GC Supplies

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SGE Manufacturing Capability - Glass Manipulation

Your chromatography analysis does not end with the selection of the GC column! The combination of components selected for your instrument also make an important contribution to successful separations. SGE brings technology and chromatography expertise to everything the sample touches.

Injector to Detector – SGE Supplies for Sample Preparation,

SAMPLE PREPARATION - MEPS™

MEPS™ (Micro Extraction by Packed Sorbent) can be used in GC sample preparation where extraction of semi-volatile polar and apolar organic compounds from aqueous samples and organic extracts is required. For a detailed description of MEPS™ see pages 222-225.

SAMPLE INTRODUCTION - Syringes

SGE's involvement in all areas of Chromatography provides us with a unique understanding of customer's requirements enabling us to optimize syringe design for sample introduction.

All SGE syringes for both manual and autosampler use incorporate SGE's new Diamond Syringe Technology offering significantly improved levels of durability, clarity and accuracy. No other syringe range provides such brilliance! SGE has a comprehensive range of syringe options including plunger protection, removable or fixed needles, a range of needle gauge and length options as well as needle-tip style alternatives. For manual syringes see pages 35-40, for GC autosampler syringes by instrument see pages 43-47.

SAMPLE INTRODUCTION - Septa

The role of septa for GC analysis is key with many chromatographic problems caused as a result of inappropriate septa material or inappropriate handling of the septa.

Desired septa attributes:

- Must reliably seal against the carrier gas pressure in the inlet.
- Must be capable of being pierced by the syringe needle without pieces of the septa being deposited in the GC inlet system, which would be catastrophic to the chromatography.
- Must be capable of being pierced and resealed time after time.
- Must not be allowed to be contaminated or bleed material into the chromatographic system.

See pages 150-151 for SGE's septa range.

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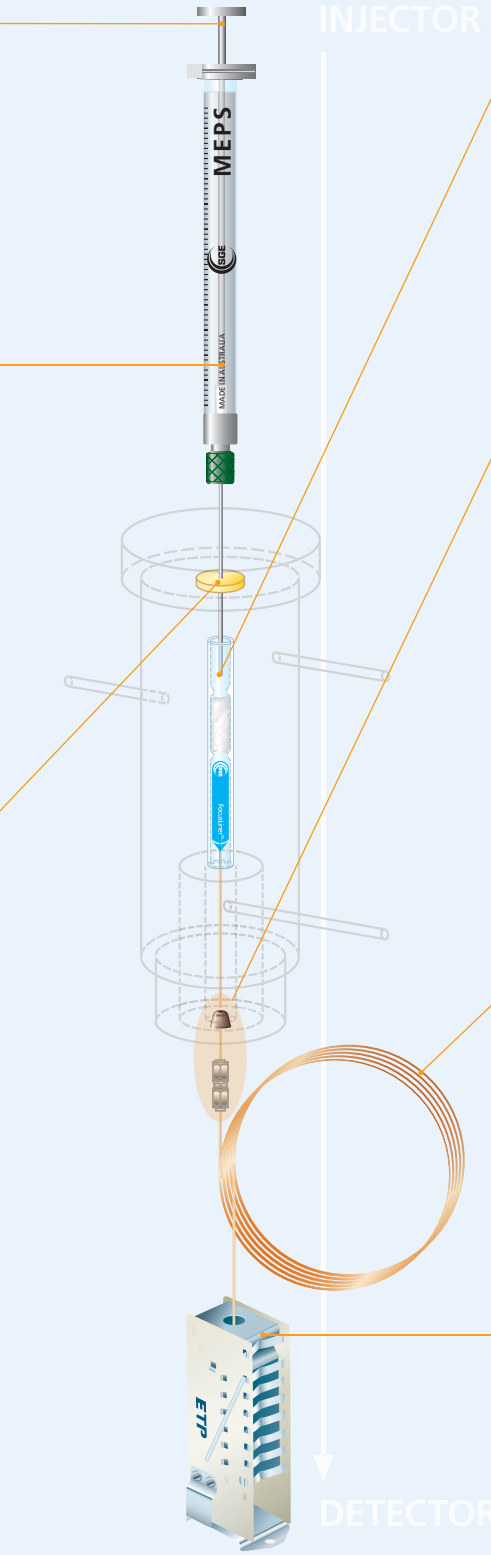
The following pages explain how each product type contributes to your analysis, and show the options SGE provides in Supplies' design, material and functionality.

Sample Introduction, Separation and Detection



SAMPLE INTRODUCTION – GC Inlet Liners

The GC Inlet liner is where the sample is introduced and vaporized into the gaseous phase. The Design of the liner is crucial, as is liner deactivation, to ensure reproducible and accurate chromatography. See pages 151-157 for SGE's new enhanced GC inlet liners.

SEPARATION - Connections

(Ferrules, unions and fittings)

SGE manufacturers an array of connection types for GC use. Within this section you will find detailed information on Unions, Nuts, Ferrules and complete connection solutions. It is important to realize the factors that can be influenced by the connection type utilized. Poorly defined or selected connections can lead to an increase in dead volume, leaks from cycled temperatures and mismatched tubing sizes. See pages 158-165 for connections.

SEPARATION - GC Capillary Columns

SGE's GC columns are manufactured end to end by SGE drawing on our five decades of capillary column innovation to provide you with separation solutions. For GC Capillary Columns see pages 73-98.

DETECTION – ETP Electron Multipliers

ETP electron multipliers from SGE are the most advanced high performance detectors available today. For ETP electron multipliers refer to pages 243-248.

Instrument Quick Pick Guide – for all GC supplies for your specific instrument, use the handy Instrument Quick Pick Guide on pages 167-180.

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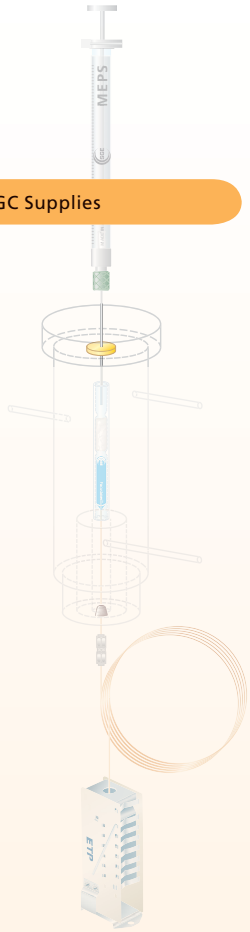
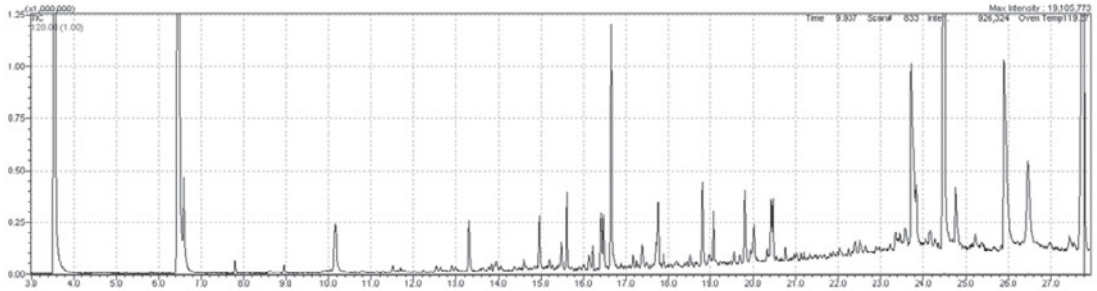
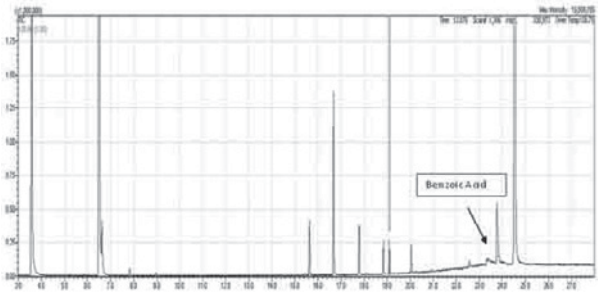


Due to the location of septa in the sample path, much attention has been focused on which material is the most appropriate to eliminate contamination, minimize bleed and ensure repeated sealing against the inlet. Comparisons between different septa materials in manufacturer's promotional material regularly show the bleed difference between Brands A, B and C. Whilst the formulation of the material is very important, without correct conditioning, handling and storage; even the best materials can interfere with analysis results.

After preparation and conditioning, SGE's septa are immediately hermetically sealed into blister packs which prevent absorption from the environment. This delivers our customers a consistent product time after time. SGE recommends the septa only be released from the pack when they are ready to be used.



Type A: Septa bleed affecting chromatography.



Type B: No septa bleed.

Expert Tip :
Keep septa in a hermetically sealed container until it is ready to be used. Pre-drilled septa used with a cone or dome tip syringe needle will give the longest life and reduce the risk of septa particles getting into the GC inlet liner which will have significant impact on the chromatography.

Material	Applications	Material	Durability	Resealing	Solvent Resistance	Tear Resistance	Maximum Injector Temperature
CS Septa	Low temperature applications	PTFE coated silicone	Good	Good	Excellent	Good	200 °C
TCS Septa	Medium/high temperature	PTFE coated triple layer silicone	Good	Very Good	Excellent	Very Good	280 °C
Auto-Sep™ Septa	High volume autosampler and manual use	Silicone	Excellent	Excellent	Excellent	Excellent	320 °C
Auto-Sep T™ Septa	Temperature programmable injectors, high volume autosamplers	PTFE coated silicone	Excellent	Excellent	Excellent	Excellent	350 °C
HT Septa	High temperature and low bleed	BTO silicone	Excellent	Excellent	Excellent	Excellent	400 °C
EC Septa	High temperature applications, high volume autosamplers	Silicone	Excellent	Excellent	Excellent	Excellent	400 °C
Enduro Blue Septa	For Shimadzu GC's only	High temperature silicone	Excellent	Excellent	Excellent	Excellent	350 °C

Septa are available in the following size formats:

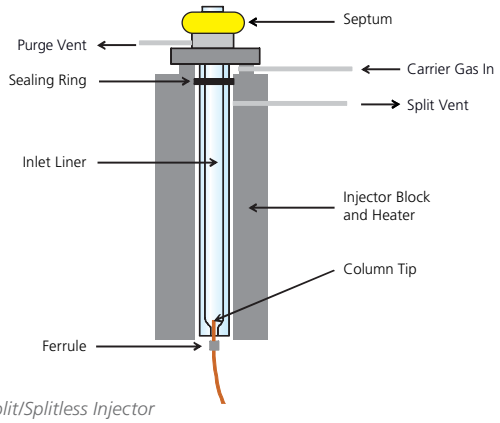
Diameter	Material
4 mm	TCS Pre-drilled
5 mm	CS, TCS Pre-drilled, HT Pre-drilled
6 mm	CS, TCS
7 mm	CS, TCS, TCS Pre-drilled, Auto Sep™, Auto Sep T™
8 mm	CS, TCS, Auto Sep™
9 mm	CS, TCS, TCS Pre-drilled, Auto Sep™, HT, EC
9.5 mm	CS, TCS, TCS Pre-drilled, Auto Sep™, Auto Sep T™, HT, EC

Diameter	Material
10 mm	CS, TCS, TCS Pre-drilled
11 mm	CS, TCS, TCS Pre-drilled, Auto Sep™, Auto Sep T™, HT, EC
11.5 mm	CS, TCS
12.5 mm	CS, TCS, Auto Sep T™, HT Pre-drilled
15 mm	CS
17 mm	TCS, Auto Sep T™, HT, EC
Plug	Enduro Blue, HT, EC

To choose septa for your instrument find them in the Instrument Quick Pick Guide pages 167-180.

GC Supplies | GC Inlet Liners

When gas chromatography with packed columns was first introduced in the 1950s, the process of sample introduction was relatively simple as the syringe needle easily fit within the bore of packed column tubing, therefore the sample being introduced into the column could be injected directly onto the packed phase. The advent of capillary columns for GC in the 1970s brought about significant improvements in column efficiency and separating power, but the drawback was the column ID no longer supported sample introduction directly onto the column. Thus, a new interface had to be created to allow the injection of the sample and its eventual transfer to the capillary column. This is what we refer to today as the injection port or GC inlet.



Split/Splitless Injector

The GC inlet functions as the interface of the sample syringe to the GC capillary column, where the sample is introduced, vaporized, mixed with carrier gas and transferred to the column. There are several types of inlets now available - split, splitless, programmable temperature vaporization (PTV) and on-column are the main examples. The most commonly used inlet is still the split/splitless injector. Each inlet has its own unique advantages and disadvantages and further details on injection techniques can be found on page 154.

