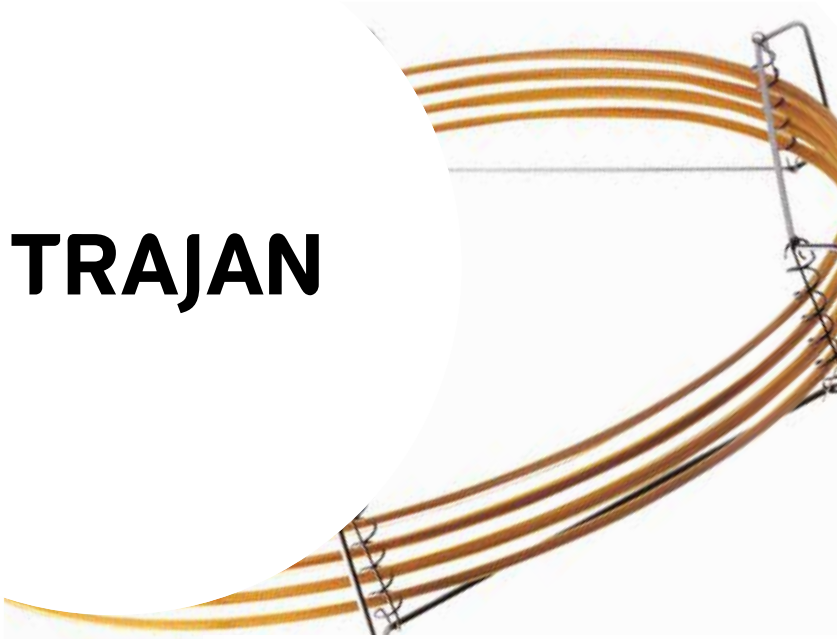








TRAJAN






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TRAJAN



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







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

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

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

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

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SGE Syringes

Please refer to the Syringes for the laboratory brochure.



SGE Inlet liners



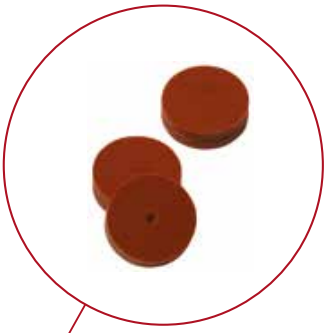
Color	Injection technique	Sample types	Liner geometry
Dark green	Splitless	• Trace level analyses • Active compounds	Taper/gooseneck
Blue	Split	• General purpose • Concentrated samples • Dirty samples	FocusLiner®
Aqua	Splitless	• Trace level analyses • Dirty samples • Wide boiling point range	Tapered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

Connectors and ferrules



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





Septa

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

**Temperature for 11 mm septa only.*



SGE GC columns

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



SilFlow®

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

Septa

Low bleed | Long lifetime



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

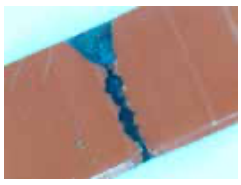
Septa selection

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

Temperature for 11 mm septa only.

Why septa should be replaced regularly:

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



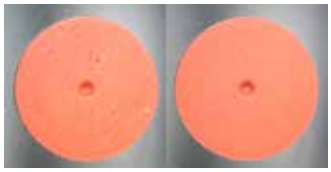


Examples of worn septa.

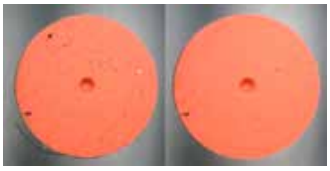
Heat stability and sticking

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

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



Coated MN septa after exposing to dust and wiping.



Uncoated MN septa after exposing to dust and wiping.

Septa for Agilent instruments

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

Septa for PerkinElmer instruments

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

Septa for Shimadzu instruments

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

Septa for Thermo Scientific instruments

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

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

Confidence in your analysis

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

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

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

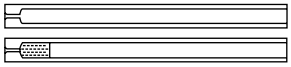
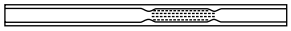
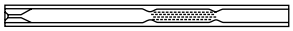
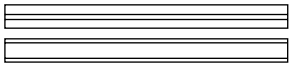
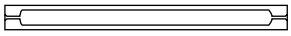
If the volume is too large, sample is lost, impacting reproducibility and sensitivity.



