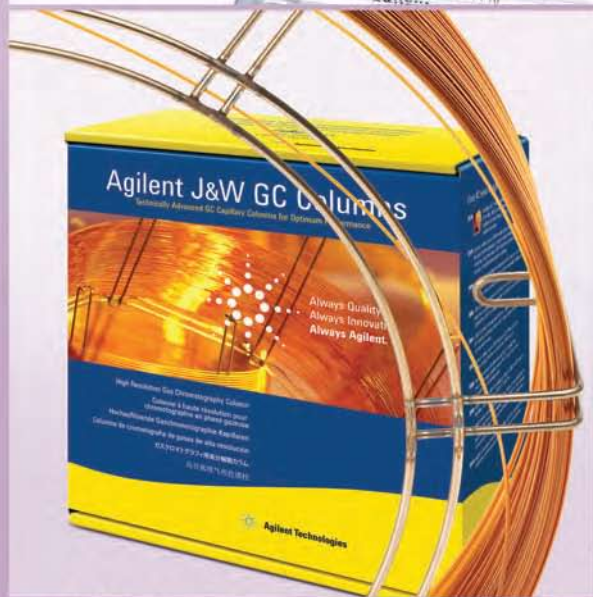
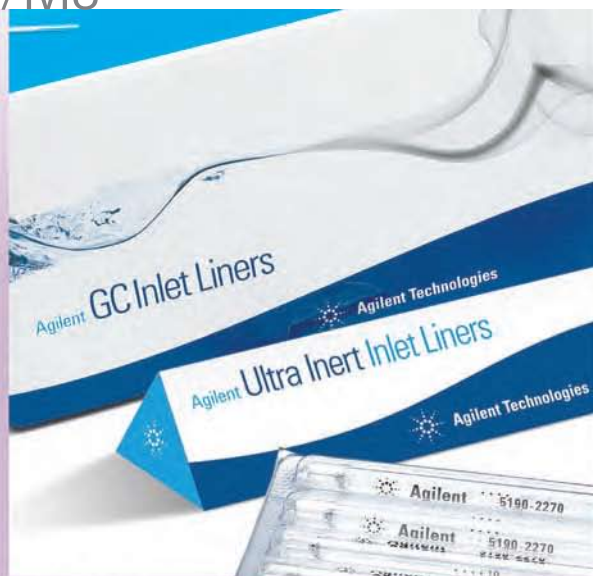


GC AND GC/MS



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GC and GC/MS Maintenance Schedule

Item	Typical Schedule	Actions/Comments
Gas Management		
Gas purifiers (carrier gas and detector gas)	Every 6 to 12 months	Replacement schedule is based on capacity and grade of gas. In general, replace non-indicating traps every 6 to 12 months or when indicating traps start to change color. Replace indicating traps when indicating material is starting to change color.
Internal split vent trap	Every 6 months*	Replace to prevent material backing up into EPC control and to avoid costly repair.
External split vent trap	Every 6 months*	Replace to prevent sample analytes from escaping into the laboratory environment.
Flow meter calibration	Every 1 to 2 years	Re-calibrate electronic flow meters – follow recommended schedule for the unit (shown on the calibration certificate).
Sample Introduction and Inlets		
Syringes and/or syringe needles	Every 3 months*	Replace syringe if dirt is noticeable in the syringe, if it cannot be cleaned, if the plunger doesn't slide easily, or if clogged. Replace needle if septa wear is abnormal or the needle becomes clogged.
Inlet liner	Weekly*	Check often. Replace when dirt is visible in the liner or if chromatography is degraded.
Liner O-rings	Monthly*	Replace with every liner change.
Inlet septum	Daily*	Check often. Replace when signs of deterioration are visible (gaping holes, fragments in inlet liner, poor chromatography, low column pressure, etc.)
Inlet hardware	Every 6 months Every year	Check for leaks and clean. Check parts and replace when parts are worn, scratched, or broken.
Inlet gold or stainless steel seal	Monthly*	For highest level of reproducibility, change inlet seal with every liner change, but minimally replace monthly or when scratched, corroded, or if there is build-up of non-volatile sample components.

*Schedule is an approximation of average usage requirements. Frequency may vary widely based upon application and sample type.

(Continued)