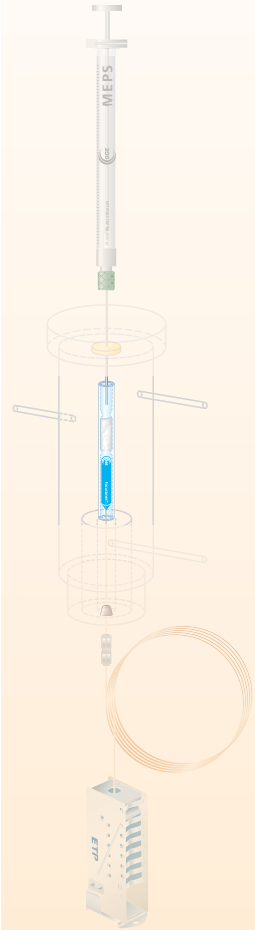
The inlet liner prevents the sample contacting the metal walls of the injector block. Inlet liner geometry and packing materials enable the inlet liner to achieve greater heated surface area; this additional surface area can often improve sample vaporization. Conversely, choosing the wrong liner geometry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

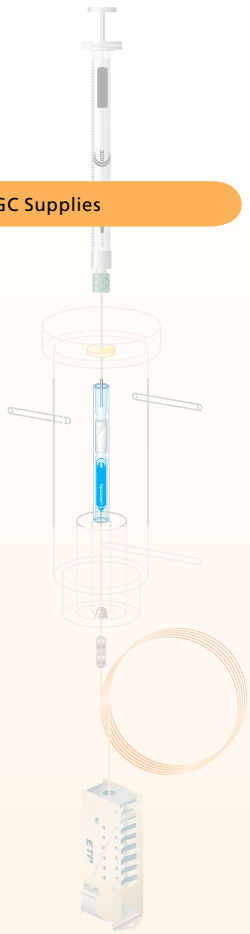
The importance of correct liner selection

In a study by Kende et al (Chromatographia 2006) the performance of trace pesticide analysis with a number of inlet liner types were investigated: Single taper, Single taper with quartz wool and Double taper.

In combination with optimal injector temperature, injection volume, split vent time, head pressure and initial oven temperature, the liner design was found to significantly impact performance.

Optimization of injector parameters within a liner increased peak areas by 30-40%. However, even within a series of controlled





injector parameters there were significant differences between liner designs. Peak areas differed as much as 100% between single taper with wool and single taper. Overall, the correct choice of liner design and injector parameters can increase peak areas and reduce detection limits by up to 300%.

Since inlet liner selection is so important, and yet unfortunately frequently misunderstood or overlooked, SGE has made some changes to our inlet liner range to make selection simple optimize your results.

SGE New Lineup

SGE's new enhanced inlet liner range brings these benefits to gas chromatographers:

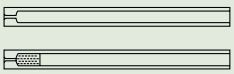
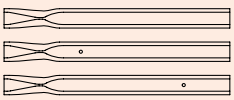
- **Easy to choose** Color coded by geometry to simplify your selection.
- **Easy to use** Contain o-rings so you're ready to go.
- **Confidence in your analysis** Certified deactivation gives you confidence in your analysis.

Easy to Choose

By drawing on our chromatography expertise, SGE has taken the complexity out of inlet liner selection.

To select an enhanced SGE inlet liner:

- Refer to the handy table below.
- Use the on-line inlet liner selection tool at www.sge.com/linertool
- Go to the Instrument Quick Pick Guide on pages 167-180.

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, 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 sample. • Wide boiling point range.	Taper 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 GC column and inhibit sample degradation due to hot metal components inside 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.

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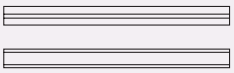
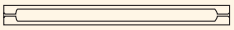
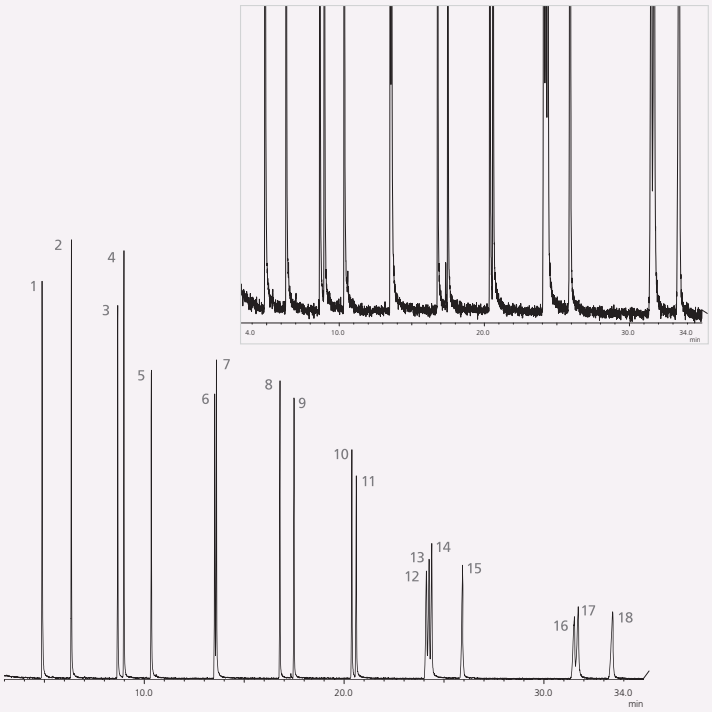
Color	Injection Technique	Sample Types	Liner Geometry	How the Geometry Works
Purple	Split Splitless	• General purpose. • Concentrated samples. • Dirty samples (only if quartz wool is present) • Gaseous samples (also Purge and Trap, Headspace).	Straight 	• Straight liners facilitate higher split flows. • 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.
Grey	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 non-volatile 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.

SGE has tested the enamel used on our new inlet liners to confirm:

- The enamel does not affect the chromatography of the sample.
- The enamel does not deteriorate when in contact with strong solvents such as dichloromethane.
- The enamel is not affected by prolonged exposure to temperatures above 400 °C.

Indication of no interference of inlet liner print or packaging with Polynuclear Aromatic Hydrocarbons (PAH) Analysis on BPX50.



1 µL injected of 20 ng/µL of:

1 naphthalene
2 2-methylnaphthalene
3 acenaphthene
4 acenaphthylene
5 fluorene
6 phenanthrene
7 anthracene
8 fluoranthene
9 pyrene
10 benzo(a)anthracene
11 chrysene
12 benzo(b)fluoranthene
13 benzo(j)fluoranthene
14 benzo(k)fluoranthene
15 benzo(a)pyrene
16 indeno(1,2,3-cd)pyrene
17 dibenzo(a,h)anthracene
18 benzo(g,h,i)perylene

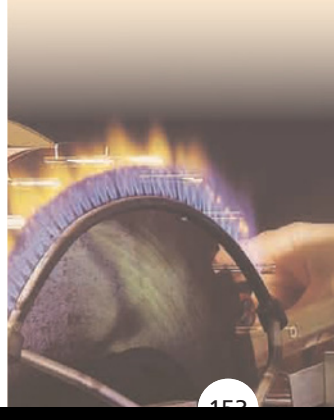
Note:

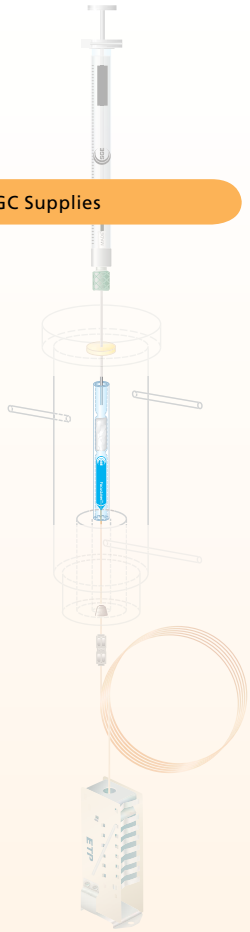
- *New enhanced SGE inlet liner was installed into the Shimadzu QP-2010.*
- *Inlet had a used, conditioned septum.*
- *Inlet liner was handled with gloves.*
- *Inlet liner was not conditioned.*
- *Analysis was performed as soon as the injector reached 300 °C.*

Inlet	300 °C
Transfer Line	300 °C
Initial Temp.	60 °C
Rate 1	35 °C/minute
	Temperature 120 °C
	Hold 0.5 minutes
Rate 2	8 °C/minute
	Temperature 200 °C
	Hold 0 minutes

Rate 3	11 °C/minute
	Temperature 270 °C
	Hold 0 minutes
Rate 4	2 °C/minute
	Temperature 300 °C
	Hold 0 minutes
Rate 5	40 °C/minute
	Temperature 320 °C
	Hold 4 minutes

MS – Source Temperature	260 °C
Scan	50-600 amu
High Pressure Injection (45psi)	Splitless for 1 minute
Constant Velocity	52 cm/sec



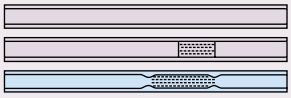
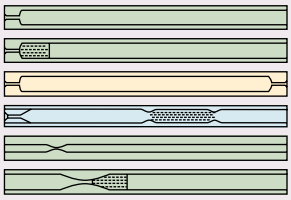
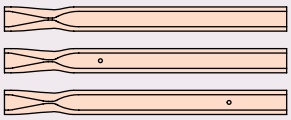


- Taper / Gooseneck
- FocusLiner™
- Taper Focus
- ConnecTite
- Straight
- Double Taper
- PTV/LVI

Variables of the Inlet Liner

Injection Technique

There are varied injection techniques for use dependent on sample type and analysis, an explanation of each is provided below. A significant proportion of chromatography separation problems are caused by poor injection selection and technique. Both inlet liner geometry and injection technique are critical considerations.

Injection Technique	Recommended Geometry Type	Technique Description
Split Injection		A portion of sample is split prior to loading onto the GC column. This is achieved by holding the split vent valve open during the loading process. The sample is vaporized in the inlet chamber, and is then swept through the liner and a portion of the vapor is loaded onto the GC column. The remainder (typically the majority of sample vapor) flows past the column entrance and out of the split vent. The flow through the liner is proportional to the split ratio that is set for the injection parameters. For instance, a 50:1 split ratio means one portion of sample will be transferred to the GC column for roughly every 50 parts that are sent out the split vent. If the GC column flow is set for 1 mL/min, the flow through the liner will be approximately 51mL/min. If we assume an internal liner volume of 1mL and a flow rate of 51mL/min through that liner, it will take approximately 1.2 seconds to clear the sample vapor from the liner.
Splitless Injection		Splitless injection is similar to a split injection since the same hardware is used however, unlike split injection, during the sample vaporization and loading, the Split Vent Valve remains closed for some period of time. This is referred to as the Splitless Hold Time and is typically 15-60 seconds in duration. This allows a maximum amount of sample to transfer to the GC column instead of being lost out the split vent. Once the loading step is complete, the split vent valve is opened and the remaining sample is swept out. It is very important that the splitless hold time be optimized for your analytes. If the split vent is opened too early, unvaporized sample may be purged from the inlet and not transferred to the column. If it is held too long, it can lead to excess solvent transfer and peak tailing. An advantage of splitless techniques is that the sample residence time within the liner is typically much longer than that of a split injection. Therefore higher molecular weight compounds have more time to achieve adequate vaporization and the discrimination effects that are often seen with split injections are reduced.
Direct Injection		Direct injection enables a nearly complete transfer of sample vapor to the GC column. Inlet liner geometry can be critical for complete sample transfer, see ConnecTite inlet liners in previous table and refer to 'How Geometry Works'.
Programmable Temperature Vaporization (PTV)		PTV injectors are unique in that they allow sample to be injected at cooler temperatures and then heated to vaporize and ultimately transfer to the GC column. This technique can also function like a pseudo large volume injection technique, in that a large volume of sample can be introduced into the injector at a cooler temperature, the sample can be de-solvated, then rapidly heated to sweep the analytes of interest onto the GC column. This increases sensitivity and lowers detection limits while minimizing the effects of excessive solvent in the system. The low initial temperature also helps protect heat sensitive compounds that might otherwise degrade in a flash vaporization technique.

Inlet Liner Packing

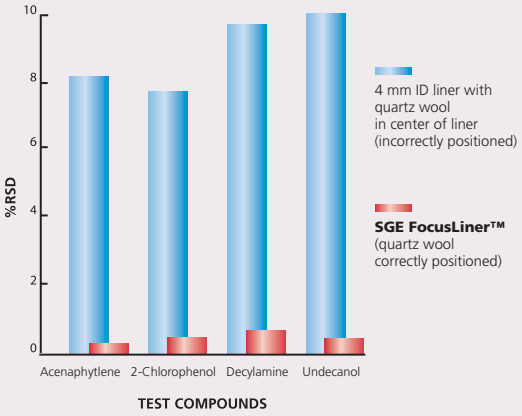
Many liner designs include deactivated quartz wool packing, some of the reasons for this are:

- Provides additional surface area for complete volatilization of the sample to minimize sample discrimination.
- Traps non-volatile components and septum particles from reaching the column.
- Wipes any sample from the syringe needle, thereby increasing reproducibility and preventing sample residue build-up at the septum.

The position of the quartz wool in the inlet liner is critical. The quartz wool is normally present in the inlet liner to mix and homogenize the vapor prior to splitting and entering the column. Quartz wool is often used at the bottom of liners (just above the column) to trap non-volatile contaminants and septum particles from entering the column. This is also an ideal placement when polar solvents are used. More importantly, however, is the location of the quartz wool when used in the needle wipe. At the point of injection the needle tip must penetrate the quartz wool to maximize vaporization of the sample and to wipe any droplets that form on the needle tip, before removal from the injection port. Unfortunately, there is no guarantee that once the liner is installed in the injector, the quartz wool plug will stay in the correct position. SGE developed the FocusLiner™ to specifically overcome this problem.