Important considerations when selecting inlet liners:

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

Liner selection guide

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

Inlet liner volume

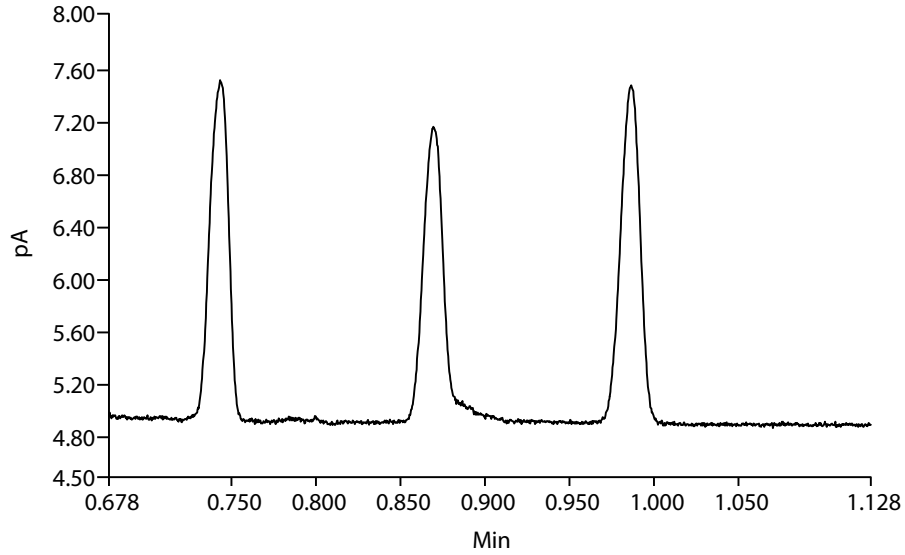


The volume of the vaporized sample should not exceed half of the total volume of the liner. Expansion volumes of solvents need to be understood to calculate injection volume. Solvents with low densities enable more volume of solvent to be injected into the GC system.

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

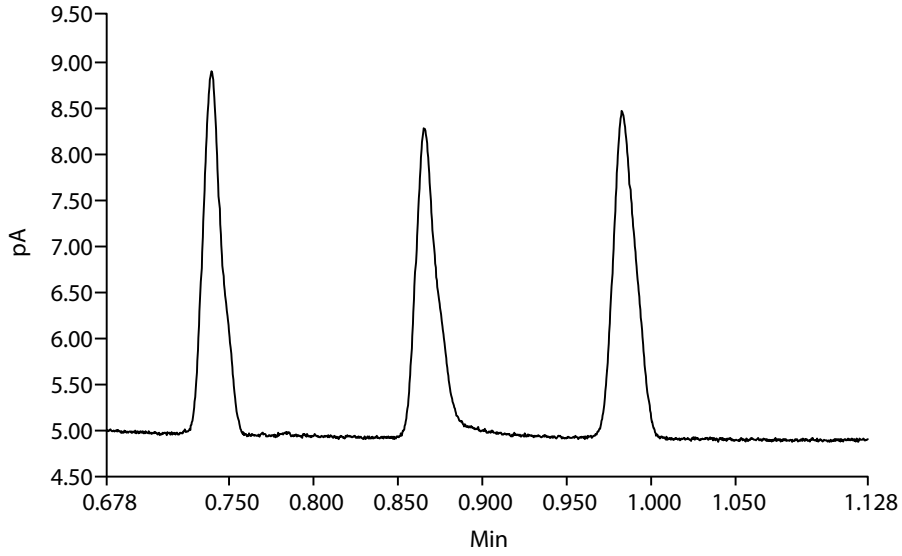
Comparison of injection volume

1 µL injection



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

2 µL injection



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

Liner deactivation

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

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

Proprietary deactivation reagent ensures stability of deactivation and excellent lifetime.



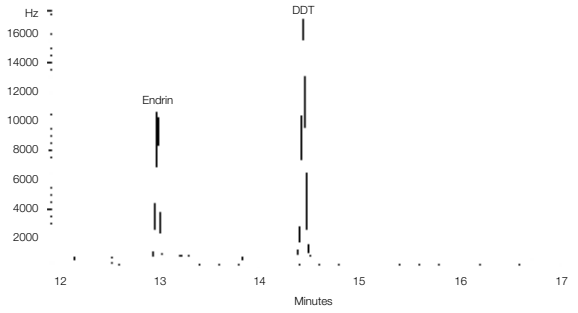
Liner comparison of Endrin and DDT% breakdown

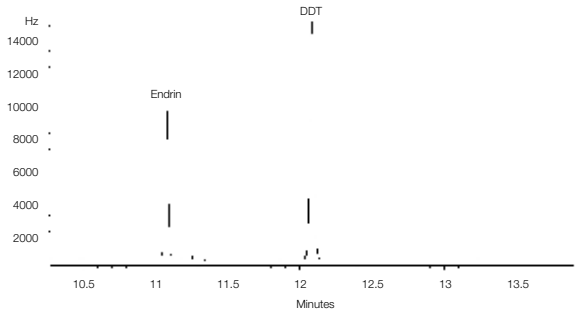
If the Endrin or DDT breakdown is 3% or higher it fails.