GC and GC/MS Maintenance Schedule

Item	Typical Schedule	Actions/Comments
Columns		
Front-end maintenance	Weekly-monthly*	Remove 1/2 to 1 m from the front of the column when experiencing chromatographic problems (peak tailing, decreased sensitivity, retention time changes, etc.). Replace inlet liner and septum, and clean inlet as necessary. Guard column may be useful for increasing column lifetime.
Solvent rinse	As needed	Perform when chromatography degradation is due to column contamination. Only for bonded and cross-linked phases.
Replacement	As needed	Replace when trimming and/or solvent rinsing no longer restore chromatographic performance.
Ferrules	As needed	Replace when changing columns and inlet/detector parts.
Detectors		
FID/NPD jets and collector	As needed	Clean when deposits are present. Replace when they become scratched, bent, or damaged, or when having difficulty lighting FID or keeping flame lit.
NPD bead	As needed	Replace when signal drifts or there is a dramatic change in sensitivity.
FID	Every 6 months	Measure hydrogen, air, and makeup gas flows.
TCD	As needed	Thermally clean by "baking-out" when a wandering baseline, increased noise, or a change in response is present. Replace when thermal cleaning does not resolve the problem.
ECD	Every 6 months or as needed	Wipe test. Thermally clean by "baking-out" when baseline is noisy, or the output value is abnormally high. Replace when thermal cleaning does not resolve the problem.
FPD	Every 6 months or as needed	Measure hydrogen, air, and makeup gas flows. Clean/replace FPD windows and seals when detector sensitivity is reduced.
NCD and SCD	Every 3 months*	Change pump oil, oil coalescing filter and chemical trap.
Mass Selective Detectors		
Tune MSD	As needed	Keep plenty of PFTBS (P/N 05971-60571) on hand.
Check the calibration vial	Every 6 months	Vial can be refilled without venting the system.
Replace the foreline pump oil	Every 6 months	Check the fluid weekly. Change when the fluid becomes discolored or every 6 months.
Replace the diffusion pump fluid	Every year or as needed	Check the fluid weekly. Too little fluid will cause the pump to run at a higher temperature, resulting in degradation and loss of high vacuum. Change when the fluid is discolored or contains particulates.
Clean the ion source	As needed	Clean when performance deteriorates to remove contamination and to restore the electrostatic properties of the ion lens system. Replace scratched parts to maintain optimal performance.

*Schedule is an approximation of average usage requirements. Frequency may vary widely based upon application and sample type.

PARTS AND SUPPLIES

NEW!

Bulk GC Supplies



Single taper splitless liner, no wool, 5190-2270



Certified gold plated seal kit, 5190-2209



Certified non-stick fluorocarbon O-ring, 5190-2269



Non-stick BTO septa, 5190-3157

Ideal for high usage laboratories, our bulk supplies provide the quality and consistency of Agilent chromatography supplies in convenient and economical packaging. We currently offer Agilent inlet liners, septa, gold inlet seals, and liner O-rings in bulk packaging.

- Economical and convenient packaging
- Overall cost of ownership reduced
- Same great quality Agilent products

Bulk GC Supplies

Description	Unit	Part No.
Single taper split liner, low pressure drop	100/pk	5190-2275
Single taper splitless liner, no wool	100/pk	5190-2270
Single taper splitless liner, glass wool	100/pk	5190-2271
Double taper splitless liner, no wool	100/pk	5190-2272
Certified gold plated seal kit, includes washer	10/pk	5190-2209
Certified non-stick fluorocarbon O-ring	100/pk	5190-2269
Non-stick fluorocarbon O-ring for Flip Top	100/pk	5190-2268
Non-stick BTO septa, 11 mm	400/pk	5190-3157
Non-stick Advanced Green septa, 11 mm	400/pk	5190-3158



Inlet Septa

Septa are available for a variety of different applications and have different upper temperature limits. Lower temperature septa are usually softer, seal better, and can withstand more punctures (injections) than their high-temperature counterparts. If septa are used above their recommended temperatures, they can leak or decompose, causing sample loss, lower column flow, decreased column life and ghosting. To minimize problems:

- Use within the recommended temperature range
- Change regularly
- Install the retainer nut "finger-tight"
- Use septum purge when available
- Use autoinjectors
- Use sharp syringe needles



Premium Non-Stick Septa

Agilent premium non-stick inlet septa are designed and manufactured to provide a reliable non-contaminating seal. Our tri-fold blister pack ensures that each septum remains clean and ready to use.

- Proprietary plasma treatment prevents sticking and unnecessary inlet cleaning
- Innovative blister packaging keeps each septum clean and ready for use
- Center point guides the needle for easy penetration, less coring and longer life
- Precision molding assures accurate fit in the inlet
- Each batch is tested for bleed on Agilent 6890 GC-FID
- Premium formulations selected for sealing and chromatographic cleanliness
- No need to bake septa before using

Summary of Premium Inlet Septum Characteristics

Septum Type	Bleed	Lifetime	Temperature Limits
Non-Stick BTO (Bleed and Temperature Optimized)	◆ ◆ ◆	◆	to 400°C injection port temp
Non-Stick Advanced Green	◆ ◆	◆ ◆	to 350°C
Non-Stick Long-Life	◆	◆ ◆ ◆	to 350°C

◆ ◆ ◆ = best ◆ ◆ = very good ◆ = good



BTO septa, 5183-4757

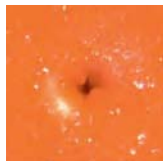
Non-Stick Bleed and Temperature Optimized (BTO) Septa

- Extended temperature range, lowest bleed
- Maximum injection port temperature 400°C
- Plasma treatment eliminates sticking in the injection port
- Pre-conditioned; ready to use
- Blister packaging for cleanliness and convenience
- Ideal for use with low-bleed, "Mass Spec" capillary columns