SGE FocusLiner™

The unique SGE FocusLiner™ uses a simple but effective design to hold the quartz wool in the correct position by means of two tapered sections in the liner (Figure 2 and 3). The tapered sections are located to ensure that the needle tip penetrates the secured quartz wool plug wiping any residual liquid sample from the needle tip while providing sufficient surface area for volatilization of the liquid sample. Current liner designs that utilize quartz wool to improve vaporization are frequently positioned incorrectly. Compounding the problem, the unsecured quartz wool plug can be easily dislodged by repeated injections. Each insertion of the needle tip can progressively move the plug until no further contact is made. Dislodging the plug can also occur through a sudden change in inlet pressure. For instance, removing the column from the injector or changing the septum can cause a sudden pressure change in the injector resulting in the movement of the plug.



A Relative Standard Deviation (RSD) of 5-10% is common for a straight through liner. With the SGE FocusLiner™, a RSD of less than 1% using external standard calibration is easily achievable showing the effectiveness of the secured quartz wool.

FocusLiner™ Conventional Liners

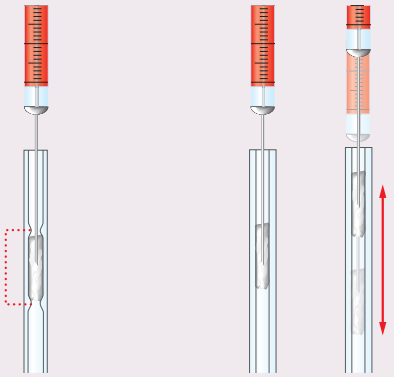


Figure 2
The two tapered sections secure the quartz wool plug effectively wiping the needle tip during injection. This results in improved reproducibility

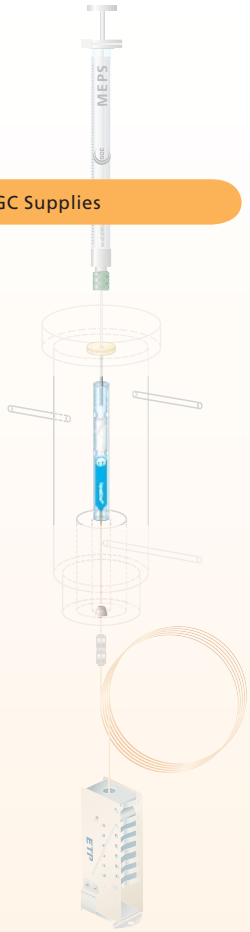
Figure 3a
Quartz wool plug is in the position to wipe needle tip.

Figure 3b.
Quartz wool plug can be removed in either direction preventing the needle wiping or sample vaporization processes.

Temperature

One of the most important objectives in reproducible chromatography is the optimization of the inlet system to achieve complete, homogenous, and reproducible vaporization of the injected sample and appropriate temperature selection is critical to achieve the vaporization.

The inlet should be heated to a high enough temperature in order to achieve a thorough vaporization of the introduced sample but not so high that it leads to



sample degradation (e.g. breakdown of thermally labile compounds). Other issues with the temperature being too high include discrimination – this is where the vaporization of the sample changes from injection to injection, or if some compounds are vaporized to a lesser extent than others. Discrimination can have a negative effect on run-to-run reproducibility.

Inlet Liner Volume

The purpose of the injection port is to allow the introduction of a sample into the gas chromatograph in a reproducible manner. The vaporized sample should be a true representation of the liquid sample and, unless specifically desired, should be injected without chemical change. The elevated temperatures used in the inlet vaporize the liquid sample to a gas for transfer to the head of the column. This phase transition is accompanied by a very significant volume change. The volume of the resulting vapor must be small enough to fit within the volume of the liner, specifically in splitless modes. If the vapor volume exceeds the liner's inner volume, that will cause overflow of the sample vapor from the liner. This is often referred to as flashback. Flashback typically results in contamination of the inlet system which in turn leads to carryover (ghost peaks) and poor run-to-run reproducibility.

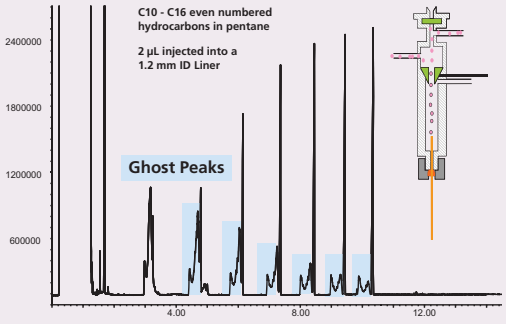
One of the disadvantages of the splitless injection technique is that it is susceptible to flashback. Due to the slower gas flows through the inlet liner and increased sample vaporization (due to increased residence time) flashback becomes more likely. There are several ways to minimize flashback. The easiest is to know the internal liner volume and sample (solvent) expansion volumes.

There are several calculators on the internet that can help facilitate these calculations using these formulae:

Liner Volume Calculation

Volume = Length x pr2

Expansion Volume V = nRT/P



Flashback

The ideal conditions are for vapor volumes to be kept below 70-80 % of the liner's inner volume, as for splitless injections. Common splitless injectors today have a function known as 'pulsed splitless' mode. In this mode, the head pressure of the inlet system is increased during the injection process. This increased head pressure helps contain the sample vapor within the liner volume and inhibits the sample from flashing back into the system gas lines.

Sample Type

For information on sample types see the GC method development section pages 250-253.

Easy to Use

SGE's enhanced inlet liners now come as a new, complete, packaged solution:

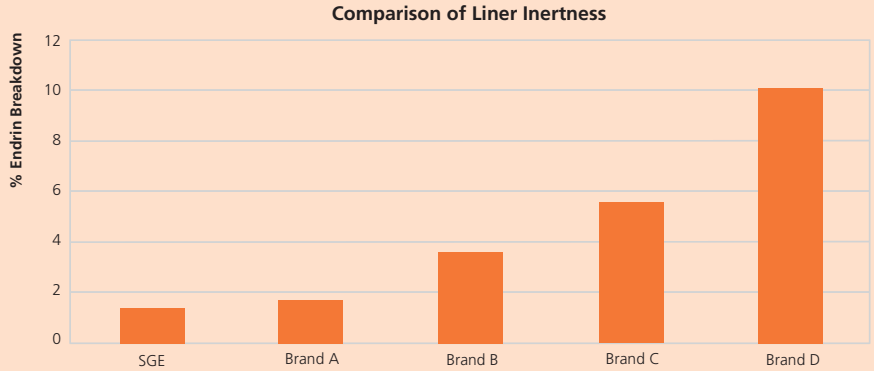
- 1, 5 and 25 packs.
- Complete with instrument appropriate o-rings or sealing rings.
- Each pack supplied with quality assurance test results.
- Color coded instrument stickers to identify which inlet liner type is in your instrument.
- SGE blister packs are now perforated enabling easy division of the 5 and 25 packs while maintaining blister integrity.

- 25 packs come in a re-usable container, with a range of attractive designs, that will be handy around the lab.

Confidence In Your Analysis

SGE standard inlet liner deactivation

SGE currently tests every batch of inlet liners for activity using the EPA 8081B method. This standard method ensures that each batch of inlet liners has less than 3 % Endrin breakdown. Now, SGE is validating this quality assurance by including a batch certificate with every pack.



SGE has compared the Endrin Breakdown activity against a wide range of competitors in the industry.

When deactivation REALLY matters

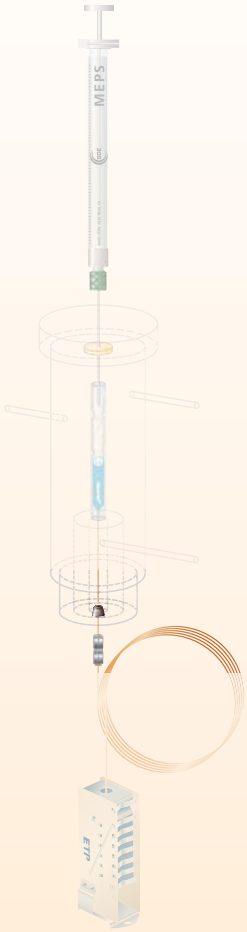
Single pack deactivation certification options:

- Sometimes there is a need for fully traceable inlet liner certification. Customers who are ISO accredited or follow GLP will benefit from SGE's certified single packs. Add CERT when ordering.
- MS ready liners in single packs conditioned and MS tested post deactivation so they are ready for use straight out of the pack. Add MS when ordering.

For SGE inlet liner product listings, see the Instrument Quick Pick Guide on pages 167-180.

SGE manufactures an array of connection types for GC use. Within this section you will find detailed information on Unions, Nuts, Ferrules and complete connection solutions. It is important to realize the factors that can be influenced by the connection type used. Poorly defined or selected connections can lead to an increase in dead volume, leaks from cycled temperatures and mismatched tubing sizes. Where possible, SGE recommends FingerTite™ solutions that eliminate the need for wrenches or other tools in your system.

Ferrules



When choosing ferrules ensure you consider the following:

1) Which material best suits your application?
2) What connection type do you want?

The following selection tables will assist with your decision.

Ferrule Material Type	Graphite	Graphite Vespel®	SilTite™ Metal
Features	• Easy to use. • Forms a stable seal. • Soft material. • Porous to oxygen. • Can be reused. • Forms a soft grip with capillary column. • Low emissions.	• A composite of graphite and Vespel®. • Mechanically robust. • Hard material, long lifetime. • Forms a strong grip with capillary column. • Cannot be reused with another capillary column. • Requires re-tightening.	• Specifically developed to overcome the problems associated with the use of 100% graphite and composite ferrules. • Strong seal on capillary columns. • Leak free - The ferrule and nut expand and contract at the same rate eliminating any chance of leaks with temperature cycling. • Nut does not need re-tightening after initial temperature cycles.
Suitable uses	• Column to injector connection. • Non-mass spectrometer detectors (FID, ECD, TCD and NPD).	• MS interfaces, - although even with a good seal will leak air compared to SilTite™ ferrules.	• Ideal for MS interfaces due to leak free seal.
Not suitable for	• Porous to oxygen. Therefore unsuitable for connecting columns to mass spectrometers.	• High temperature applications.	
Risks	• Can leave residue inside your column. • Can extrude into the injector or detector if it is over-tightened.	• If not re-tightened after installation and temperature cycles of the GC, air may enter the column or detector decreasing sensitivity of the analysis and possibly degrading the column as well as components of the system.	• Over-tightening of the seal can introduce leaks into the system. Follow the recommended installation instructions to avoid this problem. • For a leak free seal every time choose SilTite™ FingerTite connections.
Operating Temperature	Upper limit of 450 °C	Upper limit of 325 °C	No temperature limit in GC use.

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SilTite™ FingerTite – The Smart Alternative

SilTite™ FingerTite is the next generation ferrule system for gas chromatography systems providing these important benefits:

- Easy to install.
- Reliable, leak-free seal.
- Cannot be over-tightened.
- No tools required.

SilTite™ FingerTite has been developed with the unique, leak and air free properties of SilTite™ ferrules, resulting in superior air tightness to reduce background noise in sensitive MS applications so you can use them with confidence.

SGE SilTite™ ferrules and nuts are manufactured from stainless steel. SilTite™ ferrules MUST be used with SilTite™ nuts due to matching angles of the nut and the ferrule. Since inlet, detector and MS transfer lines are also made of stainless steel, the thermal expansions of all connecting parts are the same. This alleviates the problem with seating of graphite/Vespel® ferrules where they need to be tightened after several GC temperature cycles before a perfect seal is finally attained. The SilTite™ ferrules are initially sold as a kit with ferrules and matching nuts.

SilTite™ FingerTite Starter Kits by Instrument

Each starter kit includes all the parts necessary to convert one GC or GC/MS system (one injector and one detector) to the SilTite™ FingerTite system suitable for installing 0.1 – 0.25 mm ID capillary columns. In addition there are five matching SilTite™ FingerTite nuts, 10 x 0.4 mm ID SilTite™ FingerTite ferrules and a ferrule install tool which allows you to seat the ferrule in the correct position on the capillary column. Please note normal extended nuts cannot be used with SilTite™ ferrules. The use of SilTite™ FingerTite system requires that the inlet and detector end of the GC or GCMS must be reconfigured with the appropriate kit from SGE. After the system is reconfigured, only one nut and one ferrule type is needed for all GC or GCMS systems. The Smart Alternative!

For your GC instrument solution with SilTite™ FingerTite use the Instrument Quick Pick Guide on pages 167-180.

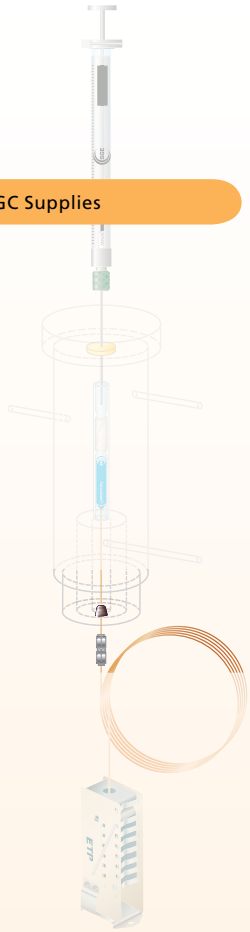
Part No. 073610

Expert Tip :
Can I reuse the SilTite™ FingerTite ferrules?
Once the SilTite™ FingerTite ferrule is crimped onto the tubing using the ferrule installation tool, the fitting is permanent. However, the column can be removed and reinserted multiple times without tools.