Competitor	
Endrin Deg%	3.23
DDT Deg%	1.95

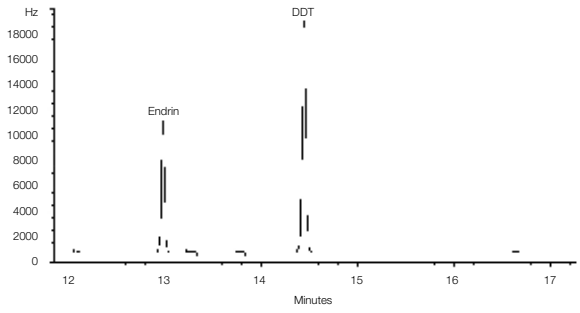
SGE FocusLiner	
Endrin Deg%	1.33
DDT Deg%	0.83

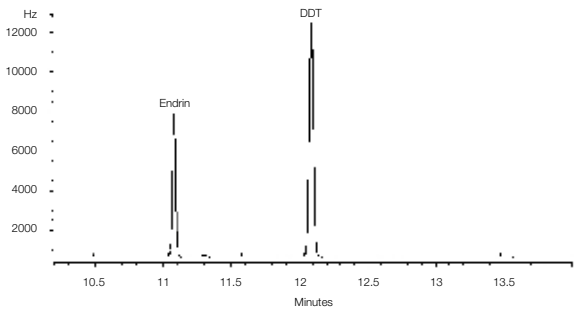
Competitor liner





SGE FocusLiner





SGE Inlet liners

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



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

O-rings and sealing rings

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

SGE Inlet liners

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



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

O-rings and sealing rings

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

SGE Inlet liners

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

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



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

O-rings and sealing rings

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

SGE Inlet liners

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



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

O-rings and sealing rings

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

Connectors and ferrules

Easy to install | Leak free | Stable



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

Considerations in ferrule selection include:

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

Minimizing problems associated with ferrules:

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

Ferrule selection guide

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

SilTite metal ferrules

SilTite

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



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

SilTite GC connectors

SilTite

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

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

SilTite FingerTite ferrules

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

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



SilTite µ-Union

Designed to connect columns without the complications of conventional connectors.

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



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

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

SilTite FingerTite ferrules

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

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

Ferrules

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

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

Ferrules continued

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



SilTite FingerTite ferrules

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

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

Ferrules

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

Ferrules continued

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

**Includes ten ferrules, two SilTite nuts.*



Connectors and ferrules | Shimadzu

SilTite FingerTite ferrules

SilTite FingerTite

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

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

Ferrules

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

**Includes ten ferrules, two SilTite nuts.*



SilTite FingerTite ferrules

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

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

Ferrules

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

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

Easy to install | Leak free | Stable



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

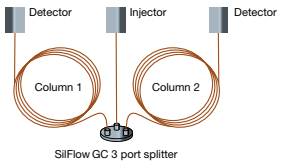
Configuration options for your chromatography solutions

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

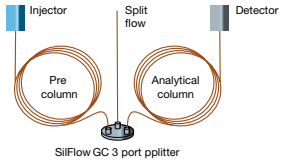
- 3 port GC splitters allowing flow splitting options with three different configurations.
- 4 port GC splitters offering similar configuration flexibility as the 3 port solution.
- Deans' switch MCD, perfect for multidimensional analyses.

Some suggested application configurations for use with SilFlow splitters:

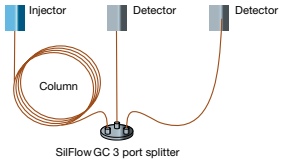
One injection to two capillary columns



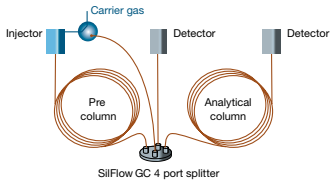
Pre-column with split to analytical column