Non-Stick Bleed and Temperature Optimized (BTO) Septa

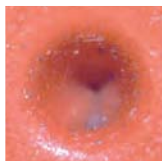
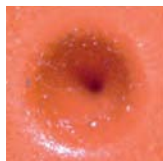
Description	Unit	Part No.
11 mm septa	50/pk	5183-4757
11 mm septa	100/pk	5183-4757-100
11 mm septa	400/pk	5190-3157
5 mm septa through-hole for on-column, in glass jar	50/pk	5183-4758

Comparison of Coring, With and Without CenterGuide (30x magnification)



High-Temperature Septa without CenterGuide

Major coring before 100 autoinjections



Agilent BTO Septa with CenterGuide

Very little coring, even after 700 autoinjections



Advanced green septa, 5183-4759

Non-Stick Advanced Green Septa

- True long-life, high temperature green septa
- More injections per septum
- Plasma treatment eliminates sticking in the injection port
- Maximum injection port temperature 350°C
- High-performance alternative to competitors' "green" septa
- Blister packaging for cleanliness and convenience

Non-Stick Advanced Green Septa

Description	Unit	Part No.
11 mm septa	50/pk	5183-4759
11 mm septa	100/pk	5183-4759-100
11 mm septa	400/pk	5190-3158
5 mm septa through-hole for on-column, in glass jar	50/pk	5183-4760



Long-life septa, 5183-4761

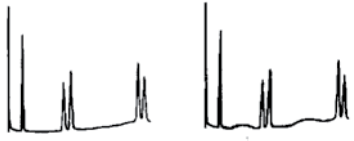
Non-Stick Long-Life Septa

- The preferred septa for autosamplers
- Pre-pierced for extended life and reduced coring
- Ideal for overnight runs
- Up to 400 injections per septum
- Plasma treatment eliminates sticking
- Maximum injection port temperature 350°C
- Soft, 45 durometer, easy on autosampler needles
- Blister packaging for cleanliness and convenience

Non-Stick Long-Life Septa

Description	Unit	Part No.
11 mm septa	50/pk	5183-4761
11 mm septa	100/pk	5183-4761-100
5 mm septa through-hole for on-column, in glass jar	50/pk	5183-4762

Septa Troubleshooting

Symptom	Possible Causes	Remedy
Extra Peaks/Humps 	Septum bleed	Turn off injector heater. If extra peaks disappear, use septum specified for higher temperature or analyze at lower inlet temperature.
Baseline Change After Large Peak 	Large leak at septum during injection and for a short time thereafter (common with large diameter needles)	Replace septum and use smaller diameter needles.
Retention Times Prolonged 	Carrier gas leaks at septum or column connection	Check for leaks. Replace septum or tighten connections if necessary.



General Purpose Septa

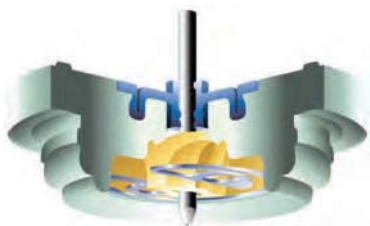
Agilent's general purpose septa are made from an enhanced injection-molded silicone rubber. The septa material, gray in color, is specified to withstand over 200 automatic injections at an injection port temperature of 350°C.

General Purpose Septa

Description	Unit	Part No.
Gray Septa		
11 mm septa	50/pk	5080-8896-50
11 mm septa	100/pk	5080-8894-100
9.5 mm (3/8 in.) septa*	50/pk	5080-8728-50
9.5 mm (3/8 in.) septa*	100/pk	5080-8728-100
5 mm through hole septa for on-column inlets, automatic or manual injections**	25/pk	5181-1260
5 mm septa for high column backpressure, on-column inlets**	25/pk	5181-1261

*for 5700 series and 5830/40 GCs

**5 mm septa are packaged in glass jars



Merlin Microseal

- Low bleed, longer life alternative to standard septa for split/splitless injection
- Has a lifetime of more than 2000 injections, depending on samples and operating conditions
- Greatly reduced instrument downtime for septa changes and injection port liner changes due to septa particulates
- Two distinct sealing mechanisms: double O-ring type seal around the syringe needle and spring assisted duckbill to seal the injection port

Merlin Microseal

Description	Part No.
High Pressure Merlin Microseal	
High pressure Merlin Microseal starter kit	5182-3442
Includes microseal septum and nut	
Merlin Microseal high pressure septum	5182-3444
Microseal high pressure nut	5182-3445
High sample volume septum kit	5181-8839
Contains Merlin high pressure Microseal, six 23-gauge syringes, 500 vials and caps	
Merlin Microseal Standard Pressure	
Merlin Microseal kit, original low pressure system	5181-8816
Includes nut and septum	
Merlin Microseal kit, original low pressure system	5181-8833
Includes nut and 2 septa	
Merlin Microseal septum, stainless steel, rubber (30 psi)	5181-8815
Microseal PTFE nut liners, 2/pk	5182-0853
Merlin Microseal manual syringe, 5 µL, 23 gauge	5182-3438
Merlin Microseal manual syringe, 10 µL, 23 gauge	5182-3439
Syringe, 5 µL, 23 gauge	9301-0892
Syringe, standard plunger, 10 µL, 23 gauge	9301-0713



For in-depth information about maintaining your GC/MS, request "Maintaining Your Agilent GC and GC/MS Systems" from your Agilent Representative (**publication number 5990-5451EN**).

