MICROCOLUMN

SGE Syringes

TRAJAN

Syringes for the laboratory

SGE Syringes

SGE syringes have been the syringe of choice in analytical laboratories for over 50 years

In the laboratory it is essential to have the right consumables to deliver an efficient workflow. The analytical syringe plays an important role in ensuring consistent delivery, precision, accuracy, and integrity of the sample.

Trajan Scientific and Medical (Trajan) is focused on delivering a portfolio of high performance syringes designed to meet these requirements.

We combine precision manufacturing and meticulous assembly, to create SGE syringes for precise volume delivery of your analytical samples.

Our comprehensive expertise in liquid handling technologies with glass and metal assembly enables us to develop syringes for a vast variety of applications.

We are confident this guide will assist you in identifying the right SGE syringe for your application. If you need help with your selection, please contact us to recommend appropriate products or to investigate a custom solution for you.

Contents

SGE Syringes | Structure of a syringe

Front screw or needle cap

Made from nickel plated brass, protects the syringe barrel from chipping and breakage.

Needle

Stainless steel needles for robustness and corrosion resistance. Fixed and removable needle options in a wide range of lengths and diameters.

Knurled front cover nut

Needle tip

A range of tip styles are available for a wide range of applications.

Removable needle

Removable needles can be replaced if bent, blocked or broken without the need to replace the entire syringe.

Needle spring/ seal/hub

Plunger tip PTFE or metal

Backing strip and scale

Bright white backing with black scale markings on manual syringes for accurate reading of the syringe scale.

Autosampler syringes have colored backing strips, distinguished by volume for easy identification of installed syringes.

Barrel

Made from borosilicate glass for robustness and solvent resistance.

Back flange

Shape provides stability and prevents syringe rolling away, made from nickel plated brass or stainless steel to resist fracture.

Plunger protection

Guides the plunger into the syringe. Helps to prevent plunger bending.

Plunger button

Designed for easy syringe use or to fit appropriate autosampler.

Plunger stem

SGE Syringes - volumetric color guide

SGE Syringes for autosamplers incorporate a vibrant color scheme, distinguished by volume, enabling easy identification of syringes installed in instruments.

Choose from a comprehensive range of SGE Syringe options including plunger protection, removable or fixed needles, a range of needle gauge and length options as well as needle tip style alternatives.

Color	Syringe capacities			
Light orange	500 nL (0.5 µL)	500 µL		500 mL (0.5 L)
Yellow	1000 nL (1 µL)		1 mL	1000 mL (1 L)
Lime	5000 nL (5 µL)	5 µL	5 mL	
Dark orange		10 µL	10 mL	
Green		25 µL	25 mL	
Purple		50 µL	50 mL	
Aqua		100 µL	100 mL	
Gray		250 µL	2.5 mL	2000 mL (2 L)

SGE Syringes | Which syringe to use?

Trajan offers a complete choice in syringes with a range of capacities, termination types, and numerous needle sizes for a wide range of applications. The following sections explain the SGE Syringe features and how to select the ideal syringe for any application.

What type of syringe?

If the syringe is being used by hand, a manual syringe should be selected. If the syringe is installed in an instrument then select an autosampler syringe to suit that particular instrument.

Manual syringe

Autosampler syringe

Trajan has a large range of manual syringes for use in chromatography and many other applications. SGE manual syringes have a bright white backing and contrasting black print making them easy to read the fluid level. This provides confidence the right volume is being delivered every time.

Trajan's extensive range of SGE autosampler syringes meet all fit, form and function criteria of a specific autosampler model. As minimum requirements, they meet dimensional specifications, have accuracy of better than ±1%*, are designed for worry free overnight sampling, have extended life, and are color coded by capacity for easy identification.

Consider the eVol® XR the digital analytical syringe for precise programmable injections. eVol syringes are easily and quickly changed allowing them to be dedicated to individual liquids or methods to prevent possible cross contamination of reagents.

eVol XR

What size syringe?

For the best possible injection reproducibility and accuracy, the smallest injectable volume from any syringe (with the exception of eVol) should be no less than 10% of its total capacity. For example: the smallest recommended injection volume from a 10 µL syringe would be 1 µL.

To accurately dispense 1 µL or less a NanoVolume syringe is recommended. SGE NanoVolume syringes are available with capacities ranging from 0.5 µL to 5 µL. These syringes can inject down to 0.05 µL because the entire sample is contained within the needle. Designed with submicron tolerances, these syringes are rugged, robust and reliable with virtually zero dead volume. Liquid tight, they provide precision and accuracy of ±2%.

**Plunger-in-barrel syringes.*

Termination

Termination refers to the interface between the syringe barrel and its mating connection such as the needle. There are several different termination options to accommodate a wide range of applications.

Many syringes are supplied and used with needles attached; there are also other terminations available: Luer Lock, Luer Tip, and threaded terminations.

Luer Lock termination

- For Luer Lock needles and fittings, syringe filters and pump priming.
- Specifically designed to secure Luer Lock needles.

Luer Tip termination

- For Luer Lock needles and fittings.

Luer Lock and Luer Tip fittings are a universal fitting with a male Luer taper made from Kel-F® or PTFE to ISO standard 594. Luer Lock needles and fittings are used with syringes having Luer terminations. These syringes are often used with syringe filters and syringe pumps.

Trajan offers both fixed and removable Luer Lock syringes. Fixed Luer Lock syringes have a Luer fitting that is permanently fixed to the barrel. If the tip is ever damaged, the syringe will need to be replaced. Removable Luer Lock syringes have Luer fittings that screw onto the barrel with the Luer Tip inserted. Luer tips and Luer fittings can be replaced if these are damaged. Removable Luer tips need to be tightened securely to ensure they do not come loose during use.

Syringes with threaded terminations screw into a valve or other device, and are required for some LC autosamplers, syringe pumps and dispensers. There are many thread terminations possible, contact Trajan if you require a particular threaded termination that is not covered in this selection guide.

Trajan's termination codes for SGE Syringes:

F	Fixed needle
R	Removable needle
LL	Luer Lock
LT	Luer Tip

Barrel internal diameter

When using a syringe pump, the internal diameter (ID) of the syringe barrel is required to calculate the pumping speed. The table below lists the IDs of SGE syringes based on capacity.

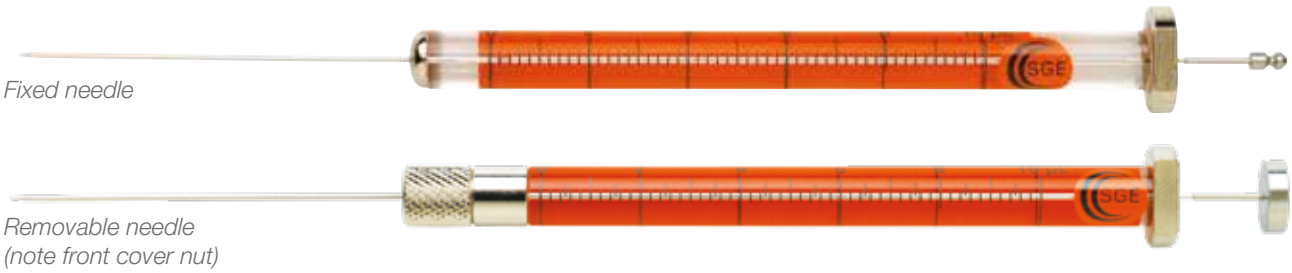
Syringe capacity	5 µL	10 µL	25 µL	50 µL	100 µL	250 µL	500 µL	1 mL
Internal diameter of syringe barrel	0.343 mm	0.485 mm	0.728 mm	1.030 mm	1.457 mm	2.303 mm	3.257 mm	4.606 mm

Syringe capacity	-	-	2.5 mL	5 mL	10 mL	25 mL	50 mL	100 mL
Internal diameter of syringe barrel	-	-	7.284 mm	10.30 mm	14.57 mm	23.03 mm	27.50 mm	34.99 mm

Note: These diameters are based on scale lengths of 54.1 mm for 5 µL and 10 µL syringes, and 60 mm for 25 µL to 100 mL syringes. Scale length is sometimes referred to as stroke length or the travel of the plunger in one direction.

Needle selection

Needle selection is based on application and personal preference.



Fixed needle

Removable needle (note front cover nut)

Fixed needle or removable needle syringes:

Fixed needle syringes are often the preferred option for experienced operators or for applications requiring trace sample levels. A fixed needle syringe is recommended for autosampler use where the probability of needle bending is minimal. Fixed needles are easy to use and the most economical syringe option. Fixed needle syringes can be heated to 70°C.

For versatility a removable needle syringe is recommended. The removable needle syringe reduces cost over time because only the needle needs to be replaced if bent or blocked. Removable needle syringes can be heated to 120°C. Removable needle syringes allow the needle to be changed for different applications.

Needles are easily changed to meet the application need. For example: a standard 10 µL removable needle syringe can be easily converted for LC or on-column use.

Trajan divides its removable needles into different ranges:

- 5 µL eVol
- 5 µL
- 10 µL
- 25 µL to 500 µL (suitable for 50 µL and 100 µL eVol syringes)
- 1 mL to 2.5 mL (suitable for 500 µL and 1 mL eVol syringes)
- 5 mL to 10 mL
- Luer Lock
- Valve needles

Gauge or outer diameter (OD)

To reduce the possibility of bending, choose the largest available needle outer diameter suitable for the application. For autosamplers, syringes with 23 gauge or 0.63 mm OD cone tipped needles should be selected for all applications except on-column injection.

Internal diameter (ID)

The ID of the needle is selected to ensure minimal retained volume without compromising the ability of the syringe to draw normal viscosity samples. Medium to high viscosity samples should be diluted prior to use or select a needle with a larger internal diameter.

Needle tip styles

Trajan has various needle tip styles to suit a range of applications and uses.

Needle tip style	Application	Features/applications
Bevel 	Manual GC	Typically used for manual injections. The tip shape helps reduce septa coring.
Cone 	GC autosampler	Most versatile needle for autosampler use. Resist coring of vial and inlet septa.
Dual gauge 	On-column injection - autosampler	Narrow gauge part suitable for suitable for large bore on-column injection.
LC 	HPLC	Also suitable for injections that do not contain an inlet septa such as Merlin Microseal™.
Dome 	With pre-drilled septa	Recommended for use with pre-drilled septa.
Side hole 	LV Injection	Usually used for headspace and large volume injections.

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

Cone
The cone shaped needle tip is specially developed to withstand multi injection demands and improve septa lifetime when used with an autosampler. The cone design effectively ‘parts’ the septa during piercing not cutting it, as would a bevel needle.

Dual gauge
Dual gauge needles have a narrow gauge at the tip suitable for large bore on-column injection. The wider gauge for the remainder of the needle gives increased strength to the needle for autosampler use.

LC
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.

Dome
This style needle is recommended for use with pre-drilled septa. The tip is rounded and polished to help septa penetration.

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

PTFE tipped or metal plunger

A syringe with a PTFE tipped plunger should be selected when analyzing ‘dirty’ samples such as serum and urine. The PTFE tip minimizes carryover and prevents particulate matter from getting between the plunger and barrel by effectively wiping the barrel inner diameter during the plunger stroke. PTFE tipped plungers are suitable for both liquid and gas samples. Syringes with PTFE tipped plungers have the added benefit of the plungers being replaceable as the PTFE wears due to use.

Metal plungers are individually fitted to the syringe glass barrel for a perfect ‘feel’, optimized life with minimal carryover, a liquid tight seal between the barrel and plunger and excellent performance.

SGE Syringe plunger options:

Metal plunger

- Stainless steel plunger individually fitted to its own syringe barrel.
- Plunger is not replaceable or interchangeable.
- Industry standard syringe for chromatography applications.
- For use when injection volume is greater than 1 µL.

Metal plunger for NanoVolume syringes (plunger-in-needle)

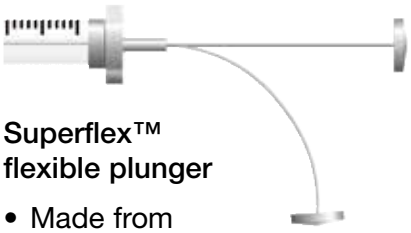
- Plunger extends into the needle tip.
- Sample is contained only in the needle, i.e. no glass contact.
- Ideal for dispensing very small liquid volumes.
- Recommended for use when sample volume is less than 1 µL.
- Capacities: 0.5 µL, 1 µL and 5 µL.

Plunger protection

- Extended protection from the top of the syringe back flange to help prevent plunger bending during injection and improve plunger stroke.
- Ideal for general use for both experienced and inexperienced users.
- Capacities: 5 µL and 10 µL (not necessary for capacities larger than 10 µL due to strength of the wider plunger diameter).

PTFE tipped plunger

- Suitable for both liquid and gas samples.
- Suitable for headspace applications.
- Plunger is replaceable.
- Ideal for ‘dirty’ samples.
- Easy to remove and clean to extend plunger life.
- Capacities: 10 µL to 100 mL.



Superflex™ flexible plunger

- Made from titanium/nickel alloy.
- Virtually indestructible plunger.
- Capacities: 5 µL and 10 µL.

Guided plunger

- Extended barrel guides plunger during injection.
- Robust and rugged.
- Capacities: 5 µL and 10 µL.

Syringe care, cleaning and use

The SGE Syringe is a precision instrument with a high standard of fit between the plunger and the glass barrel. Like most precision instruments, regular maintenance is important for ensuring long life and robust performance.

Syringes should be routinely checked for damage to the barrel and needle. Look for fine cracks in the barrel. Needles should also be checked for burrs and rough surfaces which may cause tearing and excessive wear on the septa.

Needle care

Unblocking needles:

1. To unblock the needle, remove the plunger and fill the syringe with solvent using another syringe.
2. Insert plunger and gently push solvent through the needle. Never force the plunger as too much pressure may crack the syringe barrel.

Needle cleaning kit (part number 031782)

The SGE Syringe needle cleaning kit contains a range of stylet wires for needle cleaning, tweezers and a surfactant material for barrel cleaning.

Syringe cleaning

Syringe cleaning agents will usually depend on the contaminating material. Methanol, methylene chloride, acetonitrile and acetone are commonly used.

Do not immerse the entire syringe in solvent as this may damage the adhesive used to bond parts of the syringe. Clean externally by wiping with a tissue.

Syringe cleaning steps

1. Flush thoroughly with suitable solvents. Depending on contaminant this may have to be done up to 20 times.
2. Rinse with distilled water.
3. Flush with acetone.
4. Remove plunger and wipe with tissue.
5. Refit plunger and flush with acetone.
6. Allow syringe to dry.

Cleaning steps for NanoVolume syringes can be found in the manual supplied with the syringe.

SGE Syringe temperature specifications

Heating will remove semi-volatile material from the syringe. Before heating or autoclaving remove the plunger.

- Fixed needle and fixed Luer syringes can be heated in an oven to 70°C.
- Removable needle and removable Luer syringes can be heated in an oven to 120°C.
- NanoVolume syringes can be heated in an oven to 70°C.
- Headspace syringes can be heated to 150°C.

Rapid changes in temperature can lead to splitting of the glass barrel. Ensure heating and cooling of a syringe is a gradual process.

Syringe use

- Always inspect the syringe before use. Check the barrel for cracks and the needle tip for burrs.
- To eliminate carryover between samples, flush the syringe with solvent 5-20 times, remembering to discard at least the first 2-3 washes.
- To eliminate air bubbles from the barrel, repeatedly draw and expel sample while keeping the needle tip immersed in the solution. Bubbles can also be removed by turning the barrel upright while expelling some of the sample. If bubbles persist, slow the aspiration speed.
- To make an injection, overfill the syringe then press the plunger until the correct volume is reached. Draw the plunger back slightly then wipe the needle tip with a lint free tissue. Make injection. For improved precision, a repeating adaptor, which allows the volume to be preset, may be purchased.

Before storage always flush the syringe with solvent and air dry.

Plunger care

Metal plungers for standard syringes

- Never force the plunger.
- Do not pump the plunger when the needle is blocked as the high pressure generated could crack the barrel.
- Replacement metal plungers are not available. Plungers are individually fitted to the barrels to achieve a perfect seal. This means that plungers are not interchangeable.
- Avoid unnecessary movement of plungers when the syringe is dry.

Metal plungers for NanoVolume syringes

- Always loosen needle cover nut before removing or inserting plunger.
- Wipe plunger with a lint-free tissue before replacing into the syringe.

PTFE tipped plungers

- Avoid unnecessary movement of plungers when the syringe is dry.
- Replacement PTFE tipped plungers are available for many syringes.

Syringe validation and calibration

If your laboratory is involved in GLP, ISO, GMP, NAMAS, ANSI, BSI or National Standards Protocol, then you will appreciate the importance of instrument calibration and its traceability. Although essential, this is often a time consuming, error prone and costly exercise to perform.

Certificate of conformance

Trajan supplies a syringe conformance certificate with every syringe to guarantee the syringe meets all specifications.

Trajan syringes are manufactured under a documented Quality Management System. All in-process measuring equipment and instrumentation is maintained and calibrated in accordance with stringent quality standards. Trajan warrants syringe displacement within the stated conformity specifications.

Certificate of calibration

Available for most SGE Syringes:

Trajan offers a factory calibration service, at an additional cost, for any syringe nominated by you at the time of purchase. These syringes are supplied with a certificate of calibration providing volume conformance and traceability. For identification, each calibrated syringe is uniquely numbered and marked with this number.

Many companies attempt to calibrate syringes by measuring the mass of a dispensed volume. The accuracy of this technique is affected by many variables such as weighing errors, fluctuations in environmental temperature, pressure and evaporation, as well as operator error.

Trajan uses a superior technique of calibrated volume based on the length and inner diameter of the syringe barrel. Using specialized measuring equipment, Trajan's calibration method has the highest degree of displacement volume accuracy and provides calibration traceability.

To order a calibrated syringe simply add 'CAL' to the end of the part number when ordering. For example; if you require a calibration certificate for a 002000, 10 µL fixed needle syringe; order part number 002000CAL.

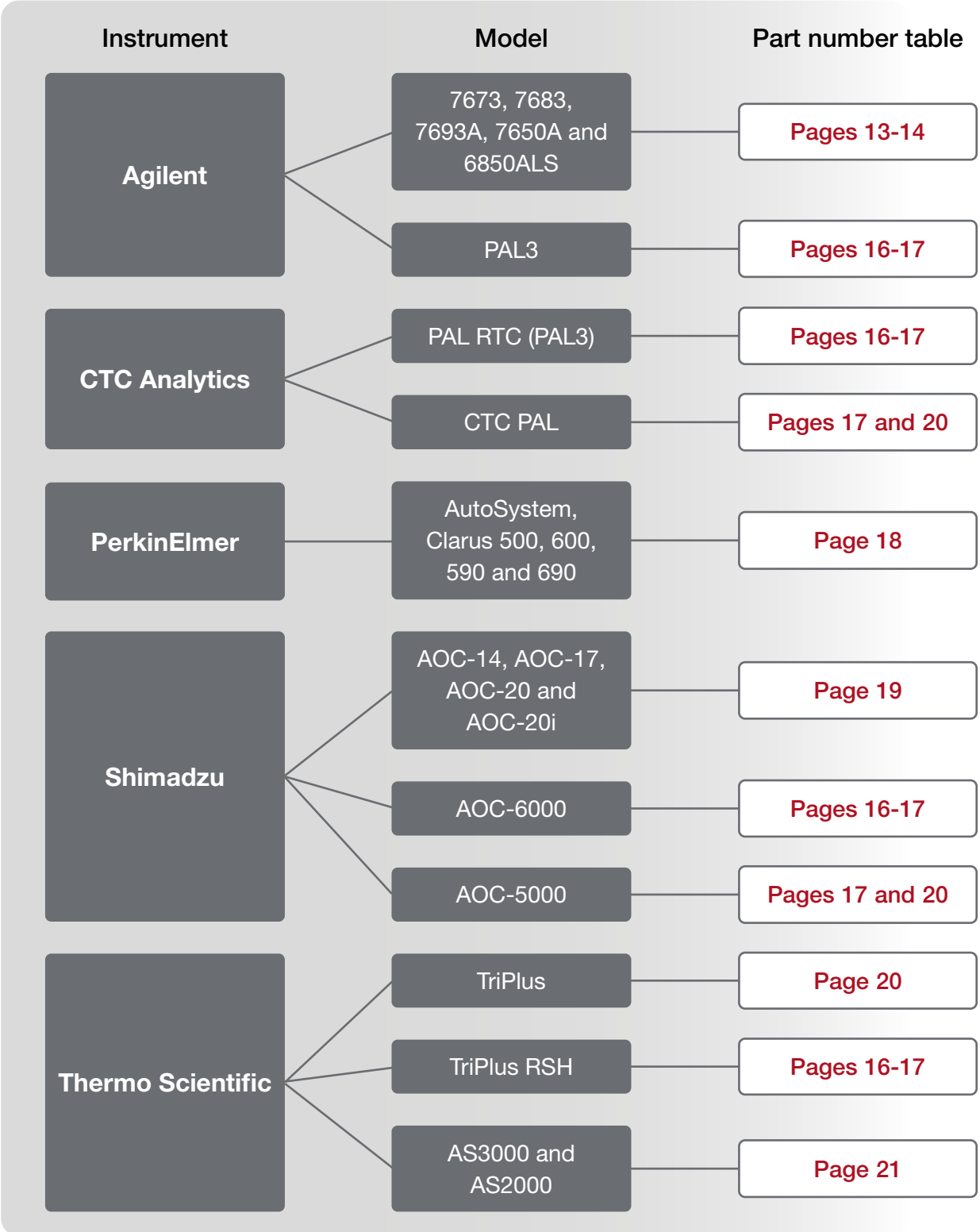
eVol XR digital analytical syringe calibration

Trajan's eVol XR – Digitally controlled analytical syringe, is the world's first user calibrated analytical syringe. Every eVol XR is factory tested to ensure its operation complies with a comprehensive list of criteria.

To achieve the highest level of accuracy possible each syringe may be calibrated. This will ensure your eVol XR will dispense more accurately than any other manual syringe-based dispensing technique. A calibration factor for each syringe is used to adjust the software instructions controlling the motor to compensate for any slight variations in the positively displaced liquid volume. The calibration procedure for eVol XR is based on a gravimetric measure of the volume dispensed from the eVol XR.

Autosampler syringe selection tree

This selection tree is provided to facilitate finding the syringes to suit your autosampler. The relevant part number table can be found after following the path for your instrument and model.



Product specifications and part numbers

Specifications			
Accuracy and reproducibility	±1% (dispensed volume) (±2% for 0.5 µL and 1 µL syringes)	Scale length	0.5 µL to 1 µL = 27.05 mm 5 µL to 10 µL = 54.1 mm 25 µL to 250 µL = 60 mm
Borosilicate glass barrel outer diameter (OD)	0.5 µL to 250 µL = 6.5 mm	International standards traceability	✓

Syringes listed in the following part number table (pages 13-14) are suitable for:

- Agilent 7673
- Agilent 7683
- Agilent 7693A
- Agilent 7650A
- Agilent 6850ALS

For Agilent PAL3 compatible syringes see pages 16-17.

Agilent 7673, 7683, 7693A, 7650A, 6850ALS

Part number	Part description and detail	Replacement needle (*needle and plunger kit)	Replacement plunger
000400	0.5 µL NanoVolume Agilent syringe with 4.2 cm 0.47 mm OD cone tipped needle	033708*	-
000410	0.5 µL NanoVolume Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	033715*	-
000415	0.5 µL NanoVolume Agilent syringe with 4.2 cm 0.63/0.47 mm OD dual gauge cone tipped needle	033730*	-
000610	1.0 µL NanoVolume Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	034715*	-
001800	5 µL fixed needle Agilent syringe with 4.2 cm 0.47 mm OD cone tipped needle	-	-
001804	5 µL fixed needle Agilent syringe with 4.2 cm 0.47 mm OD cone tipped needle PK6	-	-
001810	5 µL fixed needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	-	-
001814	5 µL fixed needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle PK6	-	-
001821	5 µL fixed needle Agilent syringe with 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	-	-
001822	5 µL fixed needle Agilent syringe with 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle PK6	-	-
002800	10 µL fixed needle Agilent syringe with 4.2 cm 0.47 mm OD cone tipped needle	-	-
002804	10 µL fixed needle Agilent syringe with 4.2 cm 0.47 mm OD cone tipped needle PK6	-	-
002805	10 µL removable needle Agilent syringe with 4.2 cm 0.47 mm OD cone tipped needle	037715	-
002810	10 µL fixed needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	-	-
002811	10 µL fixed needle Agilent syringe with 4.2 cm 0.63 mm OD side hole needle	-	-
002812	10 µL fixed needle Agilent syringe with GT plunger and 4.2 cm 0.63 mm OD cone tipped needle	-	031808
002813	10 µL fixed needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle PK25	-	-
002814	10 µL fixed needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle PK6	-	-
002815	10 µL removable needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	037717	-
002816	10 µL fixed needle Agilent syringe with GT plunger and 4.2 cm 0.63 mm OD cone tipped needle PK25	-	031808
002820	10 µL removable needle Agilent syringe with GT plunger and 4.2 cm 0.63 mm OD cone tipped needle PK10	037717	031809
002821	10 µL fixed needle Agilent syringe with 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	-	-
002822	10 µL fixed needle Agilent syringe with 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle PK6	-	-
002824	10 µL fixed needle Agilent syringe with 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle PK25	-	-
002826	10 µL fixed needle Agilent syringe with GT plunger and 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	-	-

Agilent 7673, 7683, 7693A, 7650A, 6850ALS continued

Part number	Part description and detail	Replacement needle (*needle and plunger kit)	Replacement plunger
002827	10 µL fixed needle Agilent syringe with GT plunger and 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle PK6	-	031808
002829	10 µL removable needle Agilent syringe with GT plunger and 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	037730	031809
002831	10 µL fixed needle Agilent syringe with Superflex plunger and 4.2 cm 0.47 mm OD cone tipped needle PK6	-	-
002838	10 µL fixed needle Agilent syringe with Superflex plunger and 4.2 cm 0.63 mm OD cone tipped needle PK6	-	-
003668	25 µL fixed needle Agilent syringe with GT plunger and 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	-	-
004665	50 µL removable needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	038717	-
004668	50 µL fixed needle Agilent syringe with GT plunger and 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	-	-
005668	100 µL fixed needle Agilent syringe with GT plunger and 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	-	031823

Expert tips

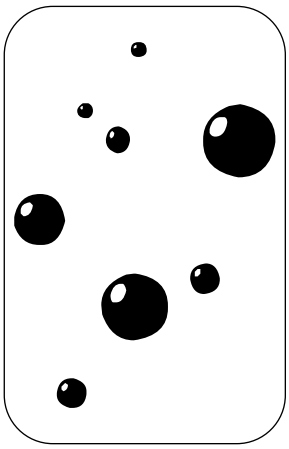
Q. We are getting air bubbles when taking up sample – what is the cause and how can we fix this?

A. To prevent air bubbles forming, repeatedly draw and expel sample while keeping needle tip immersed in the sample.

Slow down! If the plunger is being pulled back too quickly air can be pulled up from the sample.

To remove air bubbles turn the syringe tip towards the ceiling, tap the side of the barrel and expel some sample.

Air bubbles



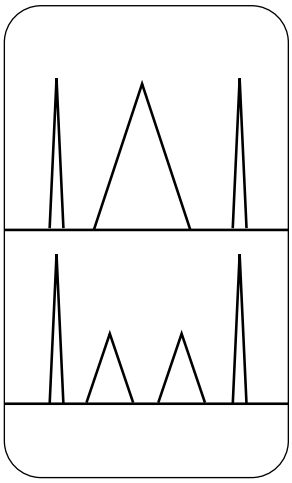
Q. Our results are inconsistent and unreliable – why is this happening and what can we do to fix this?

A. One of the major causes of inconsistent results is sampling and injection technique. Check that each sample is being injected the same way.

The SGE repeating adaptor, RAX, ensures reproducibility of sample volumes with accuracy and precision in injection.

Another cause of unreliable results is carryover between samples. Flush the syringe with solvent after each sample injected.