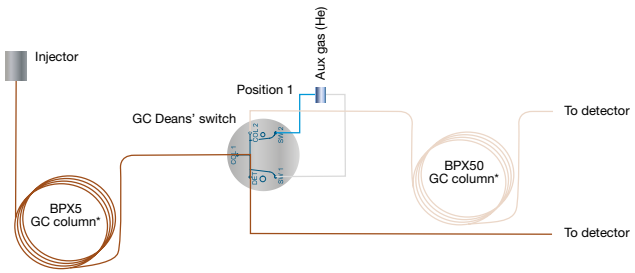
One column to two detectors



Backflush



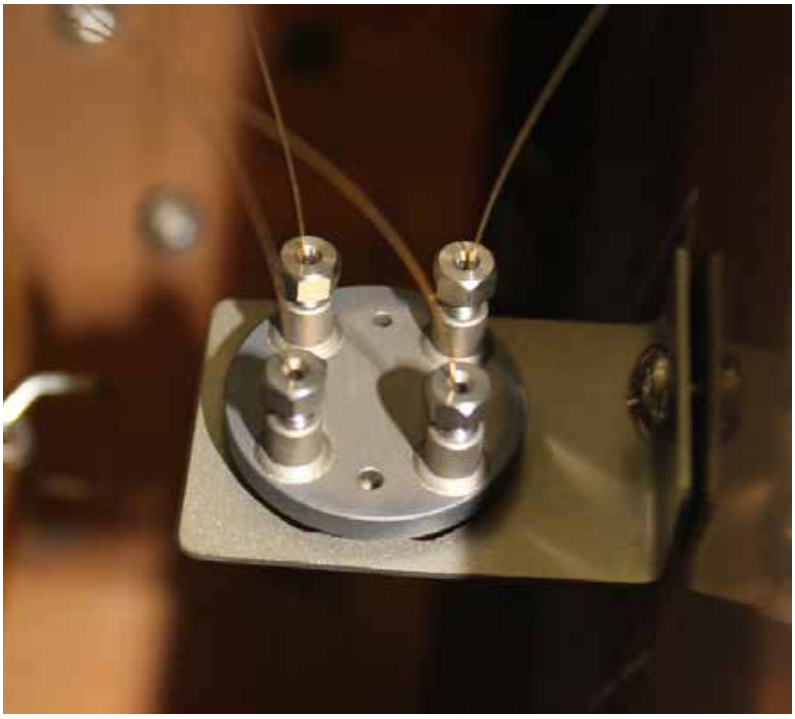
SilFlow GC Deans' switch connected with BPX5 (Phenyl Polysilphenylene Siloxane) 1st dimension GC column and BPX50 2nd dimension GC column.

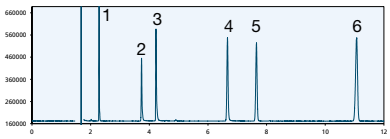


**1st and 2nd column dimension application specific. Contact your local Trajan representative.*

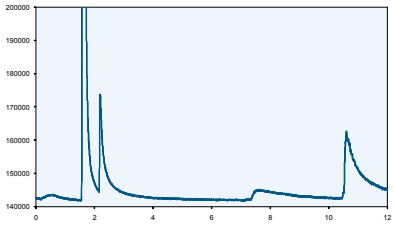
Chemically inert

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

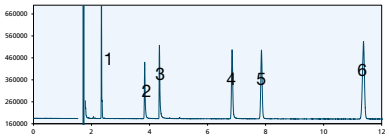




a) Column only



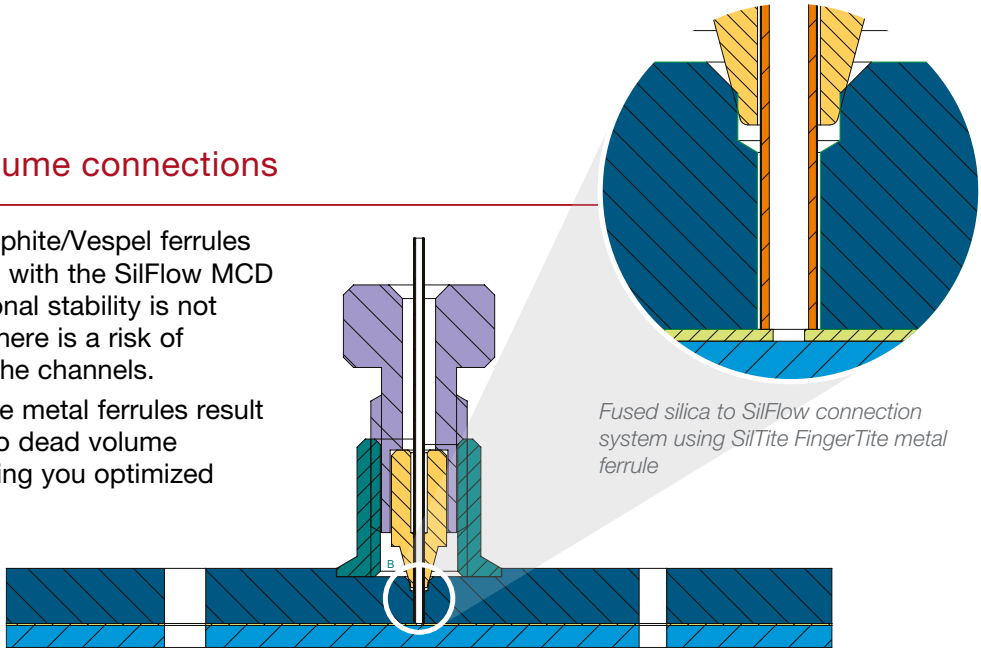
b) Column with metal connector without special deactivation