Inlet Liners

NEW!

Agilent Ultra Inert Liners



Agilent ultra inert liners are the perfect companion to Agilent J&W Ultra Inert GC columns. They provide reproducible inertness liner after liner, maintained through a sequence of samples, and for a range of analytes. Agilent's ultra inert liners were developed – and are manufactured and certified – using a suite of tests specifically designed to ensure batch-to-batch uniformity.

- Exceptional batch-to-batch liner uniformity
- Low to no bleed or background contamination
- Superior coverage, allowing use of glass wool even with highly active compounds

Only ultra inert liners are delivered in Agilent's exclusive touchless packaging with a pre-cleaned, conditioned and non-stick plasma treated O-ring pre-installed. Touchless packaging aids in removal of the old liner, and easy installation of the new, clean, preconditioned liner – without risk of contamination from touching.

Agilent Ultra Inert Liners

Description	Volume (μL)	ID (mm)	1/pk	5/pk	25/pk
Split Inlet Liners					
Straight, ultra inert liner with glass wool	990	4	5190-2294	5190-3164	5190-3168
Splitless Inlet Liners					
Single taper, ultra inert liner	900	4	5190-2292	5190-3162	5190-3166
Single taper, ultra inert liner with glass wool	900	4	5190-2293	5190-3163	5190-3167
Universal Inlet Liners					
Low pressure drop, ultra inert liner with glass wool	870	4	5190-2295	5190-3165	5190-3169

Agilent MS Certified Liners

Agilent MS certified split and splitless liners are manufactured and tested to our highest level of scrutiny to assure reproducibility.

We have built years of experience into MS certified liners to provide the quality and consistency needed for critical applications, especially those using esterification agents for trace level analysis, such as toxicology or drugs of abuse applications.

- Geometrical dimensions and tolerances of the glass are controlled by Statistical Process Control (SPC) with 100% Go-No-Go check
- Glass wool is pre-qualified with mass spectrometry, then inserted using a unique manufacturing procedure to improve reproducibility
- Deactivated MS certified liners are treated with Agilent's proven proprietary deactivation process developed to last longer than other commercially available treatment
- Random samples of MS certified liners are tested using both FID and MSD analysis of challenging probes to evaluate acid/base deactivation, response linearity, peak symmetry, bleed and background noise
- Each Agilent MS certified liner is traceable by the lot codes silk screened on the liner

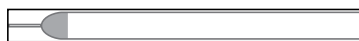
Agilent MS Certified Liners



MS certified single taper split liner, 5188-6576



MS certified straight split liner, 5188-6574



Single taper, glass wool splitless liner,
5062-3587/5188-6568

Description	Volume (μL)	ID (mm)	1/pk	5/pk	25/pk
Split Inlet Liners					
Single taper, MS certified liner with restriction to hold glass wool	870	4	5188-6576		
Straight, MS certified liner with glass wool	990	4	5188-6574	5188-6569	
Splitless Inlet Liners					
Single taper, MS certified liner with glass wool	900	4	5188-6568	5188-6567	5188-6566

Agilent Split Liners

Agilent single taper split liners are made to strict dimension specifications for optimal inlet performance and feature the tightest tolerances for OD, ID, taper, and glass wool placement. For ease-of-use and reproducibility, the liners have a positioning bead, a restriction to secure the position of the glass wool, and a feature to consistently self-position to the recommended height. The liners also feature Agilent's proprietary deactivation.

Agilent Split Liners



Single taper split liner, 5183-4647, 5183-4711



Straight split liner, 19251-60540



Straight split liner with cup, glass wool, and packing, 18740-60840



Focus liners, 210-4004-5, 210-4022-5

Tips & Tools

Agilent recommends part number 5183-4647 as the top split liner choice for:

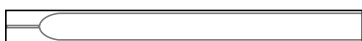
- Highest run-to-run area reproducibility
- Least discrimination for wide boiling point range samples
- Use with widest range of conditions and sample types
- Easy self-adjusting installation

Description	Volume (μL)	ID (mm)	1/pk	5/pk	25/pk	100/pk
Single Taper Split Liners						
Single taper, glass wool, deactivated, low pressure drop	870	4	5183-4647	5183-4701	5183-4702	5190-2275
Single taper, MS certified liner with restriction to hold glass wool	870	4	5188-6576			
Single taper, glass wool, deactivated	870	4	5183-4711	5183-4712	5183-4713	
Straight Split Liners						
Straight, glass wool, non-deactivated	990	4	19251-60540	5183-4691	5183-4692	
Straight, MS certified liner with glass wool	990	4	5188-6574	5188-6569		
Straight, with cup (for manual injections)	800	4	18740-80190	5183-4699	5183-4700	
Straight split liner with cup, glass wool, and packing (for manual injections, not recommended for use with EPC)	800	4	18740-60840	5183-4697	5183-4698	
Focus Liners						
Deactivated with glass wool	935	4		210-4004-5		
Tapered, deactivated with glass wool	880	4		210-4022-5		
SPME Liners						
Deactivated, for SPME	70	0.75		5188-6471		

Agilent Splitless Liners

Agilent's proprietary deactivation is important for splitless liners because of the longer sample/liner contact time in splitless mode.