Inconsistent results

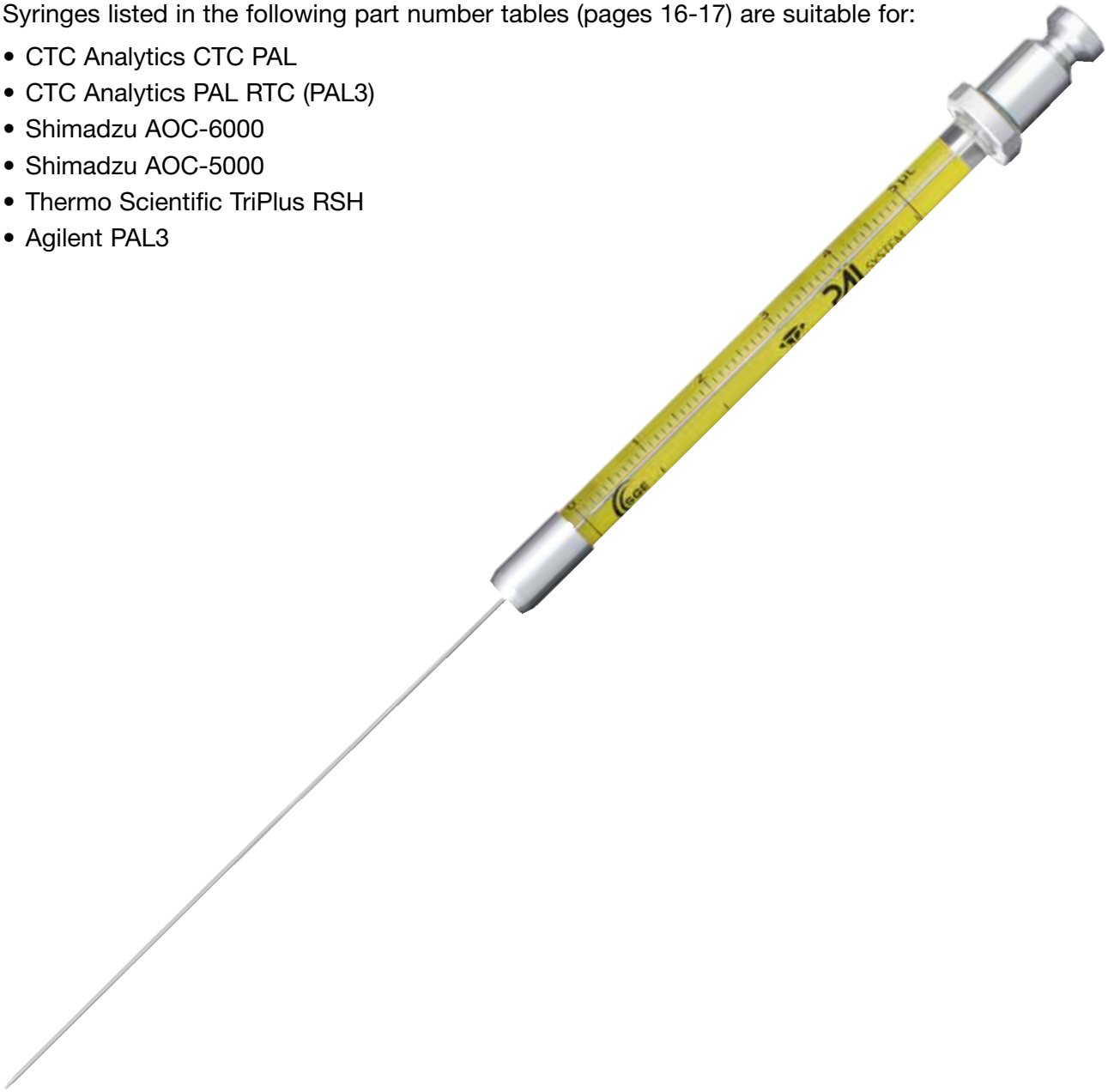


Product specifications and part numbers

Specifications			
Accuracy and reproducibility	±1% (dispensed volume) (±2% for 0.5 µL and 1 µL syringes)	Scale length	0.5 µL to 1 µL = 27.05 mm 5 µL to 10 µL = 54.1 mm 25 µL to 5 mL = 60 mm
Borosilicate glass barrel outer diameter (OD)	10 µL to 250 µL = 6.5 mm (except part numbers 003715 and 006720 = 8 mm) 500 µL = 8 mm 1 mL = 7.6 mm 2.5 mL = 9.7 mm 5 mL = 14 mm	International standards traceability	✓

Syringes listed in the following part number tables (pages 16-17) are suitable for:

- CTC Analytics CTC PAL
- CTC Analytics PAL RTC (PAL3)
- Shimadzu AOC-6000
- Shimadzu AOC-5000
- Thermo Scientific TriPlus RSH
- Agilent PAL3



CTC Analytics PAL RTC (PAL3), Shimadzu AOC-6000, Thermo Scientific TriPlus RSH and Agilent PAL3

Part number	Part description and detail	Replacement needle (* needle and plunger kit)	Replacement plunger
000480	0.5 µL NanoVolume CTC RTC and Thermo RSH syringe with 5.7 cm 0.63 mm OD cone tipped needle	033780*	-
000680	1.0 µL NanoVolume CTC RTC and Thermo RSH syringe with 5.7 cm 0.63 mm OD cone tipped needle	034780*	-
001861	5 µL fixed needle CTC RTC and Thermo RSH syringe with 5.7 cm 0.63 mm OD cone tipped needle	-	-
001863	5 µL fixed needle CTC RTC and Thermo RSH syringe with 8.5 cm 0.63 mm OD cone tipped needle	-	-
001865	5 µL fixed needle CTC RTC and Thermo RSH syringe with 5.7 cm 0.47 mm OD cone tipped needle	-	-
001871	5 µL removable needle CTC RTC and Thermo RSH syringe with 5.7 cm 0.63 mm OD cone tipped needle	036871	-
001875	5 µL removable needle CTC RTC and Thermo RSH syringe with 5.7 cm 0.47 mm OD cone tipped needle	036875	-
001877	5 µL removable needle CTC RTC and Thermo RSH syringe with 8.5 cm 0.47 mm OD cone tipped needle	036877	-
002861	10 µL fixed needle CTC RTC and Thermo RSH syringe with 5.7 cm 0.63 mm OD cone tipped needle	-	-
002862	10 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.63 mm OD cone tipped needle	-	032810
002863	10 µL fixed needle CTC RTC and Thermo RSH syringe with 8.5 cm 0.63 mm OD cone tipped needle	-	-
002864	10 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.63 mm OD cone tipped needle	-	032810
002865	10 µL fixed needle CTC RTC and Thermo RSH syringe with 5.7 cm 0.47 mm OD cone tipped needle	-	-
002866	10 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.47 mm OD cone tipped needle	-	-
002867	10 µL fixed needle CTC RTC and Thermo RSH syringe with 8.5 cm 0.47 mm OD cone tipped needle	-	-
002868	10 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.47 mm OD cone tipped needle	-	032810
002869	10 µL fixed needle CTC RTC and Thermo RSH syringe with 8.5 cm 0.47 mm OD bevel tipped needle	-	-
002871	10 µL removable needle CTC RTC and Thermo RSH syringe with 5.7 cm 0.63 mm OD cone tipped needle	037871	-
002872	10 µL removable needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.63 mm OD cone tipped needle	037871	032810
002874	10 µL removable needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.63 mm OD cone tipped needle	037873	032810
002875	10 µL removable needle CTC RTC and Thermo RSH syringe with 5.7 cm 0.47 mm OD cone tipped needle	037875	-
002876	10 µL removable needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.47 mm OD cone tipped needle	037875	032810
002878	10 µL removable needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.47 mm OD cone tipped needle	037877	032810
003862	25 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.63 mm OD cone tipped needle	-	032815
003864	25 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.63 mm OD cone tipped needle	-	032815
003866	25 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.47 mm OD cone tipped needle	-	032815
003868	25 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.47 mm OD cone tipped needle	-	032815
004862	50 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.63 mm OD cone tipped needle	-	032821
004864	50 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.63 mm OD cone tipped needle	-	032821
004866	50 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.47 mm OD cone tipped needle	-	032821
004868	50 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.47 mm OD cone tipped needle	-	032821
005862	100 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.63 mm OD cone tipped needle	-	032825
005864	100 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.63 mm OD cone tipped needle	-	032825
005866	100 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.47 mm OD cone tipped needle	-	032825
005868	100 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.47 mm OD cone tipped needle	-	032825

CTC Analytics PAL RTC (PAL3), Shimadzu AOC-6000, Thermo Scientific TriPlus RSH and Agilent PAL3 continued

Part number	Part description and detail	Replacement needle (* needle and plunger kit)	Replacement plunger
005890	100 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.63 mm OD side hole needle	-	032825
005891	100 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.63 mm OD side hole needle	-	032825
006862	250 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.63 mm OD cone tipped needle	-	032831
006864	250 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.63 mm OD cone tipped needle	-	032831
006866	250 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.47 mm OD cone tipped needle	-	032831
006868	250 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.47 mm OD cone tipped needle	-	032831
006890	250 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.63 mm OD side hole needle	-	032831
006891	250 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.63 mm OD side hole needle	-	032831
007862	500 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.63 mm OD cone tipped needle	-	032835
007864	500 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.63 mm OD cone tipped needle	-	032835
007866	500 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.47 mm OD cone tipped needle	-	032835
007868	500 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.47 mm OD cone tipped needle	-	032835
007890	500 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.63 mm OD side hole needle	-	032835
007891	500 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.63 mm OD side hole needle	-	032835
008155	1 mL fixed needle CTC RTC and Thermo RSH headspace syringe with energized GT plunger and 6.5 mm OD side hole needle	-	032841
008655	2.5 mL fixed needle CTC RTC and Thermo RSH headspace syringe with energized GT plunger and 5.6 cm 0.63 mm OD side hole needle	-	032846

CTC Analytics CTC PAL and Shimadzu AOC-5000

Part number	Part description and detail	Replacement needle (* needle and plunger kit)	Replacement plunger
002700	10 µL fixed needle CTC syringe with 5 cm 0.47 mm OD cone tipped needle	-	-
002983	10 µL fixed needle CTC syringe with GT plunger and 5 cm 0.72 mm OD side hole needle	-	031803 (PK1) 0318120 (PK2)
003700	25 µL fixed needle CTC syringe with GT plunger and 5 cm 0.47 mm OD cone tipped needle	-	0318922
005700	100 µL fixed needle CTC syringe with GT plunger and 5 cm 0.47 mm OD cone tipped needle	-	0318261
006700	250 µL fixed needle CTC syringe with GT plunger and 5 cm 0.47 mm OD cone tipped needle	-	0318926
008131	1 mL fixed needle CTC headspace syringe with energized GT plunger and 5.6 cm 0.63 mm OD side hole needle	-	031841
008136	1 mL fixed needle CTC headspace syringe with energized GT plunger and 5.6 cm 0.47 mm OD side hole needle	-	031841
008631	2.5 mL fixed needle CTC headspace syringe with energized GT plunger and 5.6 cm 0.63 mm OD side hole needle	-	031851
008636	2.5 mL fixed needle CTC headspace syringe with energized GT plunger and 5.6 cm 0.47 mm OD side hole needle	-	031851

Product specifications and part numbers

Specifications			
Accuracy and reproducibility	±1% (dispensed volume) (±2% for 0.5 µL syringes)	Scale length	0.5 µL to 5 µL = 27.05 mm 50 µL = 54.1 mm
Borosilicate glass barrel outer diameter (OD)	0.5 µL to 50 µL = 6.5 mm	International standards traceability	✓

Syringes listed in the following part number table are suitable for:

- PerkinElmer AutoSystem
- PerkinElmer Clarus 500
- PerkinElmer Clarus 600
- PerkinElmer Clarus 590
- PerkinElmer Clarus 690

PerkinElmer AutoSystem, Clarus 500, 600, 590 and 690

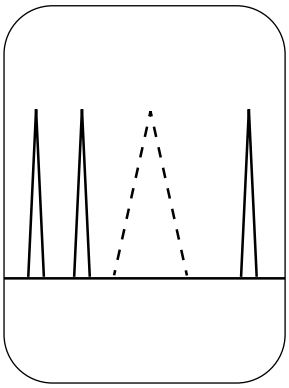
Part number	Part description and detail	Replacement needle (* needle and plunger kit)	Replacement plunger
000475	0.5 µL NanoVolume PerkinElmer syringe with 7 cm 0.47 mm OD cone tipped needle	033750*	-
000478	0.5 µL NanoVolume PerkinElmer syringe with 7 cm 0.63 mm OD cone tipped needle	033765*	-
001953	5 µL fixed needle PerkinElmer syringe with 7 cm 0.47 mm OD cone tipped needle	-	-
001954	5 µL fixed needle PerkinElmer syringe with 7 cm 0.63 mm OD cone tipped needle	-	-
001955	5 µL fixed needle PerkinElmer syringe with GT plunger and 7 cm 0.47 mm OD cone tipped needle	-	031807
001957	5 µL fixed needle PerkinElmer syringe with GT plunger and 7 cm 0.63 mm OD cone tipped needle	-	031807
004670	50 µL fixed needle PerkinElmer syringe with 7 cm 0.63 mm OD cone tipped needle	-	-

Expert tips

Q. Ghost peaks are appearing on our chromatograms and interfering with our results – what is causing this?

A. Ghost peaks can be caused by a number of areas of the instrument set up. To rule out the syringe as a cause of ghost peaks consider if the injection volume is too large or if the syringe or needle tip is contaminated.

Ghost peaks



Product specifications and part numbers

Specifications			
Accuracy and reproducibility	±1% (dispensed volume) (±2% for 0.5 µL syringes)	Scale length	0.5 µL = 27.05 mm 5 µL to 10 µL = 54.1 mm
Borosilicate glass barrel outer diameter (OD)	0.5 µL to 10 µL = 6.5 mm	International standards traceability	✓

Syringes listed in the following part number table are suitable for:

- Shimadzu AOC-14
- Shimadzu AOC-17
- Shimadzu AOC-20
- Shimadzu AOC-20i

For Shimadzu AOC-6000 compatible syringes see pages 16-17.
For Shimadzu AOC-5000 compatible syringes see pages 17 and 20.

Shimadzu AOC-14, AOC-17, AOC-20 and AOC-20i

Part number	Part description and detail	Replacement needle (* needle and plunger kit)	Replacement plunger
000440	0.5 µL NanoVolume Shimadzu syringe with 4.2 cm 0.47 mm OD cone tipped needle	033738*	-
000445	0.5 µL NanoVolume Shimadzu syringe with 4.2 cm 0.63 mm OD cone tipped needle	033745*	-
001988	5 µL fixed needle Shimadzu syringe with 4.2 cm 0.63 mm OD cone tipped needle	-	-
002897	10 µL removable needle Shimadzu syringe with 4.2 cm 0.47 mm OD cone tipped needle	037745	-
002898	10 µL removable needle Shimadzu syringe with 4.2 cm 0.63 mm OD cone tipped needle	037747	-
002902	10 µL removable needle Shimadzu syringe with GT plunger and 4.2 cm 0.63 mm OD cone tipped needle	037747	031798

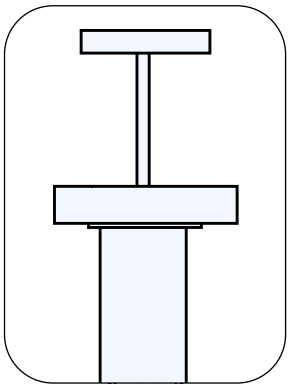
Expert tips

Q. Why is the plunger getting stuck in the syringe barrel?

A. Build up from dirty samples can cause plungers to seize – ensure correct syringe cleaning procedures are being followed. The plungers may also be 'getting stuck' if they are bent. Plungers bend because of poor dispensing technique.

If plungers are seizing when using an autosampler check that the syringe is installed correctly.

Seized plungers



Product specifications and part numbers

Specifications			
Accuracy and reproducibility	±1% (dispensed volume) (±2% for 0.5 µL and 1 µL syringes)	Scale length	0.5 µL to 1 µL = 27.05 mm 5 µL to 10 µL = 54.1 mm 25 µL to 5 mL = 60 mm
Borosilicate glass barrel outer diameter (OD)	10 µL to 250 µL = 6.5 mm (except part numbers 003715 and 006720 = 8 mm) 500 µL = 8 mm 1 mL = 7.6 mm 2.5 mL = 9.7 mm 5 mL = 14 mm	International standards traceability	✓

Syringes listed in the following part number tables (pages 20-21) are suitable for:

- Thermo Scientific TriPlus
- Thermo Scientific AS3000
- Thermo Scientific AS2000
- CTC Analytics CTC PAL
- Shimadzu AOC-5000

For Thermo Scientific TriPlus RSH compatible syringes see pages 16-17.

Thermo Scientific TriPlus, CTC Analytics CTC PAL and Shimadzu AOC-5000

Part number	Part description and detail	Replacement needle (* needle and plunger kit)	Replacement plunger
000490	0.5 µL NanoVolume CTC/Thermo syringe with 5 cm 0.47 mm OD cone tipped needle	033770*	-
000492	0.5 µL NanoVolume CTC/Thermo syringe with 5 cm 0.63 mm OD cone tipped needle	033772*	
000790	2.0 µL NanoVolume CTC/Thermo syringe with 5.0 cm 0.63 mm OD cone tipped needle	034905*	-
001981	5 µL fixed needle CTC/Thermo syringe with 5 cm 0.63 mm OD cone tipped needle	-	-
001982	5 µL fixed needle CTC/Thermo syringe with 5 cm 0.47 mm OD cone tipped needle	-	-
001984	5 µL removable needle CTC/Thermo syringe with 5 cm 0.63 mm OD cone tipped needle	036011	-
002967	10 µL fixed needle CTC/Thermo syringe with 5 cm 0.5 mm OD cone tipped needle	-	-
002971	10 µL fixed needle CTC/Thermo syringe with 5 cm 0.63 mm OD cone tipped needle PK6	-	-
002972	10 µL fixed needle CTC/Thermo syringe with GT plunger and 5 cm 0.63 mm OD cone tipped needle PK6	-	031803 (PK1) 0318120 (PK2)
002976	10 µL fixed needle CTC/Thermo syringe with GT plunger and 5 cm 0.47 mm OD cone tipped needle PK6	-	031803 (PK1) 0318120 (PK2)
002977	10 µL fixed needle CTC/Thermo syringe with GT plunger and 5 cm 0.47 mm OD cone tipped needle	-	031803 (PK1) 0318120 (PK2)
002980	10 µL fixed needle CTC/Thermo syringe with 5 cm 0.47 mm OD cone tipped needle	-	-
002981	10 µL fixed needle CTC/Thermo syringe with 5 cm 0.63 mm OD cone tipped needle	-	-
002982	10 µL removable needle CTC/Thermo syringe with 5 cm 0.47 mm OD cone tipped needle	037010	-
002984	10 µL removable needle CTC/Thermo syringe with 5 cm 0.63 mm OD cone tipped needle	037787	-
002985	10 µL removable needle CTC/Thermo syringe with GT plunger and 5 cm 0.47 mm OD cone tipped needle	037010	0318121
002986	10 µL fixed needle CTC/Thermo syringe with 5 cm 0.47 mm OD cone tipped needle PK6	-	-
002987	10 µL fixed needle CTC/Thermo syringe with GT plunger and 5 cm 0.63 mm OD cone tipped needle	-	031803 (PK1) 0318120 (PK2)
002992	10 µL fixed needle CTC/Thermo syringe with 8 cm 0.47 mm OD cone tipped needle^	-	-
002993	10 µL removable needle CTC/Thermo syringe with 8 cm 0.47 mm OD cone tipped needle^	031535	-
003987	25 µL fixed needle CTC/Thermo syringe with GT plunger and 5 cm 0.63 mm OD cone tipped needle	-	031817
003988	25 µL removable needle CTC/Thermo syringe with GT plunger and 5 cm 0.47 mm OD side hole needle	038749	031816
005333	100 µL removable needle CTC/Thermo syringe with GT plunger and 5 cm 0.47 mm OD cone tipped needle	038732	031826
005335	100 µL fixed needle CTC/Thermo syringe with GT plunger and 5 cm 0.63 mm OD cone tipped needle	-	0318261

^Syringes with 8 cm length needles are not suitable for CTC Analytics CTC PAL and Shimadzu AOC-5000.

Thermo Scientific AS3000 and AS2000

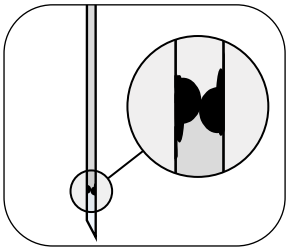
Part number	Part description and detail	Replacement needle (* needle and plunger kit)	Replacement plunger
0019811	5 µL fixed needle CTC/Thermo (classic button) syringe with 5 cm 0.63 mm OD cone tipped needle	-	-
0019821	5 µL fixed needle CTC/Thermo (classic button) syringe with 5 cm 0.47 mm OD cone tipped needle	-	-
0029671	10 µL fixed needle CTC/Thermo (classic button) syringe with 5 cm 0.5 mm OD cone tipped needle	-	-
0029741	10 µL fixed needle CTC/Thermo (classic button) syringe with 8 cm 0.72 mm OD cone tipped needle	-	-
0029761	10 µL fixed needle CTC/Thermo (classic button) syringe with GT plunger and 5 cm 0.47 mm OD cone tipped needle PK6	-	03181201
0029771	10 µL fixed needle CTC/Thermo (classic button) syringe with GT plunger and 5 cm 0.47 mm OD cone tipped needle	-	03181201
0029781	10 µL fixed needle CTC/Thermo (classic button) syringe with 7 cm 0.47 mm OD cone tipped needle	-	-
0029801	10 µL fixed needle CTC/Thermo (classic button) syringe with 5 cm 0.47 mm OD cone tipped needle	-	-
0029841	10 µL removable needle CTC/Thermo (classic button) syringe with 5 cm 0.63 mm OD cone tipped needle	037787	-
0029861	10 µL fixed needle CTC/Thermo (classic button) syringe with 5 cm 0.47 mm OD cone tipped needle PK6	-	-
0029871	10 µL fixed needle CTC/Thermo (classic button) syringe with GT plunger and 5 cm 0.63 mm OD cone tipped needle	-	03181201
0029891	10 µL fixed needle CTC/Thermo (classic button) syringe with 8 cm 0.63 mm OD cone tipped needle	-	-
0029921	10 µL fixed needle CTC/Thermo (classic button) syringe with 8 cm 0.47 mm OD cone tipped needle	-	-
0029931	10 µL removable needle CTC/Thermo (classic button) syringe with 8 cm 0.47 mm OD cone tipped needle	031535	-
0039871	25 µL fixed needle CTC/Thermo (classic button) syringe with GT plunger and 5 cm 0.63 mm OD cone tipped needle	-	0318171

Expert tips

Q. Why is the syringe needle getting blocked?

A. Needles become blocked due to a build up from dirty sample, improper cleaning or by septa during injection. SGE bevel and cone tipped needles are designed for optimum septa penetration and prevention of septa coring.

Blocked needles



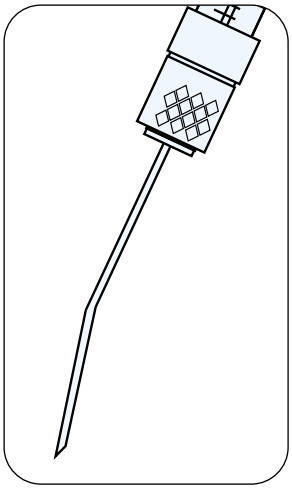
Q. Why does the needle keep bending?

A. To reduce the possibility of bending choose the largest available needle outer diameter suitable for the application. For autosamplers, syringes with 23 gauge or 0.63 mm OD cone tipped needles are recommended.

If needles are bending when the syringe is being used on an autosampler check that the syringe is installed correctly.

Use a removable needle syringe as the needle can be replaced if bent or blocked.

Bent needles



Product specifications and part numbers

0.5 µL to 5 µL NanoVolume syringes

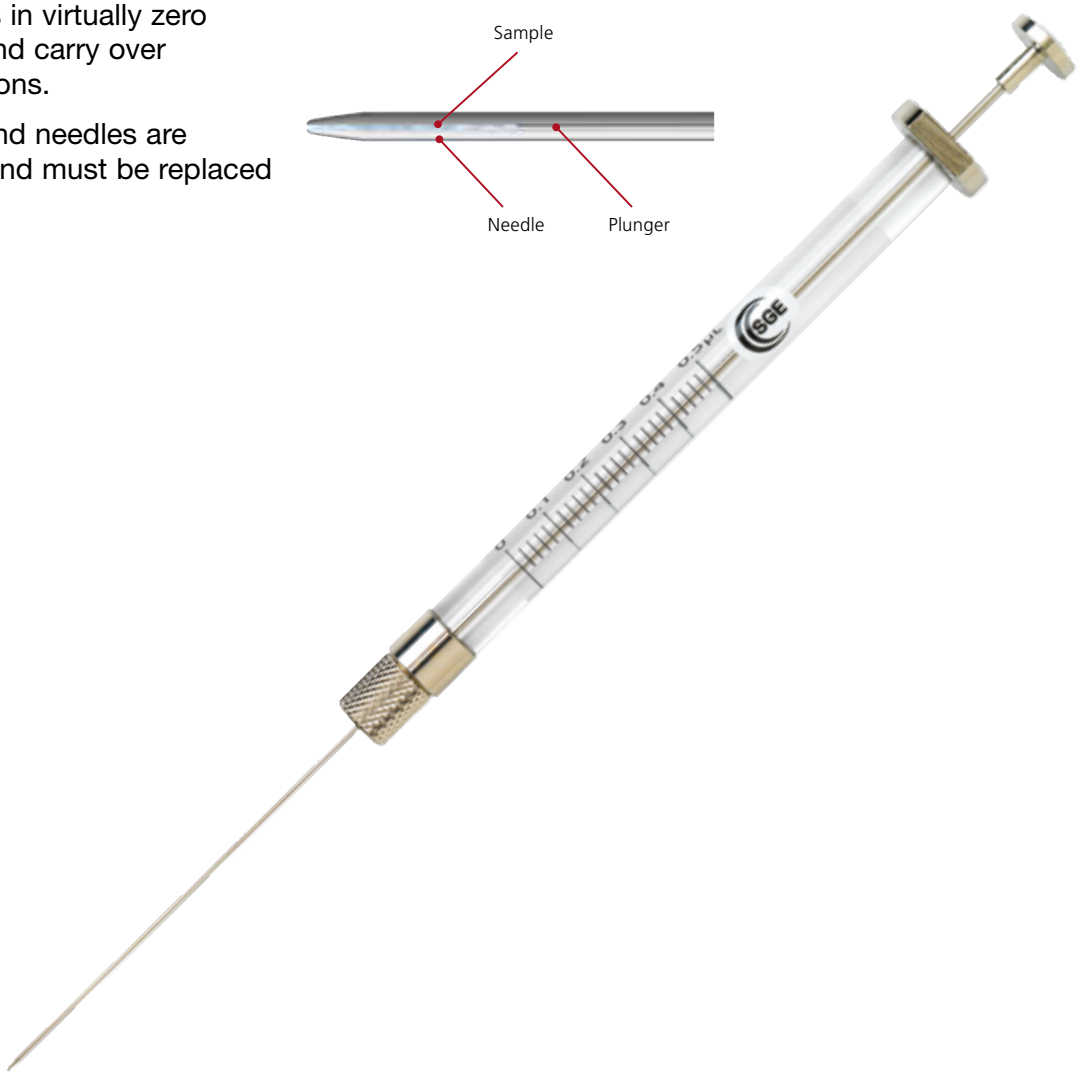
Specifications			
Accuracy and reproducibility	±2% (dispensed volume)	Scale length	0.5 µL and 1 µL = 54.1 mm 5 µL = 48.7 mm
Borosilicate glass barrel outer diameter (OD)	0.5 µL to 5 µL= 8 mm (except part numbers 000300, 000301, 000303, 000303, 000350, 000353 = 6.5 mm)	International standards traceability	✓

With the ability to inject down to 50 nL with high precision and accuracy, SGE NanoVolume syringes are perfect for NanoVolume capillary chromatography injection as well as making accurate standards that require small volumes.

The sample is only drawn into the needle, not the syringe barrel. When the plunger is depressed, the sample is completely dispensed by the NanoVolume plunger that extends to the tip of the needle.

Displacing the full sample during injection results in virtually zero dead volume and carry over between injections.

The plungers and needles are matched sets and must be replaced as a set.



0.5 µL to 5 µL NanoVolume syringes

Part number	Part description and detail	Replacement needle and plunger kit
NanoVolume		
000300	0.5 µL NanoVolume syringe with 5 cm 0.63 mm OD cone tipped needle	033010
000301	0.5 µL NanoVolume syringe with 5 cm 0.63 mm OD bevel tipped needle	033011
000303	0.5 µL NanoVolume syringe with 5 cm 0.47 mm OD cone tipped needle	033012
000310	0.5 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle	033057
000311	0.5 µL NanoVolume syringe with 7 cm 0.63 mm OD bevel tipped needle	033060
000350	0.5 µL NanoVolume syringe with 5 cm 0.63 mm OD cone tipped needle and repeating adaptor	033010
000353	0.5 µL NanoVolume syringe with 5 cm 0.47 mm OD cone tipped needle and repeating adaptor	033012
000355	0.5 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle and repeating adaptor	033057
000376	0.5 µL NanoVolume on-column syringe with 7 cm 0.47 mm OD needle	033630
000380	0.5 µL NanoVolume on-column syringe with 7.5 cm 0.23 mm OD needle	033620
000500	1.0 µL NanoVolume syringe with 5 cm 0.63 mm OD cone tipped needle	034055
000501	1.0 µL NanoVolume syringe with 5 cm 0.63 mm OD bevel tipped needle	034056
000505	1.0 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle	034057
000506	1.0 µL NanoVolume syringe with 7 cm 0.63 mm OD bevel tipped needle	034060
000510	1.0 µL NanoVolume syringe with 11.5 cm 0.63 mm OD bevel tipped needle	034059
000550	1.0 µL NanoVolume syringe with 5 cm 0.63 mm OD cone tipped needle and repeating adaptor	034055
000553	1.0 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle and repeating adaptor	034057
000570	1.0 µL NanoVolume syringe with 7 cm 0.47 mm OD cone tipped needle	034610
000800	5.0 µL NanoVolume syringe with 5 cm 0.63 mm OD cone tipped needle	035055
000801	5.0 µL NanoVolume syringe with 5 cm 0.63 mm OD bevel tipped needle	035056
000802	5.0 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle	035057
000803	5.0 µL NanoVolume syringe with 7 cm 0.63 mm OD bevel tipped needle	035058
000804	5.0 µL NanoVolume syringe with 11.5 cm 0.63 mm OD cone tipped needle	-
000850	5.0 µL NanoVolume syringe with 5 cm 0.63 mm OD cone tipped needle and repeating adaptor	035055
000852	5.0 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle and repeating adaptor	035057

Expert tips

To eliminate carryover between samples, flush the syringe with solvent 5-20 times, remembering to discard the first 2-3 washes.