Expert Tip :
Can I touch the nut even when the oven is at 200 °C?
No - the nut will be at the oven temperature so it will be too hot to touch. However, the nut is designed to dissipate the heat from the injector/detector/transfer line, so that when the oven is cool you can change the column without waiting for the injector/detector to cool down. For Mass Spectrometers always follow the manufacturer's recommendations to vent the system.

Expert Tip :
Can I break my column if I over-tighten the nut?
No - with the SilTite™ FingerTite system you cannot generate enough force with your fingers tow break the column. Never use pliers or any other tool on the nut or you will possibly damage the Adaptor as well as break the column.

Click to Play Video



Standard SGE Ferrule Solutions

Ferrule Style	Hole ID	100% Graphite	15% Graphite / 85% Vespel®
1/16" Fitting Specifications – all ferrules supplied in packets of 10			
Straight (hole ID matches the nominal size of the fitting)	1/16"	072623	072657
Sealing Ring	1/16"	0726520	072653
Reducing Ferrule (hole ID smaller than the nominal size of fittings)	0.2 mm	-	0726632
	0.3 mm	-	072659
	0.4 mm	-	072663
	0.5 mm	072627	072654
	0.8 mm	072626	072655
	0.9 mm	-	072658
	1.0 mm	072625	072656
Reducing Ferrule - Short	0.3 mm	-	073107
	0.4 mm	-	073109
	0.5 mm	072610	073111
	0.8 mm	072608	073113
	1.0 mm	072607	-
	1.2 mm	072606	-
2-Hole Ferrule	2 x 0.3 mm	-	072660
	2 x 0.4 mm	-	072662
	2 x 0.5 mm	-	072664
	0.5 and 0.3 mm	-	0726640
	0.4 and 0.3 mm	-	0726641
	0.5 and 0.4 mm	-	0726642
3-Hole Ferrule	3 x 0.3 mm	-	0726650
	3 x 0.4 mm	-	072665
No-Hole Ferrule - Blank	No hole	-	072661
No-Hole Ferrule - Short and Blank	No hole	-	073105
1/8" Fitting Specifications – all ferrules supplied in packets of 10			
Straight (hole ID matches the nominal size of the fitting)	1/8"	072622	072669
Sealing Ring	1/8"	-	072652
Reducing Ferrule (hole ID smaller than the nominal size of fittings)	1/16"	0726283	0726701
	0.4 mm	-	0726703
	0.5 mm	-	0726702
	0.8 mm	0726270	072671
	1.2 mm	072628	-
	1.6 mm	-	-
	2.4 mm	-	0726700
Reducing Ferrule - Short	1.2 mm	072609	-
No-Hole Ferrule - Blank	No hole	-	072670
2-Hole Ferrule	2 x 0.5 mm	-	-
	2 x 0.8 mm	-	072674
¼" Fitting – All ferrules supplied in packets of 10			

Expert Tip :
Always re-tighten Graphite / Vespel® ferrules by ¼ to ½ turn after the first 2-3 oven cycles.

Ferrule Style	Hole ID	100% Graphite	15% Graphite / 85% Vespel®
¼" Fitting – All ferrules supplied in packets of 10			
Straight (hole ID matches the nominal size of the fitting)	¼"	072621	072667
Sealing Ring	¼"	0726003	072651
Reducing Ferrule (hole ID smaller than the nominal size of fittings)	0.5 mm	-	0726660
	1/16"	0726282	072673
	1/8"	0726281	072668
	5/16"	-	-
	6.0 mm	0726212	0726673
Reducing Ferrule - Short	1/8"	0726151	-
	5/16"	0726212	-
	6.0 mm	072604	-
No-Hole Ferrule - Blank	No hole	-	072666

Unions

SGE Unions are available in two material types: stainless steel and glass-lined stainless steel (GLT™ lined unions).

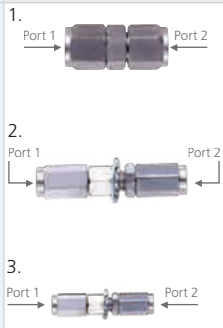
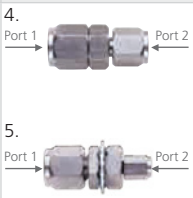
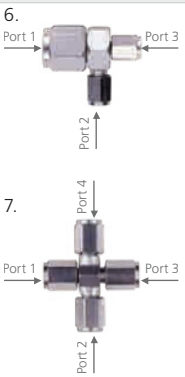
- Stainless steel unions come in a variety of tube sizes and configurations for example: straight through, reducing, tees, crosses and bulkheads.
- GLT™ unions are inert and mainly used for connecting fused silica tubing of various internal diameters.

All SGE unions are supplied with the appropriate nuts, ferrules and/or sealing rings.

Note: If unions are supplied with a "short" nut they can be converted into an "extended" nut. Replacement ferrules would then be standard ferrules, rather than the supplied short ferrules or sealing rings.

Stainless Steel Nut
Uses reducing ferrule - short or Graphite Ring

Extended Stainless Steel Nut

Union Types	1. Straight Through Unions. 2. Bulkhead Unions. 3. Bulkhead Mini Unions.	4. Reducing Unions. 5. Reducing Bulkhead Unions.	6. Union Tees. 7. Union Cross.	8. Glass Lined Mini Unions.	9. SilTite™ Mini Unions.
Images					

Union Types	1. Straight Through Unions. 2. Bulkhead Unions. 3. Bulkhead Mini Unions.	4. Reducing Unions. 5. Reducing Bulkhead Unions.	6. Union Tees. 7. Union Cross.	8. Glass Lined Mini Unions.	9. SilTite™ Mini Unions.
Material Characteristics	• Available in Stainless steel or Glass lined (GLT™) Stainless steel.	• Stainless steel.	• Stainless steel.	• Glass Lined (GLT™) Stainless Steel.	• Glass Lined (GLT™) Stainless Steel. • SilTite™ Mini Union utilize the SilTite™ technology – coupling SilTite™ ferrules with SilTite™ nuts.
Connections Suitable	• Connecting tubing of the same diameter. • Glass lined tubing (GLT™) and plastic tubing.	• For connecting tubing of different diameters. • Suitable for glass lined tubing (GLT™), metal and plastic tubing.	• Union tees have the ability to have different size legs for different size tubing.	• Connecting fused silica and capillary tubing. • Tubing of different sizes can also be connected. However, mini union ferrules for the tubing that is different than the normal usage need to be purchased separately.	• Recommended as the best option for attaching fused silica tubing in the laboratory. • Please note that standard Mini Union nuts cannot be used with SilTite™ ferrules.
Features, Benefits and Applications	• Low dead volume. • Non-swaging, easy to remove fittings that will not deform tubing. • High temperature operations - ferrules are the temperature limiting component.	• Non-swaging, easy to remove fittings that will not deform tubing. • No back ferrule required. • Gives greater flexibility with regards to micro-control valves. • Suitable for glass lined (GLT™), metal and plastic tubing.	• Allows splitting of the flow between two or more outlets. • Suitable for glass lined (GLT™), metal and plastic tubing. • Non-swaging, easy to remove fittings that will not deform tubing. • No back ferrule required. • The male/female tees can be stacked in order to make a manifold of 1/16" tubing which can be used for drying samples or splitting sample stream to multiple outlets.	• Inert due to glass lining. • Smaller in size than standard 1/16" unions, less of a heat sink and do not put extra weight on fused silica tubing connections. • Fused silica connections due to the reduced weight and thermal mass.	• Allows for tubing to be connected without concern of leakage from temperature cycling or fear of getting pieces of the ferrule stuck inside the tubing.
Sizes available	• 1/16" to 1/4".	• 1/16" to 1/8" to 1/4".	• SGE produces four different Tee configurations: 1) all 1/16", 2)1 leg 1/8" and two legs 1/16", 3) 1 leg 1/4" and two legs 1/16" and 4) 1 leg 1/16" and two legs 1/8". • The union cross is a four port union all set up to connect 1/16" tubing.	• 0.4 mm ID (for use with tubing <0.25 mm ID). • 0.5 mm ID (for use with tubing 0.32 mm ID). • 0.8 mm ID (for use with tubing 0.45 and 0.53 mm ID).	• 0.4 mm ID (for use with tubing < 0.25 mm ID). • 0.5 mm ID (for use with tubing 0.32 mm ID). • 0.8 mm ID (for use with tubing 0.45 and 0.53 mm ID). • 1/32".

Straight Through Unions

Port 1 ID	Port 2 ID	Ferrule Type, ID and Part No.	Supplied with	Nut Type ID and Part No.	Use with Tubing ID Sizes	Use with Tubing OD Sizes	Part No.
Stainless Steel							
1/8"	1/8"	1/8" ID (072602)	5 ferrules and 2 nuts	1/8" ID (103402)	Any ID up to the OD of the tubing	1/8"	101310
1/16"	1/16"	1/16" (072603)	5 ferrules and 2 nuts	–	Any ID up to the OD of the tubing	1/16"	103330
1/16"	1/16"	Not supplied	2 nuts	SSN-16 (103403)	Any ID up to the OD of the tubing	1/16"	1033301
1/4"	1/4"	1/4" GFF (072601)	5 ferrules and 2 nuts	1/4" ID (103401)	Any ID up to the OD of the tubing	1/4"	101270
Glass Lined							
0.4 mm	0.4 mm	0.5 mm ID (072627)	5 ferrules and 2 nuts	103405	0.1 – 0.25 mm	0.32 to 0.36 mm	103419
0.5 mm	0.5 mm	0.5 mm ID (072627)	5 ferrules and 2 nuts	103405	0.32 mm	0.43 mm	103420
0.8 mm	0.8 mm	0.8 mm ID (072626)	5 ferrules and 2 nuts	103405	0.45 – 0.53 mm	0.68 mm	1034200

Bulkhead Unions

Description	Port 1 ID	Port 2 ID	Ferrule Type, ID & Part No.	Nut Type ID & Part No.	Supplied with	Use with Tubing ID Sizes	Use with Tubing OD Sizes	Part No.
VSLNU without Chamfer (Attaches Two Pieces of Fused Silica Tubing)								
SGE GC Union Bulkhead Stainless Steel w/ Locknut, for 1/8"	1/8"	1/8"	1/8" ID (072602)	1/8" ID (103402)	5 ferrules, 2 nuts	–	1/8" OD	101320
SGE GC Union Bulkhead Stainless Steel w/ Locknut, for 1/16"	1/16"	1/16"	1/16" ID (072603)	1/16" ID (103403)	5 ferrules, 2 nuts	–	1/16" OD	101340
SGE Bulkhead Union with glass lining of 0.4 mm ID	0.4 mm	0.4 mm	0.4 mm ID (072663)	(103405) or (103408)	2 ferrules, 2 nuts	From 0.1 – 0.25 mm ID to 0.1 – 0.25 mm ID	From 0.32 – 0.36 mm OD	1236302
SGE Bulkhead Union with glass lining of 0.5 mm ID	0.5 mm	0.5 mm	0.5 mm ID (072654)	(103405) or (103408)	2 ferrules, 2 nuts	0.32 mm ID	0.43 mm OD	1236300
SGE Bulkhead Union with glass lining of 0.8 mm ID	0.8 mm	0.8 mm	0.8 mm ID (072655)	(103405) or (103408)	2 ferrules, 2 nuts	From 0.1 – 0.25 mm ID to 0.45 – 0.53 mm ID	From 0.32 – 0.36 to 0.68 mm OD	1236306

Bulkhead Mini-Unions

Port 1 ID	Port 2 ID	Ferrule Type, ID & Part No.	Nut Type ID & Part No.	Supplied with	Use with Tubing ID Sizes	Use with Tubing OD Sizes	Part No.
0.5 mm	0.5 mm	0.5 mm ID (072630)	1.2 mm ID (103400)	5 ferrules, 2 nuts	0.32 mm ID	0.43 mm OD	103427
0.8 mm	0.8 mm	0.8 mm ID (072629)	1.2 mm ID (103400)	5 ferrules, 2 nuts	0.45 – 0.53 mm ID	0.68 mm OD	103428

Reducing Unions

Port 1 ID	Port 2 ID	Ferrule Type, ID & Part No.	Nut Type ID & Part No.	Use with Tubing OD Sizes	Part No.
1/4"	1/16"	1/16" ID (072603), 1/4" ID (072601)	1/16" ID (103403), 1/4" ID (1034030)	1/16"	103451
1/4"	1/16"	1/16" ID (072603), 1/4" ID (072601)	1/4" ID (103401), 1/16" ID (103403)	1/16" and 1/4"	101230
1/4"	1/8"	1/8" ID (072602), 1/4" ID (072601)	1/4" ID (103401), 1/8" ID (103402)	1/8" and 1/4"	101250
1/8"	1/16"	1/16" ID (072603), 1/8" ID (072602)	1/16" ID (103403), 1/8" ID (103402)	1/16" and 1/8"	101290

Reducing Bulkhead Unions

Description	Port 1 ID	Port 2 ID	Ferrule Type, ID & Part No.	Nut Type ID & Part No.	Use with Tubing OD Sizes	Part No.
SGE GC Union Bulkhead Stainless Steel w/Locknut 1/8" to 1/16"	1/8"	1/16"	1/16" ID (072603) and 1/8" ID (072602)	1/8" ID (103402) and 1/16" ID (103403)	1/8" and 1/16" OD	101300