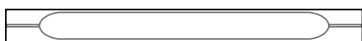
Agilent Splitless Liners



Single taper splitless liner, 5181-3316/5181-3316i



Single taper, glass wool splitless liner, 5062-3587/5188-6568



Double taper splitless liner, 5181-3315



Straight, non-deactivated, quartz splitless liner, 18740-80220/5181-8818



Straight, non-deactivated splitless liner, 210-3003



Direct inject liner, 18740-80200

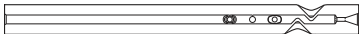
Description	Volume (μL)	ID (mm)	1/pk	5/pk	25/pk	100/pk
Single Taper Splitless Liners						
Single taper, deactivated	900	4	5181-3316	5183-4695	5183-4696	5190-2270
Single taper, inert	900	4	5181-3316i			
Single taper, glass wool, deactivated	900	4	5062-3587	5183-4693	5183-4694	5190-2271
Single taper, MS certified liner with glass wool	900	4	5188-6568	5188-6567	5188-6566	
Double Taper Splitless Liners						
Double taper, deactivated	800	4	5181-3315	5183-4705	5183-4706	5190-2272
Straight Splitless Liners						
Straight, deactivated, quartz	250	2	5181-8818	5183-4703	5183-4704	
Straight, non-deactivated, quartz	250	2	18740-80220	5183-4707	5183-4708	
Straight, non-deactivated	990	4	210-3003	210-3003-5		
Direct Inlet Liners						
Straight, non-deactivated (for gas samples, headspace, or purge & trap)	140	1.5	18740-80200	5183-4709	5183-4710	

NEW!

Agilent Dimpled Liners

- Single tapered liner
- Agilent proprietary deactivation
- Blocked line of sight to column
- No glass wool
- Optimized for cold splitless or solvent vent
- Recommended for heavy matrix samples, such as pesticides in food extracts

The 2 mm dimpled liner was designed for use in the Agilent MultiMode Inlet for the analysis of heavy matrix samples, such as food safety extracts. Cold splitless injection mode is recommended. Sample residue collects and spreads within the body of the liner – not reaching the taper, bottom of the inlet, or the GC column. This extends the number of analyses before the liner needs to be replaced, improving productivity while reducing inlet maintenance and cost of ownership.



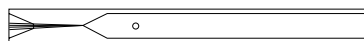
Single taper dimpled splitless liner, 5190-2296

Agilent Dimpled Liners

Description	Volume (µL)	ID (mm)	Part No.
Dimpled splitless single taper, deactivated	200	2	5190-2296

Agilent Direct Connect Liners

Agilent's Direct Connect Liners provide maximum recovery and minimal decomposition of active compounds for methods requiring splitless injection, such as EPA Method 8270. They are best for relatively clean samples containing active analytes, such as water extracts. The liners directly connect with the column, similar to press-fit connectors, to aid complete transfer of sample onto the column, eliminating the problem of inlet discrimination and further increasing sensitivity.



Single taper direct connect liner, G1544-80730



Dual taper direct connect liner, G1544-80700

Direct Connect Liners

Description	Part No.
Single taper direct connect liner, splitless, 4 mm ID, Agilent proprietary deactivation	G1544-80730
Dual taper direct connect liner, splitless, 4 mm ID, Agilent proprietary deactivation	G1544-80700
Single taper direct connect liner, splitless, 4 mm ID, deactivated, inert	G1544-80731



Liner O-rings in dial packaging

Liner O-Rings

- Liners are sealed in the inlet with O-rings or graphite seals
- Graphite seals are used when inlet temperatures exceed 350°C
- Fluorocarbon O-ring seals are easier to replace than graphite that deforms and flakes apart

Only Agilent Fluorocarbon Liner O-rings are:

- Pre-cleaned, then conditioned to eliminate out-gassing of contaminants, which is especially important for trace, ECD and MSD analyses
- Plasma treated for a non-stick, contaminant-free surface that won't stick to the inlet metal surface
- Packaged for convenience and cleanliness in a novel dial package that delivers 1 clean O-ring at a time

Liner O-Rings

Description	Unit	Part No.
Certified non-stick fluorocarbon O-ring	10/pk	5188-5365
	100/pk	5190-2269
Graphite O-ring for splitless liner	10/pk	5180-4173
Graphite O-ring for split liner	10/pk	5180-4168
Non-stick fluorocarbon liner O-ring for Flip Top	10/pk	5188-5366
	100/pk	5190-2268
High temperature PTV inlet liner fluorocarbon O-ring	10/pk	5188-5311



Vespel/Graphite ferrules, 5181-3323

Capillary Column Ferrules and Nuts

Using the wrong ferrule or a worn-out ferrule to seal your column connection can result in inconsistent and unreliable chromatography. An improper ferrule can cause leaks, which allow air and other contaminants to enter the instrument through the column seal, causing major interference with column and detector performance.