When replacing the plunger and needle follow the instructions included in the kit – the front cover nut must be loosened before removing the plunger.

5 µL to 500 µL metal plunger syringes

Specifications			
Accuracy and reproducibility	±1% (dispensed volume)	Scale length	5 µL to 10 µL = 54.1 mm 25 µL to 500 µL = 60 mm
Borosilicate glass barrel outer diameter (OD)	5 µL to 10 µL = 6.5 mm 25 µL to 500 µL = 8 mm	International standards traceability	✓

5 µL to 500 µL metal plunger syringes

Part number	Part description and detail	Replacement needle
001000	5 µL fixed needle syringe with 5 cm 0.47 mm OD bevel tipped needle	-
001050	5 µL removable needle syringe with 5 cm 0.47 mm OD bevel tipped needle	036110
001100	5 µL fixed needle syringe with flexible plunger and 5 cm 0.47 mm OD bevel tipped needle	-
002000	10 µL fixed needle syringe with 5 cm 0.47 mm OD bevel tipped needle	-
002003	10 µL fixed needle syringe with 7 cm 0.47 mm OD bevel tipped needle	-
002005	10 µL fixed needle syringe with 5 cm 0.47 mm OD cone tipped needle	-
002030	10 µL fixed needle syringe with 5 cm 0.47 mm OD bevel tipped needle PK6	-
002033	10 µL fixed needle syringe with 5 cm 0.47 mm OD bevel tipped needle PK10	-
002035	10 µL fixed needle syringe with 5 cm 0.47 mm OD bevel tipped needle PK25	-
002050	10 µL removable needle syringe with 5 cm 0.47 mm OD bevel tipped needle	037110
002080	10 µL removable needle syringe with 5 cm 0.47 mm OD bevel tipped needle PK6	037110
002100	10 µL fixed needle syringe with flexible plunger and 5 cm 0.47 mm OD bevel tipped needle	-
002105	10 µL fixed needle syringe with flexible plunger and 5 cm 0.47 mm OD cone tipped needle	-
002130	10 µL fixed needle syringe with flexible plunger and 5 cm 0.47 mm OD bevel tipped needle PK6	-
002133	10 µL fixed needle syringe with flexible plunger and 5 cm 0.47 mm OD cone tipped needle PK6	-
002135	10 µL fixed needle syringe with flexible plunger and 5 cm 0.63 mm OD cone tipped needle PK6	-
002180	10 µL removable needle syringe with flexible plunger and 5 cm 0.47 mm OD bevel tipped needle PK6	037110
003000	25 µL fixed needle syringe with 5 cm 0.5 mm OD bevel tipped needle	-
003050	25 µL removable needle syringe with 5 cm 0.5 mm OD bevel tipped needle	038110
004000	50 µL fixed needle syringe with 5 cm 0.5 mm OD bevel tipped needle	-
004050	50 µL removable needle syringe with 5 cm 0.5 mm OD bevel tipped needle	038110
005000	100 µL fixed needle syringe with 5 cm 0.5 mm OD bevel tipped needle	-
005050	100 µL removable needle syringe with 5 cm 0.5 mm OD bevel tipped needle	038110
005055	100 µL removable needle syringe with 7 cm 0.5 mm OD bevel tipped needle	038130
006000	250 µL fixed needle syringe with 5 cm 0.5 mm OD bevel tipped needle	-
006050	250 µL removable needle syringe with 5 cm 0.5 mm OD bevel tipped needle	038110
007000	500 µL fixed needle syringe with 5 cm 0.5 mm OD bevel tipped needle	-
007050	500 µL removable needle syringe with 5 cm 0.5 mm OD bevel tipped needle	038110

5 µL to 10 µL guided plunger syringes

Specifications			
Accuracy and reproducibility	±1% (dispensed volume)	Scale length	5 µL to 10 µL = 54.1 mm
Borosilicate glass barrel outer diameter (OD)	5 µL to 10 µL = 6.5 mm	International standards traceability	✓

Guided plunger syringes are the most rugged syringe available, making them perfect for industrial environments.

5 µL to 10 µL guided plunger syringes

Part number	Part description and detail	Replacement needle	Replacement plunger
001400	5 µL fixed needle guided plunger syringe with 5 cm 0.47 mm OD bevel tipped needle	-	-
001450	5 µL removable needle guided plunger syringe with 5 cm 0.47 mm OD bevel tipped needle	036110	-
001495	5 µL removable needle guided plunger syringe with 5 cm 0.47 mm OD bevel tipped needle (half scale)	037110	-
002400	10 µL fixed needle guided plunger syringe with 5 cm 0.47 mm OD bevel tipped needle	-	-
002450	10 µL removable needle guided plunger syringe with 5 cm 0.47 mm OD bevel tipped needle	037110	-
002455	10 µL removable needle guided plunger syringe with GT plunger and 5 cm 0.47 mm OD bevel tipped needle	037110	031805

10 µL to 500 µL PTFE tipped plunger syringes

Specifications			
Accuracy and reproducibility	±1% (dispensed volume)	Scale length	10 µL = 54.1 mm 25 µL to 500 µL = 60 mm
Borosilicate glass barrel outer diameter (OD)	10 µL = 6.5 mm 25 µL to 500 µL = 8 mm	International standards traceability	✓

10 µL to 500 µL PTFE tipped plunger syringes

Part number	Part description and detail	Replacement needle	Replacement plunger
002200	10 µL fixed needle syringe with GT plunger and 5 cm 0.47 mm OD bevel tipped needle	-	031810
002202	10 µL fixed needle syringe with GT plunger and 5 cm 0.47 mm OD bevel tipped needle PK6	-	031810
002208	10 µL fixed needle syringe with GT plunger and 7 cm 0.47 mm OD bevel tipped needle	-	031810
002250	10 µL removable needle syringe with GT plunger and 5 cm 0.47 mm OD bevel tipped needle	037110	031811
002252	10 µL removable needle syringe with GT plunger and 5 cm 0.47 mm OD bevel tipped needle PK6	037110	031811
003200	25 µL fixed needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	-	031815
003250	25 µL removable needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	038110	031815
004200	50 µL fixed needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	-	031820
004229	50 µL fixed Luer Tip syringe with GT plunger	-	031820
004230	50 µL fixed Luer Lock syringe with GT plunger	-	031820
004232	50 µL fixed Luer Lock syringe with GT plunger and plunger stop	-	-
004250	50 µL removable needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	038110	031820
004279	50 µL syringe with removable needle valve and GT plunger	-	031820
005200	100 µL fixed needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	-	031825
005229	100 µL fixed Luer Tip syringe with GT plunger	-	031825
005230	100 µL fixed Luer Lock syringe with GT plunger	-	031825
005232	100 µL fixed Luer Lock syringe with GT plunger and plunger stop	-	-
005250	100 µL removable needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	038110	031825
005279	100 µL syringe with removable needle valve and GT plunger	-	031825
006200	250 µL fixed needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	-	031830
006229	250 µL fixed Luer Tip syringe with GT plunger	-	031830
006230	250 µL fixed Luer Lock syringe with GT plunger	-	031830
006232	250 µL fixed Luer Lock syringe with GT plunger and plunger stop	-	031833
006250	250 µL removable needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	038110	031830
006279	250 µL syringe with removable needle valve and GT plunger	-	031830
007200	500 µL fixed needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	-	031835
007229	500 µL fixed Luer Tip syringe with GT plunger	-	031835
007230	500 µL fixed Luer Lock syringe with GT plunger	-	031835
007232	500 µL fixed Luer Lock syringe with GT plunger and plunger stop	-	-
007250	500 µL removable needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	038110	031835
007279	500 µL syringe with removable needle valve and GT plunger	-	031835

1 mL to 100 mL PTFE tipped plunger syringes

Specifications			
Accuracy and reproducibility	±1% (dispensed volume)	Scale length	1 mL to 25 mL = 60 mm 50 mL = 84.2 mm 100 mL = 104 mm
Borosilicate glass barrel outer diameter (OD)	1 mL = 9 mm 2.5 mL = 11 mm 5 mL = 14 mm 10 mL = 18 mm 25 mL = 27 mm 50 mL = 32.8 mm 100 mL = 40.8 mm	Thread in plunger stem	6-32 UNC
		International standards traceability	✓

1 mL to 100 mL PTFE tipped plunger syringes

Part number	Part description and detail	Replacement needle	Replacement plunger
008020	1 mL fixed Luer Tip syringe with GT plunger	-	031842
008025	1 mL fixed Luer Lock syringe with GT plunger	-	0318441
008100	1 mL removable needle syringe with GT plunger and 5 cm 0.63 mm OD bevel tipped needle	039110	031842
008102	1 mL fixed needle syringe with GT plunger and 5 cm 0.72 mm OD bevel tipped needle	-	0318441
008110	1 mL syringe with removable needle valve and GT plunger	-	031842
008160	1 mL syringe with removable Luer Lock valve and GT plunger	-	031842
008420	2.5 mL fixed Luer Tip syringe with GT plunger	-	031852
008425	2.5 mL fixed Luer Lock syringe with GT plunger	-	031852
008500	2.5 mL removable needle syringe with GT plunger and 5 cm 0.63 mm OD bevel tipped needle	039110	031852
008502	2.5 mL fixed needle syringe with GT plunger and 5 cm 0.72 mm OD bevel tipped needle	-	031852
008510	2.5 mL syringe with removable needle valve and GT plunger	-	031852
008560	2.5 mL syringe with removable Luer Lock valve and GT plunger	-	031852
008700	5 mL removable needle syringe with GT plunger and 5 cm 0.63 mm OD bevel tipped needle	031516	031856
008760	5 mL removable Luer Lock syringe with GT plunger	-	031856
008762	5 mL fixed Luer Lock syringe with GT plunger	-	0318562
008770	5 mL syringe with removable Luer Lock valve and GT plunger	-	031856
008900	10 mL removable needle syringe with GT plunger and 5 cm 0.63 mm OD bevel tipped needle	031516	031862
008960	10 mL removable Luer Lock syringe with GT plunger	-	031862
008962	10 mL fixed Luer Lock syringe with GT plunger	-	031864
008970	10 mL syringe with removable Luer Lock valve and GT plunger	-	031862
009462	25 mL removable Luer Lock syringe with GT plunger	-	031870
009463	25 mL fixed Luer Lock syringe with GT plunger	-	031874
009472	25 mL syringe with removable Luer Lock valve and GT plunger	-	031870
009660	50 mL removable Luer Lock syringe with GT plunger	-	0312170
009670	50 mL syringe with removable Luer Lock valve and GT plunger	-	0312170
009760	100 mL removable Luer Lock syringe with GT plunger	-	0312176
009770	100 mL syringe with removable Luer Lock valve and GT plunger	-	0312176

LC syringes

Specifications			
Accuracy and reproducibility	±1% (dispensed volume)	Scale length	5 µL to 10 µL = 54.1 mm 25 µL to 2.5 mL = 60 mm
Borosilicate glass barrel outer diameter (OD)	5 µL and 10 µL = 6.5 mm 25 µL to 500 µL = 8 mm 1 mL = 8.8 mm 2.5 mL = 10.8 mm	International standards traceability	✓

Syringes listed in the following part number table are suitable for:

- Beckman/Altex
- Rheodyne
- SSI instruments
- Valco valves

Beckman/Altex, Rheodyne, SSI instruments and Valco valves

Part number	Part description and detail	Replacement needle	Replacement plunger
001301	5 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	-	-
002300	10 µL fixed needle syringe with Superflex plunger and 5.1 cm 0.72 mm OD LC needle	-	-
002301	10 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	-	-
002313	10 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	037250	031811
002315	10 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle PK6	-	-
002330	10 µL fixed needle syringe with Superflex plunger and 5.1 cm 0.72 mm OD LC needle PK6	-	-
002335	10 µL fixed needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	-	031810
003300	25 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	-	-
003312	25 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	038250	031815
004300	50 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	-	-
004312	50 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	038250	031820
005300	100 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	-	-
005312	100 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	038250	031825
006300	250 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	-	-
006310	250 µL removable needle syringe with 5.1 cm 0.72 mm OD LC needle		-
006312	250 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	038250	031830
007300	500 µL fixed needle syringe with and 5.1 cm 0.72 mm OD LC needle	-	-
007310	500 µL removable needle syringe with 5.1 cm 0.72 mm OD LC needle	038250	-
007312	500 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	038250	031835
008105	1 mL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	039250	031842
008505	2.5 mL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	039250	031842

Expert tips

Users of Valco injectors requiring 3/4" long needles, must fit a Valco VISF-2 adaptor.

When using the complete loop fill technique, the syringe capacity should be greater than twice the loop volume. The loop capacity sets the injection volume.

When using the partial loop technique, the injection volume should be no greater than half the loop capacity. The injection size sets the injection volume.

SGE Syringes | Hamilton cross reference

Variation notes:

FN = fixed needle, GT = gas tight, with PTFE tipped plunger, H = Hamilton, LL = Luer Lock, LT = Luer Tip, RN = removable needle, WO = without

Hamilton part number	Part description and detail	Trajan SGE part number	Part description and detail	Equivalent or option	Variation
0160310	1750 HITACHI SYRINGE	007660	500 µL Hitachi LC autosampler syringe with GT plunger with M10 - 1.0 screw thread	E	
202640	701RSN AOC 14/17(22s/1.69"/2)	002898	10 µL removable needle Shimadzu syringe with 4.2 cm 0.63 mm OD cone tipped needle	O	23 g needle
202660	1002LTN CTC SYR (22/56/5)	008631	2.5 mL fixed needle CTC headspace syringe with energized GT plunger and 5.6 cm 0.63 mm OD side hole needle	O	23 g needle
202880	701RN VARIAN 8100/8200	002924	10 µL removable needle Varian (8035, 8100, 8200) syringe with GT plunger and 5.3 cm 0.5 mm OD needle	O	25 g needle
203043	1702N CTC SYRINGE (26s/51/AS)	003700	25 µL fixed needle CTC syringe with GT plunger and 5 cm 0.47 mm OD cone tipped needle	E	
203072	SYR,701 CTC,SLIM (26s/51/2)	002980	10 µL fixed needle CTC/Thermo syringe with 5 cm 0.47 mm OD cone tipped needle	O	Cone tipped needle
203073	701N CTC SYRINGE (22s/51/3)	002710	10 µL fixed needle CTC syringe with 5.1 cm 0.72 mm OD LC needle	E	
203074	SYR,1702CTC,SLIM (26s/51/AS)	0039871	25 µL fixed needle CTC/Thermo (classic button) syringe with GT plunger and 5 cm 0.63 mm OD cone tipped needle	O	23 g needle
203075	1702N CTC SYRINGE (22s/51/3)	003715	25 µL fixed needle CTC syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle (8 mm OD barrel)	E	
203076	SYR,1710 CTC,SLIM (26s/51/AS)	005700	100 µL fixed needle CTC syringe with GT plunger and 5 cm 0.47 mm OD cone tipped needle	E	
203077	SYR,1710N CTC,SLIM (22s/51/3)	005715	100 µL fixed needle CTC syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	E	
203078	1725N CTC SYRINGE (26/51/AS)	006700	250 µL fixed needle CTC syringe with GT plunger and 5 cm 0.47 mm OD cone tipped needle	E	
203082	1001LTN CTC SYRINGE (23/51/5)	008131	1 mL fixed needle CTC headspace syringe with energized GT plunger and 5.6 cm 0.63 mm OD side hole needle	E	
203084	1002LTN CTC SYRINGE (23/51/5)	008631	2.5 mL fixed needle CTC headspace syringe with energized GT plunger and 5.6 cm 0.63 mm OD side hole needle	E	
203141	1001LTN CTC SYRINGE (26/51/5)	008136	1 mL fixed needle CTC headspace syringe with energized GT plunger and 5.6 cm 0.47 mm OD side hole needle	E	
203181	1002LTN CTC SYRINGE (26/51/5)	008636	2.5 mL fixed needle CTC headspace syringe with energized GT plunger and 5.6 cm 0.47 mm OD side hole needle	E	
203185	7701.2 CTC SYRINGE (26/51/AS)	000790	2.0 µL NanoVolume CTC/Thermo syringe with 5.0 cm 0.63 mm OD cone tipped needle	O	2 µL instead of 1.2 µL
203189	75N CTC SYRINGE (26s/51/AS)	001982	5 µL fixed needle CTC/Thermo syringe with 5 cm 0.47 mm OD cone tipped needle	E	
203205	701N CTC SYRINGE (26s/51/AS)	002700	10 µL fixed needle CTC syringe with 5 cm 0.47 mm OD cone tipped needle	E	
203235	1710N CTC SYRINGE (22/51/3)	005720	100 µL fixed needle CTC syringe with GT plunger and 5.1 cm 0.72 mm OD (0.4 mm ID) LC needle	E	
203349	1750N CTC SYR (22/51/3)	007720	500 µL fixed needle CTC syringe with GT plunger and 5.1 cm 0.72 mm OD (0.4 mm ID) LC needle	E	
203361	701N CTC SYR (23S/51/AS)	002981	10 µL fixed needle CTC/Thermo syringe with 5 cm 0.63 mm OD cone tipped needle	E	
203362	701N CTC SYR (23S-26S/51/AS)	002980	10 µL fixed needle CTC/Thermo syringe with 5 cm 0.47 mm OD cone tipped needle	O	26 g needle
203363	701N CTC SYR (23S/2"/2)	002981	10 µL fixed needle CTC/Thermo syringe with 5 cm 0.63 mm OD cone tipped needle	O	Cone tipped needle
203566	1710 CTC A200S SYR (22s/2/3)	005331	100 µL fixed needle CTC/Thermo syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	E	
204000	SYRINGE,75N(26S/50/2)	0019821	5 µL fixed needle CTC/Thermo (classic button) syringe with 5 cm 0.47 mm OD cone tipped needle	O	Cone tipped needle

Hamilton part number	Part description and detail	Trajan SGE part number	Part description and detail	Equivalent or option	Variation
204001	SYRINGE,701SN(26S/50/2)	0029801	10 µL fixed needle CTC/Thermo (classic button) syringe with 5 cm 0.47 mm OD cone tipped needle	O	Cone tipped needle
204051	SYRINGE,75SN(26S/50/AS)	0019821	5 µL fixed needle CTC/Thermo (classic button) syringe with 5 cm 0.47 mm OD cone tipped needle	E	
204052	SYRINGE,701SN 26S/50/AS)	0029801	10 µL fixed needle CTC/Thermo (classic button) syringe with 5 cm 0.47 mm OD cone tipped needle	E	
207189	701 PAL3 (26S/85/AS)	002867	10 µL fixed needle CTC RTC and Thermo RSH syringe with 8.5 cm 0.47 mm OD cone tipped needle	E	
207290	1002 CTC PAL3 (23/65/5)HS	008655	2.5 mL fixed needle CTC RTC and Thermo RSH headspace syringe with energized GT plunger and 5.6 cm 0.63 mm OD side hole needle	E	
207292	1010 CTC PAL3(19/57/3)	008951	10 mL removable needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 1.07 mm OD LC tipped needle	E	
207803	701 PAL3 (23S/57/AS)	002861	10 µL fixed needle CTC RTC and Thermo RSH syringe with 5.7 cm 0.63 mm OD cone tipped needle	E	
207807	701 PAL3 (26S/57/AS)	002865	10 µL fixed needle CTC RTC and Thermo RSH syringe with 5.7 cm 0.47 mm OD cone tipped needle	E	
207813	1701 PAL3 (22S/57/3)	002880	10 µL removable needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.72 mm OD LC needle	E	
207829	1725 PAL3 (23/57/AS)	006862	250 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.63 mm OD cone tipped needle	E	
207831	1725 PAL3 (26/85/AS)	006868	250 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.47 mm OD cone tipped needle	E	
207836	1001 PAL3 (22/57/3)	008150	1 mL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.72 mm OD LC tipped needle	E	
207837	1701 PAL3 (26S/57/AS)	002866	10 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.47 mm OD cone tipped needle	E	
207839	1701 PAL3 (23S/57/AS)	002862	10 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.63 mm OD cone tipped needle	E	
207840	1710 PAL3 (26S/57/AS)	005866	100 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.47 mm OD cone tipped needle	E	
207853	1001 CTC PAL3 (23/65/5)HS	008155	1 mL fixed needle CTC RTC and Thermo RSH headspace syringe with energized GT plunger and 6.5 cm 0.63 mm OD side hole needle	E	
54658-01	SYRINGE,1710C,AUTO SAMPLER	005696	100 µL V6 dispenser syringe	E	
54659-01	SYRINGE,1725C,AUTO SAMPLER	006696	250 µL V6 dispenser syringe	E	
54660-01	SYRINGE,1750C,AUTO SAMPLER	007696	500 µL V6 dispenser syringe	E	
54661-01	SYRINGE,1001C,AUTO SAMPLER	008196	1.0 mL V6 dispenser syringe	E	
54662-01	SYRINGE,1002C,AUTO SAMPLER	008596	2.5 mL V6 dispenser syringe	E	
62161-01	SYRINGE,1702C,SPARK AUTO	003696	25 µL V6 dispenser syringe	E	
67430-01	SYR,1702N,(23/51/AS),CTC-S	003700	25 µL fixed needle CTC syringe with GT plunger and 5 cm 0.47 mm OD cone tipped needle	O	26 g needle
67432-01	SYR,1710N,(22S/51/3),CTC-S-X	005331	100 µL fixed needle CTC/Thermo syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	E	
67434-01	SYR,1710N,(23/51/AS),CTC-S	005335	100 µL fixed needle CTC/Thermo syringe with GT plunger and 5 cm 0.63 mm OD cone tipped needle	E	
67436-01	SYR,75N,(26S/51/AS),CTC-S	0019821	5 µL fixed needle CTC/Thermo (classic button) syringe with 5 cm 0.47 mm OD cone tipped needle	E	
67438-01	SYR,701N,(26S/51/AS),CTC-S	0029801	10 µL fixed needle CTC/Thermo (classic button) syringe with 5 cm 0.47 mm OD cone tipped needle	E	
67440-01	SYR,701SN,(23S/51/AS),CTC-S	002951	10 µL fixed needle Varian 8400/CTC/Thermo (classic button) syringe with 5 cm 0.63 mm OD cone tipped needle	E	
67442-01	SYR,1725N,(22/51/3),CTC-S	006720	250 µL fixed needle CTC syringe with GT plunger and 5.1 cm 0.72 mm OD (0.4 mm ID) LC needle	E	
67446-01	SYR,1702N,(22S/51/3),CTC-S	003715	25 µL fixed needle CTC syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle (8 mm OD barrel)	E	

Hamilton part number	Part description and detail	Trajan SGE part number	Part description and detail	Equivalent or option	Variation
67448-01	SYR,1750N,(22/51/3),CTC-S	007720	500 µL fixed needle CTC syringe with GT plunger and 5.1 cm 0.72 mm OD (0.4 mm ID) LC needle	E	
67450-01	SYR,1705N,(22/51/3),CTC-S	004810	50 µL fixed needle CTC syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	E	
67452-01	SYR,1710SN,(22S/51/3),CTC-S	005715	100 µL fixed needle CTC syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	E	
67454-01	SYR,1701SN,(23S/51/AS),CTC-S	0029871	10 µL fixed needle CTC/Thermo (classic button) syringe with GT plunger and 5 cm 0.63 mm OD cone tipped needle	E	
80000	1701N 10 µL SYR (26s/2"/2)	002200	10 µL needle syringe with GT plunger and 5 cm 0.47 mm OD bevel tipped needle	E	
80004	1701NCH 10 µL SYR (26s/2"/2)	002200 + 031930	10 µL fixed needle syringe with GT plunger and 5 cm 0.47 mm OD bevel tipped needle and repeating adaptor	E	
80020	1702 WISP SYR 25 µL	003990	25 µL Waters Wisp syringe with GT plunger	E	
80024	1725 WISP SYR 250 µL	006690	250 µL Waters Wisp syringe with GT plunger	E	
80030	1701RN 10 µL SYR (26s/2"/2)	002250	10 µL removable needle syringe with GT plunger and 5 cm 0.47 mm OD bevel tipped needle	E	
80039	1701NPT5 10 µL SYR (26s/2"/5)	002250 + 037410	10 µL removable needle syringe with GT plunger and 5 cm side hole dome tipped needle	O	Removable needle
80065	1701RNR 10 µL SYR (22s/2"/3)	002313	10 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	E	
80074	SYRINGE,175ASN,23S GA,1.71	001810	5 µL fixed needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	O	Not GT (note that H is half scale 10 µL)
80074	SYRINGE,175ASN,23S GA,1.71	002812	10 µL fixed needle Agilent syringe with GT plunger and 4.2 cm 0.63 mm OD cone tipped needle	O	Full scale 10 µL instead of half scale 5 µL
80075	1701N 10 µL SYR (26s/2"/3)	002335	10 µL fixed needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	O	22 g needle
80076	175ASN SYR (23-26/1.71"/HP)	001821	5 µL fixed needle Agilent syringe with 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	O	Not GT (note that H is half scale 10 µL)
80076	175ASN SYR (23-26/1.71"/HP)	002826	10 µL fixed needle Agilent syringe with GT plunger and 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	O	Full scale 10 µL instead of half scale 5 µL
80079	1701ASN SYR(23S/26S/1.71"/HP)	002826	10 µL fixed needle Agilent syringe with GT plunger and 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	E	
80080	1701ASN SYR (23s/1.71"/HP)	002812	10 µL fixed needle Agilent syringe with GT plunger and 4.2 cm 0.63 mm OD cone tipped needle	E	
80084	175ASRN(23s/1.71"/HP)	002829	10 µL removable needle Agilent syringe with GT plunger and 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	O	Dual gauge needle (note that H 5 µL is half scale 10 µL)
80085	1701N 10 µL SYR (26/2"/3)	002335	10 µL fixed needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	O	22 g needle
80086	175ASRN SYR (23-26/1.71"/HP)	002829	10 µL removable needle Agilent syringe with GT plunger and 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	O	Full scale 10 µL instead of half scale 5 µL
80087	1701ASRN 10 µL SYR 23s/1.71"/HP	002829	10 µL removable needle Agilent syringe with GT plunger and 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	O	Dual gauge needle
80088	1701ASRN 10 µL SYR 26s/1.71"/HP	002829	10 µL removable needle Agilent syringe with GT plunger and 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	O	Dual gauge needle
80089	1701ASRN SYR (23S/26S/1.71/HP)	002829	10 µL removable needle Agilent syringe with GT plunger and 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	E	
80090	175ASN 5 µL (23S/1.71"/HP) 6/PK	002812	10 µL fixed needle Agilent syringe with GT plunger and 4.2 cm 0.63 mm OD cone tipped needle	O	Full scale 10 µL instead of half scale 5 µL
80090	175ASN 5 µL (23S/1.71"/HP) 6/PK	002816	10 µL removable needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle PK25	O	Full scale 10 µL instead of half scale 5 µL
80092	175ASN 5 µL (23-26/1.71"/HP) 6/PK	002827	5 µL fixed needle Agilent syringe with GT plunger and 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle PK6	O	Full scale 10 µL instead of half scale 5 µL