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

Low dead volume connections

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



Fused silica to SilFlow connection system using SilTite FingerTite metal ferrule

Superb operational stability

SilFlow technical specifications:

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

Easy to install and leak free

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



Each SilFlow kit contains:

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

SilFlow GC 3 port splitter

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

SilFlow GC 4 port splitter

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

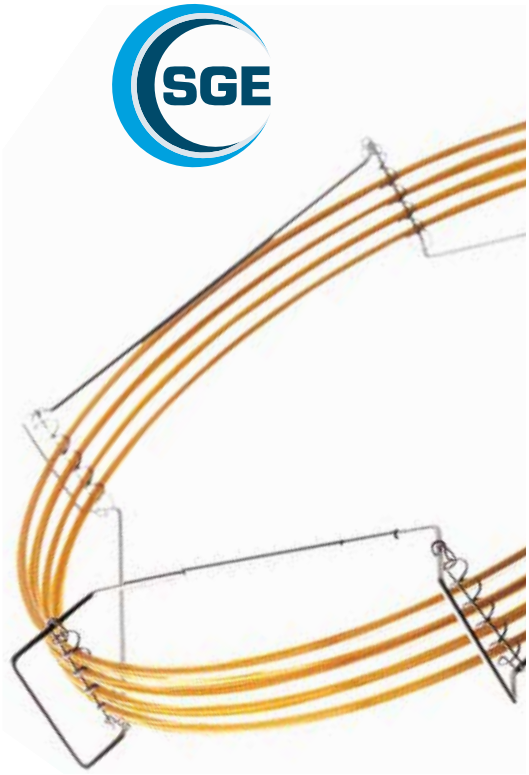
SilFlow GC Deans' switch

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

SilFlow replacement parts

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

Minimal bleed | Highly inert
Temperature stable



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

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

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

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

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

Adjusting GC column performance

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

Stationary phase

General rules on selecting a phase

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

Retention indices for eight cross-linked phases

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

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

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

Retention indices are calculated using the following formula:

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

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

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

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

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

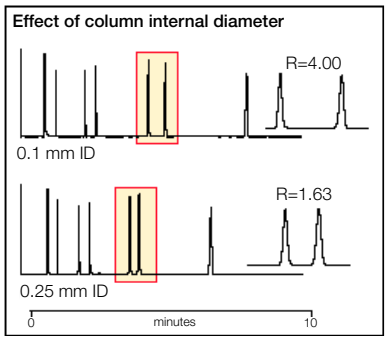
Average retention index values are listed, and provide an indication of the phase polarity. This can assist in selecting a suitable stationary phase for a particular application area. The individual responses to each test compound can further assist in determining the best phase for any specific type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

Column internal diameter

Effect of column internal diameter

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

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

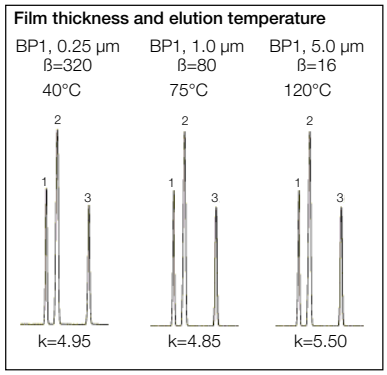


Column ID	Recommendations
0.1 mm and 0.15 mm	Fast GC columns ideal for FID, ECD.
0.22 mm and 0.25 mm	Ideal for MS and high resolution applications.
0.32 mm	Provide good resolution for most applications, ample sample loading and compatibility with nearly all detector systems.
0.53 mm	Provide large sample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