For optimum performance, ferrules should be replaced every time the column is replaced and when performing column maintenance.

To minimize problems, follow these general techniques for ferrule installation:

- Don't overtighten – finger tighten the column nut, then use wrench to tighten
- Maintain cleanliness
- Bake out ferrules prior to use (Vespel and Vespel/Graphite only)
- Avoid contamination, such as fingerprint oils
- Inspect used ferrules with magnifier for cracks, chips, or other damage before reusing them
- Change ferrules when new columns or injector/detector parts are installed

Caution: Agilent capillary column ferrules are manufactured to tolerances specific for Agilent J&W HP and DB brand columns. Fused silica tubing used for Agilent J&W VF columns has slightly different tolerances for the outer diameter.



For more information about capillary column compatibility, please visit www.agilent.com/chem/gcsupplies

For the most reliable seals, please refer to the table below for the recommended ferrules for your Agilent GC column.

Ferrule Compatibility

Column ID	DB and HP		VF	
	Graphite	Graphite/Vespel	Graphite	Graphite/Vespel
0.25	500-2114	5181-3323	CR211104	CR213104
0.32	5080-8853	5062-3515	CR211105	CR213105
0.53	5080-8773	5062-3512	CR211108	CR213108

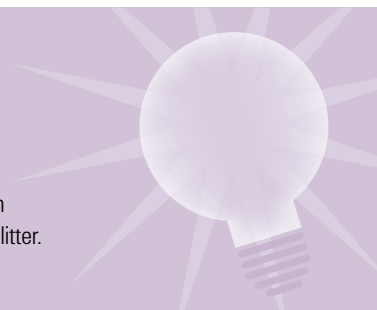
Ferrule Selection Recommendations

Ferrule/Seal Type	Upper Temp. Limit	Usages	Advantages	Limitations
Graphite (100%)	450°C	- General purpose for capillary columns - Suitable for FID and NPD - Recommended for high temperature and cool on-column applications	- Easy-to-use stable seal - Higher temperature limit - Can be removed easily	- Not for MS or oxygen-sensitive detectors - Soft, easily deformed or destroyed - Possible system contamination
Vespel/Graphite (85%/15%)	350°C	- General purpose for capillary columns - Recommended for MS and oxygen-sensitive detectors - Most reliable leak-free connection	- Mechanically robust - Long lifetime	- Not reusable - Flows at elevated temperature - Must re-tighten frequently
Vespel (100%)	280°C	- Isothermal operation - Can be reused or removed easily - Excellent sealing material when making metal or glass connections	- Mechanically robust - Long lifetime - Can be reused or removed easily	- Leaks after temperature cycle - Flows at elevated temperature - Must re-tighten frequently

Tips & Tools

100% Vespel ferrules should only be used for isothermal applications.

SilTite ferrules are required for leak-tight seals with the Ultimate Union, Deans Switch, and Effluent Splitter.





Graphite ferrules, 5080-8853



Vespel ferrule, 5181-3322



Vespel/Graphite ferrule, 5062-3514

Capillary Column Ferrules and Nuts

Ferrule ID (mm)	Column ID (mm)	Unit	Part No.
General Purpose Graphite Ferrules (Short)			
0.5	0.1, 0.2, 0.25, 0.32	10/pk	5080-8853
0.4	0.05, 0.25	10/pk	500-2114
0.8	0.45, 0.53	10/pk	500-2118
1.0	0.53	10/pk	5080-8773
85% Vespel, 15% Graphite Ferrules (Short)			
0.4	0.1, 0.2, 0.25	10/pk	5181-3323
0.5	0.32	10/pk	5062-3514
0.8	0.45, 0.53	10/pk	5062-3512
Preconditioned 85% Vespel, 15% Graphite Ferrules (Long)*			
0.3	0.1	10/pk	5062-3507
0.4	0.1, 0.2, 0.25	10/pk	5062-3508
0.5	0.32	10/pk	5062-3506
0.8	0.53	10/pk	5062-3538
100% Vespel, High Performance Ferrules (Short)**			
0.4	0.1, 0.2, 0.25	10/pk	5181-3322
0.5	0.32	10/pk	5062-3513
0.8	0.45, 0.53	10/pk	5062-3511
Specialty Ferrules, 85% Vespel, 15% Graphite			
Two Hole			
0.3		10/pk	5181-3388
0.4	0.1, 0.2, 0.25	10/pk	5062-3580
0.5	0.32	10/pk	5062-3581
No hole		10/pk	5181-3308
High Temperature PTV Inlet, SS/Graphite			
0.4	0.32	10/pk	5188-5315
0.4	0.53	10/pk	5188-5314

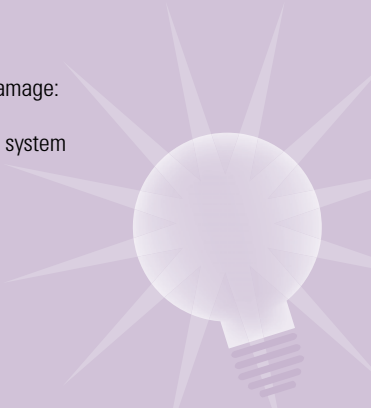
*These ferrules are recommended for use with Agilent GC/MS transfer lines with P/N 05988-20066 MS interface column nut.