Hamilton part number	Part description and detail	Trajan SGE part number	Part description and detail	Equivalent or option	Variation
80094	1701ASN SYR (23s/1.71"/HP) 6/PK	002812	10 µL fixed needle Agilent syringe with GT plunger and 4.2 cm 0.63 mm OD cone tipped needle	O	
80094	1701ASN SYR (23s/1.71"/HP) 6/PK	002816	10 µL fixed needle Agilent syringe with GT plunger and 4.2 cm 0.63 mm OD cone tipped needle PK25	O	
80096	1701ASN (23-26/1.71"/HP) 6/PK	002827	5 µL fixed needle Agilent syringe with GT plunger and 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle PK6	E	
80100	7001KH 1 µL SYR (25/2.75"/3)	000570	1.0 µL NanoVolume syringe with 7 cm 0.47 mm OD cone tipped needle	O	26 g, cone tipped needle
80104	7001KHCH 1 µL SYR (25/2.75"/3)	000570 + 031930	1.0 µL NanoVolume syringe with 7 cm 0.47 mm OD cone tipped needle and repeating adaptor	O	26 g, a tipped needle
80107	7001KHWG 1 µL SYR (25s/2.75"/3)	000570 + 031930	1.0 µL NanoVolume syringe with 7 cm 0.47 mm OD cone tipped needle and repeating adaptor	O	26 g, cone tipped needle
80135	7001KH 1.0 µL SYR (25/2.75"/2)	000506	1.0 µL NanoVolume syringe with 7 cm 0.63 mm OD bevel tipped needle	O	23 g needle
80175	7001ASRN (26/1.71"/HP)	000610	1.0 µL NanoVolume Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	O	23 g needle
80176	7001ASRN (23/1.71"/HP)	000610	1.0 µL NanoVolume Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	E	
80200	1702N 25 µL SYR (22s/2"/2)	003200	25 µL fixed needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	O	25 g needle
80201	1702LT 25 µL SYR	004229	50 µL fixed Luer Tip syringe with GT plunger	O	50 µL
80222	1702TLLX 25 µL SYR	004232	50 µL fixed Luer Lock syringe with GT plunger and plunger stop	O	50 µL
80223	1702TLLX SYR W/BSHG STD BTN	004232	50 µL fixed Luer Lock syringe with GT plunger and plunger stop	O	50 µL
80230	1702RN 25 µL SYR (22s/2"/2)	003250	25 µL removable needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	O	25 g needle
80238	1702RNW 25 µL SYR (25s/1.97"/3)	003250 + 038260	25 µL removable needle syringe with GT plunger and Waters LC tipped needle	E	
80239	1702NPT5 25 µL SYR (22s/2"/5)	003250 + 038410	25 µL removable needle syringe with GT plunger and 5 cm side hole dome tipped needle	O	RN, 25 g needle
80265	1702RNR 25 µL SYR (22s/2"/3)	003312	25 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	E	
80275	1702N 25 µL SYR (22s/2"/3)	003300	25 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	O	Not GT
80285	1702N 25 µL SYR (22/2"/3)	003300	25 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	O	Not GT
80300	701N 10 µL SYR (26s/2"/2)	002000	10 µL fixed needle syringe with 5 cm 0.47 mm OD bevel tipped needle	E	
80300	701N 10 µL SYR (26s/2"/2)	002950	10 µL fixed needle Varian 8400 syringe with 5 cm 0.47 mm OD bevel tipped needle	E	
80304	701NCH 10 µL SYR (26s/2"/2)	002000 + 031930	10 µL fixed needle syringe with 5 cm 0.47 mm OD bevel tipped needle and repeating adaptor	E	
80307	701NWG 10 µL SYR (26s/2"/2)	002000 + 031930	10 µL fixed needle syringe with 5 cm 0.47 mm OD bevel tipped needle and repeating adaptor	E	
80318	701SN 10 µL SYR (26s/3.15"/AS)	0029921	10 µL fixed needle CTC/Thermo (classic button) syringe with 8 cm 0.47 mm OD cone tipped needle	E	
80330	701RN 10 µL SYR (26s/2"/2)	002050	10 µL removable needle syringe with 5 cm 0.47 mm OD bevel tipped needle	E	
80334	701RNCH 10 µL SYR (26s/2"/2)	002050 + 031930	10 µL removable needle syringe with 5 cm 0.47 mm OD bevel tipped needle and repeating adaptor	E	
80336	701RN 10 µL SYR 6/PK (26s/2"/2)	002080	10 µL removable needle syringe with 5 cm 0.47 mm OD bevel tipped needle PK6	E	
80337	701RNWG 10 µL SYR (26s/2"/2)	002050 + 031930	10 µL removable needle syringe with 5 cm 0.47 mm OD bevel tipped needle and repeating adaptor	E	
80339	701NPT5 10 µL SYR (26s/2"/5)	002050 + 037410	10 µL removable needle syringe with 5 cm side hole dome tipped needle	O	RN
80342	701SN 10 µL SYR (23s/2"/HP)	002005	10 µL fixed needle syringe with 5 cm 0.47 mm OD cone tipped needle	E	
80350	701SN 10 µL SYR (26s/2.75"/2)	002003	10 µL fixed needle syringe with 7 cm 0.47 mm OD bevel tipped needle	E	
80357	701ASRN 10 µL SYR (23s/1.71"/HP)	002815	10 µL removable needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	E	
80358	701ASRN 10 µL SYR (26s/1.71"/HP)	002805	10 µL removable needle Agilent syringe with 4.2 cm 0.47 mm OD cone tipped needle	E	

Hamilton part number	Part description and detail	Trajan SGE part number	Part description and detail	Equivalent or option	Variation
80359	701ASRN 10 µL (23-26/1.71"/HP)	002829	10 µL removable needle Agilent syringe with GT plunger and 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	O	GT
80360	901N 10 µL SYR (26s/2"/2)	002400	10 µL fixed needle guided plunger syringe with 5 cm 0.47 mm OD bevel tipped needle	E	
80365	701SNR 10 µL SYR (22s/2"/3)	002301	10 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	E	
80366	701N 10 µL SYR 6/PK (26s/2"/2)	002030	10 µL fixed needle syringe with 5 cm 0.47 mm OD bevel tipped needle PK6	E	
80370	901RN 10 µL SYR (26s/2"/2)	002450	10 µL removable needle guided plunger syringe with 5 cm 0.47 mm OD bevel tipped needle	E	
80383	701SN 10 µL SYR (26s/2"/3)	002301	10 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	E	
80384	701SN 10 µL SYR (26s/3"/2)	002003	10 µL fixed needle syringe with 7 cm 0.47 mm OD bevel tipped needle	O	7 cm needle
80387	701ASN 10 µL SYR (23s/1.71"/HP)	002810	10 µL fixed needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	E	
80388	701ASN 10 µL SYR (26s/1.71"/HP)	002800	10 µL fixed needle Agilent syringe with 4.2 cm 0.47 mm OD cone tipped needle	E	
80389	701ASN 10 µL SYR-HP 26s (6/PK)	002804	10 µL fixed needle Agilent syringe with 4.2 cm 0.47 mm OD cone tipped needle PK6	E	
80390	701ASN 10 µL SYR-HP 23s (6/PK)	002814	10 µL fixed needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle PK6	E	
80391	701ASN 6/PK (23-26/1.71"/HP)	002822	10 µL fixed needle Agilent syringe with 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle PK6	E	
80393	701ASN SYR (23-26/1.71"/HP)	002821	10 µL fixed needle Agilent syringe with 4.2 cm 0.47 mm OD cone tipped dual gauge needle	E	
80398	701ASN 10 µL SYR (23S/1.71"/2)	002810	10 µL fixed needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	O	Cone tipped needle
80399	701ASN 10 µL SYR (26S/1.71"/2)	002800	10 µL fixed needle Agilent syringe with 4.2 cm 0.47 mm OD cone tipped needle	O	Cone tipped needle
80400	702N 25 µL SYR (22s/2"/2)	003000	25 µL fixed needle syringe with 5 cm 0.5 mm OD bevel tipped needle	E	
80404	702NCH 25 µL SYR (22s/2"/2)	003000 + 031930	25 µL fixed needle syringe with 5 cm 0.5 mm OD bevel tipped needle and repeating adaptor	O	25 g needle
80407	702NWG 25 µL SYR (22s/2"/2)	003000 + 031930	25 µL fixed needle syringe with 5 cm 0.5 mm OD bevel tipped needle and repeating adaptor	O	25 g needle
80419	702SN 25 µL SYR (22/2"/3)	003300	25 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	E	
80430	702RN 25 µL SYR (22s/2"/2)	003050	25 µL removable needle syringe with 5 cm 0.5 mm OD bevel tipped needle	O	25 g needle
80439	702NPT5 25 µL SYR (22s/2"/5)	003050 + 038410	25 µL removable needle syringe with 5 cm side hole dome tipped needle	O	RN, 25 g needle
80465	702SNR 25 µL SYR (22s/2"/3)	003300	25 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	E	
80500	705N 50 µL SYR (22s/2"/2)	004000	50 µL fixed needle syringe with 5 cm 0.5 mm OD bevel tipped needle	O	25 g needle
80501	705LT 50 µL SYR	004229	50 µL fixed Luer Tip syringe with GT plunger	E	
80505	705NCH 50 µL SYR (22s/2"/2)	004000 + 031930	50 µL fixed needle syringe with 5 cm 0.5 mm OD bevel tipped needle and repeating adaptor	O	25 g needle
80521	705SN 50 µL SYR (22/2"/3)	004300	50 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	E	
80530	705RN 50 µL SYR (22s/2"/2)	004050	50 µL removable needle syringe with 5 cm 0.5 mm OD bevel tipped needle	O	25 g needle
80539	705NPT5 50 µL SYR (22s/2"/5)	004050 + 038410	50 µL removable needle syringe with 5 cm side hole dome tipped needle	O	RN, 25 g needle
80565	705SNR 50 µL SYR (22s/2"/3)	004300	50 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	E	
80600	710N 100 µL SYR (22s/2"/2)	005000	100 µL fixed needle syringe with 5 cm 0.5 mm OD bevel tipped needle	O	25 g needle
80601	710LT 100 µL SYR	005229	100 µL fixed Luer Tip syringe with GT plunger	E	
80605	710NCH 100 µL SYR (22s/2"/2)	005000 + 031930	100 µL fixed needle syringe with 5 cm 0.5 mm OD bevel tipped needle and repeating adaptor	O	25 g needle
80621	710SN 100 µL SYR (22/2"/3)	005300	100 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	E	
80630	710RN 100 µL SYR (22s/2"/2)	005050	100 µL removable needle syringe with 5 cm 0.5 mm OD bevel tipped needle	O	25 g needle

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80639	710NPT5 100 µL SYR (22s/2"/5)	005050 + 038410	100 µL removable needle syringe with 5 cm side hole dome tipped needle	O	RN, 25 g needle
80665	710SNR 100 µL SYR (22s/2"/3)	005300	100 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	E	
80700	725N 250 µL SYR (22S/2"/2)	006000	250 µL fixed needle syringe with 5 cm 0.5 mm OD bevel tipped needle	O	25 g needle
80701	725LT 250 µL SYR	006229	250 µL fixed Luer Tip syringe with GT plunger	E	
80730	725RN 250 µL SYR (22s/2"/2)	006050	250 µL removable needle syringe with 5 cm 0.5 mm OD bevel tipped needle	O	25 g needle
80739	725N 250 µL SYR (22S/2"/5)	006050 + 038410	250 µL removable needle syringe with 5 cm side hole dome tipped needle	O	RN, 25 g needle
80765	725NR 250 µL (22/2"/3)	006300	250 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	E	
80800	750N 500 µL SYR (22/2"/2)	007000	500 µL fixed needle syringe with 5 cm 0.5 mm OD bevel tipped needle	O	25 g needle
80801	750LT 500 µL SYR	007229	500 µL fixed Luer Tip syringe with GT plunger	E	
80830	750RN 500 µL SYR (22/2"/2)	007050	500 µL removable needle syringe with 5 cm 0.5 mm OD bevel tipped needle	O	25 g needle
80839	750N 500 µL SYR (22/2"/5)	007050 + 038410	500 µL removable needle syringe with 5 cm side hole dome tipped needle	O	RN, 25 g needle
80865	750N 500 µL SYR (22/2"/3)	007300	500 µL fixed needle syringe with and 5.1 cm 0.72 mm OD LC needle	E	
80900	1705N 50 µL SYR (22s/2"/2)	004200	50 µL fixed needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	O	25 g needle
80901	1705LT 50 µL SYR	004229	50 µL fixed Luer Tip syringe with GT plunger	E	
80920	1705TLL 50 µL SYR	004230	50 µL fixed Luer Lock syringe with GT plunger	E	
80922	1705TLLX 50 µL SYR	004232	50 µL fixed Luer Lock syringe with GT plunger and plunger stop	E	
80927	1705TLL 50 µL SYR W/SLOTS	004230	50 µL fixed Luer Lock syringe with GT plunger	E	
80930	1705RN 50 µL SYR (22s/2"/2)	004250	50 µL removable needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	O	25 g needle
80938	1705RNW 50 µL SYR(25s/1.97"/3)	004250 + 038260	50 µL removable needle syringe with GT plunger and Waters LC tipped needle	E	
80939	1705NPT5 50 µL SYR (22s/2"/5)	004250 + 038410	50 µL removable needle syringe with GT plunger and 5 cm side hole dome tipped needle	O	RN, 25 g needle
80956	1705SL 50 µL SYR (22s/2"/2)	004279	50 µL syringe with removable needle valve and GT plunger	E	
80962	1705CX 50 µL SYR W/STOP	004995	50 µL syringe with GT plunger and 1/4-28 UNF termination	E	
80965	1705RNR 50 µL SYR (22s/2"/3)	004312	50 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	E	
80975	1705N 50 µL SYR (22s/2"/3)	004312	50 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	O	RN
80985	1705N 50 µL SYR (22/2"/3)	004312	50 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	O	RN
81000	1710N 100 µL SYR (22s/2"/2)	005200	100 µL fixed needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	O	25 g needle
81001	1710LT 100 µL SYR	005229	100 µL fixed Luer Tip syringe with GT plunger	E	
81020	1710TLL 100 µL SYR	005230	100 µL fixed Luer Lock syringe with GT plunger	E	
81022	1710TLLX 100 µL SYR	005232	100 µL fixed Luer Lock syringe with GT plunger and plunger stop	E	
81027	1710TLL 100 µL SYR W/SLOTS	005230	100 µL fixed Luer Lock syringe with GT plunger	E	
81030	1710RN 100 µL SYR (22s/2"/2)	005250	100 µL removable needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	O	25 g needle
81038	1710RNW 100 µL SYR (25s/1.97"/3)	005250 + 038260	100 µL removable needle syringe with GT plunger and Waters LC tipped needle	E	
81039	1710NPT5 100 µL SYR (22s/2"/5)	005250 + 038410	100 µL removable needle syringe with GT plunger and 5 cm side hole dome tipped needle	O	RN, 25 g needle
81056	1710SL 100 µL SYR (22s/2"/2)	005279	100 µL syringe with removable needle valve and GT plunger	E	
81060	1710C 100 µL SYR	005990	100 µL syringe with GT plunger and 1/4-28 UNF termination	E	
81062	1710CX 100 µL SYR W/STOP	005990	100 µL syringe with GT plunger and 1/4-28 UNF termination	E	
81065	1710RNR 100 µL SYR (22s/2"/3)	005312	100 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	E	

Hamilton part number	Part description and detail	Trajan SGE part number	Part description and detail	Equivalent or option	Variation
81075	1710N 100 µL SYR (22s/2"/3)	005312	100 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	O	RN, needle ID 0.37 mm
81085	1710N 100 µL SYR (22/2"/3)	005312	100 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	O	RN
81100	1725LTN 250 µL SYR (22s/2"/2)	006200	250 µL fixed needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	O	Not LT
81101	1725LT 250 µL SYR	006229	250 µL fixed Luer Tip syringe with GT plunger	E	
81120	1725TLL 250 µL SYR	006230	250 µL fixed Luer Lock syringe with GT plunger	E	
81122	1725TLLX 250 µL SYR	006232	250 µL fixed Luer Lock syringe with GT plunger and plunger stop	E	
81127	1725TLL 250 µL SYR W/SLOTS	006230	250 µL fixed Luer Lock syringe with GT plunger	E	
81130	1725RN 250 µL SYR (22s/2"/2)	006250	250 µL removable needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	E	
81138	1725RNW 250 µL SYR (25s/1.97"/3)	006250 + 038260	250 µL removable needle syringe with GT plunger and Waters LC tipped needle	O	RN
81139	1725LTN 250 µL SYR (22S/2"/5)	006250 + 038410	250 µL removable needle syringe with GT plunger and 5 cm side hole dome tipped needle	O	
81156	1725SL 250 µL SYR (22s/2"/2)	006279	250 µL syringe with removable needle valve and GT plunger	E	
81162	1725CX 250 µL SYR W/STOP	006995	250 µL syringe with GT plunger and 1/4-28 UNF termination	E	
81165	1725RNR 250 µL SYR (22/2"/3)	006312	250 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	E	
81175	1725LTN 250 µL SYR (22S/2"/3)	006312	250 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	O	RN
81185	1725LTN 250 µL SYR (22/2"/3)	006312	250 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	O	RN
81201	1750LT 500 µL SYR	007229	500 µL fixed Luer Tip syringe with GT plunger	E	
81216	1750LTN 500 µL SYR (22/2"/3)	007312	500 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	O	RN
81217	1750LTN 500 µL SYR (22/2"/2)	007200	500 µL fixed needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	O	Not LT
81220	1750TLL 500 µL SYR	007230	500 µL fixed Luer Lock syringe with GT plunger	E	
81222	1750TLLX 500 µL SYR	007232	500 µL fixed Luer Lock syringe with GT plunger and plunger stop	E	
81227	1750TLL 500 µL SYR W/SLOTS	007230	500 µL fixed Luer Lock syringe with GT plunger	E	
81230	1750RN 500 µL SYR (22/2"/2)	007250	500 µL removable needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	E	
81243	1750LTNPT5 500 µL SYR (22/2"/5)	007250 + 038410	500 µL removable needle syringe with GT plunger and 5 cm side hole dome tipped needle	O	Not LT, 25 g needle
81256	1750SL 500µL SYR	007279	500 µL syringe with removable needle valve and GT plunger	O	23 g needle
81262	1750CX 500 µL SYR W/STOP	007995	500 µL syringe with GT plunger and 1/4-28 UNF termination	E	
81265	1750RNR 500 µL SYR (22/2"/3)	007312	500 µL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	E	
81301	1001LT 1.0 mL SYR	008020	1 mL fixed Luer Tip syringe with GT plunger	E	
81316	1001LTN 1.0 mL SYR (22/2"/3)	008105	1 mL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	O	RN
81317	1001LTN 1.0 mL SYR (22/2"/2)	008102	1 mL fixed needle syringe with GT plunger and 5 cm 0.72 mm OD bevel tipped needle	O	Not LT
81318	1001LTNCH 1.0 mL SYR (22/2"/2)	008102	1 mL fixed needle syringe with GT plunger and 5 cm 0.72 mm OD bevel tipped needle	O	WO adaptor
81320	1001TLL 1.0 mL SYR	008025	1 mL fixed Luer Lock syringe with GT plunger	E	
81324	1001TLLCH 1.0 mL SYR	008025	1 mL fixed Luer Lock syringe with GT plunger	O	WO adaptor
81327	1001TLL 1.0 mL SYR W/SLOTS	008025	1 mL fixed Luer Lock syringe with GT plunger	E	
81330	1001RN 1.0 mL SYR (22/2"/2)	008100	1 mL removable needle syringe with GT plunger and 5 cm 0.63 mm OD bevel tipped needle	E	
81343	1001LTNPT5 1.0 mL SYR (22/2"/5)	008100 + 039120	1 mL removable needle syringe with GT plunger and 5 cm side hole dome tipped needle	O	Not LT, 23 g needle
81356	1001SL 1.0 mL SYR (22/2"/2)	008110	1 mL syringe with removable needle valve and GT plunger	E	
81360	1001C 1.0 mL SYR	008185	1 mL syringe with GT Plunger and 1/4-28 UNF termination	E	
81365	1001RNR 1.0 mL SYR (22/2"/3)	008105	1 mL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	E	

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81401	1002LT 2.5 mL SYR	008420	2.5 mL fixed Luer Tip syringe with GT plunger	E	
81403	1002LTCH 2.5 mL SYR	008420	2.5 mL fixed Luer Tip syringe with GT plunger	O	WO adaptor
81416	1002LTN 2.5 mL SYR (22/2"/3)	008505	2.5 mL removable needle syringe with GT plunger and 5.1 cm 0.72 mm OD LC needle	E	
81417	1002LTN 2.5 mL SYR (22/2"/2)	008502	2.5 mL fixed needle syringe with GT plunger and 5 cm 0.72 mm OD bevel tipped needle	E	
81418	1002LTNCH 2.5 mL SYR (22/2"/2)	008502	2.5 mL fixed needle syringe with GT plunger and 5 cm 0.72 mm OD bevel tipped needle	O	WO adaptor
81420	1002TLL 2.5 mL SYR	008425	2.5 mL fixed Luer Tip syringe with GT plunger	E	
81424	1002TLLCH 2.5 mL SYR	008425	2.5 mL fixed Luer Lock syringe with GT plunger	O	WO adaptor
81427	1002TLL 2.5 mL SYR W/SLOTS	008425	2.5 mL fixed Luer Lock syringe with GT plunger	E	
81430	1002RN 2.5 mL SYR (22/2"/2)	008500	2.5 mL removable needle syringe with GT plunger and 5 cm 0.63 mm OD bevel tipped needle	O	23 g needle
81443	1002LTNPT5 2.5 mL SYR (22/2"/5)	008500 + 039120	2.5 mL removable needle syringe with GT plunger and 5 cm side hole dome tipped needle	O	RN not LT, 23 g needle
81456	1002SL 2.5 mL SYR (22/2"/2)	008510	2.5 mL syringe with removable needle valve and GT plunger	E	
81460	1002C 2.5 mL SYR	008687	2.5 mL syringe with GT plunger and 1/4-28 UNF termination	E	
81501	1005LT 5.0 mL SYR	008760	5 mL removable Luer Lock syringe with GT plunger	O	LL not LT
81516	1005LTN 5 mL SYR (22/2"/3)	008700 + 0315233	5 mL removable needle syringe with GT plunger and LC needle	O	RN
81517	1005LTN 5.0 mL SYR (22/2"/2)	008700	5 mL removable needle syringe with GT plunger and 5 cm 0.63 mm OD bevel tipped needle	O	RN
81518	1005LTNCH 5.0 mL SYR (22/2"/2)	008762	5 mL fixed Luer Lock syringe with GT plunger	O	LL not LT, WO adaptor
81520	1005TLL 5.0 mL SYR	008762	5 mL fixed Luer Lock syringe with GT plunger	E	
81524	1005TLLCH 5.0 mL SYR	008762	5 mL fixed Luer Lock syringe with GT plunger	O	WO adaptor
81527	1005TLL 5 mL SYR W/SLOTS	008762	5 mL fixed Luer Lock syringe with GT plunger	E	
81530	1005RN 5.0 mL SYR (22/2"/2)	008700	5 mL removable needle syringe with GT plunger and 5 cm 0.63 mm OD bevel tipped needle	E	
81560	1005C 5.0 mL SYR	008787	5 mL syringe with GT plunger and 1/4-28 UNF termination	E	
81601	1010LT 10.0 mL SYR	008962	10 mL fIxed Luer Lock syringe with GT plunger	O	LL not LT
81610	1010W 10.0 mL (WATERS) SYR	008962	10 mL fIxed Luer Lock syringe with GT plunger	E	
81616	1010LTN 10 mL SYR (22/2"/3)	008900 + 0315233	10 mL removable needle syringe with GT plunger and LC needle	O	RN
81617	1010LTN 10.0 mL SYR (22/2"/2)	008900	10 mL removable needle syringe with GT plunger and 5 cm 0.63 mm OD bevel tipped needle	O	RN
81618	1010LTNCH 10.0 mL SYR (22/2"/2)	008962	10 mL fIxed Luer Lock syringe with GT plunger	O	LL not LT, WO adaptor
81620	1010TLL 10.0 mL SYR	008962	10 mL fIxed Luer Lock syringe with GT plunger	E	
81624	1010TLLCH 10.0 mL SYR	008962	10 mL fIxed Luer Lock syringe with GT plunger	O	WO adaptor
81627	1010TLL 10 mL SYR W/SLOTS	008962	10 mL fIxed Luer Lock syringe with GT plunger	E	
81630	1010RN 10.0 mL SYR (22/2"/2)	008900	10 mL removable needle syringe with GT plunger and 5 cm 0.63 mm OD bevel tipped needle	E	
81660	1010C 10.0 mL SYR	008987	10 mL syringe with GT plunger and 1/4-28 UNF termination	E	
82017	1001.25LTN 1.25 mL SYR (22/2"/2)	008502	2.5mL fixed needle syringe with GT plunger and 5 cm 0.72 mm OD bevel tipped needle	O	Not LT, 2.5 mL instead of 1.25 mL
82520	1025TLL 25.0 mL SYR	009463	25 mL fixed Luer Lock syringe with GT plunger	E	
82525	1025TLL W/O FL 25 mL SYR W/SLOT	009463	25 mL fIxed Luer Lock syringe with GT plunger	O	
82527	1025TLL 25 mL SYR W/SLOTS	009463	25 mL fIxed Luer Lock syringe with GT plunger	E	
84850	85N 5 µL SYR (26s/2"/2)	001400	5 µL fixed needle guided plunger syringe with 5 cm 0.47 mm OD bevel tipped needle	E	
84851	85RN 5 µL SYR (26s/2"/2)	001450	5 µL removable needle guided plunger syringe with 5 cm 0.47 mm OD bevel tipped needle	E	
84852	801N 10 µL SYR (26s/2"/2)	002400	10 µL fixed needle guided plunger syringe with 5 cm 0.47 mm OD bevel tipped needle	E	
84853	801RN 10 µL SYR (26s/2"/2)	002450	10 µL removable needle guided plunger syringe with 5 cm 0.47 mm OD bevel tipped needle	E	
85020	1050TLL 50.0 mL SYR	009660	50 mL removable Luer Lock syringe with GT plunger	E	

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85027	1050TLL 50 mL SYR W/SLOTS	009660	50 mL removable Luer Lock syringe with GT plunger	E	
86020	1100TLL 100.0 mL SYR	009760	100 mL removable Luer Lock syringe with GT plunger	E	
86204	7101KHCH 1 µL SYR (22/2.75"/3)	000553	1.0 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle and repeating adaptor	O	
86207	7101KHWG 1 µL SYR (22/2.75"/3)	000553	1.0 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle and repeating adaptor	O	
86211	7101KH 1 µL SYR (22s/2.75"/2)	000505	1.0 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle	O	
86250	7000.5KH 0.5 µL SYR (25/2.75"/3)	000310	0.5 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle	O	
86252	7000.5KHCH 0.5 µL SYR(25/2.75/3)	000355	0.5 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle and repeating adaptor	O	
86254	7000.5KHWG 0.5 µL SYR(25/2.75/3)	000355	0.5 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle and repeating adaptor	O	Cone tip, 23 g needle
86259	7000.5KH 0.5 µL SYR (25/2.75"/2)	000311	0.5 µL NanoVolume syringe with 7 cm 0.63 mm OD bevel tipped needle	O	23 g needle
86274	7000.5ASRN (26/1.71"/HP)	000400	0.5 µL NanoVolume Agilent syringe with 4.2 cm 0.47 mm OD cone tipped needle	E	
86276	7000.5ASRN (23/1.71"/HP)	000410	0.5 µL NanoVolume Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	E	
86311	S0500 0.5 L SYR (TLL)	009910	500 mL jumbo Luer Lock syringe	E	
86312	S1000 1.0 L SYR (TLL)	009920	1000 mL jumbo Luer Lock syringe	E	
86313	S1500 1.5 L SYR (TLL)	009930	2000 mL jumbo Luer Lock syringe	O	
86314	S2000 2.0 L SYR (TLL)	009930	2000 mL jumbo Luer Lock syringe	E	
86326	1025SL 25 mL SYR (22/2"/2)	009472	25 mL syringe with removable Luer Lock valve and GT plunger	O	LL, select needle separately
86326	1025SL 25 mL SYR (22/2"/2)	009472	25 mL syringe with removable Luer Lock valve and GT plunger	O	LL, select needle separately
86336	1050SL 50 mL SYR (22/2"/2)	009670	50 mL syringe with removable Luer Lock valve and GT plunger	O	LL, select needle separately
86336	1050SL 50 mL SYR (22/2"/2)	009670	50 mL syringe with removable Luer Lock valve and GT plunger	O	LL, select needle separately
86346	1100SL 100 mL SYR (22/2"/2)	009770	100 mL syringe with removable Luer Lock valve and GT plunger	O	LL, select needle separately
87402	701RNFS 10 µL SYR (0.17 mm/10 cm/3)	002050 + 037610	10 µL removable needle syringe with 10 cm 0.17 mm OD needle	E	
87404	1701RNFS 10 µL SYR (0.17 mm/10 cm/3)	002250 + 037610	10 µL removable needle syringe with GT plunger and 5 cm 0.47 mm OD bevel tipped needle	E	
87900	75N 5 µL SYR (26s/2"/2)	001000	5 µL fixed needle syringe with 5 cm 0.47 mm OD bevel tipped needle	E	
87919	75N 5 µL SYR (26s/2"/3)	001301	5 µL fixed needle syringe with 5.1 cm 0.72 mm OD LC needle	O	22g needle
87930	75RN 5.0 µL SYR (26s/2"/2)	001050	5 µL removable needle syringe with 5 cm 0.47 mm OD bevel tipped needle	E	
87943	65RNR 5.0 µL SYR (22s/2"/3)	001450	5 µL removable needle guided plunger syringe with 5 cm 0.47 mm OD bevel tipped needle	O	26g needle, bevel tip
87957	75ASRN 5 µL SYR (23s/1.71"/HP)	001810	5 µL fixed needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	O	FN
87958	75ASRN 5 µL SYR (26s/1.71"/HP)	001800	5 µL fixed needle Agilent syringe with 4.2 cm 0.47 mm OD cone tipped needle	O	FN
87959	75ASRN SYR (23S/26S/1.71"/HP)	001821	5 µL fixed needle Agilent syringe with 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	O	FN
87987	75ASN 5 µL SYR (23s/1.71 "/HP)	001810	5 µL fixed needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	E	
87988	75ASN 5 µL SYR (26s/1.71"/HP)	001800	5 µL fixed needle Agilent syringe with 4.2 cm 0.47 mm OD cone tipped needle	E	
87989	75ASN 5 µL SYR(26s/1.71"/HP) 6PK	001804	5 µL fixed needle Agilent syringe with 4.2 cm 0.47 mm OD cone tipped needle PK6	E	
87990	75ASN 5 µL SYR(23s/1.71"/HP) 6PK	001814	5 µL fixed needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle PK6	E	

Hamilton part number	Part description and detail	Trajan SGE part number	Part description and detail	Equivalent or option	Variation
87991	75ASN 5 µL SYR (23s/1.71"/2)	001810	5 µL fixed needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	O	Cone tipped needle
87992	75ASN 5 µL SYR (26s/1.71"/2)	001800	5 µL fixed needle Agilent syringe with 4.2 cm 0.47 mm OD cone tipped needle	O	Cone tipped needle
87993	75ASN 5 µL SYR (23-26/1.71"/HP)	001821	5 µL fixed needle Agilent syringe with 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	E	
87994	75ASN 5 µL 6/PK (23-26/1.71"/HP)	001822	5 µL fixed needle Agilent syringe with 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle PK6	E	
88000	7105KH 5.0 µL SYR (24/2.75"/3)	000802	5.0 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle	O	23 g needle, cone tip
88004	7105KHCH 5.0 µL SYR (24/2.75"/3)	000852	5.0 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle and repeating adaptor	O	23 g needle, cone tip
88007	7105KHWG 5.0 µL SYR (24/2.75"/3)	000852	5.0 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle and repeating adaptor	O	23 g needle, cone tip
88011	7105KH 5.0 µL SYR (24/2.75"/2)	000803	5.0 µL NanoVolume syringe with 7 cm 0.63 mm OD bevel tipped needle	O	23 g needle, cone tip
88035	75ASN/PE SYR 5 µL 0.63 mm OD	001954	5 µL fixed needle PerkinElmer syringe with 7 cm 0.63 mm OD cone tipped needle	E	
88040	75ASN/PE SYR 5 µL 0.47 mm OD	001953	5 µL fixed needle PerkinElmer syringe with 7 cm 0.47 mm OD cone tipped needle	E	

Every effort has been made to ensure the SGE branded equivalents and similar close options suggested here are suitable alternative products, however the appropriateness for individual applications must remain the responsibility of the user.