Film thickness

Sample loading

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



Volatility of solute

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

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

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

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

Film thickness continued

Phase ratio

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

Calculate phase ratio using the following formula:

$$ß = d/4d_f$$

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

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

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

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

Column length

Effect of column length

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

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

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

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

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

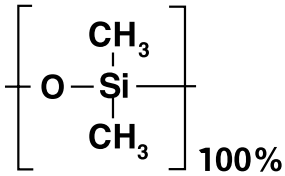
Components
1. o-Ethylphenol
2. p-Cresol
3. 2,4-Xylenol
4. 2,5-Xylenol
5. 2-iso-Propylphenol



12 m x 0.32 mm ID	**25 m x 0.32 mm ID**	**50 m x 0.32 mm ID**
Efficiency (effective plates): 25,000	Efficiency (effective plates): 50,000	Efficiency (effective plates): 100,000

BP1

100% Dimethyl Polysiloxane



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

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

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

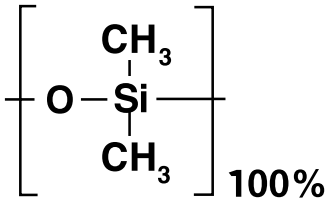
Suitable replacement for: CP-Sil 5 CB, DB-1, DB-Petro, Elite-1, HP-1, HP-1ms, Petrocol DH, Rtx-1, SPB-1, SPB-1 SULFUR, Ultra 1, VB-1, VF-1ms, ZB-1.

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

BPX1

100% Dimethyl Polysiloxane

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



Application areas: ASTM methods D2887 and D6532.

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

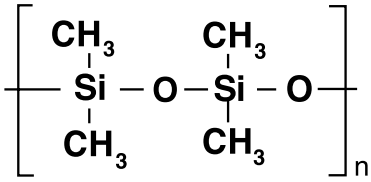
Suitable replacement for: DB-2887, DB-HT, Elite-SimDist, HP-1, Petrocol 2887, Petrocol EX2887, Rtx-2887.

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

SolGel-1ms™

100% Dimethyl Polysiloxane in a Sol-Gel matrix

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



Application areas: Recommended for highly active compounds.

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

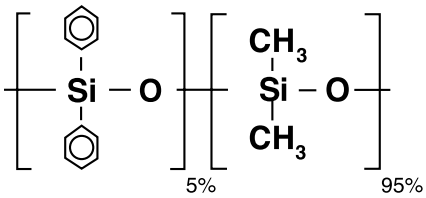
Suitable replacement for: CP-Sil 5 CB, DB-1, DB-Petro, Elite-1ms, HP-1ms, Petrocol DH, Rtx-1, SPB-1, SPB-1 SULFUR, TG-1MS, Ultra 1, VB-1, VF-1ms, ZB-1.

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

BP5

5% Phenyl / 95% Dimethyl Polysiloxane

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



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

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

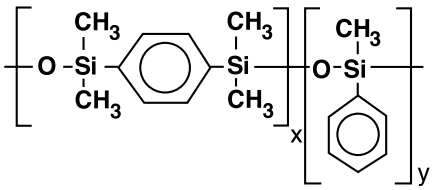
Suitable replacement for: CP-Sil 8 CB, DB-5, Elite-5, HP-5, MDN-5, PTE-5, Rtx-5, SPB-5, Ultra 2, VB-5, ZB-5.

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

BP5MS

5% Phenyl Polysilphenylene-siloxane

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



Application areas: 5% GCMS analyses

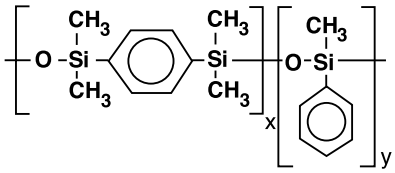
Operating temperature: 0.1-0.25 µm film thickness: -40°C to 330/350°C.

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

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

BPX5

5% Phenyl Polysilphenylene-siloxane



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

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

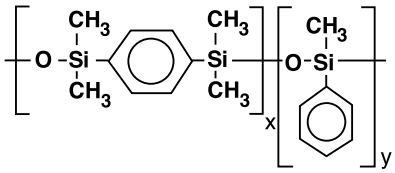
Operating temperature: 0.1-1.5 µm film thickness: -40°C to 360/370°C.
>1.5 µm film thickness: -40°C to 350/360°C.

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

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

BPX35

35% Phenyl Polysilphenylene-siloxane



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

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

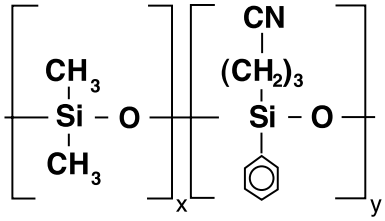
Operating temperature: 0.1-0.5 µm film thickness: 10°C to 330/360°C.