**These ferrules are recommended for use in isothermal analysis only.

Tips & Tools

Look for the following signals that indicate ferrule damage:

- Background noise from oxygen diffusing into the system
- Column bleed catalyzed by oxygen
- Sample degradation
- Sample loss
- Increase in detector signal/noise
- Poor retention time reproducibility





SilTite metal ferrules, 5188-5361



Universal column nut, 5181-8830



MS interface column nut, 05988-20066

SilTite Metal Ferrules

Description	Unit	Part No.
For use with 0.25 mm ID capillary columns	10/pk	5188-5361
For use with 0.32 mm ID capillary columns	10/pk	5188-5362
For use with 0.53 mm ID capillary columns	10/pk	5188-5363
For use with 1/16 in. OD stainless steel tubing	10/pk	5184-3571
Includes 2 column nuts		

Column Nuts

Description	Part No.
Short Nuts	
Universal column nut, 1/16 in. hex, 2/pk	5181-8830
Finger tight column nut for 530 µm columns*	5020-8293
Finger tight column nut for 320 µm columns and smaller*	5020-8292
Blanking plug, finger tight style	5020-8294
6850 column nut, 2/pk	5183-4732
Extended column nut, VI inlet	G3504-20504
High Temperature SimDis PTV inlet, 4 mm hex	5188-5312
Long Nuts	
MS interface column nut, female	05988-20066
Inlet column nut for long or long two-hole ferrules	05921-21170
Accessories	
Open end wrench, 1/4 and 5/16 in.	8710-0510

*For use with graphite ferrules only

Straight Ferrules

Description	Unit	Part No.
1/4 in. PTFE	10/pk	0100-1378
1/4 in. Graphite	10/pk	0100-1324
1/8 in. Graphite	10/pk	0100-1325
1/8 in. 85% Vespel/15% Graphite	10/pk	0100-1332
1/16 in. PTFE	10/pk	0100-1375
1/16 in. Graphite	10/pk	0100-1326
1/16 in. VG-2 Vespel, 40% Graphite	10/pk	0100-1379
6.4 mm Vespel		0100-1104
1/4 in. 85% Vespel/15% Graphite	10/pk	0100-1331

Reducing Ferrules

Description	Unit	Part No.
1/8 to 1/16 in. Vespel	10/pk	0100-1342
1/8 to 1/16 in. VG-1 Vespel, 15% Graphite	10/pk	0100-1344
1/16 in. to 0.4 mm VG-2 Vespel, 40% Graphite	10/pk	0100-1381

Ferrules for LTM Rapid Heating/Cooling System

Description	Unit	Part No.
For use with 0.25-0.4 mm ID LTM columns	5/pk	5190-1437
For use with 0.4-0.5 mm ID LTM columns	5/pk	5190-1438
For use with 0.5-0.8 mm ID LTM columns	5/pk	5190-1439

Ferrules and Nuts for NCD and SCD

Description	Part No.
Spare column nut and ferrule kit	G6600-80018





Capillary Flow Technology Supplies

Agilent offers a family of GC accessories based on our proprietary Capillary Flow Technology. These accessories increase system productivity and performance:

- QuickSwap MS Interface provides vent-free removal of columns
- Deans Switch device simplifies the analysis of complex samples
- Purged Effluent Splitter for inert, leak-free column effluent splitting



Ultimate Union

Ultimate Union

The Ultimate Union is part of Agilent's Capillary Flow Technology family, providing extremely low dead volume column connections. Like the QuickSwap, Deans Switch and Purged Effluent Splitter, the Ultimate Union uses special fittings and SilTite ferrules to create an inert, leak-free and robust seal that doesn't need re-tightening after temperature cycles.

Each Agilent Ultimate Union kit contains:

- 1 Union (your choice of deactivated or non-deactivated)
- 2 Internal nuts
- 1 Swaging nut
- 1 Oven wall clip

Kits do not include SilTite ferrules. Please order ferrules for your column ID separately. SilTite ferrules include 2 transfer line nuts.