Digital analytical syringe | eVol® XR

Product specifications and part numbers

eVol® XR is the coupling of two precision devices: a digitally controlled electronic drive and an XCHANGE® enabled analytical syringe.

Ergonomic, comfortable and easy to use.

- Suitable for use with volatile samples.
- Variable speed of operation.
- eVol syringes are easily and quickly changed allowing them to be dedicated to individual liquids or methods to prevent possible cross contamination of reagents.
- Easily calibrated by operators, and calibration factors saved for each syringe, enabling laboratories to comply with stringent global laboratory standards (e.g. GLP, GMP, FDA).
- Programmable and able to store a laboratory workflow (up to 98 steps).
- Password protection options enabling standardization of work processes.
- Inject directly onto a chromatography column with a consistent flow rate.
- eVol syringe stainless steel needle enables direct injection through septa.

Accuracy of eVol syringes

Syringe volume	1 mL	500 µL	100 µL	50 µL	5 µL
At 100% (uncalibrated)*	±0.7%	±0.7%	±0.7%	±1.0%	±1.0%
At 100% (calibrated)**	±0.2%	±0.2%	±0.2%	±0.2%	±0.2%
At 10% (calibrated)***	±0.5%	±0.5%	±0.5%	±0.5%	±1.0%

**Calibration factor of 1.0000 applied to handle.*
***Syringe and handle calibrated at full volume.*
****Syringe and handle calibrated at 10% of capacity. Accuracy based on the 10% dispensed volume closest to zero position.*

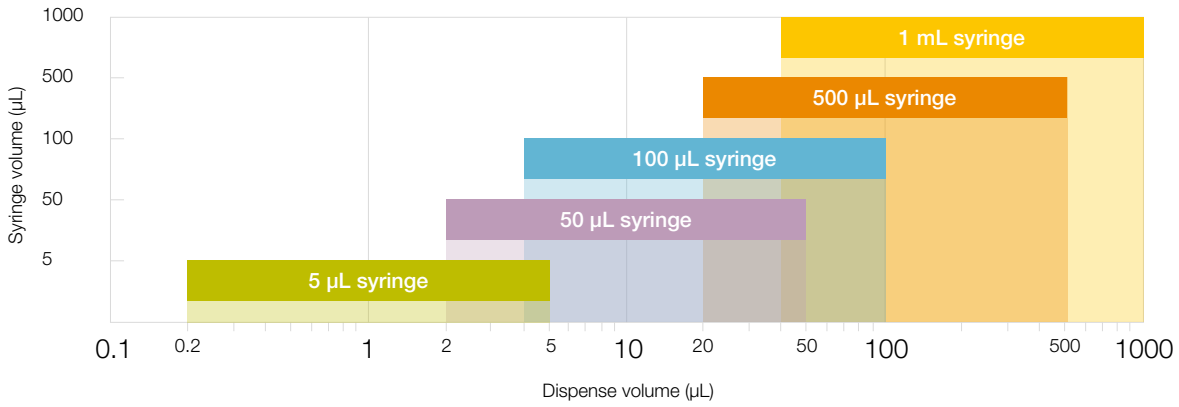
Note: For best results when performing repeat dispense (one aspiration followed by multiple dispense steps) use a calibration factor of 1.0000.

Precision of eVol syringes

Syringe volume	1 mL	500 µL	100 µL	50 µL	5 µL
At 100%	±0.3%	±0.3%	±0.4%	±0.4%	±0.5%
At 10%	±0.6%	±0.6%	±0.7%	±0.8%	±1.0%

Product specification

Volume range of eVol syringes



Applications include:

- Preparation of calibration standards
- Preparation and addition of internal standards
- Precise dispensing of aqueous and non-aqueous liquids
- Routine dispensing
- Sample dilution
- Ergonomic operation with substances in a fume hood
- GC and LC instrument injections
- Eliminates the need for serial dilutions
- Micro titrations
- TLC spotting
- FDA methods requiring a 1 mL syringe

Improve standard laboratory processes

The award winning eVol XR improves the pace of laboratory processes while delivering improved accuracy and reproducibility.

Process	Without eVol XR	With eVol XR	Benefits of using eVol XR
eVol XR			
Standard preparation	Standards prepared in a large volume flask. From this standard aliquots are individually dispensed into autosampler vials.	Standards are made up directly in the vial, including the make up solvent.	• Less glassware usage • Reduces waste fluid • Significant time saving • Improved accuracy and reproducibility
Addition of standards	Small amounts of standard aspirated and dispensed into all samples before being transferred to an autosampler vial.	One aspiration and a fast series of repeated accurate dispenses directly into vials.	• Significant time saving • Improved accuracy and reproducibility
Delivery of derivatization agents	Laboratory staff required to work in a fume hood with potentially hazardous materials, to prepare combinations of derivatization agents in open vials.	Process completed with eVol XR programmed to aspirate an amount of solvent or agent and then dispense aliquots into sealed vials. This is a single handed operation.	• Improved operator safety, lower spill and splash risk • Ergonomic benefits behind fume hood screen • Improved accuracy and reproducibility • Less glassware use
Serial dilutions	Transfer of a small amount of solution to another container. Solvent added to achieve the required volume. This is repeated multiple times to obtain the required final accurate concentration.	One aspiration of the solution can be dispensed directly into the solvent to achieve the required accurate concentration.	• Complete workflow simplification • Significant time savings • Improved accuracy • Less solvent required • Less glassware used

eVol XR for MEPS®

Enabling MEPS automation.

MEPS is microextraction by packed sorbent, the miniaturization of conventional SPE (solid phase extraction) packed bed devices from milliliter bed volumes to microliter volumes.

The MEPS approach to sample preparation is suitable for reversed phase, normal phase, mixed mode or ion exchange chemistries.

MEPS advantages over conventional SPE:

Less sample required giving you greater flexibility when you have small sample quantities.

- Less solvent used means less solvent waste and ultimately reduced expense.
- Faster preparation time, reducing from hours to minutes for improved laboratory workflow.
- MEPS incorporates packed phase in a micro-cartridge or BIN (barrel insert and needle) which is then integrated into an SGE analytical syringe to make miniaturized SPE possible. With MEPS, the sample processing, extraction and injection steps are performed using the same syringe.

Configuration for MEPS

MEPS BINs are available for use with eVol MEPS syringes, with a range of packing material phases.

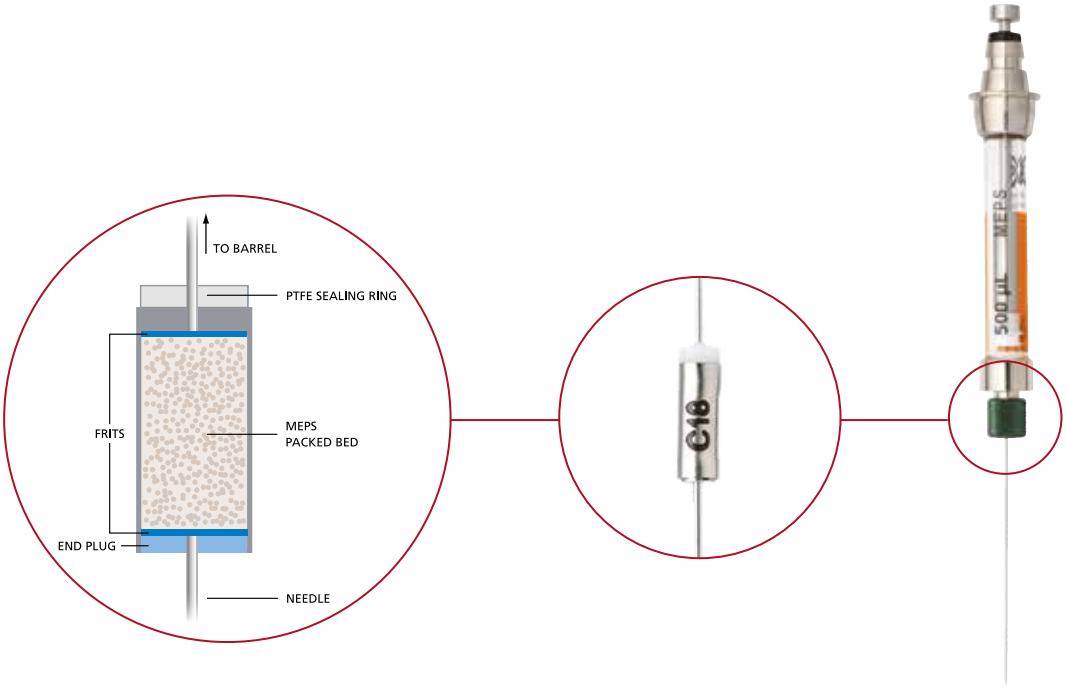
- MEPS BINs can be used with 50 µL, 100 µL and 500 µL eVol MEPS syringes.
- LC needles are 55.5 mm in length, 22 gauge and LC tipped.
- GC needles are 55.5 mm in length, 23 gauge and cone tipped.

eVol MEPS applications

Use eVol MEPS for sample preparation, SPE method development, sample clean up and proofing before transition to fully automated platforms. Quickly process small sample batches, or urgent samples.

Suitable for a range of analyses:

- **Environmental** e.g. determination of organic priority pollutants and emerging compounds in wastewater and snow samples.
- **Forensics** e.g. the analysis of cotinine in human urine by GCMS.
- **Pharmaceutical** e.g. liquid chromatographic analysis of oxcarbazepine and its metabolites in plasma and saliva.
- **Food and flavor** e.g. determination of 2,4,6-trichloroanisole and 2,4,6-tribromoanisole in wine.
- **Life sciences** e.g. rapid and sensitive method for determination of cyclophosphamide in patient plasma samples.



eVol XR

Part number	Part description and detail	Replacement needle	Replacement plunger
eVol kits and components			
2910010	eVol stand (acrylic)	-	-
2910012	eVol charger	-	-
2910030	eVol charging stand	-	-
2910040	eVol replacement battery	-	-
2910100	eVol XR starter kit for NMR (eVol XR handle, charger, stand. 3 eVol removable needle syringes with bevel tipped removable needles: 5 µL with 11.5 cm removable needle, 50 µL with 11.5 cm and 18 cm removable needles, 500 µL with 11.5 cm and 18 cm removable needles)	-	-
2910200	eVol XR starter kit (eVol XR handle, charger, stand. 3 eVol syringes with 5 cm bevel tipped needles: 5 µL , 100 µL , 1 mL)	-	-
2910205	eVol XR (handle only)	-	-
eVol syringes			
2910020	5 µL eVol syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	036910	2910380
2910021	5 µL eVol syringe with GT plunger. No needle.	-	2910380
2910022	50 µL eVol syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	038110	2910382
2910023	50 µL eVol syringe with GT plunger. No needle.	-	2910382
2910024	500 µL eVol syringe with GT plunger and 5 cm 0.63 mm OD bevel tipped needle	039110	2910384
2910025	500 µL eVol syringe with GT plunger. No needle.	-	2910384
2910029	100 µL eVol syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	038110	2910383
2910035	1 mL eVol syringe with GT plunger and 5 cm 0.63 mm OD bevel tipped needle	039110	2910385
2910037	100 µL eVol syringe with GT plunger. No needle.	-	2910383
2910320	5 µL eVol syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle PK3	036910	2910380
2910322	50 µL eVol syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle PK3	038110	2910382
2910324	500 µL eVol syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle PK3	039110	2910384
2910329	100 µL eVol syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle PK3	038110	2910383
2910335	1 mL eVol syringe with GT plunger and 5 cm 0.63 mm OD bevel tipped needle PK3	039110	2910385
eVol MEPS syringes			
2910026	500 µL eVol MEPS syringe with GT plunger	-	2910384
2910027	50 µL eVol MEPS syringe with GT plunger	-	2910382
2910028	100 µL eVol MEPS syringe with GT plunger	-	2910383

MEPS BINs

Part number	Part description and detail
MEPS barrel insert and needle (BIN) for LC applications	
2900701	C18 MEPS BIN for eVol MEPS syringes, 0.72 mm OD LC tipped needle PK5
2900702	C8 MEPS BIN for eVol MEPS syringes, 0.72 mm OD LC tipped needle PK5
2900703	APS MEPS BIN for eVol MEPS syringes, 0.72 mm OD LC tipped needle PK5
2900705	HVDB MEPS BIN for eVol MEPS syringes, 0.72 mm OD LC tipped needle PK5
2900706	SDVB MEPS BIN for eVol MEPS syringes, 0.72 mm OD LC tipped needle PK5
2900707	C2 MEPS BIN for eVol MEPS syringes, 0.72 mm OD LC tipped needle PK5
MEPS barrel insert and needle (BIN) for GC applications	
2900711	C18 MEPS BIN for eVol MEPS syringes, 0.63 mm OD cone tipped needle PK5
2900712	C8 MEPS BIN for eVol MEPS syringes, 0.63 mm OD cone tipped needle PK5
2900713	APS MEPS BIN for eVol MEPS syringes, 0.63 mm OD cone tipped needle PK5
2900715	HDVB MEPS BIN for eVol MEPS syringes, 0.63 mm OD cone tipped needle PK5
2900716	SDVB MEPS BIN for eVol MEPS syringes, 0.63 mm OD cone tipped needle PK5
2900717	C2 MEPS BIN for eVol MEPS syringes, 0.63 mm OD cone tipped needle PK5

SGE Syringes

MICROCOLUMN

Microcolumn Srl
Via Lavoratori Autobianchi, 1 Ed. 24/B – 20832 DESIO
MB Tel. 0362 1482750 - Fax 0362 1851366
www.microcolumn.it
Email: commerciale@microcolumn.it

Microcolumn Srl
Via Lavoratori Autobianchi, 1 Ed. 24/B – 20832 DESIO
MB Tel. 0362 1482750 - Fax 0362 1851366
www.microcolumn.it
Email: commerciale@microcolumn.it

TRAJAN

GC consumables

TRAJAN

In the laboratory today, the time spent and the precision required for sample preparation are key investments in an efficient workflow. Having spent that time and effort in sample preparation, it then becomes critical to maintain the integrity of the sample as it is delivered to the separation and detection steps of the analysis. This is why Trajan Scientific and Medical (Trajan) is focussed on delivering a portfolio of high performance GC Inlet liners, GC columns, connections and fittings all with the specific and aggregate intent of ensuring the sample is not compromised on its journey to the detection system.

Our portfolio is built on the strength and world class heritage of the SGE GC supplies portfolio. In each of our manufacturing operations around the world, our products are built to exacting standards so that you can rely on their performance, accuracy and precision.

With a strong team of design chemists and production engineers, and an extensive network of application based industry opinion leaders, our portfolio of GC consumables continues to develop within Trajan. This means you, as a user in the laboratory, are assured of your sample integrity through collection, injection, separation and detection, optimizing your analysis.

We are confident that in this selection guide you will be able to identify and select the correct consumables for your application. If not, please contact us and we can investigate a custom solution for you.

As a major provider of tools and components for the analytical industry, Trajan is manufacturing product in the USA, Malaysia and Australia and we continue to service our valued customers around the world via a connected group of commercial and distribution facilities in Europe, the Americas, Asia and Australia. This supply chain is ably supported by a strong field technical team around the world.

Contents

SGE Syringes

Please refer to the Syringes for the laboratory brochure.

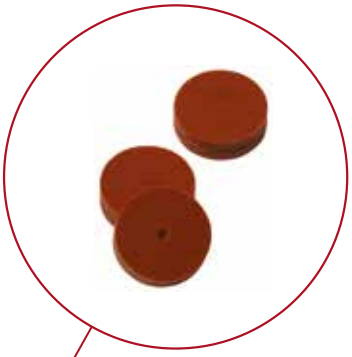
SGE Inlet liners

Color	Injection technique	Sample types	Liner geometry
Dark green	Splitless	• Trace level analyses • Active compounds	Taper/gooseneck
Blue	Split	• General purpose • Concentrated samples • Dirty samples	FocusLiner®
Aqua	Splitless	• Trace level analyses • Dirty samples • Wide boiling point range	Tapered FocusLiner
Orange	Direct	• Trace level analyses • Active compounds	ConnecTite™
Purple	Split/ splitless	• General purpose • Concentrated samples • Dirty samples (only if quartz wool is present) • Gaseous samples (also purge and trap, headspace)	Straight
Yellow	Splitless LVI	• Trace level analyses • Low boiling point compounds • Active compounds	Double taper
Gray	PTV LVI	• Trace level analyses • Large volume injections	PTV/LVI

Connectors and ferrules

SilTite®

Material	Uses	Advantages	Limitations
100% Graphite	FID, NPD, high temperature	• Easy-to-use stable seal • Higher temperature limit • Easily removed • Reusable	• Not for MS or oxygen-sensitive detectors • Soft, easily deformed or destroyed • Possible system contamination
15% Graphite/ 85% Vespel®	MS and oxygen-sensitive detectors	• Long lifetime • High temperature limit • MS compatible	• Cannot be re-used • Must be re-tightened after initial temperature cycles
SilTite® metal	MS and oxygen-sensitive detectors	• Long lifetime • High temperature limit • MS compatible	• Cannot be re-used



Septa

Material	Max operating temperature	Key features
GP grade	275°C*	Low temperature applications
EC grade	350°C*	Low bleed
MN grade	350°C*	Premium septa for autosamplers
HT grade	400°C*	Outstanding mechanical properties for the highest temperature applications

**Temperature for 11 mm septa only.*

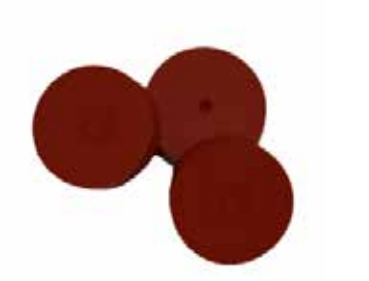
SGE GC columns

Column parameter	Parameters affecting resolution			Performance changes
	Efficiency	Retention	Selectivity	
Column length (m)	✓			Doubling column length increases resolution by ~40%
Internal diameter (mm)	✓	✓		The smaller the column ID, the greater the efficiency and better the resolution
Film thickness (µm)		✓		The thicker the film, the greater the retention, e.g. ideal for highly volatile compounds. The thinner the film, the sharper the peaks and lower the bleed
Stationary phase chemistry			✓	Altering the stationary phase can affect elution order and help separate closely, or co-eluting peaks

SilFlow®

3 port, 4 port or Deans' switch configuration microchannel devices for multidimensional analysis.

Low bleed | Long lifetime



The purpose of a septa in a GC system is to isolate the sample flow path from the outside world. The septa provides a barrier that is readily penetrated by the injector needle whilst maintaining internal pressure without causing system contamination. An ideal septa has low bleed and a long lifetime.

Septa selection

	GP grade	EC grade	MN grade	HT grade	Enduro blue
					
	• Low temperature applications.	• Combines significantly longer injection life, low bleed and low injection port adhesion.	• Premium septa for autosamplers. • Up to 400 injections per septa. • Pre-pierced to reduce coring.	• Bleed and temperature optimized, combined with outstanding mechanical properties for the highest temperature applications. • Retains softness and pierceability at high temperatures, and low injection port adhesion.	• For Shimadzu GCs.
Material	Silicone	High temperature silicone	High temperature silicone	BTO silicone	High temperature silicone
Durability	Good	Excellent	Excellent	Excellent	Excellent
Resealing	Good	Excellent	Excellent	Excellent	Excellent
Solvent resistance	Excellent	Excellent	Excellent	Excellent	Excellent
Tear resistance	Good	Excellent	Excellent	Excellent	Excellent
Maximum temperature	275°C*	350°C*	350°C*	400°C*	350°C

*Temperature for 11 mm septa only.

Why septa should be replaced regularly:

- Avoid decomposition in GC inlet
- Prolong column lifetime
- Avoid system leaks and sample loss

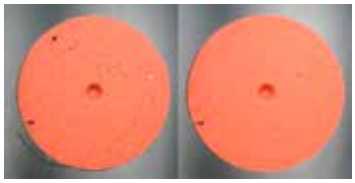
Examples of worn septa.

Heat stability and sticking

All EC, MN and HT grade septa are treated with a non-stick coating:

- Reduces sticking in the injection port
- Improves ease of replacement
- Prevents dust accumulation on the surface
- Reduces potential causes of leaks and contamination

Coated MN septa after exposing to dust and wiping.



Uncoated MN septa after exposing to dust and wiping.

Septa for Agilent instruments

Diameter (mm)	Type	Pack size	Part number
For Agilent 7890, 6890, 6850, 5890 and 4890			
11	GP	50	041826
11	EC	25	041902
11	MN	50	041856
11	HT	25	041898

Septa for PerkinElmer instruments

Diameter (mm)	Type	Pack size	Part number
For PerkinElmer Autosystem, Clarus 500, 600, 590 and 690			
11	GP	50	041826
11	EC	25	041902
11	MN	50	041856
11	HT	25	041898

Septa for Shimadzu instruments

Style	Type	Pack size	Part number
For Shimadzu GC-2030, GC-2014, GC-2010 and GC-17A			
Plug	Enduro blue	50	041890
Plug	EC	50	041905
Plug	HT	50	041895

Septa for Thermo Scientific instruments

Diameter (mm)	Type	Pack size	Part number
For Thermo Scientific TRACE 1300 series GC†			
11	GP	50	041826
11	EC	25	041902
11	MN	50	041856
11	HT	25	041898

†Contact us for 17 mm septa part numbers for previous Thermo Scientific instruments.

Confidence in your analysis

The purpose of an inlet liner in a GC system is to allow a sample injected in the liquid phase to pass into the gaseous phase and onto the GC column.

The elevated temperature used in the GC inlet vaporizes the liquid sample into a gaseous sample for transfer to the GC column.

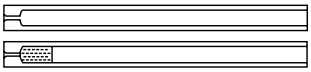
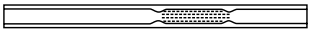
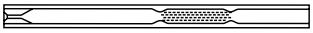
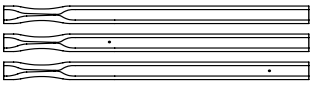
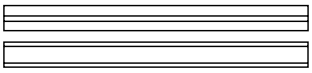
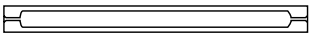
During the transition from a liquid to a gas, there is change in the volume and the liner must be able to contain this volume.

If the volume is too large, sample is lost, impacting reproducibility and sensitivity.

Important considerations when selecting inlet liners:

- Must ensure complete vaporization of the sample before it reaches the column entrance.
- Must not react with the sample.
- The liner volume must be larger than the volume of vaporized sample.
- The liner should minimize discrimination not promote it.
- Adding quartz wool increases the surface area and promotes mixing.
- Inlet liners should be deactivated, especially for analysis of polar solutes and for splitless injections.
- Wool should be placed in the optimum position.

Liner selection guide

Color	Injection technique	Sample types	Liner geometry	How the Geometry Works
Dark green	Splitless	• Trace level analyses • Active compounds	Taper/gooseneck 	• A bottom taper focuses sample onto the head of the column and minimizes sample contact with metal parts of the inlet. • Remember – the addition of quartz wool to your inlet liner 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).
Blue	Split	• General purpose • Concentrated samples • Dirty samples	FocusLiner 	• 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.
Aqua	Splitless	• Trace level analyses • Dirty samples • Wide boiling point range	Tapered FocusLiner 	• Bottom taper focuses sample onto the head of the column and minimizes contact with metal parts of the inlet. • 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.
Orange	Direct	• Trace level analyses • Active compounds	ConnecTite 	• ConnecTite liners facilitate maximum transfer of sample to the GC column and inhibit sample degradation due to hot metal components inside the inlet. • Systems equipped with electronic pressure control require a hole in the liner body to maintain system gas flows. • ConnecTite liners that have a hole near the bottom are best suited to analyses where a tailing solvent peak could affect early eluting compounds. ConnecTite liners with a hole at the top of the liner will improve your analysis with aqueous injections or where compounds of interest elute away from the solvent peak.
Purple	Split/splitless	• General purpose • Concentrated samples • Dirty samples (only if quartz wool is present) • Gaseous samples (also purge and trap, headspace)	Straight 	• Straight liners facilitate higher split flows. • Narrow bore straight liners facilitate fast GC work. • Small injection volumes of less than 0.5 µL are best used with a narrow bore. • Narrow bore straight liners improve focussing of gaseous samples (purge, trap and headspace).
Yellow	Splitless LVI	• Trace level analyses • Low boiling point compounds • Active compounds	Double taper 	• Bottom taper minimizes contact with metal parts of the inlet and focuses sample onto the head of the column. • Top taper aids in minimizing sample flashback.
Gray	PTV LVI	• Trace level analyses • Large volume injections	PTV/LVI 	• PTV and LVI liners generally have sintered glass beads or powder to increase the surface area and trap nonvolatile residue. • PTV liners use baffles or a wisp of quartz wool to aid in vaporization of samples and retain droplets during low temperature injections. • Side hole needles are recommended for these techniques to ensure effective distribution of sample within the liner.

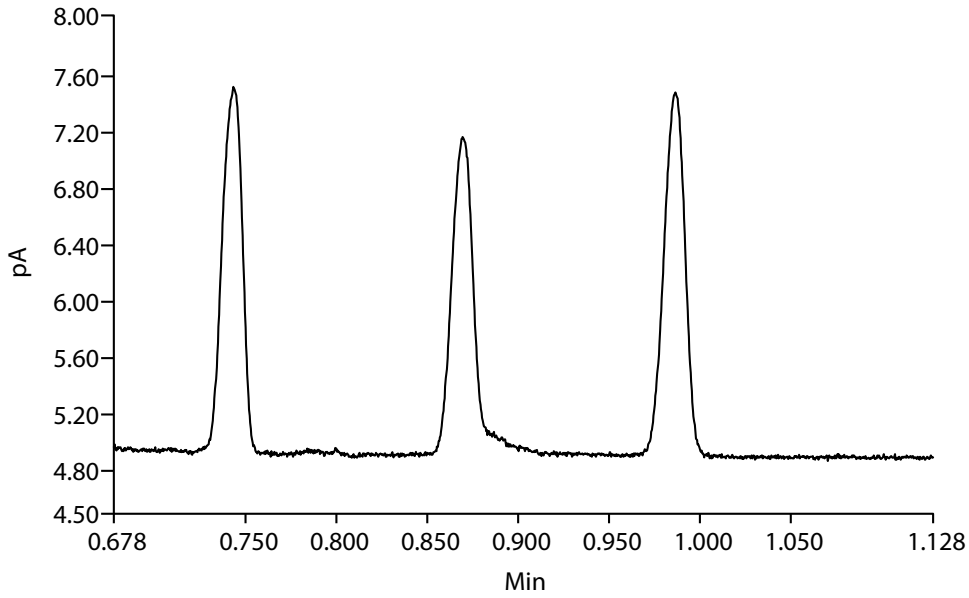
Inlet liner volume

The volume of the vaporized sample should not exceed half of the total volume of the liner. Expansion volumes of solvents need to be understood to calculate injection volume. Solvents with low densities enable more volume of solvent to be injected into the GC system.

To demonstrate this, acetonitrile was injected onto a split straight liner with volume of 986 µL.