Union Tees

Port 1 ID	Port 2 ID	Port 3 ID	Ferrule Type, ID & Part No.	Nut Type ID & Part No.	Use with Tubing OD Sizes	Part No.
1/16"	1/16"	1/16"	1/16" ID (072603)	1/16" ID (103403)	1/16" OD	103418
1/8"	1/16"	1/16"	1/8" ID (072602), 1/16" ID (072603)	1/16" ID (103403), 1/8" ID (103402)	1/8" and 1/16" OD	1034180
1/8"	1/8"	1/16"	1/8" ID (072602), 1/16" ID (072603)	1/16" ID (103403), 1/8" ID (103402)	1/8" and 1/16" OD	1034181
1/4"	1/16"	1/16"	1/16" ID (072603), 1/4" ID (072601)	1/4" ID (103401), 1/16" ID (103403)	1/16" and 1/4" OD	1034183

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Union Cross

All Ports	Ferrule Type ID & Part No.	Nut Type, ID & Part No.	Ferrule Type, ID & Part No.	Nut Type, OD & Part No.	Part No.
1/16"	1/16" ID (072603)	1/16" ID (103403)	Any ID up to the OD of the tubing	1/16" OD	1034187

Glass Lined Mini Unions

Port 1 ID	Port 2 ID	Ferrule Type, ID & Part No.	Nut Type ID & Part No.	Column ID Size	Use with Tubing OD Sizes	Part No.
0.3 mm	0.3 mm	0.3 mm ID (072695)	1.2 mm ID (103400)	0.025 – 0.15 mm ID	0.22 – 0.285 mm OD	103430
0.4 mm	0.4 mm	0.4 mm ID (072696)	1.2 mm ID (103400)	0.1 – 0.25 mm ID	0.32 – 0.36 mm OD	103431
0.5 mm	0.5 mm	0.5 mm ID (072697)	1.2 mm ID (103400)	0.1mm, 0.25 mm and 0.36 mm	From 0.32 – 0.36 to 0.43 mm OD	103432
0.8 mm	0.8 mm	0.8 mm ID (072698)	1.2 mm ID (103400)	From 0.1 – 0.25 mm ID to 0.45 – 0.53 mm ID	From 0.32 – 0.36 to 0.68 mm OD	103433

The Mini Unions require the use of a 3/16" wrench for tightening since trying to set the ferrules properly with even a small adjustable wrench will lead to leaks or broken tubing. This wrench is available from SGE (Part Number 18500002).

SilTite™ Mini Unions

For instrument specific SilTite™ connections, see the Instrument Quick Pick Guide from page 167.

Description	Port 1 ID	Port 2 ID	Ferrule Type, ID & Part No.	Nut Type ID & Part No.	Supplied with	Column ID Size	Use with Tubing OD Sizes	Part No.
SGE GC Ferrule SilTite™ (Metal) Mini Union, 0.25 mm ID Capillary Column.	0.4 mm	0.4 mm	0.4 mm ID (073470)	0.8 mm ID (073553)	5 ferrules, 2 nuts	0.1 – 0.25 mm ID	0.32 to 0.36 mm OD	073550
SGE GC Ferrule SilTite™ (Metal) Mini Union, 0.32 mm ID Capillary Column.	0.5 mm	0.5 mm	0.5 mm ID (073471)	0.8 mm ID (073553)	5 ferrules, 2 nuts	0.32 mm ID	0.43 mm OD	073551
SGE GC Ferrule SilTite™ (Metal) Mini Union, 0.53 mm ID Capillary Column.	0.8 mm	0.8 mm	0.8 mm ID (073472)	0.8 mm ID (073553)	5 ferrules, 2 nuts	0.45 – 0.53 mm ID	0.68 mm OD	073552
SGE GC Ferrule SilTite™ (Metal) Mini Union, 1/32" OD Metal Capillary Column.	1/32"	1/32"	1/32" ID (073219)	0.8 mm ID (073553)	5 ferrules, 2 nuts	Any ID up to the OD of the tubing	1/32" OD metal capillary columns	073554

All nuts used in SGE's fittings can be purchased as replacement parts.

Nuts for SGE Fittings

Standard Stainless Steel

Extended Stainless Steel

SGE has taken special consideration of the design of the connections and nuts for fittings. The nuts and fittings are unique in that the fitting is flat faced and the point of the ferrule is towards the nut. This makes a more robust system since the angled portion of the fitting cannot be damaged.

SGE nuts are made in a variety of:

- Materials - stainless steel, nickel plated brass and brass.
- Lengths - standard and extended.
- Tubing size - 1/16", 1/8" and 1/4" and mini-union.
- Hole sizes - regular or 1.2 mm for capillary columns.
- Configurations to compliment SGE's product range - regular, SilTite™ range and SilTite™ FingerTite range.

For instrument specific nuts please see the Instrument Quick Pick Guide from page 167.

Replacement Nuts

Description	Use with Tubing OD Sizes	Pack Size	Part No.
GC Nut Stainless Steel for SGE normal or short fittings	1/4"	5	103401
GC Nut Stainless Steel for SGE normal or short fittings	1/8"	5	103402
GC Nut Stainless Steel for SGE normal or short fittings	1/16"	5	103403
GC Nut Extended Stainless Steel for SGE long fittings	1/16"	5	103408
GC Nut Extended Stainless Steel for SGE long fittings	up to 1.2 mm	5	103405
GC Nut Extended BRASS for SGE long fittings	up to 1.2 mm	5	103406
Stainless Steel Male Nut	1/16"	5	1034030
Nut Mini-nut for mini-unions from SGE	up to 0.68 mm	5	103400

Replacement SilTite™ Nuts

Description	Use with Tubing OD Sizes	Pack Size	Part No.
SilTite™ Nut 10/32" and 1/16" ID	-	5	073225
SilTite™ Agilent Injector Nut	-	5	073226
SilTite™ Nut Thermo FIN	-	5	073230
SilTite™ Nut Varian	-	5	073231
SilTite™ Nut Shimadzu INJ	-	5	073232
SilTite™ Nut Shimadzu STD Interface	-	5	073233
GC Ferrule SilTite™ (Metal) Nut	up to 0.68 mm	5	073224
GC Ferrule SilTite™ (Metal) Mini-union Nuts for SilTite™ mini-unions only	up to 0.68 mm	5	073553

GC Supplies | Gas Purifiers for GC

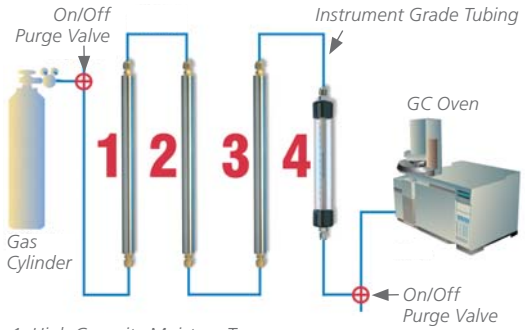
Gas purifiers are an essential part of your GC analysis. Without the appropriate gas purifier, problems such as noisy baselines, moisture entering GC column, excessive bleed, reduced column lifetime and irreproducible results will occur. These problems are created by hydrocarbons, moisture and oxygen in the carrier gases. It is recommended to use individual purifiers to handle each of these typical contaminants.

Which Purifier?

As a minimum requirement for capillary gas chromatography, especially for a new GC, SGE recommends the kit be connected as shown below, consisting of four gas purifiers to remove moisture, contaminating organic substances and oxygen.

The stainless steel bodies are approximately 300 mm long and 23 mm OD. They are designed for use at ambient temperature and at pressures below 100 psi.

Installation of SGE Gas Management System



1. High Capacity Moisture Trap
2. High Capacity Hydrocarbon Trap
3. High Capacity Oxygen Trap
4. Back-up Indicating Oxygen Trap

All traps supplied with 1/8" Swage type fittings, instrument grade tubing and purge valves.

Gas Purifier Kit

Description	Part No.
Essential Gas Purifier Kit Contains: High Capacity Moisture trap High Capacity Hydrocarbon Trap High Capacity Oxygen Trap Back-up Indicating Oxygen Trap	103494

Moisture Purifiers

Under laboratory temperatures and flows normally associated with GC carrier gases i.e. less than 1 L/min, these purifiers can be expected to reduce the moisture in a high purity gas stream to less than 10 ppb and under these conditions are expected to absorb about 12 g of H_2O.

The moisture trap can be used on all Air, Helium, Hydrogen and Nitrogen carrier gas lines.

Description	Fitting Size	Code	Part No.
Moisture Trap	1/8"	GF-MS	103487
Moisture Trap	1/4"	GF-MS	103480

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For use with Packed GC Columns – Refillable Gas Purifiers

Description	Fitting Size	Code	Part No.
Indicating Molecular Sieve – Purifier	1/8"	GF-IMS	103495
Indicating Molecular Sieve – Refill Kit 250 cc	n/a	GF-IMS	1034950

Transparent outer casing (approximately 32 mm OD x 280 mm long) allows lifetime to be gauged from indicator (not recommended for high resolution capillary chromatography).

Hydrocarbon Traps

The trap capacity depends on the overall molecular weight of the contamination. Typically at 1 L/min, C4 hydrocarbons should be less than 15 ppb. The Hydrocarbon trap absorbs hydrocarbon contaminants in the carrier gas. It has an impervious outer stainless steel casing and can remove hydrocarbons to achieve a level as low as 15 ppb.

Description	Fitting Size	Code	Part No.
Hydrocarbon Trap	1/8"	GF-MSX	103488
Hydrocarbon Trap	1/4"	GF-MSX	103481

Ideal for non-critical applications such as hydrogen combustion gas lines (not recommended for high resolution capillary chromatography).

Description	Fitting Size	Code	Part No.
Activated Charcoal – Purifier	1/8"	GF-C100	103485
Activated Charcoal – Refill Kit 250 cc	n/a	GF-C100	1034850

Oxygen Scrubbers

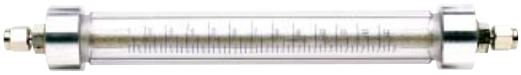
At flows of 1 L/min or less, of high purity gas (hydrogen, helium, and nitrogen) at laboratory temperatures, these scrubbers are expected to produce carrier gas containing less than 15 ppb of oxygen. The oxygen traps can also remove small amounts of water without affecting the oxygen capacity. When used in conjunction with an indicating oxygen trap (GF-IOT), the oxygen content at the GC can be as low as 2 ppb.

Description	Fitting Size	Code	Part No.
Oxygen Trap	1/8"	GF-O	103486
Oxygen Trap	1/4"	GF-O	103482

Used separately, the oxygen trap can remove oxygen to achieve a level as low as 15 ppb. The trap has an outer stainless steel casing.

Indicating Oxygen Trap

The Oxygen Indicating trap is used in conjunction with the oxygen trap, indicating when it needs to be changed.



Description	Fitting Size	Code	Part No.
Indicating Oxygen Trap	1/8"	GF-IOT	103491

Split Vent Trap

Prevents toxic gases entering the atmosphere from the GC split vent.

Description	Fitting Size	Code	Part No.
Molecular Sieve	1/16"	AT-P	0932184

Instrument Quick Pick for Agilent Technologies

Autosampler Syringes

All needles are 42 mm long with a cone point.

Agilent 7673, 7683 & 6850 ALS

Volume	Needle Gauge (OD mm)	Syringe Code	Syringe Part No.	Pack Size	Spare Needle Part No.	Pack Size	Spare Plunger Part No.	Pack Size
Fixed Tapered Needle								
5 µL	23-26s (0.63/0.47)	5F-AG-0.63/0.47C	001821	1	–	–	–	–
10 µL	23-26s (0.63/0.47)	10F-AG-0.63/0.47C	002821	1	–	–	–	–
10 µL Gas Tight	23-26s (0.63/0.47)	10F-AG-GT-0.63/0.47C	002826	1	–	–	031808	2
Fixed Straight Needle								
5 µL	26 (0.47)	5F-AG-0.47C	001800	1	–	–	–	–
5 µL(M)	23 (0.63)	5F-AG-0.63C	001810	1	–	–	–	–
10 µL	26 (0.47)	10F-AG-0.47C	002800	1	–	–	–	–
10 µL(M)	23 (0.63)	10F-AG-0.63C	002810	1	–	–	–	–
10 µL(M) Gas Tight	23 (0.63)	10F-AG-GT-0.63C	002812	1	–	–	031808	2
Removable Tapered Needle								
0.5 µL	23-26s (0.63/0.47)	0.5BR-AG-0.63/0.47C	000415	1	033730	1**	–	–
5 µL	23-26s (0.63/0.47)	5R-AG-0.63/0.47C	001825	1	036730	2	–	–
10 µL	23-26s (0.63/0.47)	10R-AG-0.63/0.47C	002825	1	037730	2	–	–
10 µL Gas Tight	23-26s (0.63/0.47)	10R-AG-GT-0.63/0.47C	002829	1	037730	2	031809	2
Removable Straight Needle								
0.5 µL	26 (0.47)	0.5BR-AG-0.47C	000400	1	033708	1**	–	–
0.5 µL (M)	23 (0.63)	0.5BR-AG-0.63C	000410	1	033715	1**	–	–
1 µL	23 (0.63)	1BR-AG-0.63C	000610	1	034715	1**	–	–
5 µL	26 (0.47)	5R-AG-0.47C	001805	1	036710	2	–	–
5 µL (M)	23 (0.63)	5R-AG-0.63C	001815	1	036720	2	–	–
10 µL	26 (0.47)	10R-AG-0.47C	002805	1	037715	2	–	–
10 µL (M)	23 (0.63)	10R-AG-0.63C	002815	1	037717	2	–	–
10 µL Gas Tight	26 (0.47)	10R-AG-GT-0.47C	002817	1	037715	2	031809	2
10 µL (M) Gas Tight	23 (0.63)	10R-AG-GT-0.63C	002818	1	037717	2	031809	2
Wide Bore Needle (For use with 10 µL syringe only)	23 (0.63/0.15 ID)	N10-AG-0.63(0.15)C	–		037725	2	–	–

(M) Suitable for use with the Merlin Microseal™ Injector. ** Denotes Spare Needle and Plunger kit.

