	X	O	O
Acetonitrile (ACN)	X	X	X	O	LR	O	O
Benzene	O	O	X	O	O	O	O
Butyl Alcohol	O	O	O	O	O	O	O
Chloroform	O	X	X	X	O	O	O
Cyclohexanone	X	X	X	O	X	O	O
Dimethyl Sulfoxide (DMSO)	X	X	X	O	X	O	O
Ethyl Acetate	X	X	X	O	O	O	O
Ethyl Alcohol	X	O	O	O	LR	O	O
Formaldehyde	X	X	NI	O	O	O	LR
Hexane	O	O	O	O	O	O	O
Hydrochloric Acid, 1N (HCl)	LR	LR	O	LR	O	O	X
Hydrochloric Acid, 6N (HCl)	LR	X	LR	X	LR	O	X
Hydrochloric Acid, 12N (HCl)	X	X	LR	X	X	O	X
Hydrogen Peroxide, 3%	X	O	NI	O	O	O	X
Isopropyl Alcohol	X	O	O	LR	O	O	O
Methanol	X	O	O	LR	O	O	O
Nitric Acid, 6N (HNO3)	X	O	O	X	O	O	X
Nitric Acid, 12N (HNO3)	X	X	NI	X	X	LR	X
Sodium Carbonate (aqueous)	O	NI	NI	LR	O	O	NI
Sodium Hydroxide, 3N (NaOH)	X	X	O	O	O	O	X
Sulfuric Acid, 6N (H2SO4)	LR	X	LR	X	LR	O	LR
Sulfuric Acid, 32N (H2SO4)	X	X	X	X	LR	LR	X
Tetrahydrofuran (THF)	X	X	NI	O	X	O	O
Toluene	O	O	O	O	O	O	O

O: Recommended	LR: Limited recommendation	X: Not recommended	NI: No info
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