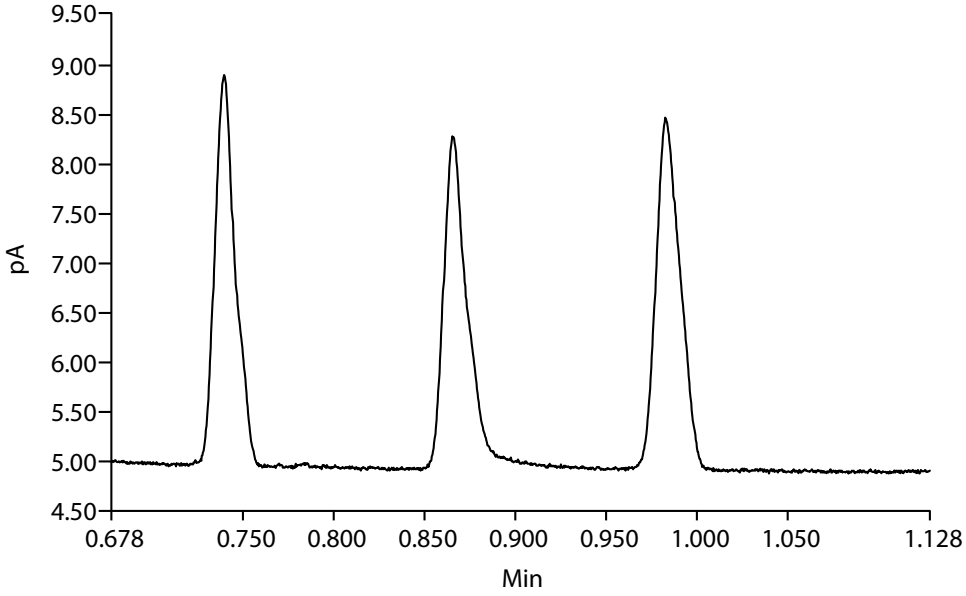
Comparison of injection volume

1 µL injection



1 µL expands to 432 µL: Good peak shape, but approaching limits of half total liner volume.

2 µL injection



2 µL expands to 864 µL: Peak shape distorted as vapor exceeded half of liner volume.

Liner deactivation

Deactivation is carried out at a temperature >400°C which is hotter than injection port temperatures. This ensures no thermal breakdown of the deactivation under normal injection operating conditions.

Deactivation of liners with wool in situ means there is no handling of the wool after deactivation. Manual handling of wool can cause fracturing which can lead to active sites.

Proprietary deactivation reagent ensures stability of deactivation and excellent lifetime.

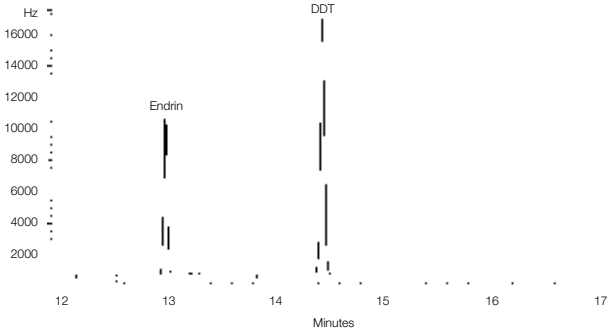
Liner comparison of Endrin and DDT% breakdown

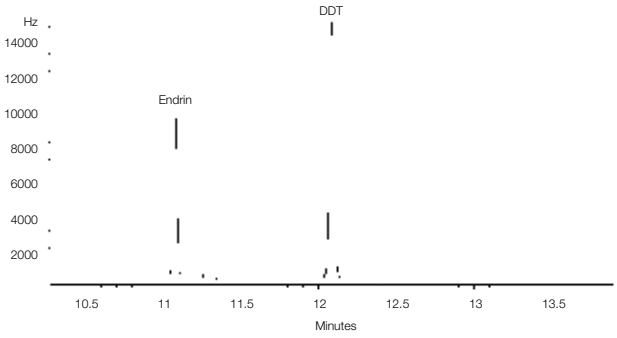
If the Endrin or DDT breakdown is 3% or higher it fails.

Competitor	
Endrin Deg%	3.23
DDT Deg%	1.95

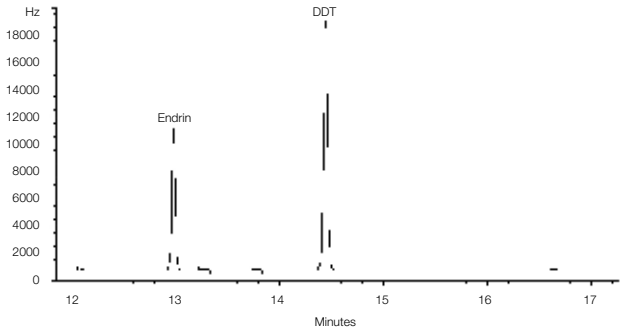
SGE FocusLiner	
Endrin Deg%	1.33
DDT Deg%	0.83

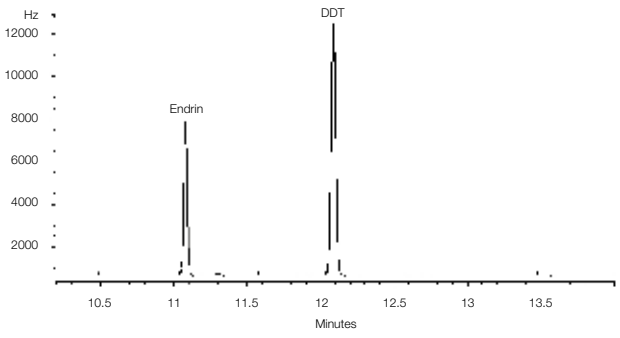
Competitor liner





SGE FocusLiner





SGE Inlet liners

Description and geometry sketch	OD (mm)	ID (mm)	Length (mm)	Pack size	Part number
For Agilent 7890, 6890, 6850, 5890 and 4890					
Split/splitless FocusLiner	6.3	4	78.5	5	092002
				25	092219
Split/splitless tapered FocusLiner	6.3	4	78.5	5	092003
				25	092011
Split/splitless FAST FocusLiner	6.3	2.3	78.5	5	092005
				25	092008
Split/splitless tapered FAST FocusLiner	6.3	2.3	78.5	5	092111
				25	092115
ConnecTite liner standard	6.3	4	78.5	5	092324
ConnecTite liner top hole	6.3	4	78.5	5	092325
ConnecTite liner bottom hole	6.3	4	78.5	5	092326
Split, straight-through liner	6.3	4	78.5	5	092007
				25	092222
Split (quartz wool)	6.3	4	78.5	5	092001
				25	092220
Split/splitless with single taper	6.3	4	78.5	5	092017
				25	092229
Split/splitless with single taper (quartz wool)	6.3	4	78.5	5	092019
				25	092218
Split/splitless with double taper	6.3	4	78.5	5	092018
				25	092230
Direct, straight-through liner	6.3	1.2	78.5	5	092016
				25	092224
Split/splitless quartz, straight-through liner	6.1	2	78.5	5	092004
Splitless with recessed gooseneck	6.3	2	78.5	5	092013
Split/splitless recessed gooseneck (quartz wool)	6.3	4	78.5	5	092010

- Taper/gooseneck
- FocusLiner
- Tapered FocusLiner
- ConnecTite
- Straight
- Double taper
- PTV/LVI

O-rings and sealing rings

Description	Usage	Pack size	Part number
For Agilent 7890, 6890, 6850, 5890 and 4890			
O-ring	Temperatures up to 300°C. Suitable for inlet liners with OD of 6.3 mm	10	0726532
Graphite sealing ring	Temperatures up to 450°C. Suitable for inlet liners with OD of 6.3 mm	10	0726005
Graphite sealing ring	Temperatures up to 450°C. Suitable for use with inlet liners 092004	10	0726006

SGE Inlet liners

Description and geometry		OD (mm)	ID (mm)	Length (mm)	Pack size	Part number
For PerkinElmer Clarus 590 and 690						
Split/splitless FocusLiner		6.3	4	78.5	5	092002
					25	092219
Split/splitless tapered FocusLiner		6.3	4	78.5	5	092003
					25	092011
Split/splitless FAST FocusLiner		6.3	2.3	78.5	5	092005
					25	092008
Split/splitless tapered FAST FocusLiner		6.3	2.3	78.5	5	092111
					25	092115
ConnecTite Liner standard		6.3	4	78.5	5	092324
ConnecTite Liner top hole		6.3	4	78.5	5	092325
ConnecTite Liner bottom hole		6.3	4	78.5	5	092326
Split, straight-through liner		6.3	4	78.5	5	092007
					25	092222
Split (quartz wool)		6.3	4	78.5	5	092001
					25	092220
Split/splitless with single taper		6.3	4	78.5	5	092017
					25	092229
Split/splitless with single taper (quartz wool)		6.3	4	78.5	5	092019
					25	092218
Split/splitless with double taper		6.3	4	78.5	5	092018
					25	092230
Direct, straight-through liner		6.3	1.2	78.5	5	092016
					25	092224
Split/splitless quartz, straight-through liner		6.1	2	78.5	5	092004
Splitless with recessed gooseneck		6.3	2	78.5	5	092013
Split/splitless recessed gooseneck (quartz wool)		6.3	4	78.5	5	092010
					25	092223

- Taper/gooseneck
- FocusLiner
- Tapered FocusLiner
- ConnecTite
- Straight
- Double taper
- PTV/LVI

O-rings and sealing rings

Description	Usage	Pack size	Part number
For PerkinElmer Clarus 590 and 690			
O-ring	Temperatures up to 300°C. Suitable for inlet liners with OD of 6.3 mm	10	0726532
Graphite sealing ring	Temperatures up to 450°C. Suitable for inlet liners with OD of 6.3 mm	10	0726005
Graphite sealing ring	Temperatures up to 450°C. Suitable for use with inlet liners 092004	10	0726006

SGE Inlet liners

Description and geometry sketch	OD (mm)	ID (mm)	Length (mm)	Pack size	Part number
For Shimadzu GC-2030 (SPL injector), GC-2010 (SPL-2010 Injector), GC-2014 (SPL-2014 injector) and GC-17A (SPL-17 injector)					
Split/splitless FocusLiner (top of wool 25 mm)	5	3.4	95	5	092059*
Split/splitless tapered FocusLiner (top of wool 25 mm)	5	3.4	95	5	092058
Split/splitless FocusLiner (top of wool 15 mm)	5	3.4	95	5	092062
Split/splitless tapered FocusLiner (top of wool 15 mm)	5	3.4	95	5	092068
ConnecTite liner standard	5	3.4	95	5	092329
ConnecTite liner top hole	5	3.4	95	5	092330
ConnecTite liner bottom hole	5	3.4	95	5	092331
Split, straight-through liner	5	3.4	95	5	092064
Splitless, straight-through liner	5	2.6	95	5	0920861
Split/splitless with single taper	5	3.4	95	5	092071
Split/splitless with middle gooseneck	5	3.4	95	5	092077
Split/splitless with recessed gooseneck and quartz wool	5	3.4	95	5	092061
Split/splitless with middle gooseneck	5	3.4	95	5	092085
ConnecTite (0.53 mm ID columns)	5	2.6	95	5	092087
SPME liner	5	0.75	95	5	092089

** When using a standard 42 mm needle for autosamplers, the sample will be injected on top of the wool for this liner.*

- Taper/gooseneck
- FocusLiner
- Tapered FocusLiner
- ConnecTite
- Straight
- Double taper
- PTV/LVI

O-rings and sealing rings

Description	Usage	Pack size	Part number
O-ring	For GC-2030 (SPL-2030 injector), GC-2014 (SPL-2014 injector) and GC-2010 (SPL-2010 injector)	10	0726533
Graphite sealing ring	Temperatures up to 450°C. For GC-17A (SPL-17 injector)	10	0726007

SGE Inlet liners

Description and geometry	OD (mm)	ID (mm)	Length (mm)	Pack size	Part number
For Thermo Scientific TRACE 1300 series GC					
Split/splitless FocusLiner	6.3	4	78.5	5	092002
				25	092219
Split/splitless tapered FocusLiner	6.3	4	78.5	5	092003
				25	092011
Split/splitless FAST FocusLiner	6.3	2.3	78.5	5	092005
				25	092008
Split/splitless tapered FAST FocusLiner	6.3	2.3	78.5	5	092111
				25	092115
ConnecTite Liner standard	6.3	4	78.5	5	092324
ConnecTite Liner top hole	6.3	4	78.5	5	092325
ConnecTite Liner bottom hole	6.3	4	78.5	5	092326
Split, straight-through liner	6.3	4	78.5	5	092007
				25	092222
Split (quartz wool)	6.3	4	78.5	5	092001
				25	092220
Split/splitless with single taper	6.3	4	78.5	5	092017
				25	092229
Split/splitless with single taper (quartz wool)	6.3	4	78.5	5	092019
				25	092218
Split/splitless with double taper	6.3	4	78.5	5	092018
				25	092230
Direct, straight-through liner	6.3	1.2	78.5	5	092016
				25	092224
Split/splitless quartz, straight-through liner	6.1	2	78.5	5	092004
Splitless with recessed gooseneck	6.3	2	78.5	5	092013
Split/splitless recessed gooseneck (quartz wool)	6.3	4	78.5	5	092010
				25	092223

- Taper/gooseneck
- FocusLiner
- Tapered FocusLiner
- ConnecTite
- Straight
- Double taper
- PTV/LVI

O-rings and sealing rings

Description	Usage	Pack size	Part number
For Thermo Scientific TRACE 1300 series GC			
O-ring	Temperatures up to 300°C. Suitable for inlet liners with OD of 6.3 mm	10	0726532
Graphite sealing ring	Temperatures up to 450°C. Suitable for inlet liners with OD of 6.3 mm	10	0726005
Graphite sealing ring	Temperatures up to 450°C. Suitable for use with inlet liners 092004	10	0726006

Easy to install | Leak free | Stable

Ferrules are used to seal the connection of the column or liner to the GC system.

Considerations in ferrule selection include:

- Leak free seal
- Accommodate various column ODs
- Seal with minimum torque
- Non-stick to column or fittings
- Withstand temperature cycling

Minimizing problems associated with ferrules:

- Do not over tighten
- Ensure clean prior to use
- Bake out prior to use
- Change ferrule when installing new column
- Use correct ferrule for column size

Ferrule selection guide

Material	Uses	Advantages	Disadvantages
100% Graphite	FID, NPD	• Easy-to-use stable seal • High temperature limit • Easily removed • Reusable	• Not for MS or oxygen-sensitive detectors • Soft, easily deformed or destroyed • Possible system contamination
15% Graphite/85% Vespel	MS and oxygen-sensitive detectors	• Long lifetime • High temperature limit • MS compatible	• Cannot be re-used • Must be re-tightened after initial temperature cycle
SilTite metal	MS and oxygen-sensitive detectors	• Long lifetime • High temperature limit • MS compatible	• Cannot be re-used

SilTite metal ferrules

SilTite

Designed for connecting fused silica GC columns and tubing to mass spectrometer interfaces and injectors.

SilTite metal ferrules provide a continuous leak free connection without the need to re-tighten the nut after a few temperature cycles. SilTite ferrules are a high performing alternative to Graphite/Vespel ferrules in a GCMS system. Their performance and cost effectiveness also makes them ideal for connecting GC columns to injectors and atmospheric detectors.

SilTite GC connectors

SilTite

Column connections in GC have traditionally suffered from unreliability, leaks, excessive dead volumes and lack of inertness, leading to poor chromatography results and instrument downtime.

SilTite GC connectors are designed to minimize installation time and provide ongoing, robust connections throughout the life of the GC column.

SilTite FingerTite ferrules

Designed for each injector and detector, simplify your GC column installation.

- Typical kit contains 5 x female nuts, 10 x ferrules and 1 x measuring tool.
- A ferrule system for GC systems delivering an easy, leak free installation for capillary columns without the use of any tools.
- SilTite FingerTite will simplify your column installation process, giving you less hassle and more time for chromatography.

SilTite µ-Union

Designed to connect columns without the complications of conventional connectors.

- Tubing connections without leakage concern from temperature cycling or fear of getting pieces of ferrule stuck inside the tubing.
- Low thermal mass: 9 mm in length and mass <0.5 g.
- Available in kits to connect a range of columns from 0.1 mm ID through to 0.53 mm ID.
- Each kit contains: 5 x ferrules, 2 x male µ-connector end fittings, 2 x female µ-connector end fittings and installation tooling.

The SilTite µ-Union comes fitted standard when you order a GC capillary column with integrated guard (5 m). Just add SGXX to the end of the column part number where XX is the column ID e.g. 054101SG32 for a 0.32 mm ID guard on column part number 054101.

Part number	Part description and detail
073560	SilTite µ-Union for joining 0.10-0.25 mm and 0.10-0.25 mm ID columns/fused silica
073561	SilTite µ-Union for joining 0.10-0.25 mm and 0.32 mm ID columns/fused silica
073562	SilTite µ-Union for joining 0.10-0.25 mm and 0.53 mm ID columns/fused silica
073563	SilTite µ-Union for joining 0.32 mm and 0.32 mm ID columns/fused silica
073564	SilTite µ-Union for joining 0.32 mm and 0.53 mm ID columns/fused silica
073565	SilTite µ-Union for joining 0.53 mm and 0.53 mm ID columns/fused silica
Replacement parts	
073566	Replacement SilTite µ-Union ferrules for joining 0.10-0.25 mm and 0.10-0.25 mm ID columns/fused silica, PK10
073567	Replacement SilTite µ-Union ferrules for joining 0.10-0.25 mm and 0.32 mm ID columns/fused silica, PK10
073568	Replacement SilTite µ-Union ferrules for joining 0.10-0.25 mm and 0.53 mm ID columns/fused silica, PK10
073569	Replacement SilTite µ-Union ferrules for joining 0.32 mm and 0.32 mm ID columns/fused silica, PK10
073570	Replacement SilTite µ-Union ferrules for joining 0.32 mm and 0.53 mm ID columns/fused silica, PK10
073571	Replacement SilTite µ-Union ferrules for joining 0.53 mm and 0.53 mm ID columns/fused silica, PK10
073572	Replacement SilTite µ-Union only (no ferrules) for joining 0.10-0.32 mm and 0.10-0.32 mm ID columns/fused silica, PK5
073573	Replacement SilTite µ-Union only (no ferrules) for joining 0.10-0.32 mm and 0.53 mm ID columns/fused silica, PK5
073574	Replacement SilTite µ-Union only (no ferrules) for joining 0.53 mm and 0.53 mm ID columns/fused silica, PK5

SilTite FingerTite ferrules

Description	Column ID	Ferrule ID	Pack size	Part number
For Agilent 7890, 6890, 6850, 5890 and 4890				
SilTite FingerTite INJ/FID starter kit	0.10-0.25 mm	0.4 mm	*	073610
SilTite FingerTite capillary/FID starter kit	0.10-0.25 mm	0.4 mm	*	073611
SilTite FingerTite INJ/MS starter kit	0.10-0.25 mm	0.4 mm	*	073612
SilTite FingerTite INJ/FID starter kit	0.53 mm	0.7 mm	*	07361053
SilTite FingerTite injector starter kit	0.53 mm	0.7 mm	*	07361054
Replacement parts				
SilTite FingerTite ferrule 0.4 mm	0.10-0.25 mm	0.4 mm	10	073630
SilTite FingerTite ferrule 0.5 mm	0.32 mm	0.5 mm	10	073631
SilTite FingerTite ferrule 0.7 mm	0.53 mm	0.7 mm	10	073632
SilTite FingerTite blanking ferrule	–	–	2	073633
SilTite FingerTite female nut	–	–	5	073636
SilTite FingerTite INJ base seal	0.10-0.25 mm	–	2	073640
SilTite FingerTite capillary adaptor	–	–	1	0736101
SilTite FingerTite MS adaptor	–	–	1	0736102
SilTite FingerTite FID detector	–	–	1	0736103
SilTite FingerTite injector adaptor (includes 2 base seals)	0.10-0.25 mm	–	1	0736104

**Each starter kit includes all the parts necessary to convert one GC system (one injector and one detector) to the SilTite FingerTite system. In addition there are five SilTite FingerTite nuts, ten SilTite FingerTite ferrules, and a ferrule install tool which allows you to seat the ferrule in the correct position on the capillary column.*

Ferrules

Instrument	Column ID	Ferrule ID	Pack size	Part number
15% Graphite/85% Vespel ferrules				
Injectors and detectors at atmospheric pressure e.g. FID	0.10-0.25 mm	0.4 mm	10	073109
	0.32 mm	0.5 mm	10	073111
	0.53 mm	0.8 mm	10	073113
	for 1/8" OD packed columns	1/8"	10	072669
	for 1/4" OD packed columns	1/4"	10	072667
GCMS interface connection	0.10-0.25 mm	0.4 mm	10	072663
	0.32 mm	0.5 mm	10	072654
	0.53 mm	0.8 mm	10	072655
100% Graphite ferrules				
Injectors and detectors at atmospheric pressure e.g. FID (not for GCMS)	0.10-0.32 mm	0.5 mm	10	072635
	0.45-0.53 mm	0.8 mm	10	072636
	for 1/8" OD packed columns	1/8"	10	072602
	for 1/4" OD packed columns	1/4"	10	072601
SilTite metal ferrules				
GCMS interface connection (starter kit)	0.10-0.25 mm	0.4 mm	10*	073200
	0.32 mm	0.5 mm	10*	073201
	0.53 mm	0.8 mm	10*	073202
Split/splitless injectors (starter kit)	0.10-0.25 mm	0.4 mm	10#	073270
	0.32 mm	0.5 mm	10#	073271
	0.45-0.53 mm	0.8 mm	10#	073272
	1/32"	0.81 mm	10#	073273

**Includes ten ferrules, two SilTite nuts. #Includes ten ferrules, two SilTite nuts and two SilTite inlet base seals.*

Ferrules continued

Instrument	Column ID	Ferrule ID	Pack size	Part number
Replacement SilTite metal ferrules				
All connections	0.10-0.25 mm	0.4 mm	10	073220
	0.32 mm	0.5 mm	10	073221
	0.53 mm	0.8 mm	10	073222
	1/32"	0.81 mm	10	073219
Replacement SilTite nuts				
GCMS interface connection	–	–	5	073224
Split/splitless injector	–	–	5	073226
Replacement SilTite base seals				
Split/splitless injector	–	–	2	073400
	–	–	10	073401

Connectors and ferrules | PerkinElmer

SilTite FingerTite ferrules

SilTite FingerTite

Description	Column ID	Ferrule ID	Pack size	Part number
SilTite FingerTite PerkinElmer injector/GCMS starter kit	0.10-0.25 mm	0.4 mm	*	073623
SilTite FingerTite PerkinElmer injector/FID starter kit	0.10-0.25 mm	0.4 mm	*	073622
Replacement parts				
SilTite FingerTite ferrule 0.4 mm	0.10-0.25 mm	0.4 mm	10	073630
SilTite FingerTite ferrule 0.5 mm	0.32 mm	0.5 mm	10	073631
SilTite FingerTite ferrule 0.7 mm	0.53 mm	0.7 mm	10	073632
SilTite FingerTite blanking ferrule	–	–	2	073633
SilTite FingerTite female nut	–	–	5	073636

**Each starter kit includes all the parts necessary to convert one GC system (one injector and one detector) to the SilTite FingerTite system. In addition there are five SilTite FingerTite nuts, ten SilTite FingerTite ferrules, and a ferrule install tool which allows you to seat the ferrule in the correct position on the capillary column.*

Ferrules

Instrument	Column ID	Size of nut	Ferrule ID	Pack size	Part number
15% Graphite/85% Vespel ferrules					
For injectors and detectors at atmospheric pressure e.g. FID	0.10-0.25 mm	1/16"	0.4 mm	10	072663
	0.10-0.25 mm	1/8"	0.4 mm	10	0726703
	0.32 mm	1/16"	0.5 mm	10	072654
	0.32 mm	1/8"	0.5 mm	10	0726702
	0.45-0.53 mm	1/16"	0.8 mm	10	072655
	0.45-0.53 mm	1/8"	0.8 mm	10	072671
	for 1/8" OD packed columns	1/8"	1/8"	10	072669
	for 1/4" OD packed columns	1/4"	1/4"	10	072667

Ferrules continued

Instrument	Column ID	Size of nut	Ferrule ID	Pack size	Part number
100% Graphite ferrules					
Injectors and detectors at atmospheric pressure e.g. FID (not for GCMS)	0.10-0.32 mm	1/16"	0.5 mm	10	072627
	0.10-0.32 mm	1/8"	0.5 mm	10	072624
	0.45-0.53 mm	1/16"	0.8 mm	10	072626
	0.45-0.53 mm	1/8"	0.8 mm	10	0726280
	1/8" OD packed columns	1/8"	1/8"	10	072622
	1/4" OD packed columns	1/4"	1/4"	10	072621
SilTite metal ferrules					
GCMS interface connection (starter kit)	0.10-0.25 mm	–	0.4 mm	10*	073200
	0.32 mm	–	0.5 mm	10*	073201
	0.53 mm	–	0.8 mm	10*	073202
Replacement SilTite metal ferrules					
GCMS interface connection	0.10-0.25 mm	–	0.4 mm	10	073220
	0.32 mm	–	0.5 mm	10	073221
	0.53 mm	–	0.8 mm	10	073222
	1/32"	–	0.81 mm	10	073219
Replacement SilTite nuts					
SilTite metal nuts	–	–	–	5	073224

**Includes ten ferrules, two SilTite nuts.*

Connectors and ferrules | Shimadzu

SilTite FingerTite ferrules

SilTite FingerTite

Description	Column ID	Ferrule ID	Pack size	Part number
For Shimadzu GC-2030 and GC-2010				
SilTite FingerTite INJ/FID starter kit	0.10-0.25 mm	0.4 mm	*	073619
SilTite FingerTite INJ/MS starter kit	0.10-0.25 mm	0.4 mm	*	073618
SilTite FingerTite INJ/FID starter kit	0.53 mm	0.7 mm	*	07362053
Replacement parts				
SilTite FingerTite ferrule 0.4 mm	0.10-0.25 mm	0.4 mm	10	073630
SilTite FingerTite ferrule 0.5 mm	0.32 mm	0.5 mm	10	073631
SilTite FingerTite ferrule 0.7 mm	0.53 mm	0.7 mm	10	073632
SilTite FingerTite ferrule blanking	–	–	2	073633
SilTite FingerTite female nut	–	–	5	073636

**Each starter kit includes all the parts necessary to convert one GC system (one injector and one detector) to the SilTite FingerTite system. In addition there are five SilTite FingerTite nuts, ten SilTite FingerTite ferrules, and a ferrule install tool which allows you to seat the ferrule in the correct position on the capillary column.*

Ferrules

Column ID	Description	Pack size	Part number
For Shimadzu GC-2030, GC-2014, GC-2010, and GC-17A injectors (not for MS interfaces or QP2010 injector)			
0.10-0.32 mm ID columns	100% Graphite	10	0726080
0.45-0.53 mm ID columns	100% Graphite	10	0726082
5 mm OD packed columns	100% Graphite	10	0726001
0.10-0.25 mm ID columns	SilTite metal - initial installation	10*	073350
0.10-0.25 mm ID columns	SilTite ferrules	10	073227
0.32 mm ID columns	SilTite metal - initial installation	10*	073351
0.32 mm ID columns	SilTite ferrules	10	073228
0.45-0.53 mm ID columns	SilTite metal - initial installation	10*	073352
0.53 mm ID columns	SilTite ferrules	10	073229
n/a	SilTite metal nuts - slotted	5	073232
For Shimadzu QP5000/5050 standard MS interface			
QP5000-I 0.10-0.25 mm ID columns	15% Graphite/85% Vespel ferrules	10	0726563
QP5000-I 0.32 mm ID columns	15% Graphite/85% Vespel ferrules	10	0726564
QP5000-II and QP5050 0.10-0.25 mm ID columns	15% Graphite/85% Vespel ferrules	10	0726561
QP5000-II and QP5050 0.32 mm ID columns	15% Graphite/85% Vespel ferrules	10	0726562
0.10-0.25 mm ID columns	SilTite metal - initial installation	10*	073204
0.10-0.25 mm ID columns	SilTite ferrules	10	073227
0.32 mm ID columns	SilTite metal - initial installation	10*	073205
0.32 mm ID columns	SilTite ferrules	10	073228
0.53 mm ID columns	SilTite ferrules	10	073229
n/a	SilTite metal nuts - QP5000/5050 standard MS interface	5	073233
For Shimadzu QP5000/5050 wide bore MS interface, QP2010 injector and QP2010 standard MS interface			
0.10-0.25 mm ID columns	15% Graphite/85% Vespel ferrules	10	072663
0.32 mm ID columns	15% Graphite/85% Vespel ferrules	10	072654
0.45-0.53 mm ID columns	15% Graphite/85% Vespel ferrules	10	072655
0.10-0.25 mm ID columns	SilTite metal - initial installation	10*	073200
0.10-0.25 mm ID columns	SilTite ferrules	10	073220
0.32 mm ID columns	SilTite metal - initial installation	10*	073201
0.32 mm ID columns	SilTite ferrules	10	073221
0.45-0.53 mm ID columns	SilTite metal - initial installation	10*	073202
0.45-0.53 mm ID columns	SilTite ferrules	10	073222
n/a	SilTite metal nuts	5	073224
Replacement SilTite nuts			
GC-2030/GC-2010 GCMS system		5	073224
GC-2030/GC-2010 GCMS system with QP5000 series MS		5	073224
GC-2030/GC-2014/GC-2010 GC injectors and atmospheric detectors		5	073224
QP5000 jet separator MS interface		5	073224
QP5000 direct MS interface		5	073233
All injectors jet separator (starter kit), except GC-2030/GC-2014/GC-2010		5	073232

**Includes ten ferrules, two SilTite nuts.*

SilTite FingerTite ferrules

Description	Column ID	Ferrule ID	Pack size	Part number
For Thermo Scientific TRACE 1300 series GC				
SilTite FingerTite INJ/MS starter kit (ISQ/ITQ MS only)	0.10-0.25 mm	0.4 mm	*	073612
SilTite FingerTite injector starter kit**	0.10-0.25 mm	0.4 mm	*	0736100 + 0736104
Replacement parts				
SilTite FingerTite ferrule 0.4 mm	0.10-0.25 mm	0.4 mm	10	073630
SilTite FingerTite ferrule 0.5 mm	0.32 mm	0.5 mm	10	073631
SilTite FingerTite ferrule 0.7 mm	0.53 mm	0.7 mm	10	073632
SilTite FingerTite blanking ferrule	–	–	2	073633
SilTite FingerTite female nut	–	–	5	073636
SilTite FingerTite INJ base seal	0.10-0.25 mm	–	2	073640
SilTite FingerTite MS adaptor	–	–	1	0736102
SilTite FingerTite injector adaptor (includes 2 base seals)	0.10-0.25 mm	–	1	0736104

**Each starter kit includes all the parts necessary to convert one GC system (one injector and one detector) to the SilTite FingerTite system. In addition there are five SilTite FingerTite nuts, ten SilTite FingerTite ferrules, and a ferrule install tool which allows you to seat the ferrule in the correct position on the capillary column. ** Starter kit 0736100 requires injector adaptor 0736104.*

Ferrules

Instrument	Column ID	Ferrule ID	Pack size	Part number
15% Graphite/85% Vespel ferrules				
For Thermo Scientific TRACE 1300 series GC split/splitless injectors	0.10-0.25 mm	0.4 mm	10	073109
	0.32 mm	0.5 mm	10	073111
	0.53 mm	0.8 mm	10	073113
For Thermo Scientific TRACE 1300 series GC GCMS interface connection	0.10-0.25 mm	0.4 mm	10	072663
	0.32 mm	0.5 mm	10	072654
	0.53 mm	0.8 mm	10	072655
100% Graphite ferrules				
For Thermo Scientific TRACE 1300 series GC split/splitless injectors	0.10-0.32 mm	0.5 mm	10	072635
	0.45-0.53 mm	0.8 mm	10	072636
SilTite metal ferrules				
GCMS interface connection (starter kit)	0.10-0.25 mm	0.4 mm	10*	073200
	0.32 mm	0.5 mm	10*	073201
	0.53 mm	0.8 mm	10*	073202
For Thermo Scientific TRACE 1300 series GC split/splitless injectors (starter kit)	0.10-0.25 mm	0.4 mm	10#	073270
	0.32 mm	0.5 mm	10#	073271
	0.45-0.53 mm	0.8 mm	10#	073272
	1/32"	0.81 mm	10#	073273
Replacement SilTite metal ferrules				
All GCMS interface connections	0.10-0.25 mm	0.4 mm	10	073220
	0.32 mm	0.5 mm	10	073221
	0.53 mm	0.8 mm	10	073222
	1/32"	0.81 mm	10	073219
For Thermo Scientific TRACE 1300 series GC split/splitless injector connections	0.10-0.25 mm	0.4 mm	10	073220
	0.32 mm	0.5 mm	10	073221
	0.53 mm	0.8 mm	10	073222
	1/32"	0.81 mm	10	073219
Replacement SilTite nuts				
SilTite metal nuts for all GCMS interface connections	–	–	5	073224
For Thermo Scientific TRACE 1300 series GC split/splitless injector	–	–	5	073226
Replacement SilTite base seals				
For Thermo Scientific TRACE 1300 series GC split/splitless injector	–	–	2	073400
	–	–	10	073401

**Includes ten ferrules, two SilTite nuts. #Includes ten ferrules, two SilTite nuts and two SilTite inlet base seals.*

Easy to install | Leak free | Stable

Trajan understands today's chromatographers need to move from tubing based flow systems to planar microchannel systems to deliver flexible chromatography solutions. SilFlow is an innovation in design and fabrication resulting in a highly efficient and reliable microfluidic platform that improves your GC connectivity to enable maximum chromatography performance.