Septa

Instrument	Diameter	Septum Type	Pack Size	Part No.
Agilent Technologies				
7890, 6890, 5890, 5880, 4890 & 6850	11	CS	50	041826
	11	TCS	50	041846
	11	TCS Pre-drilled	50	041856
	11	Auto-Sep™	25	041872
	11	Auto-Sep T™	25	041882
	11	Auto-Sep T™	100	041883
	11	HT	25	041898
	11	EC	25	041902

Agilent Technologies

Septa Continued

Instrument	Diameter	Septum Type	Pack Size	Part No.
5700, 5800 & 5900	9.5	CS	50	0418240
	9.5	TCS	50	0418440
	9.5	TCS Pre-drilled	50	0418540
	9.5	Auto-Sep™	25	041871
	9.5	Auto-Sep T™	25	041880
	9.5	HT	25	041897
	9.5	EC	25	041901
5750, 710, 720, 810 & 7610	12.5	CS	50	041828
	12.5	TCS	50	041848
	12.5	Auto-Sep T™	25	041884
	12.5	HT Pre-drilled	25	0418992
	12.5	EC	25	041906
7620, 5790, 5880 & 5890	5	CS	50	041820
	5	TCS Pre-drilled	50	041850
	5	HT Pre-drilled	25	0418991

Inlet Liners

- Taper / Gooseneck
- FocusLiner™
- Taper Focus
- ConnecTite
- Straight
- Double Taper
- PTV/LVI

Description and Geometry Sketch	OD (mm)	ID (mm)	Length (mm)	Pack Size	Part No.
For Agilent 5890, 6850, 6890, 7890 and HP4890					
Split / Splitless FocusLiner™	6.3	4	78.5	1	09200201
				5	092002
				25	092219
Split / Splitless Tapered FocusLiner™	6.3	4	78.5	1	09200301
				5	092003
				25	092011
Split / Splitless FAST FocusLiner™	6.3	2.3	78.5	1	09200501
				5	092005
				25	092008
Split / Splitless Tapered FAST FocusLiner™	6.3	2.3	78.5	1	09211101
				5	092111
				25	092115
ConnecTite Liner Standard	6.3	4	78.5	1	09232401
				5	092324
ConnecTite Liner Top Hole	6.3	4	78.5	1	09232501
				5	092325
ConnecTite Liner Bottom Hole	6.3	4	78.5	1	09232601
				5	092326
Split, Straight-through Liner	6.3	4	78.5	1	09200701
				5	092007
				25	092222
Spilt, with Quartz Wool	6.3	4	78.5	1	09200101
				5	092001
				25	092220
Split / Splitless with Single Taper	6.3	4	78.5	1	09201701
				5	092017
				25	092229
Split / Splitless with Single Taper (Quartz Wool)	6.3	4	78.5	1	09201901
				5	092019
				25	092218
Split / Splitless with Double Taper	6.3	4	78.5	1	09201801
				5	092018
				25	092230
Direct, Straight-through Liner	6.3	1.2	78.5	1	09201601
				5	092016
				25	092224
Split / Splitless Quartz, Straight-through Liner	6.1	2	78.5	1	09200401
				5	092004
Splitless with Recessed Gooseneck	6.3	2	78.5	1	09201301
				5	092013
Split / Splitless Recessed Gooseneck (Quartz Wool)	6.3	4	78.5	1	09201001
				5	092010
				25	092223

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Inlet Liners Continued

Description and Geometry Sketch	OD (mm)	ID (mm)	Length (mm)	Pack Size	Part No.
For AC Control Injector					
Sim Dist Liner for Programmed Injector	3	1.6	73	1	09221001
				5	092210
				25	092211
For Gerstel CIS 4 Injector					
Sintered Glass. Large Volume Injection (LVI)	3	1.8	71	1	09224301
				5	092243
Single Baffle	3	1.8	71	1	09224601
				5	092246

O-rings

Description	Usage	Pack Size	Part No.
Viton O-Ring	Can be used at temperatures up to 300 °C. Suitable for liners with OD of 6.3 mm.	10	0726532
Graphite Sealing Ring	Can be used at temperatures up to 450 °C. Suitable for all inlet liners above except 092004 and 09200401.	10	0726005
Graphite Sealing Ring	Can be used at temperatures up to 450 °C. Suitable for use with liners 092004 and 09200401.	10	0726006

Ferrules

Instrument	Column ID	Ferrule ID	Pack Size	Part No.
15% Graphite / 85% Vespel® Ferrules				
For Injectors & Detectors at atmospheric pressure e.g. FID	0.1-0.25 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
For GC-MS Interface Connection	0.1-0.25 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 & Detectors at atmospheric pressure e.g. FID (Not for GC-MS)	0.1-0.32 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				
For GC-MS Interface Connection (Starter Kit)	0.1-0.25 mm	0.4 mm	10*	073200
	0.32 mm	0.5 mm	10*	073201
	0.53 mm	0.8 mm	10*	073202
For Split / Splitless Injectors (Starter Kit)	0.1-0.25 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				
For All Connections	0.1-0.25 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				
For GC-MS Interface Connection	_	–	5	073224
For Split / Splitless Injector	_	–	5	073226
Replacement SilTite™ Base Seals				
For Split / Splitless Injector	_	–	2	073400
	_	–	10	073401

* Includes 10 ferrules, 2 SilTite™ nuts. # Includes 10 ferrules, 2 SilTite™ nuts and 2 SilTite™ Inlet Base Seals.

Agilent Technologies

GC Supplies

SilTite™ FingerTite Ferrules

Description		Pack Size	Part No.
Siltite™ Fingertite Agilent INJ / FID Starter Kit		*	073610
Siltite™ Fingertite Agilent Capillary / FID Starter Kit		*	073611
Siltite™ Fingertite Agilent INJ / MS Starter Kit		*	073612
Siltite™ Fingertite Ferrule 0.4 mm	Replacement Items	10	073630
Siltite™ Fingertite Ferrule 0.5 mm	Replacement Items	10	073631
Siltite™ Fingertite Blanking Ferrule	Replacement Items	2	073633
Siltite™ Fingertite Female Nut	Replacement Items	5	073636
Siltite™ Fingertite Agilent INJ Base Seal	Replacement Items	2	073640

** Each starter kit includes all the parts necessary to convert one GC system (one injector and one detector) to the SilTite™ FingerTite system suitable for installing 0.1 – 0.25 mm ID capillary columns. In addition there are 5 SilTite™ FingerTite nuts, one packet (10 ferrules) of 0.4 mm ID SilTite™ FingerTite ferrules and a ferrule install tool which allows you to seat the ferrule in the correct position on the capillary column.*

Electron Multipliers

Instrument	Analyzer Type	Technique	Part No.
Agilent Technologies			
5970 (All)	Quadrupole	GC-MS	14511
5971, 5972, GCD	Quadrupole	GC-MS	14516
5973 (For initial installation - includes mount)	Quadrupole	GC-MS	14617
5973 (Replacement multiplier only)	Quadrupole	GC-MS	14616
5988 (+/- ions)	Quadrupole	GC-MS	14612
5989 no HED	Quadrupole	GC-MS	14613

Instrument Quick Pick for PerkinElmer

PerkinElmer

Autosampler Syringes

All needles are 70 mm long with a cone point style.

PerkinElmer Autosystem

Volume	Needle Gauge (OD mm)	Syringe Code	Syringe Part No.	Pack Size	Spare Needle Part No.	Pack Size	Spare Plunger Part No.	Pack Size
Fixed Needle								
5 µL	26 (0.47)	5F-PE-0.47C	001953	1	–	–	–	–
5 µL	23 (0.63)	5F-PE-0.63C	001954	1	–	–	–	–
5 µL *Gas Tight*	26 (0.47)	5F-PE-GT-0.47C	001955	1	–	–	031807	2
5 µL *Gas Tight*	23 (0.63)	5F-PE-GT-0.63C	001957	1	–	–	031807	2
50 µL	23 (0.63)	50F-PE-0.63C	004670	1	–	–	–	
Removable Needle								
0.5 µL	26 (0.47)	0.5BR-PE-0.47C	000475	1	033750	1**	–	–
0.5 µL	23 (0.63)	0.5BR-PE-0.63C	000478	1	033765	1**	–	–

**Denotes spare Needle and Plunger kit.

Septa

Instrument	Diameter	Septum Type	Pack Size	Part No.
PerkinElmer				
Sigma, 900, 990, 8000series, AutoSystem & Clarus	11	CS	50	041826
	11	TCS	50	041846
	11	TCS Pre-drilled	50	041856
	11	Auto-Sep™	25	041872
	11	Auto-Sep T™	25	041882
	11	Auto-Sep T™	100	041883
	11	HT	25	041898
	11	EC	25	041902

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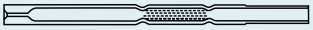
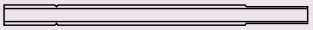
Inlet Liners

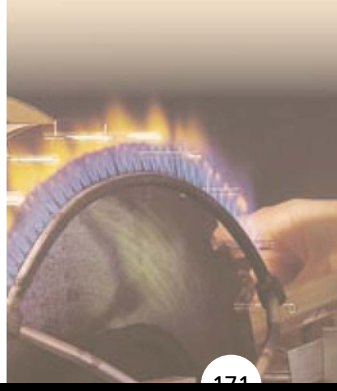
Description and Geometry Sketch	OD (mm)	ID (mm)	Length (mm)	Pack Size	Part No.
For AutoSystem™ & Clarus 500, 600					
Split / Splitless Single Taper liner	6.2	4	92	1	09209901
				5	0920990
				25	092099025
Split / Splitless FocusLiner™	6.2	4	92	1	09209201
				5	092092
				25	09209225
 Split / Splitless Tapered FocusLiner™	6.2	4	92	1	09209501
				5	092095
				25	09209525
 Split, straight-through liner	6.2	4	92	1	09210001
				5	092100
				25	09210025
Splitless, straight-through liner	6.2	2	92	1	09210301
				5	092103
Split / Splitless for PSS injector	4	2	86.2	1	09209801
				5	092098
Split / Splitless FocusLiner™ for PSS injector	4	2	86.2	1	09210101
				5	092101
Large Volume Injection (LVI) liner for PSS injector, sintered glass	4	2	86.2	1	09224401
				5	092244
Packed Column liner	6	3	112	1	09223601
				5	092236
For 8000 and Sigma series					
Split / Splitless	5	3	100	1	09209101
				5	092091
Splitless with single taper	5	2	100	1	09209401
				5	092094
PTV Liner					
PTV liner with 0.25 mm ID restriction (recessed gooseneck)	2	1	88	1	09209701
				5	092097
For AutoSystem Injectors					
ConnecTite Liner Standard	6.2	4	92	1	09234401
				5	092344
ConnecTite Liner Top Hole	6.2	4	92	1	09234501
				5	092345
ConnecTite Liner Bottom Hole	6.2	4	92	1	09234601
				5	092346

O-rings

Description	Usage	Pack Size	Part No.
Viton O-Ring	Can be used at temperatures up to 300 °C. For use with 6.2 mm OD liners.	10	0726536

Ferrules

Instrument	Column ID	Size of Nut	Ferrule ID	Pack Size	Part No.
15% Graphite / 85% Vespel® Ferrules					
For Injectors & Detectors at atmospheric pressure e.g. FID	0.1-0.25 mm	1/16"	0.4 mm	10	072663
	0.1-0.25 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
	1/8" OD Packed Columns	1/8"	1/8"	10	072669
	1/4" OD Packed Columns	1/4"	1/4"	10	072667



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PerkinElmer

Ferrules Continued

100% Graphite Ferrules					
For Injectors & Detectors at atmospheric pressure e.g. FID (Not for GC-MS)	0.1-0.32 mm	1/16"	0.5 mm	10	072627
	0.1-0.32 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					
For GC-MS Interface Connection (Starter Kit)	0.1-0.25 mm	–	0.4 mm	10*	073200
	0.32 mm	–	0.5 mm	10*	073201
	0.53 mm	–	0.8 mm	10*	073202
Replacement SilTite™ Ferrules					
For GC-MS Interface Connection	0.1-0.25 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	–	–	5	–	073224

*Includes 10 ferrules, 2 SilTite™ nuts.

GC Supplies

SilTite™ FingerTite Ferrules

Description		Column ID	Ferrule ID (mm)	Pack Size	Part No.
PerkinElmer					
Injector/GC-MS		0.1-0.25 mm	0.4	*	073623
Injector/GC-MS		0.1-0.25 mm	0.4	*	073622
Ferrule 0.4 mm	Replacement Items	0.1-0.25 mm	0.4	10	073630
Ferrule 0.5 mm	Replacement Items	0.32 mm	0.5	10	073631
Ferrule Blanking	Replacement Items	–	–	2	073633
Female Nut	Replacement Items	–	–	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 suitable for installing 0.1 – 0.25 mm ID capillary columns. In addition there are 5 SilTite™ FingerTite nuts, one packet (10 ferrules) of 0.4 mm ID SilTite™ FingerTite ferrules and a ferrule install tool which allows you to seat the ferrule in the correct position on the capillary column.*

Instrument Quick Pick for Shimadzu

Shimadzu

Autosampler Syringes

All needles are 42 mm long with a cone point style.