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

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

BP624

Cyanopropylphenyl Polysiloxane



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

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

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

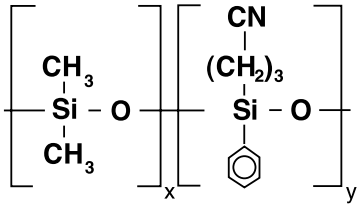
Suitable replacement for: AT-624, CP-Select 624 CB, DB-624, Elite-624, HP-VOC, OV-624, 007-624, Rtx-624, TG-624, VOCOL, ZB-624.

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

BP10 (1701)

14% Cyanopropylphenyl Polysiloxane

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



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

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

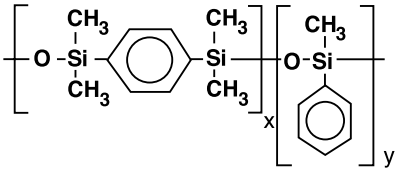
Suitable replacement for: CP-Sil 19 CB, 007-1701, DB-1701, Elite-1701, HP-1701, Rtx-1701, TG-1701, VF-1701ms, ZB-1701.

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

BPX50

50% Phenyl Polysilphenylene-siloxane

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



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

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

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

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

BP20 (WAX)

Polyethylene Glycol



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

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

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

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

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

BP21 (FFAP)

Polyethylene Glycol (PEG) – TPA Treated



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

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

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

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

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

SolGel-WAX™

Polyethylene Glycol (PEG) in a Sol-Gel matrix



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

Application areas: Recommended for highly active compounds.

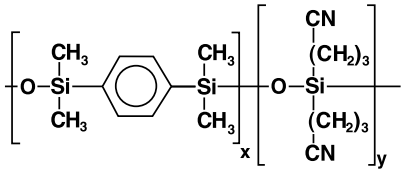
Operating temperature: 0.1-1 µm film thickness: 30°C to 260/280°C.

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

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

BPX70

70% Cyanopropyl Polysilphenylene-siloxane



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

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

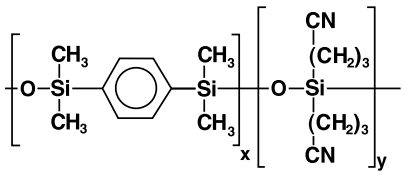
Operating temperature: 0.2-0.5 µm film thickness: 50°C to 250/260°C.

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

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

BPX90

90% Cyanopropyl Polysilphenylene-siloxane



- Unique bonded phase
- Highly polar
- Thermally stable

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

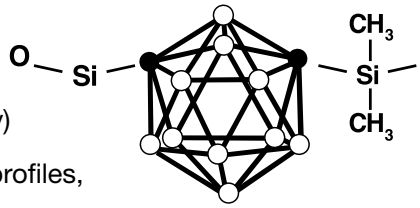
Operating temperatures: 0.25-0.5 µm film thickness: 80°C to 280°C.

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

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

HT5

5% Phenyl (equiv.) Polycarborane siloxane



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

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

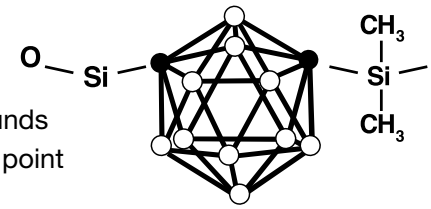
Operating temperature: 0.1-0.5 µm film thickness: 10°C to 380/400°C.

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

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

HT8

8% Phenyl (equiv.) Polycarborane siloxane



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

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

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

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

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

HT8-PCB

8% Phenyl (equiv.) Polycarborane siloxane

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

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



GC PLOT columns | SGE

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

BP BOND Q

Features and benefits

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

Recommended applications

- Volatile solvents
- Hydrocarbons

Product specifications

- 100% Divinylbenzene

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

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

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

BP BOND U

Features and benefits

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

Recommended applications

- Trace H_2S, COS and mercaptans in hydrocarbon streams

Product specifications

- Divinylbenzene Ethylene Glycol/Dimethylacrylate

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

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

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

BP BOND Molsieve 5A

Features and benefits

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

Recommended applications

- Separation of permanent gases
- Refinery or natural gases

Product specifications

- Molecular Sieve (5A)