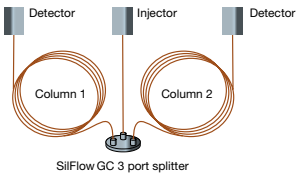
Configuration options for your chromatography solutions

The SilFlow microchannel device (MCD) is available in a number of configurations:

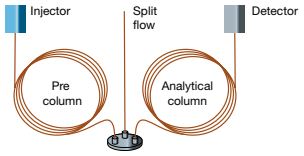
- 3 port GC splitters allowing flow splitting options with three different configurations.
- 4 port GC splitters offering similar configuration flexibility as the 3 port solution.
- Deans' switch MCD, perfect for multidimensional analyses.

Some suggested application configurations for use with SilFlow splitters:

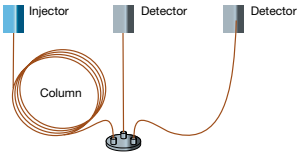
One injection to two capillary columns



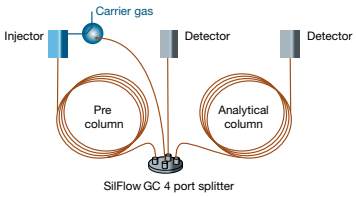
Pre-column with split to analytical column



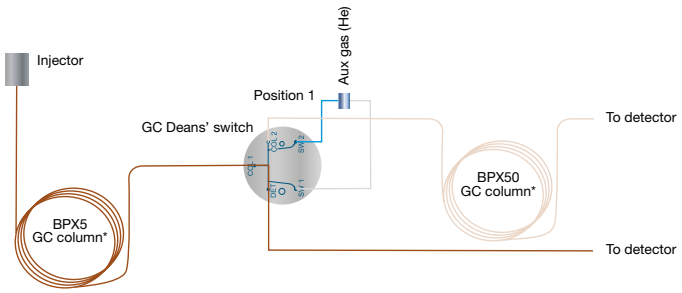
One column to two detectors



Backflush



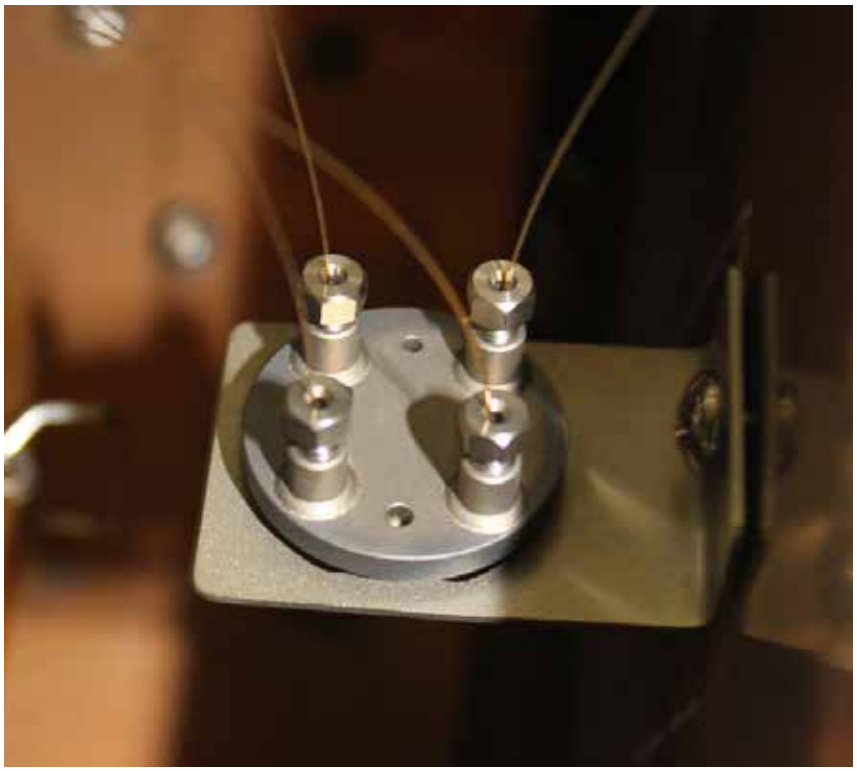
SilFlow GC Deans' switch connected with BPX5 (Phenyl Polysilphenylene Siloxane) 1st dimension GC column and BPX50 2nd dimension GC column.

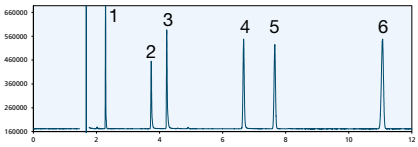


**1st and 2nd column dimension application specific. Contact your local Trajan representative.*

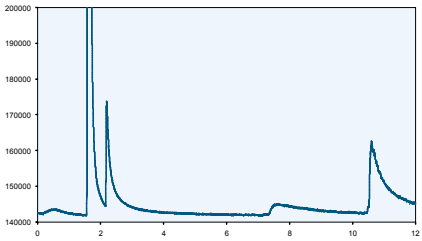
Chemically inert

- Enabled by Trajan's expertise in surface chemistry, SilFlow features chemically deactivated stainless steel channels avoiding active sites experienced with conventional connections.
- SilFlow can be incorporated into your system without impacting your chromatography.

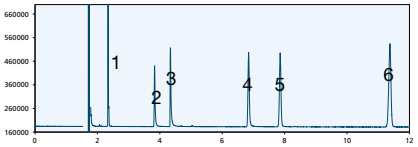




a) Column only



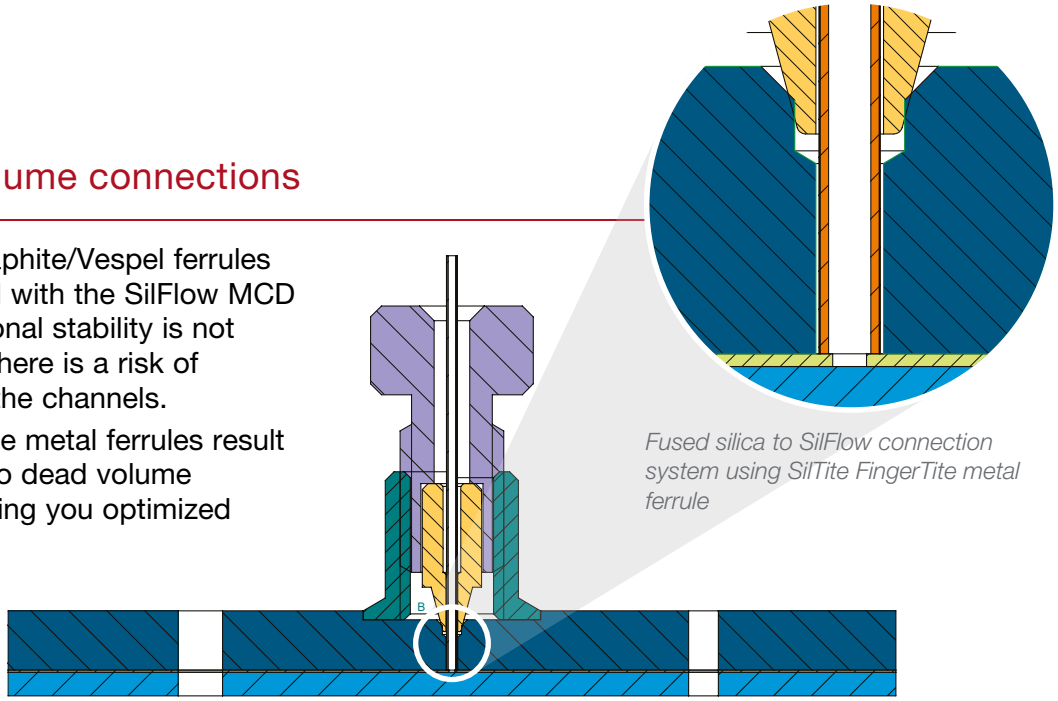
b) Column with metal connector without special deactivation



c) Column with deactivated SilFlow (GC Deans' switch)

Low dead volume connections

- Graphite or Graphite/Vespel ferrules cannot be used with the SilFlow MCD as the dimensional stability is not adequate and there is a risk of contaminating the channels.
- SilTite FingerTite metal ferrules result in a reliable zero dead volume connection, giving you optimized peak shapes.



Fused silica to SilFlow connection system using SilTite FingerTite metal ferrule

Superb operational stability

SilFlow technical specifications:

- Pressure capability - The SilFlow system can be operated at pressures greater than 25,000 psi (170,000 kPa).
- Thermal lag - SilFlow tracks oven temperature up to 20°C/min. The design of SilFlow alleviates cold spots and sample condensation.
- Maximum temperature - No practical temperature limit. Limited only by the temperature rating of the GC column being used, ≤420°C.

Easy to install and leak free

SilFlow kits incorporate SilTite FingerTite fittings that are easy to set up and can be tightened using finger force to achieve a perfect, reliable seal, even for the most sensitive MS systems – no wrenches required!

Each SilFlow kit contains:

- SilFlow microfluidic device (MCD)
- SilTite FingerTite tool
- Mounting bracket
- Ferrules, nuts and blanking ferrules

SilFlow GC 3 port splitter

Part number	Part description and detail
123722	Port A 0.25/0.32 mm ID, ports B and C 0.25/0.32 mm ID SilFlow GC 3 port splitter kit
123721	Port A 0.53 mm ID, ports B and C 0.25/0.32 mm ID SilFlow GC 3 port splitter kit
123720	Port A 1.1 mm OD, ports B and C 0.25/0.32 mm ID SilFlow GC 3 port splitter kit
123725	Microchannel device only, port A 0.25/0.32 mm ID, ports B and C 0.25/0.32 mm ID SilFlow GC 3 port splitter
123724	Microchannel device only, port A 0.53 mm ID, ports B and C 0.25/0.32 mm ID SilFlow GC 3 port splitter
123723	Microchannel device only, port A 1.1 mm OD, ports B and C 0.25/0.32 mm ID SilFlow GC 3 port splitter

SilFlow GC 4 port splitter

Part number	Part description and detail
123732	Port A 0.25/0.32 mm ID, ports B, C, and D 0.25/0.32 mm ID SilFlow GC 4 port splitter kit
123731	Port A 0.53 mm ID, ports B, C, and D 0.25/0.32 mm ID SilFlow GC 4 port splitter kit
123730	Port A 1.1 mm OD, ports B, C, and D 0.25/0.32 mm ID SilFlow GC 4 port splitter kit
123735	Microchannel device only, port A 0.25/0.32 mm ID, ports B, C, and D 0.25/0.32 mm ID SilFlow GC 4 port splitter
123734	Microchannel device only, port A 0.53 mm ID, ports B, C, and D 0.25/0.32 mm ID SilFlow GC 4 port splitter
123733	Microchannel device only, port A 1.1 mm OD, ports B, C, and D 0.25/0.32 mm ID SilFlow GC 4 port splitter

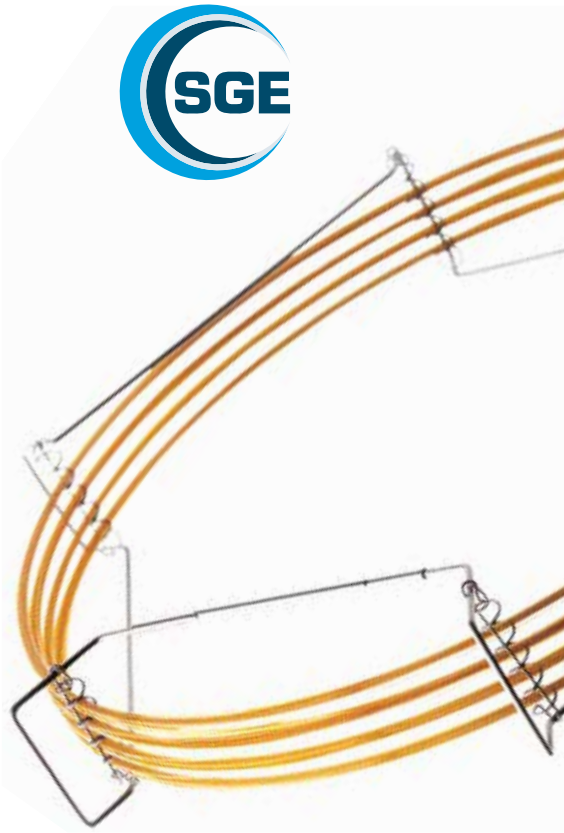
SilFlow GC Deans' switch

Part number	Part description and detail
1237031	Deans' switch kit (includes 1.1 mm OD tubing)
1237261	Microchannel device only Deans' switch

SilFlow replacement parts

Part number	Part description and detail
Replacement parts	
123704	SilFlow nuts, PK10
123713	SilFlow ferrules 0.35 mm ID, PK10
123706	SilFlow ferrules 0.4 mm ID, PK10
123707	SilFlow ferrules 0.5 mm ID, PK10
123709	SilFlow ferrules 0.7 mm ID, PK10
123705	SilFlow ferrules 1.1 mm ID, PK5
123715	SilFlow blanking ferrules and pins, PK5
123717	SilTite FingerTite tool
123743	SilFlow ferrules 0.55 mm ID, PK10
123744	SilFlow ferrules 0.75 mm ID, PK10
123742	SilFlow ferrules 0.8 mm ID, PK10
123755	SilFlow stainless steel capillary tubing, 75 cm long, 1.1 mm OD sleeved to 1/16" at one end (not included in kits, must be purchased separately if required)

Minimal bleed | Highly inert
Temperature stable



The GC column carries out the separation. When selecting a column for an application, four basic parameters need to be considered:

- Stationary phase
- Column internal diameter
- Film thickness
- Column length

A GC column is generally specified with two maximum operating temperatures:

- The isothermal limit at which the column may be run continuously.
- A programmed maximum where the column reaches a maximum for a limited period only.

There is also a minimum temperature below which a column will perform poorly. If a column is run continuously at the upper limit of temperature, column bleed will be observed. This is background noise caused by stationary phase degradation and this increases with increased film thickness.

Adjusting GC column performance

Column parameter	Parameters affecting resolution			Performance changes
	Efficiency	Retention	Selectivity	
Column length (m)	✓			Doubling column length increases resolution by ~40%
Internal diameter (mm)	✓			The smaller the column ID, the greater the efficiency and better the resolution
Film thickness (µm)		✓		The thicker the film, the greater the retention e.g. ideal for highly volatile compounds. The thinner the film, the sharper the peaks and lower the bleed
Stationary phase chemistry			✓	Altering the stationary phase can affect elution order and help separate closely, or co-eluting peaks

Stationary phase

General rules on selecting a phase

- Select the least polar phase that will perform the separation you require.
- Non-polar stationary phases separate analytes predominantly by order of boiling point. Increase the amount of phenyl and/or cyanopropyl content in the phase, and the separation is then influenced more by differences in dipole moments or charge distributions (BP10 (1701), BPX35, BPX50, BPX70).
- To separate compounds that differ more in their hydrogen bonding capacities (for example aldehydes and alcohols), polyethylene glycol type phases are best suited (BP20 (WAX), BP21 (FFAP), SolGel-WAX).
- Wherever possible use published retention indices to assist in your selection. Retention indices are calculated for a range of probe compounds which can highlight specific selectivity characteristics of a stationary phase.

Retention indices for eight cross-linked phases

The use of retention indices is a valuable tool in assisting selection of the stationary phase which provides maximum resolution for the compounds to be analyzed.

The retention indices of the five test compounds indicate the differences and similarities of each stationary phase. The values are calculated in reference to a homologous series of n-alkane hydrocarbons plotted on a logarithmic scale. Each n-alkane has a retention index of 100 times the carbon number (ie. C6, RI=600). Therefore, the retention index for each of the test compounds illustrates the elution position in reference to this n-alkane series.

Each probe compound is selected to represent the interaction characteristics of various organic functionalities.

Retention indices are calculated using the following formula:

Probe compound	Interactions represented
Benzene	Aromatics, unsaturated hydrocarbons
Butanol	Alcohols, diols
2-Pentanone	Ethers, esters, ketones and aldehydes
Nitropropane	Nitro and nitrile derivatives
Pyridine	Aromatic bases

$$IA = 100N+100n \, (\log t'R(A) - \log t'R(N)) \, / \, (\log t'R(N+n) - \log t'R(N))$$

IA is the retention index of compound A (from corrected retention times) which elutes between two n-paraffins separated by either one or two carbon numbers.

Phase	Benzene (X)	Butanol (Y)	2-Pentanone (Z)	Nitropropane (U)	Pyridine (S)	Average
BP1	647	646	666	707	722	678
BP5	667	665	692	743	746	703
BPX5	664	667	697	752	750	706
HT8	680	673	728	796	780	731
BPX35	728	726	763	862	848	785
BP10 (1701)	709	774	772	862	832	790
BP20 (WAX)	947	1153	998	1217	1185	1100
BPX70	1067	1219	1170	1365	1300	1224

The table lists the responses to each test compound and the average value for eight cross-linked phases ranging from the non-polar BP1 to the very polar BPX70. The range has been developed to cover the widest possible range of compound functionality and application areas.

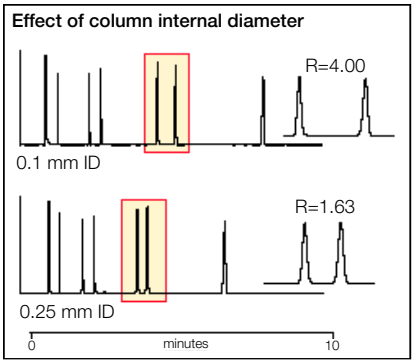
Average retention index values are listed, and provide an indication of the phase polarity. This can assist in selecting a suitable stationary phase for a particular application area. The individual responses to each test compound can further assist in determining the best phase for any specific type or group of compounds.

Column internal diameter

Effect of column internal diameter

The smaller the internal diameter the greater the efficiency and therefore the better the resolution. Reduce the diameter by half and the column efficiency doubles.

As the diameter increases, the film thickness can increase to maintain the same phase ratio. The thicker the film, the greater the loading capacity. Overloading a column will always result in loss of resolution. If the column diameter is halved while maintaining the same film thickness, then the loading capacity will also be halved.

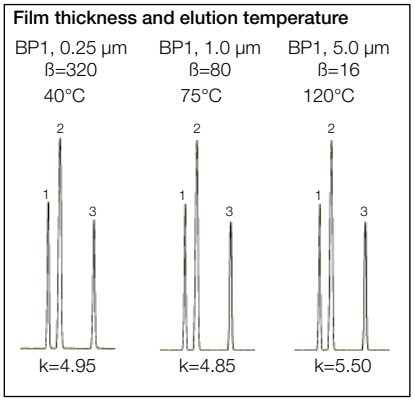


Column ID	Recommendations
0.1 mm and 0.15 mm	Fast GC columns ideal for FID, ECD.
0.22 mm and 0.25 mm	Ideal for MS and high resolution applications.
0.32 mm	Provide good resolution for most applications, ample sample loading and compatibility with nearly all detector systems.
0.53 mm	Provide large sample capacities.

Film thickness

Sample loading

For samples with a variation in solute concentration, a thick film column is recommended. This will reduce the possibility of broad overloaded peaks co-eluting with other compounds of interest. If the separation of two solutes is sufficient and co-elution is still unlikely, even with large differences in concentration, then a thinner film can be used.



Volatility of solute

The greater the film thickness, the greater the retention of a solute, therefore the higher the elution temperature. As a rule, doubling the film thickness results in an increase in elution temperature of approximately 15-20°C, under isothermal conditions. Using a temperature program, the increase in elution temperature is slightly less.

As well as film thickness, changing the column internal diameter also effects the elution temperature. To avoid using two parameters that can alter individually, phase ratio is often used as it takes both into account.

The chromatograms demonstrate the effect on elution temperature for a mixture of compounds using 0.32 mm ID columns with film thickness of 0.25 µm, 1 µm and 5 µm.

An increase in film thickness from 0.25 µm to 5 µm needs a change in analysis temperature of 80°C to maintain the same elution time.

Film thickness continued

Phase ratio

Phase ratio encompasses both the film thickness and column internal diameter to give a value that can characterize all column internal diameters and film thickness combinations.

Calculate phase ratio using the following formula:

$$ß = d/4d_f$$

where:
ß = phase ratio
d = column internal diameter (µm)
d_f = film thickness (µm)

From the phase ratio value, a column can be categorized for the type of application it would best suit. The smaller the ß value, the greater the concentration of phase to the volume of the column, making it better suited for analyzing volatile compounds. Columns which have thin films, are generally better suited for high molecular weight compounds and are characterized by large ß values.

Film thickness (µm)	Column ID (µm)					
	100	150	220	250	320	530
	Phase ratio					
0.1	250	-	550	625	800	1325
0.15	-	-	-	-	-	883
0.25	-	150	220	250	320	530
0.5	-	75	110	125	160	265
1.0	-	-	55	63	80	132
3.0	-	-	-	-	27	44
5.0	-	-	-	-	16	26

Keeping a similar phase ratio when changing column internal diameters will ensure that your chromatographic parameters will not need substantial changes.

Column length

Effect of column length

Always try to select the shortest column length that will provide the required resolution for the application (12-30 m).

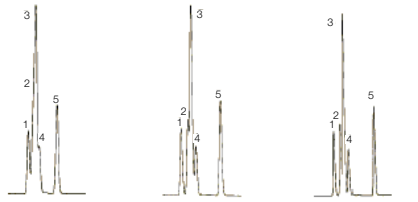
If the maximum column length available is being used and resolution of the sample mixture is still inadequate, try changing the stationary phase or internal diameter.

Resolution is proportional to the square root of the column efficiency. Therefore, doubling the column length will only increase the resolving power of the column by approximately 40%.

The three chromatograms give an indication of how column length influences the resolution of a mixture.

Effect of column length
Phase: BP20, 0.5 µm
Temperature: 170°C, isothermal
Linear velocity: 25 cm/sec, He

Components
1. o-Ethylphenol
2. p-Cresol
3. 2,4-Xylenol
4. 2,5-Xylenol
5. 2-iso-Propylphenol



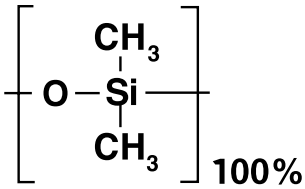
12 m x 0.32 mm ID
Efficiency (effective plates): 25,000

25 m x 0.32 mm ID
Efficiency (effective plates): 50,000

50 m x 0.32 mm ID
Efficiency (effective plates): 100,000

BP1

100% Dimethyl Polysiloxane



- Classic dimethyl polysiloxane technology with high temperature cross-linking
- Excellent general purpose GC column
- Low bleed
- Non-polar
- Suitable for all routine analyses

Application areas: Suitable for analysis of hydrocarbons, aromatics, pesticides, phenol, herbicides, amines.

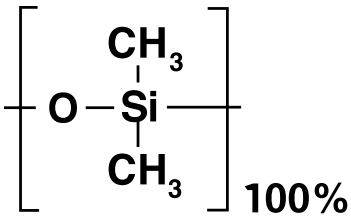
Operating temperature: 0.1-1 µm film thickness: -60°C to 340/360°C.
>1-3 µm film thickness: -60°C to 300/320°C.
>3-5 µm film thickness: -60°C to 280/300°C.

Suitable replacement for: CP-Sil 5 CB, DB-1, DB-Petro, Elite-1, HP-1, HP-1ms, Petrocol DH, Rtx-1, SPB-1, SPB-1 SULFUR, Ultra 1, VB-1, VF-1ms, ZB-1.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.1	10	0.1	054022
0.22	12	0.25	054046
0.22	25	0.25	054047
0.22	30	0.25	054050
0.22	50	0.25	054048
0.22	50	1	054054
0.22	60	0.25	054051
0.25	15	0.1	054039
0.25	15	0.25	054043
0.25	30	0.25	054044
0.25	30	1	054056
0.25	60	0.25	054045
0.32	12	0.5	054064
0.32	12	1	054070
0.32	25	0.5	054065
0.32	25	1	054071
0.32	30	0.25	054062
0.32	30	0.5	054068
0.32	30	3	054073
0.32	50	0.5	054066
0.32	50	1	054072
0.32	50	5	054082
0.32	60	0.5	054069
0.53	12	1	054086
0.53	25	1	054087
0.53	25	5	054095
0.53	30	1	054090
0.53	30	3	054808
0.53	30	5	054806
0.53	50	5	054096
0.53	60	5	054807
0.32	30	1	054813
0.25	30	0.5	054820
0.32	60	1	054810

BPX1

100% Dimethyl Polysiloxane



- Non-polar column
- Dimensionally stabilized phase
- Low bleed
- Specifically designed for high temperature hydrocarbon analysis
- Ideal for simulated distillation

Application areas: ASTM methods D2887 and D6532.

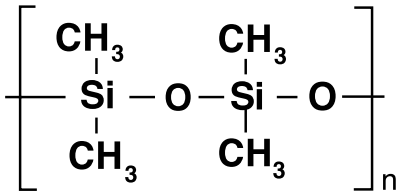
Operating temperature: Polyimide clad, 0.1-0.9 µm film thickness: -30°C to 400°C.
Polyimide clad, 2.65 µm film thickness: -30°C to 370°C.

Suitable replacement for: DB-2887, DB-HT, Elite-SimDist, HP-1, Petrocol 2887, Petrocol EX2887, Rtx-2887.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.1	10	0.1	054777
0.53	6	2.65	0548025
0.53	10	0.1	054803
0.53	10	0.9	054801
0.53	10	2.65	054802

SolGel-1ms™

100% Dimethyl Polysiloxane in a Sol-Gel matrix



- A robust, inert, high temperature, non-polar phase for use with mass spectrometers
- Highly inert
- Less bleed - better MS library identification, less ion source maintenance, and better sensitivity
- Also suitable for use with all non-MS detectors

Application areas: Recommended for highly active compounds.

Operating temperature: 0.25 µm film thickness: 0°C to 340/360°C.