Shimadzu AOC14, AOC17 and AOC20

Volume	Needle Gauge (OD mm)	Syringe Code	Syringe Part No.	Pack Size	Spare Needle Part No.	Pack Size	Spare Plunger Part No.	Pack Size
Fixed Needle								
5 µL	26 (0.47)	5F-S-0.47C	001987	1	–	–	–	
5 µL	23 (0.63)	5F-S-0.63C	001988	1	–	–	–	
250 µL *Gas Tight*	23 (0.63)	250F-S-GT-0.63C	006682	1	–	–	031828	1
Removable Needle								
0.5 µL	26 (0.47)	0.5BR-S-0.47C	000440	1	033738	1**	–	–
0.5 µL	23 (0.63)	0.5BR-S-0.63C	000445	1	033745	1**	–	–
0.5 µL	23-26s (0.63/0.47)	0.5BNR-S-0.63/0.47C	000450	1	033730	1**	–	–
10 µL	26 (0.47)	10R-S-0.47C	002897	1	037745	2	–	–
10 µL	23 (0.63)	10R-S-0.63C	002898	1	037747	2	–	–
10 µL *Gas Tight*	23 (0.63)	10R-S-GT-0.63C	002902	1	037747	2	031798	2

**Denotes spare Needle and Plunger kit.

Septa

Instrument	Septum Type	Pack Size	Part No.
9A, 14, 15A, 16, 17A, 2010 & 2014			
	Enduro Blue	50	041890
	HT	50	041895
	EC	50	041905

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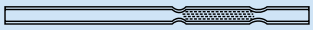
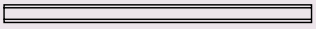
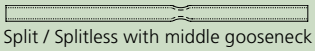
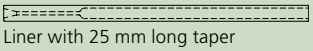
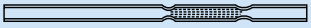
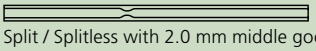
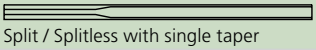
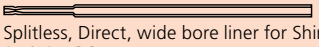
Inlet Liners

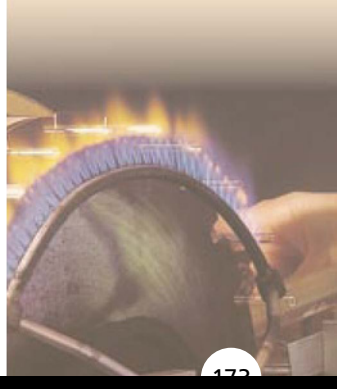
Shimadzu

Description and Geometry Sketch	OD (mm)	ID (mm)	Length (mm)	Pack Size	Part No.
For GC-2010 (SPL-2010 Injector), GC-2014 (SPL-2014 Injector) and GC-17A (SPL-17 Injector)					
Split / Splitless FocusLiner™ *	5	3.4	95	1	09205901
				5	092059
				25	09205925
Split / Splitless Tapered FocusLiner™ *	5	3.4	95	1	09205801
				5	092058
				25	09205825
 Split / Splitless FocusLiner™	5	3.4	95	1	09206201
				5	092062
Split / Splitless Tapered FocusLiner™	5	3.4	95	1	09206801
				5	092068
				25	09206825
 Split, straight-through liner	5	3.4	95	1	09206401
				5	092064
Splitless straight-through liner	5	2.6	95	1	092086101
				5	0920861
Split / Splitless with Single Taper	5	3.4	95	1	09207101
				5	092071
 Split / Splitless with middle gooseneck	5	3.4	95	1	09207701
				5	092077
				25	09207725
Split / Splitless with recessed gooseneck and quartz wool	5	3.4	95	1	09206101
				5	092061
Split / Splitless with middle gooseneck	5	3.4	95	1	09208501
				5	092085
				25	09208525
 Liner with 25 mm long taper	5	3.4	95	1	09229001
				5	092290
				25	09229025
ConnecTite (0.53 mm ID columns)	5	2.6	95	1	09208701
				5	092087
SPME Liner	5	0.75	95	1	09208901
				5	092089
For GC-14(SPL-14 Injector)					
 Split / Splitless FocusLiner™	5	3.4	99	1	09206501
				5	092065
Split / Splitless Tapered FocusLiner™	5	3.4	99	1	09206601
				5	092066
 Split / Splitless with 2.0 mm middle gooseneck	5	3.4	99	1	09208201
				5	092082
 Split / Splitless with single taper	5	3.4	99	1	092083101
				5	0920831
 Splitless, Direct, wide bore liner for Shimadzu 9A/16A GC	5	3.4	139	1	09208401
				5	092084
ConnecTite Liner Standard	5	3.4	95	1	09232901
				5	092329
ConnecTite Liner Top Hole	5	3.4	95	1	09233001
				5	092330
ConnecTite Liner Bottom Hole	5	3.4	95	1	09233101
				5	092331

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

O-rings and Sealing Rings

Description	Usage	Pack Size	Part No.
Graphite Sealing Ring	Can be used at temperatures up to 450 °C. For 14, 15A & 16 (SPL-14 injector).	10	0726001
Graphite Sealing Ring	Can be used at temperatures up to 450 °C. For 17A (SPL-17 injector).	10	0726007
Viton O-Ring	Can be used at temperatures up to 300 °C. For 2010 & 2014 (SPL-2010 Injector & SPL-2014 Injector).	10	0726533



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Ferrules

Column ID	Description	Pack Size	Part No.
GC14A, GC17A, GC2010 and GC2014 Detector / 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
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 & QP5050 0.10-0.25 mm ID columns	15% Graphite/ 85% Vespel® Ferrules	10	0726561
QP5000-II & 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™ Metal - Initial Installation	10*	073206
0.53 mm ID columns	SilTite™ Ferrules	10	073229
n/a	SilTite™ Metal Nuts-QP5000/5050 Standard MS interface	5	073233
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

* Includes 10 ferrules, 2 SilTite™ nuts.

Replacement Parts

Material	Pack Size	Part No.
Replacement SilTite™ Nuts		
For 2010 GC-MS System	5	073224
For 2010 GC-MS System with QP5000 series MS	5	073224
For 2010/2014 GC Injectors and atmospheric detectors	5	073224
QP5000 Jet Separator MS Interface	5	073224
QP5000 Direct MS Interface	5	073233
For All Injectors Jet Separator (Starter Kit), except 2010/2014	5	073232

SilTite™ FingerTite Ferrules

Description		Pack Size	Part No.
Siltite™ Fingertite Shimadzu 2010 Inj / Fid Starter Kit		*	073620
Siltite™ Fingertite Shimadzu 2010 Inj / Ms Starter Kit		*	073621
Siltite™ Fingertite Ferrule 0.4 mm	Replacement Items	10	073630
Siltite™ Fingertite Ferrule 0.5 mm	Replacement Items	10	073631
Siltite™ Fingertite Blanking Ferrule	Replacement Items	2	073633
Siltite™ Fingertite Female Nut	Replacement Items	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 suitable for installing 0.1 – 0.25 mm ID capillary columns. In addition there are 5 SilTite™ FingerTite nuts, one packet (10 ferrules) of 0.4 mm ID SilTite™ FingerTite ferrules and a ferrule install tool which allows you to seat the ferrule in the correct position on the capillary column.*

Electron Multipliers

MS Description	Analyzer Type	Technique	Part No.
QP5000	Quadrupole	GC-MS	14533

Instrument Quick Pick for Thermo Scientific

Autosampler Syringes for Thermo Scientific / CE Instruments / Fisons

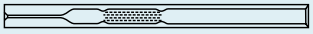
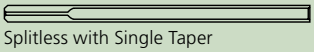
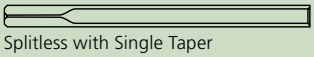
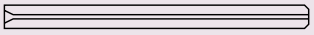
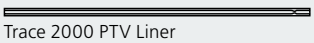
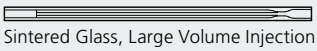
All needles have a cone point style.

AUTOSAMPLER				NEEDLE SPECIFICATIONS						
TriPlus	AS3000	AS2000	AS200/800	Volume	Length (mm)	Gauge	Syringe Code	Syringe Part No.	Needle Part No.	Pack Size
Fixed Needle										
•				5 µL	50	26 (0.47)	5FX-5C	001105	–	–
•		•		10 µL	50	23 (0.63)	10F-C/T-GT-5/0.63C	002987	–	–
•		•		10 µL	80	23 (0.63)	10F-C/T-8/0.63C	002989	–	–
•		•		10 µL	80	26 (0.47)	10F-C/T-8/0.47C	002992	–	–
•	•	•	•	10 µL	50	25 (0.50)	10F-C/T-5/0.50C	002967	–	–
•	•	•	•	10 µL	50	23 (0.63)	10F-C/T-5/0.63C	002981	–	–
•	•	•	•	10 µL	50	26 (0.47)	10F-C/T-5/0.47C	002980	–	–
Removable Needle										
•	•	•		10 µL	50	26 (0.47)	10R-C/T-5/0.47C	002982	037785	2
•	•	•	•	10 µL	50	23 (0.63)	10R-C/T-5/0.63C	002984	037787	2
•		•	•	10 µL	80	26 (0.47)	10R-C/T-8/0.47C	002993	031535	3
•	•			0.5 µL	50	26 (0.47)	0.5BNR-C/T-5/0.47C	000490	033770	–
•	•			0.5 µL	50	23 (0.63)	0.5BNR-C/T-5/0.63C	000492	033772	–

Septa

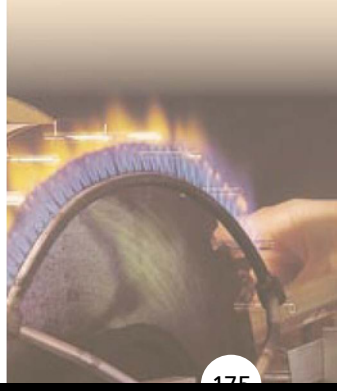
Instrument	Diameter (mm)	Septum Type	Pack Size	Part No.
8000 Series, FOCUS, Trace/ULTRA GC™	17	TCS	50	0418491
	17	Auto-Sep T™	25	041886
	17	HT	25	0418990
	17	EC	25	041903

Inlet Liners

Description and Geometry Sketch	OD (mm)	ID (mm)	Length (mm)	Pack Size	Part no.
For TRACE™ and Focus™					
 Splitless FocusLiner™ (for use with 70 mm Needle)	8	5	105	1	09204501
				5	092045
Splitless FocusLiner™ with Top-end Restriction (for use with 70 mm Needle)	8	5	105	1	09204601
				5	092046
				25	09204625
Split FocusLiner™ (for use with 50 mm Needle)	8	5	105	1	09204801
				5	092048
Splitless FocusLiner™ (for use with 50 mm Needle)	8	5	105	1	09204901
				5	092049
 Splitless with Single Taper	8	3	105	1	09214101
				5	092141
				25	09214125
 Splitless with Single Taper	8	5	105	1	09214401
				5	092144
				25	09214425
Splitless, Straight-through Liner	8	3	105	1	09214701
				5	092147
				25	09214725
 SPME Liner	8	0.8	105	1	09214801
				5	092148
Split, Straight-through Liner	8	5	105	1	0921501
				5	092150
				25	09215025
 Trace 2000 PTV Liner	2.75	1.75	120	1	09214201
				5	092142
				25	09214225
 Sintered Glass, Large Volume Injection (LVI) Liner	2.75	0.78/1.8	120	1	09215501
				5	092155
				25	09215525

For inlet liners to suit Finnigan 9001 and GCQ GCs, see the Agilent Liners page 168.

- Taper / Gooseneck
- FocusLiner™
- Taper Focus
- ConnecTite
- Straight
- Double Taper
- PTV/LVI



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Inlet liners Continued

Description and Geometry Sketch	OD (mm)	ID (mm)	Length (mm)	Pack Size	Part no.
ConnecTite Liner Standard	8	5	105	1	09233401
				5	092334
ConnecTite Liner Top Hole	8	5	105	1	09233501
				5	092335
ConnecTite Liner Bottom Hole	8	5	105	1	09233601
				5	092336

Sealing Rings

Description	Usage	Pack Size	Part No.
Graphite Sealing Ring	8 mm ID. For 8000 & TRACE GCs.	10	0726004

Ferrules

Instrument	Column ID	Ferrule ID	Pack Size	Part No.
15% Graphite / 85% Vespel® Ferrules				
For All Injectors & Detectors (Not for 8000 Series, Focus, Trace/Ultra GC)	0.1-0.25 mm	0.4 mm	10	0726549
	0.32 mm	0.5 mm	10	0726557
	0.53 mm	0.8 mm	10	0726548
	1/8" OD Packed Columns	1/8"	10	072669
	1/4" OD Packed Columns	1/4"	10	072667
For All Focus, Trace/Ultra Injectors & Detectors at atmospheric pressure e.g. FID (Not for GC-MS)	0.1-0.25 mm	0.4 mm	10#	072696
	0.32 mm	0.5 mm	10#	072697
	0.53 mm	0.8 mm	10#	072698
Brass Nut for Focus, Trace/Ultra GC Injectors & Non-MS Detectors			2	1034085
100% Graphite Ferrules				
For Injectors & Detectors at atmospheric pressure e.g. FID (Not for GC-MS)	0.1-0.32 mm	0.5 mm	10	072619
	0.45-0.53 mm	0.8 mm	10	072614
	1/8" OD Packed Columns	1/8"	10	072622
	1/4" OD Packed Columns	1/4"	10	072621
SilTite™ Metal Ferrules				
For GC-MS Interface Connections (Starter Kit)	0.1-0.25 mm	0.4 mm	10*	073450
	0.32 mm	0.5 mm	10*	073451
	0.53 mm	0.8 mm	10*	073452
	1/32"	0.81 mm	10*	073453
Replacement SilTite™ Metal Ferrules				
For All GC-MS Interface Connections	0.1-0.25 mm	0.4 mm	10	073330
	0.32 mm	0.5 mm	10	073331
	0.53 mm	0.8 mm	10	073332
	1/32"	0.81 mm	10	073333
Replacement SilTite™ Nuts				
			5	073230

To be used in combination with brass nut (Part No. 1034085) * Includes 10 ferrules, 2 SilTite™ nuts.