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

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

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

Gas filters

Clean gas | Accurate analysis
Easily installed



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

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



Clean gas

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

Accurate analysis

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

Easily installed

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

Enhanced gas quality for maximum productivity

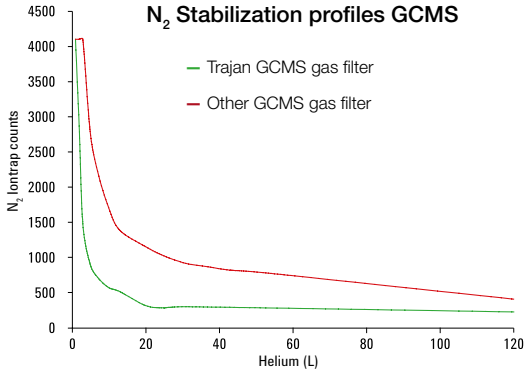


Figure 1 shows the fast stabilization rate (the N_2 mass measured by mass spectrometry) of a GCMS after replacement of the filter.

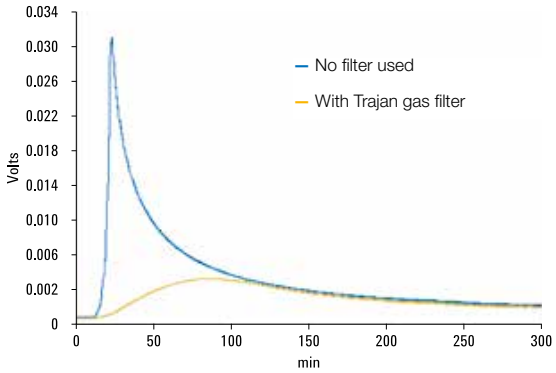


Figure 2 shows the difference in bleed levels of two GC columns due to moisture exposure with and without a filter when running a temperature program (50°C to 350°C, 20°C/min). When no filter is used, an extreme rise in the bleed profile is clearly visible due to moisture in the carrier gas. By using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

Gas filter selection guide

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

Gas filter technical specifications

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

Gas filters

Gas filters

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

Connecting units

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

Gas filter kits

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

Big Trap gas filter

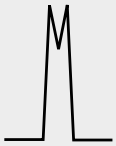
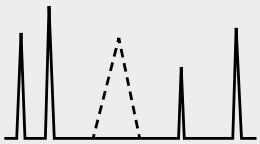
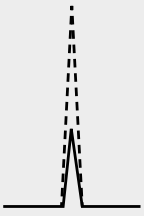
For bulk purification applications or where several instruments are plumbed from a single source, a Big Trap gas filter is an ideal solution. A one-piece heavy walled aluminium tube provides 750 cm^3 of capacity and a pressure rating up to 250 psig.



Big Traps

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

Basic troubleshooting guide

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

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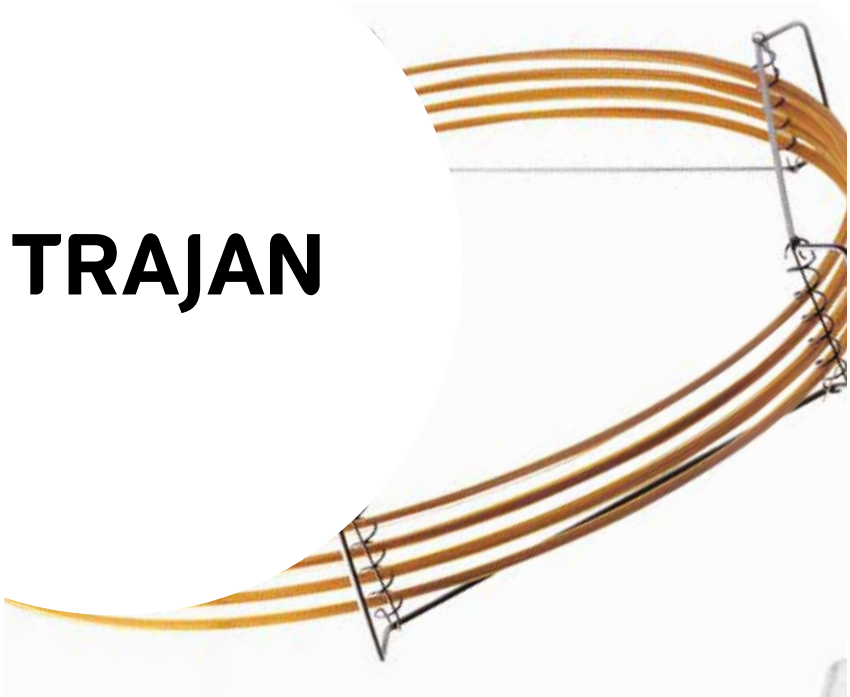








TRAJAN











GC consumables

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