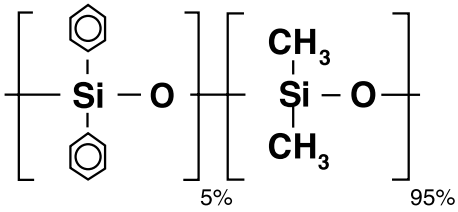
Suitable replacement for: CP-Sil 5 CB, DB-1, DB-Petro, Elite-1ms, HP-1ms, Petrocol DH, Rtx-1, SPB-1, SPB-1 SULFUR, TG-1MS, Ultra 1, VB-1, VF-1ms, ZB-1.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.25	30	0.25	054795
0.25	60	0.25	054793
0.32	30	0.25	054798

BP5

5% Phenyl / 95% Dimethyl Polysiloxane

- Excellent general purpose GC column
- Low bleed
- Non-polar
- High temperature



Application areas: Aromatics, pesticides, herbicides, drugs of abuse, hydrocarbons.

Operating temperature: 0.25-1.5 µm film thickness: -60°C to 320/340°C.
>1.5 µm film thickness: -60°C to 280/300°C.

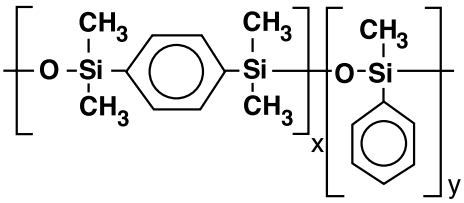
Suitable replacement for: CP-Sil 8 CB, DB-5, Elite-5, HP-5, MDN-5, PTE-5, Rtx-5, SPB-5, Ultra 2, VB-5, ZB-5.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.22	25	0.25	054168
0.25	15	0.25	054182
0.25	30	0.25	054183
0.25	30	1	054203
0.25	60	0.25	054184
0.32	25	0.5	054186
0.32	30	0.25	054177
0.32	30	0.5	054216
0.32	30	1	054189
0.53	30	1	054195
0.53	30	5	054196

BP5MS

5% Phenyl Polysilphenylene-siloxane

- Perfect for your 5% GCMS analysis
- Optimized silphenylene content for general purpose MS analyses



Application areas: 5% GCMS analyses

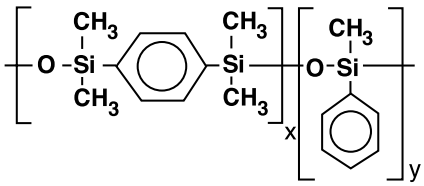
Operating temperature: 0.1-0.25 µm film thickness: -40°C to 330/350°C.

Suitable replacement for: CP-Sil 8 CB, DB-5ms, Elite-5ms, RTX-5ms, TG-5SilMS, VF-5ms, ZB-5ms.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.18	20	0.18	054301
0.25	15	0.25	054308
0.25	30	0.25	054310

BPX5

5% Phenyl Polysilphenylene-siloxane



- High temperature
- General purpose GC column - suitable for over 80% of all routine analyses performed by gas chromatography
- Very low bleed - ideal for trace analysis
- Non-polar
- Extremely inert
- Ideal for GCMS

Application areas: Ultra trace analyses, pesticides/herbicides, hydrocarbons, solvents, phenols, amines, GCMS and other specific detector applications.

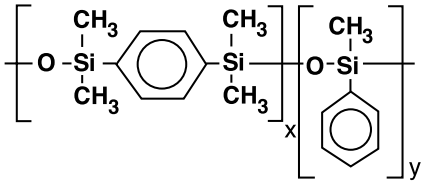
Operating temperature: 0.1-1.5 µm film thickness: -40°C to 360/370°C.
>1.5 µm film thickness: -40°C to 350/360°C.

Suitable replacement for: AT-5ms, CP-Sil 8 CB, DB-5, DB-5ms, DB-5.625, Elite-5ms, HP-5, HP-5ms, MDN-5S, Rtx-5MS, Rxi-5Sil MS, SPB-5, TG-5MS, TG-5SilMS, Ultra 2, VB-5, VF-5ms, XTI-5, ZB-5, ZB-5ms.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.1	10	0.1	054099
0.15	25	0.25	054104
0.22	12	0.25	054112
0.22	25	0.25	054113
0.22	50	0.25	054114
0.25	7	0.25	054149
0.25	15	0.25	054100
0.25	15	0.1	0542170
0.25	15	1	054121
0.25	30	0.25	054101
0.25	30	0.1	0541011
0.25	60	0.25	054102
0.25	30	0.5	0541025
0.25	30	1	054122
0.25	60	1	054123
0.32	12	0.25	054118
0.32	25	0.25	054119
0.32	15	0.25	054144
0.32	30	0.25	054145
0.32	60	0.25	054146
0.32	25	0.5	054125
0.32	30	0.5	0541205
0.32	6	1	0541261
0.32	12	1	054127
0.32	30	1	054153
0.32	50	1	054129
0.32	60	1	054154
0.53	12	1	054130
0.53	25	1	054131
0.53	25	0.25	054134
0.53	30	0.5	0541345
0.53	30	1.5	0541348
0.53	30	1	054148
0.53	30	3	054160

BPX35

35% Phenyl Polysilphenylene-siloxane



- Mid polarity column
- Ideal for conformational analysis
- Inert
- Equivalent to USP phase G42
- High temperature
- Low bleed

Application areas: Environmental analyses, pesticides/herbicides, drugs of abuse, pharmaceuticals, polynuclear aromatic hydrocarbons, GCMS applications.

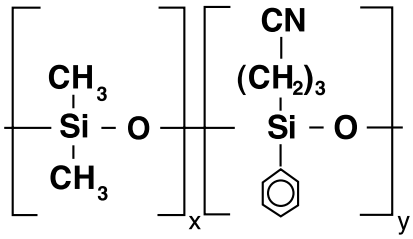
Operating temperature: 0.1-0.5 µm film thickness: 10°C to 330/360°C.

Suitable replacement for: DB-35, DB-35ms, Elite-35ms, HP-35, MDN-35, Rtx-35, SPB-35, TG-35MS, VF-35ms, ZB-35.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.1	10	0.1	054699
0.25	30	0.25	054701
0.25	60	0.25	054702
0.32	30	0.5	0547158

BP624

Cyanopropylphenyl Polysiloxane



- US EPA method 624 optimized column
- Designed for volatiles analysis
- Ideal for EPA methods 624, 8240 and 8260 and method SW-846

Application areas: EPA method 624, drinking water volatiles, chlorinated hydrocarbons solvents.

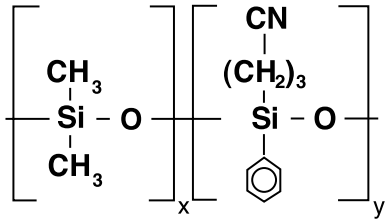
Operating temperature: 1.4-3 µm film thickness: 0°C to 230/240°C.

Suitable replacement for: AT-624, CP-Select 624 CB, DB-624, Elite-624, HP-VOC, OV-624, 007-624, Rtx-624, TG-624, VOCOL, ZB-624.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.25	15	1.4	054839
0.25	30	1.4	054840
0.25	60	1.4	054842
0.32	30	1.8	054832
0.32	60	1.8	054841
0.53	30	3	054836
0.53	50	3	054835
0.53	60	3	054838

BP10 (1701)

14% Cyanopropylphenyl Polysiloxane



- Ideal for organochlorine pesticides analysis
- Highly inert
- Low bleed

Application areas: Environmental analyses (EPA methods 608 and 8081), pesticides/herbicides, drugs of abuse, pharmaceuticals.

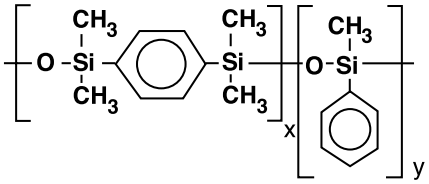
Operating temperature: 0.25-0.5 µm film thickness: -20°C to 280/300°C.
1 µm film thickness: -20°C to 260/280°C.

Suitable replacement for: CP-Sil 19 CB, 007-1701, DB-1701, Elite-1701, HP-1701, Rtx-1701, TG-1701, VF-1701ms, ZB-1701.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.22	25	0.25	054253
0.25	30	0.25	054256
0.32	25	0.5	054268
0.32	30	0.25	054259
0.32	30	1	054270
0.53	25	1	054280
0.53	30	1	054283

BPX50

50% Phenyl Polysilphenylene-siloxane



- Mid polarity
- Inert
- Low bleed
- High temperature
- Ideal for a range of EPA methods and pharmaceutical applications

Application areas: EPA methods 604, 608, 8060, 8081, triazines/herbicides, drug screening, steroids and a variety of pharmaceutical applications.

Operating temperature: 0.1-1 µm film thickness: 80°C to 330/350°C.

Suitable replacement for: AT-50, CP-Sil 24 CB, DB-17, Elite-17, HP-17, OPTIMA 17MS, Rtx-50, Rxi-17, SPB-17, SPB-50, 007-17, VF-17ms, ZB-50.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.1	10	0.1	054740
0.15	30	0.15	054741
0.25	15	0.25	054750
0.25	30	0.25	054751
0.25	60	0.25	054752
0.32	30	0.25	054761
0.53	30	1	054772

BP20 (WAX)

Polyethylene Glycol

- Industry standard wax column
- Polar phase
- Cross-linked for stability and washing

Application areas: Alcohol, free acids, fatty acid methyl esters, aromatics, solvents, essential oils.

Operating temperature: 0.1-1 µm film thickness: 20°C to 260/280°C.
>1 µm film thickness: 20°C to 240/260°C.

Suitable replacement for: Carbowax 20M, CP-Wax 52 CB, DB-WAX, Elite-WAX, HP-20M, HP-INNOWax RH-WAX, Rtx-Wax, Stabilwax, SUPELCOWAX 10, TG-WaxMS, VF-WAXms, ZB-WAX.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.22	25	0.25	054421
0.22	30	0.25	054424
0.22	50	0.25	054422
0.25	30	0.25	054427
0.25	60	0.25	054428
0.25	30	0.5	054415
0.25	30	1	054439
0.32	30	0.25	054433
0.32	50	0.25	054431
0.32	25	0.5	054436
0.32	30	0.5	054438
0.32	50	0.5	054437
0.32	25	1	054442
0.53	30	1	054444
0.53	30	1	054451
0.53	60	1	0544515
0.53	25	2	054456

BP21 (FFAP)

Polyethylene Glycol (PEG) – TPA Treated

- Nitroterephthalic acid modified PEG
- Polar phase
- Ideal for low molecular weight acids

Application areas: Volatile free acids, fatty acid methyl esters, alcohols, aldehydes, acrylates, ketones.

Operating temperature: 0.25-1 µm film thickness: 35°C to 240/250°C.

Suitable replacement for: CP-Wax 58 FFAP CB, DB-FFAP, Elite-FFAP, HP-FFAP, Stabilwax-DA, TG-WaxMS A, ZB-FFAP.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.22	25	0.25	054462
0.25	30	0.25	054465
0.25	60	0.25	054466
0.32	25	0.25	054468
0.32	30	0.25	054471
0.32	50	0.25	054469
0.32	50	0.5	054480
0.53	30	0.5	054477
0.53	30	1	054478

SolGel-WAX™

Polyethylene Glycol (PEG) in a Sol-Gel matrix

- Bonded polyethylene glycol
- Very robust high temperature column
- Less susceptible to damage by oxygen than conventional wax phases
- Polar phase
- Low bleed and inert

Application areas: Recommended for highly active compounds.

Operating temperature: 0.1-1 µm film thickness: 30°C to 260/280°C.

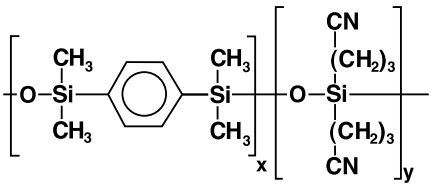
Suitable replacement for: AT-Wax, CP-Wax 52 CB, DB-Wax, Elite-WAX, HP-20M, HP-INNOWax, Nukol, Rtx-Wax, Stabilwax, SUPELCOWAX 10, TG-WaxMS, VB-WAX, ZB-WAX.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.1	10	0.1	0547100
0.25	30	0.25	054796
0.25	60	0.25	054791
0.25	30	1	054787
0.32	30	0.25	054788
0.32	60	0.25	054789
0.32	30	0.5	054797
0.32	60	0.5	054792
0.53	30	0.5	054786
0.53	30	1	054785

BPX70

70% Cyanopropyl Polysilphenylene-siloxane

- High temperature
- Custom designed for separation of fatty acid methyl esters (FAMEs)
- Industry standard column for FAME analysis
- Ideal for cis/trans isomer separation
- Polar phase



Application areas: Fatty acid methyl esters, carbohydrates, pharmaceuticals, GCMS applications.

Operating temperature: 0.2-0.5 µm film thickness: 50°C to 250/260°C.

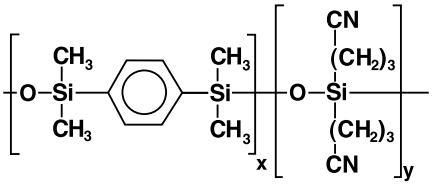
Suitable replacement for: CP-Sil 88, DB-23, Rtx-2330, SP-2330, SP-2380, VF-23ms, ZB-FAME.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.1	10	0.2	054600
0.22	25	0.25	054602
0.22	30	0.25	054612
0.22	50	0.25	054603
0.22	60	0.25	054613
0.25	30	0.25	054622
0.25	60	0.25	054623
0.25	120	0.25	054624
0.32	25	0.25	054606
0.32	30	0.25	054616
0.32	50	0.25	054607
0.32	60	0.25	054617
0.53	30	0.5	054620

BPX90

90% Cyanopropyl Polysilphenylene-siloxane

- Unique bonded phase
- Highly polar
- Thermally stable



Application areas: Fast separation of fragrances, aromatics, petrochemical, pesticides, PCBs and isomers of Fatty Acid Methyl Esters (FAMEs).

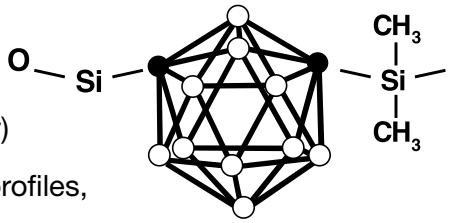
Operating temperatures: 0.25-0.5 µm film thickness: 80°C to 280°C.

Suitable replacement for: CP-Sil 88, DB-23, HP-23, Rtx-2330, SP-2330, SP-2380, TG-POLAR.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.25	15	0.25	054570
0.25	30	0.25	054580
0.25	60	0.25	054590
0.25	100	0.25	054596
0.32	30	0.5	054583

HT5

5% Phenyl (equiv.) Polycarborane siloxane



- Ultra high temperature column range
- Unique phase – no equivalent phases
- Ideal for simulated distillation applications (petroleum industry)

Application areas: Simulated distillation, general hydrocarbon profiles, pesticides/herbicides, GCMS applications.

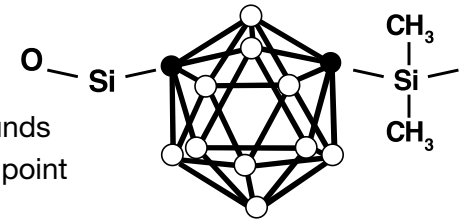
Operating temperature: 0.1-0.5 µm film thickness: 10°C to 380/400°C.

Suitable replacement for: No equivalents, unique ultra high temperature column.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.22	12	0.1	054631
0.22	25	0.1	054632
0.25	15	0.1	054633
0.25	30	0.1	054634
0.32	12	0.1	054641
0.32	25	0.1	054642
0.32	30	0.5	054668
0.53	6	0.1	054655
0.53	12	0.15	054657
0.53	25	0.15	054658

HT8

8% Phenyl (equiv.) Polycarborane siloxane



- High temperature
- Low bleed
- Preferred column for polychlorinated biphenyl (PCB) compounds
- Separates PCBs on ortho ring substitution as well as boiling point
- Ideal for environmental analyses

Application areas: PCB congener analyses, nitro-substituted aromatics, polynuclear aromatic hydrocarbons, pesticides/herbicides.

Operating temperature: 0.1-0.25 µm film thickness: -20°C to 360/370°C.

Suitable replacement for: No equivalents, unique ultra high temperature column.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.22	25	0.25	054675
0.22	50	0.25	054676
0.25	30	0.25	054677
0.25	60	0.25	054683
0.32	25	0.25	054680

HT8-PCB

8% Phenyl (equiv.) Polycarborane siloxane

- Unique ultra high temperature column optimizes for 209 PCB congener separations
- Optimized for 209 PCB congener separations

Part number	Part description and detail
HT8-PCB	
054236	0.25 mm ID x 60 m length HT8-PCB GC capillary column
Fast HT8-PCB	
054690	0.1 mm ID x 10 m length Fast HT8-PCB GC capillary column

GC PLOT columns | SGE

The analysis of gases and volatiles has historically been challenging for gas chromatographers. The need to maintain resolution for very volatile compounds has meant that many methods are still based on traditional packed columns. This is limiting as packed columns offer low resolution and are often dedicated to one specific analysis.

BP BOND Q

Features and benefits

- Highly stable column can withstand repeated water injections
- Reduced need for particle trap due to minimal particle shredding
- Broad application range – ideal for volatile solvent and hydrocarbon analysis

Recommended applications

- Volatile solvents
- Hydrocarbons

Product specifications

- 100% Divinylbenzene

Operating temperature: 3-5 µm film thickness: -100°C to 300/320°C.

Suitable replacement for: PoraBOND Q, Rt-Q-BOND, Rt-QPLOT, SupelQ PLOT, TracePLOT TG-BOND Q.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.25	10	3	0570123
0.25	25	3	0570223
0.32	10	5	0570135
0.32	25	5	0570235
0.32	50	5	0570535

BP BOND U

Features and benefits

- Maximum temperature extended from 190°C to 300°C
- Bleed reduction provides lower detection limits and faster stabilization times
- Ideal for applications such as trace Hydrogen Sulfide (H_2S), Carbonyl Sulfide (COS) and mercaptans in hydrocarbon streams

Recommended applications

- Trace H_2S, COS and mercaptans in hydrocarbon streams

Product specifications

- Divinylbenzene Ethylene Glycol/Dimethylacrylate

Operating temperature: 7 µm film thickness: 300°C.

Suitable replacement for: PoraBOND U, Rt-U-BOND, TracePLOT TG-BOND U.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.32	10	7	0571137
0.32	25	7	0571237

BP BOND Molsieve 5A

Features and benefits

- Reduction in analysis times of up to 75% compared with packed columns
- Baseline separation of argon (Ar)/oxygen (O_2) achieved at ambient temperatures
- Fast elution of carbon monoxide (CO) with symmetrical peaks

Recommended applications

- Separation of permanent gases
- Refinery or natural gases

Product specifications

- Molecular Sieve (5A)

Operating temperature: 30 µm film thickness: -20°C to 350/350°C.

Suitable replacement for: CP-Molsieve 5A, Mol Sieve 5A PLOT, MXT-Msieve 5A, Rt-Msieve 5A, TracePLOT TG-BOND Msieve 5A.

ID (mm)	Length (m)	Film thickness (µm)	Part number
0.25	10	30	0572123
0.25	25	30	0572223
0.32	10	30	0572133
0.32	25	30	0572233
0.32	50	30	0572533

Gas filters

Clean gas | Accurate analysis
Easily installed

Gas filters are an essential part of your GC analysis as contaminants in gases can significantly impact the quality of results. Oxygen, hydrocarbons and moisture can lead to problems such as noisy baselines, moisture entering the GC column, excessive bleed and septa degradation.

Even if carrier gas is of the highest quality, contaminants can be picked up from every part of the gas line. Therefore, a gas filter is needed to ensure that maximum productivity is achieved.

Clean gas

Gas filters are designed to provide fast stabilization times to reduce gas consumption, and provide clean gas to GC and GCMS systems.

Accurate analysis

Inserting a gas filter in the gas line significantly reduces impurity levels, thus improving trace analysis.

Easily installed

The gas filter system consists of two key parts: the filters and the connecting unit. The connecting unit has inlet and outlet connectors for the gas lines. The connecting unit can be bench or wall-mounted and is available in 1, 2 and 4 port configurations and for 1/4" and 1/8" gas lines.

Enhanced gas quality for maximum productivity

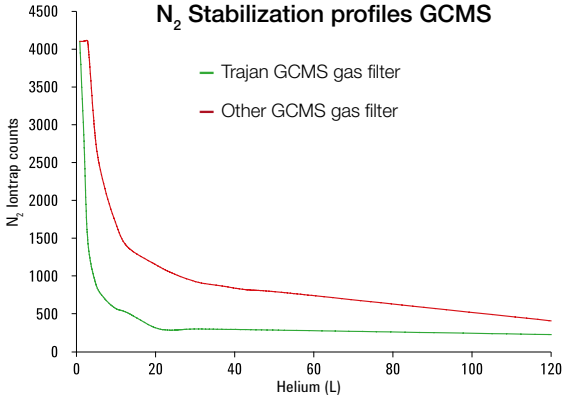


Figure 1 shows the fast stabilization rate (the N_2 mass measured by mass spectrometry) of a GCMS after replacement of the filter.

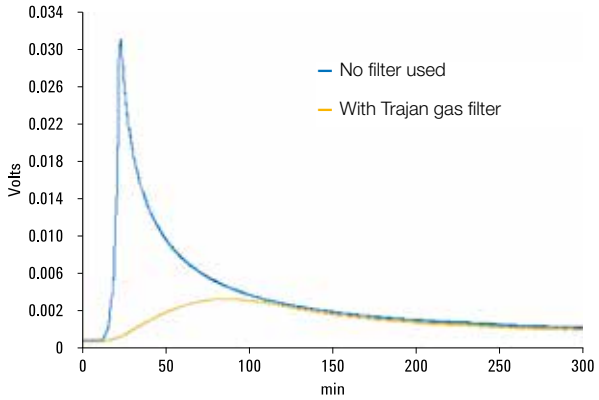


Figure 2 shows the difference in bleed levels of two GC columns due to moisture exposure with and without a filter when running a temperature program (50°C to 350°C, 20°C/min). When no filter is used, an extreme rise in the bleed profile is clearly visible due to moisture in the carrier gas. By using gas filters, a normal bleed profile is achieved with the removal of all moisture in the carrier gas.

Gas filter selection guide

Technique	Recommended filter(s)	Advantages
GCMS	Carrier gas	High data accuracy, lower maintenance
GC column	Moisture and oxygen	Longer lifetime
Electron capture detectors (GC)	Moisture and oxygen	High sensitivity
Thermal conductivity detectors (GC)	Moisture and oxygen	High sensitivity, lower maintenance
Flame ionization detectors (GC)	Two hydrocarbon	High sensitivity
Photoionization detectors (GC)	Oxygen and hydrocarbon	High sensitivity

Gas filter technical specifications

	Oxygen filter	Moisture filter	Hydrocarbon filter	Carrier gas filter
Function	Removes oxygen as well as traces of sulfur and chlorine compounds from the carrier gas	Removes water, oil and other foreign material from the carrier gas	Removes organic compounds from gas streams	Single combination filter; removes water, oxygen and organic compounds
Indicator color change	From green to gray	From green to pale brown	No indicator	Oxygen: from green to gray Moisture: from green to pale brown Hydrocarbons: no indicator
Capacity	150 mL oxygen	7.2 g water	Approximately 7 g, depending on impurities	100 mL oxygen, 1 g water, organics depending on impurities
Outlet concentration at operating flow of 1-10 L/min	<50 ppb	<0.1 ppm	<0.1 ppm	Oxygen <50 ppb Moisture <0.1 ppm Organics <0.1 ppm

Gas filters

Gas filters

Part number	Part description and detail
1035230	Gas filter - Hydrocarbon
1035220	Gas filter - Moisture
1035210	Gas filter - Oxygen
1035250	Gas filter - Carrier gas

Connecting units

Part number	Part description and detail
1035004	Gas filter connecting unit 1/4" (high flow)
1035008	Gas filter connecting unit 1/8" (high flow)
1035044	Gas filter connecting unit 1/4" (4 position)
1035048	Gas filter connecting unit 1/8" (4 position)
1035024	Gas filter connecting unit 1/4" (2 position)
1035028	Gas filter connecting unit 1/8" (2 position)
1035014	Gas filter connecting unit 1/4" (1 position)
1035018	Gas filter connecting unit 1/8" (1 position)

Gas filter kits

Part number	Part description and detail
1035154	Gas filter kit - Carrier gas 1/4" (1 gas filter, connecting unit - 1 position)
1035158	Gas filter kit - Carrier gas 1/8" (1 gas filter, connecting unit - 1 position)
1035164	Gas filter kit - FID 1/4" (4 gas filters, connecting unit - 4 position)
1035168	Gas filter kit - FID 1/8" (4 gas filters, connecting unit - 4 position)

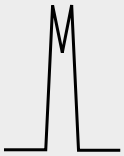
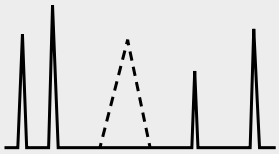
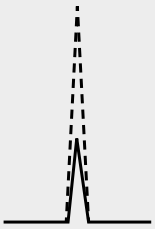
Big Trap gas filter

For bulk purification applications or where several instruments are plumbed from a single source, a Big Trap gas filter is an ideal solution. A one-piece heavy walled aluminium tube provides 750 cm^3 of capacity and a pressure rating up to 250 psig.

Big Traps

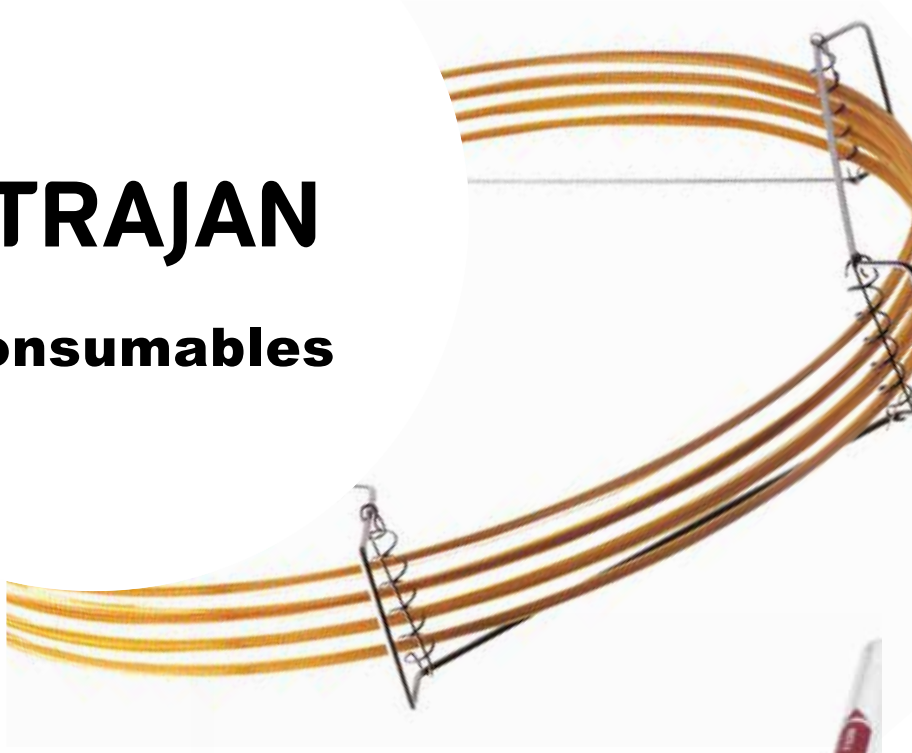
Part number	Part description and detail
1035334	Big Trap gas filter 1/4" - Hydrocarbon
1035338	Big Trap gas filter 1/8" - Hydrocarbon
1035324	Big Trap gas filter 1/4" - Moisture
1035328	Big Trap gas filter 1/8" - Moisture
1035314	Big Trap gas filter 1/4" - Oxygen
1035318	Big Trap gas filter 1/8" - Oxygen
1035344	Big Trap gas filter 1/4" - Universal
1035348	Big Trap gas filter 1/8" - Universal
1035300	Big Trap mounting clip, PK2

Basic troubleshooting guide

Problem	Reason	Resolution
Peak fronting 	Column overload	Reduce sample concentration or injection volume
	Incorrect polarity of column for compound	Use correct column
Peak tailing 	Column is active	Remove first meter of column, recheck; replace column if necessary
	Active inlet liner	Replace liner with clean, deactivated liner
	Incorrect column for analysis	Use correct column
	Incorrect column installation	Check inlet and outlet connections, and for any cold spots
Peak splitting 	Poor injection technique	Refine injection technique
	Mixed solvents	Use only single solvent system
	Poor resolution	Use different column or change temperature profile
Ghost peaks 	Run GC without injection; if ghost peaks disappear then the problem is probably the syringe or solvent; if ghost peaks are still evident then the problem is either the septum or the breakdown of the phase.	
	Contaminated syringe or solvents	Clean syringe thoroughly and replace solvents
	Septum bleed	Replace with Trajan septa
	Breakdown of column phase	Choose different phase which restricts breakdown
	Too large an injection volume	Decrease injection volume
Specific peaks low response 	Column is active	Remove first meter of column; recheck; replace column if necessary
	Active inlet liner	Replace liner with clean, deactivated liner
	Incorrect calculation of sample	Verify calculations
	FID altered gas flows	Readjust gas flows

TRAJAN

GC consumables



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