SilTite™ FingerTite Ferrules

Description	Column ID	Ferrule ID (mm)	Pack Size	Part No.
Thermo (Available from SGE on 1/1/2011)				
Injector/GC-MS (non-ISQ)	0.1-0.25 mm	0.4	*	073616
Injector/GC-MS ISQ	0.1-0.25 mm	0.4	*	073615
Injector/FID	0.1-0.25 mm	0.4	*	073614
Ferrule 0.4 mm	0.1-0.25 mm	0.4	10	073630
Ferrule 0.5 mm	0.32 mm	0.5	10	073631
Ferrule Blanking	–	–	2	073633
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 suitable for installing 0.1 – 0.25 mm ID capillary columns. In addition there are 5 SilTite™ FingerTite nuts, one packet (10 ferrules) of 0.4 mm ID SilTite™ FingerTite ferrules and a ferrule install tool which allows you to seat the ferrule in the correct position on the capillary column.*

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Electron Multipliers

Thermo Scientific

MS Description	Analyzer Type	Technique	Part No.
DSQ (Replacement multiplier)	Quadrupole	GC-MS	14633
Polaris-Q (Replacement multiplier only)	Ion Trap	GC-MS	14633
ITQ (Replacement multiplier only)	Ion Trap	GC-MS	14633
ISQ (Replacement multiplier only)	Quadrupole	GC-MS	14633

Instrument Quick Pick for Varian / Bruker

Autosampler Syringes

Varian / Bruker

Volume	Length	Needle Gauge (OD mm)	Tip Style	Syringe Code	Syringe Part No.	Pack Size	Needle Part No.	Pack Size	Plunger Part No.	Pack Size
Varian/Bruker 8035, 8100 and 8200										
Fixed Needle										
10 µL Gas Tight	53	25 (0.5)	S/Hole	10F-GT-VA8X-II	002923	1	–	–	031218	1
Removable Needle										
1 µL*	51	26 (0.47)	Cone	1BR-VA8X	000655	1	034720	1**	–	–
10 µL Gas Tight	53	25 (0.5)	S/Hole	10R-GT-VA8X-II	002924	1	037777	1	031218	1
Needle Alternatives for P/N 002924										
	50	25 (0.5)	Bevel	N10-VA8035-II	–	1	037776	2	–	–
	105	–	OC	N10-VA8035-0.17-II	–	1	037778	2	–	–
	53	23 (0.63)	S/Hole	N10-VA8X00H-0.63-II	–	1	037779	2	–	–
	53	25 (0.5)	S/Hole	N10-VA800H-II(0.2)	–	1	037780	1	–	–
100 µL Gas Tight	53	25 (0.5)	S/Hole	100R-GT-VA8X	005921	1	038745	1	031824	1
Varian/Bruker CP-8400/8410, CP-9010/9050										
Fixed Needle										
10 µL	50	26 (0.47)	Bevel	10F-VA8400-5/0.47	002950	1	–	–	–	–
10 µL	50	23 (0.63)	Cone	10F-C/T-5/0.63C	002981	1	–	–	–	–
Removable Needle										
10 µL	50	26 (0.47)	Cone	10R-C/T-5/0.47C	002982	1	037785	2	–	–

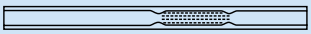
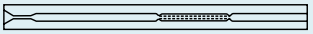
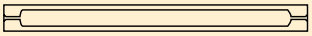
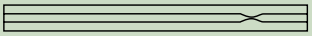
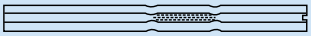
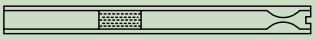
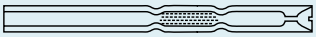
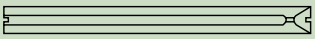
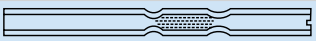
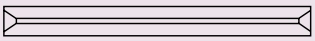
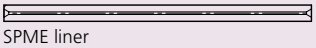
*Not suitable for 8200 autosampler. **Denotes Plunger and Needle Kit.

Septa

Instrument	Diameter	Septum Type	Pack Size	Part No.
Varian/Bruker				
1177 Injector	9	CS	50	041824
	9	TCS	50	041844
	9	TCS Pre-drilled	50	041854
	9	Auto-Sep T™	25	041879
	9	HT	25	041896
	9	EC	25	041900
1040, 1041, 1060 & 1061 Injectors	9.5	CS	50	0418240
	9.5	TCS	50	0418440
	9.5	TCS Pre-drilled	50	0418540
	9.5	Auto-Sep™	25	041871
	9.5	Auto-Sep T™	25	041880
	9.5	HT	25	041897
	9.5	EC	25	041901

Varian / Bruker

Inlet Liners

Description and Geometry Sketch	OD (mm)	ID (mm)	Length (mm)	Pack Size	Part no.
For 1177 Injector					
 Split / Splitless FocusLiner™	6.3	4	78.5	1	09200201
				5	092002
				25	092219
Split / Splitless Tapered FocusLiner™	6.3	4	78.5	1	09221901
				5	092003
				25	092011
Split / Splitless FAST FocusLiner™	6.3	2.3	78.5	1	09200501
				5	092005
				25	092008
 Split / Splitless Tapered FAST FocusLiner™	6.3	2.3	78.5	1	09211101
				5	092111
				25	092115
Split, straight-through liner	6.3	4	78.5	1	09200701
				5	092007
				25	092222
Spilt, with quartz wool	6.3	4	78.5	1	09200101
				5	092001
				25	092220
Split / Splitless with single taper	6.3	4	78.5	1	09201701
				5	092017
				25	092229
Split / Splitless with single taper (quartz wool)	6.3	4	78.5	1	09201901
				5	092019
				25	092218
 Split / Splitless with double taper	6.3	4	78.5	1	09201801
				5	092018
				25	092230
Direct, straight-through liner	6.3	1.2	78.5	1	09201601
				5	092016
				25	092224
 Splitless with Recessed Gooseneck	6.3	2	78.5	1	09201301
				5	092013
Split / Splitless Recessed Gooseneck (quartz wool)	6.3	4	78.5	1	09201001
				5	092010
				25	092223
For 1075/1077 Injector					
 Split, FAST FocusLiner™	6.3	2.3	72	1	09211301
				5	092113
 Split with Quartz Wool	6.3	4	72	1	09202101
				5	092021
				25	09222125
 Split FocusLiner™ with Top-end Restriction	6.3	4	72	1	09202801
				5	092028
Splitless FocusLiner™ with Top-end Restriction	6.3	4	74	1	09202601
				5	092026
Split, Tapered FocusLiner™	6.3	4	72	1	09202501
				5	092025
 Splitless, Slots at Both Ends	6.3	2	74	1	09202401
				5	092024
				25	092228
 Split FocusLiner™	6.3	4	72	1	09202201
				5	092022
For 1078/1079 Injector					
Sintered Glass, Large Volume Injection (LVI) Liner	5	1.8/3.4	54	1	09224501
				5	092245
				25	09224525
 Straight-through Liner	5	0.5	54	1	09203101
				5	092031
 SPME liner	5	0.75	54	1	09211701
				5	092117

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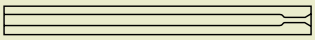
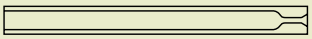
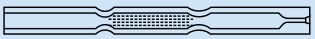
 Splitless with Single Taper	5	2	54	1	09203901
				5	092039
 Split / Splitless with single taper	5	3.4	54	1	09203801
				5	092038
				25	09203825
 Split / Splitless FocusLiner™	5	3.4	54	1	09203701
				5	092037
				25	09203725
Split / Splitless Tapered FocusLiner™	5	3.4	54	1	09203601
				5	092036
				25	09203625
For 1093/1094 Injector					
ConnecTite SPI Liner, (Restriction = 0.25 mm)	4.6	0.5	54	1	09202701
				5	092027
ConnecTite SPI Liner, (Restriction = 0.5 mm) for 0.53 mm ID On-column	4.6	0.8	54	1	09203401
				5	092034
				25	09203425
ConnecTite SPI Liner, (Restriction = 0.25 mm)	4.6	0.8	54	1	09203001
				5	092030
For 1075/1079 Injector					
ConnecTite Liner Standard	6.3	4	72	1	09233901
				5	092339
ConnecTite Liner Top Hole	6.3	4	72	1	09234001
				5	092340
ConnecTite Liner Bottom Hole	6.3	4	72	1	09234101
				5	092341

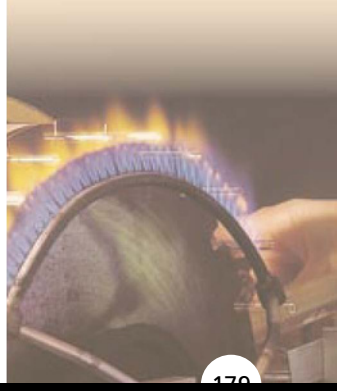
O-rings and Sealing Rings

Description	Usage	Pack Size	Part No.
Viton O-Ring for 1177 Injector	Can be used at temperatures up to 300 °C.	10	0726532
Graphite Sealing Ring for 1075 & 1077 Injectors		10	072601
Graphite Sealing Ring for 1078 & 1079 Injectors		10	0726217

Ferrules

Instrument	Column ID	Ferrule ID	Pack Size	Part No.
15% Graphite / 85% Vespel® Ferrules				
For GC-MS & Detectors at atmospheric pressure e.g. FID	0.1-0.25 mm	0.4 mm	10	072663
	0.32 mm	0.5 mm	10	072654
	0.53 mm	0.8 mm	10	072655
Packed Columns	1/8" OD Packed Columns	1/8"	10	072669
	1/4" OD Packed Columns	1/4"	10	072667
100% Graphite Ferrules				
For Injectors & Detectors at atmospheric pressure e.g. FID	0.1-0.32 mm	0.5 mm	10	072627
	0.45-0.53 mm	0.8 mm	10	072626
	1/8" OD Packed Columns	1/8"	10	072622
	1/4" OD Packed Columns	1/4"	10	072621
SilTite™ Metal Ferrules				
For GC-MS Interface Connections (Starter Kit)	0.1-0.25 mm	0.4 mm	10*	073300
	0.32 mm	0.5 mm	10*	073301
	0.53 mm	0.8 mm	10*	073302
	1/32"	0.81 mm	10*	073303
Nuts for Varian Injector				
			2	1034060

* Includes 10 ferrules, 2 SilTite™ nuts.



Varian / Bruker

Ferrules Continued

Instrument	Column ID	Ferrule ID	Pack Size	Part No.
Replacement SilTite™ Ferrules				
For GC-MS Interface Connections	0.1-0.25 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				
			5	073231

*Includes 10 ferrules, 2 SilTite™ nuts.

GC Supplies

SilTite™ FingerTite Ferrules

Description	Column ID	Ferrule ID (mm)	Pack Size	Part No.
Varian/Bruker				
Injector/GC-MS	0.1-0.25 mm	0.4	*	073619
Injector/FID	0.1-0.25 mm	0.4	*	073618
Ferrule 0.4 mm	0.1-0.25 mm	0.4	10	073630
Ferrule 0.5 mm	0.32 mm	0.5	10	073631
Ferrule Blanking	–	–	2	073633
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 suitable for installing 0.1 – 0.25 mm ID capillary columns. In addition there are 5 SilTite™ FingerTite nuts, one packet (10 ferrules) of 0.4 mm ID SilTite™ FingerTite ferrules and a ferrule install tool which allows you to seat the ferrule in the correct position on the capillary column.*

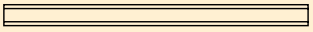
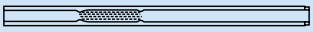
Electron Multipliers

MS Description	Analyzer Type	Technique	Part No.
Saturn (Pre-2000)	Ion trap	GC-MS	14138
Saturn 2000, 2100 & 2200	Ion trap	GC-MS	14147

Instrument Quick Pick for ATAS Optic Injectors

ATAS

Inlet Liners

Description and Geometry Sketch	OD (mm)	ID (mm)	Length (mm)	Pack Size	Part No.
 Straight-through Liner	5	3	81	1	0922701
				5	092270
Frit & Tapered liner	5	3	81	1	09227301
				5	092273
 Split / Splitless FocusLiner™	5	3	81	1	09227201
				5	092272

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