Internal nut, G2855-20530



Tee, inert, G3184-60065

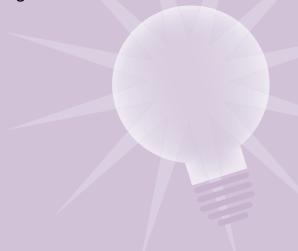
Ultimate Union Kits, Fittings and Ferrules

Description	Part No.
Ultimate union kit, deactivated	G3182-61580
Ultimate union kit, non-deactivated	G3182-61581
Internal nut	G2855-20530
Swaging nut	G2855-20555
SilTite metal ferrules, 0.10-0.25 mm ID capillary columns	5188-5361
SilTite metal ferrules, 0.32 mm ID capillary columns	5188-5362
SilTite metal ferrules, 0.53 mm ID capillary columns	5188-5363
Tee, inert	G3184-60065

Tips & Tools

Agilent's QuickSwap Interface Restrictors can increase the productivity of your Agilent 5975 inert MSD system.

Turn to page 326.



Fittings, Ferrules and Supplies

For leak-free, low dead volume and inert column connections with capillary flow accessories, such as the Deans Switch or QuickSwap MS Interface, use only SilTite ferrules and specified nuts. For Capillary Flow devices, use deactivated fused silica tubing. Do not use tubing that has been coated with stationary phase.

Fittings, Ferrules and Supplies

Description	Unit	Part No.
Internal nut		G2855-20530
Swaging nut		G2855-20555
Tee, inert		G3184-60065
Column storage fitting		G2855-20590
SilTite metal ferrules, 0.10-0.25 mm ID capillary columns	10/pk	5188-5361
SilTite metal ferrules, 0.32 mm ID capillary columns	10/pk	5188-5362
SilTite metal ferrules, 0.53 mm ID capillary columns	10/pk	5188-5363
Ferrule pre-swaging tool		G2855-60200

Column/Retention Gap Installation Supplies

Description	Part No.
250 µm retention gap, one 5 m piece	160-2255-5
320 µm retention gap, one 5 m piece	160-2325-5
530 µm retention gap, one 5 m piece	160-2535-5
Fused silica, deactivated, 0.15 mm x 1 m	160-2625-1
Fused silica, deactivated, 0.15 mm x 5 m	160-2625-5
Fused silica, deactivated, 0.15 mm x 10 m	160-2625-10



Glass press-fit connections



Quartz splitter

Press-fit Capillary Column Connectors

In the past it was necessary to use press-fit connectors with specific dimensions to connect columns of those dimensions. Modern press-fit connectors are "laser-milled" to provide highly reproducible taper angles throughout the length of the press-fit, ensuring an excellent seal. Now the only choice you have to make is between a glass union for standard applications, and fused silica unions or deactivated quartz unions for applications demanding maximum inertness.

Glass and Fused Silica Press-fit Connectors

Description	Unit	Part No.
Glass union, universal, 2-way	25/pk	705-0825
Fused silica union, universal, 2-way	5/pk	705-0905
Fused silica union, universal, 2-way	25/pk	705-0925
Fused silica union, universal, 3-way		705-0903
Polymide sealing resin, 5 g		500-1200

Quartz Press-fit Connectors/Splitters

Description	Unit	Part No.
Quartz column connector, 0.1 to 0.53 mm	5/pk	5181-3395
Deactivated quartz column connector	5/pk	5181-3396
Quartz splitter		5181-3397
Quartz deactivated splitter		5181-3398

Mechanical Capillary Column Connectors

Description	Unit	Part No.
Connector, body and nut		5061-5801
Ferrules for Connectors		
Vespel, 0.2 to 0.53 mm ID tubing	2/pk	5061-5804
Vespel, 0.32 to 0.32 mm ID tubing	2/pk	5061-5805
Vespel, 0.32 to 0.53 mm ID tubing	2/pk	5061-5806
Fused silica, undeactivated 530 μ m tubing, 10 m		160-2530-10



Graphpak connector for Agilent capillary detectors



Graphpak divider for simultaneous sampling



Capillary injection port connector, 5021-7170

Graphpak Capillary Column Connectors (2.5 mm)*

Column ID (mm)	Connector ID (mm)	Part No.
Capillary Detector Port Connector		
0.32/0.25	0.4	5021-7166
0.53	0.7	5021-7164
Capillary Divider for Simultaneous Sampling		
0.32/0.25	0.53	5021-7148
0.53	0.7	5021-7146
Capillary Injection Port Connector		
0.2	0.3	5021-7169
0.32/0.25	0.4	5021-7170
0.53	0.7	5021-7168

*The 2.5 mm Graphpak is not compatible with the Graphpak 2M used for the PTV.

Note: Order ferrules in addition to the connector to fit your column. Ferrules must be ordered separately.

Ferrules for Connectors

Column ID (mm)	ID (mm)	Unit	Part No.
0.2	0.3	10/pk	5021-7136
0.32/0.25	0.4	10/pk	5021-7137
0.53	0.7	10/pk	5021-7134
Graphpak plug ferrule		10/pk	5021-7133
Replacement Graphpak column nut		5/pk	5062-3525

Valves and Loops



General purpose gas sampling valves

Gas Sampling General Purpose Valves

Description	Part No.
6-port replacement valve WE series, 400 psi, 225°C	5062-9508
6-port replacement valve WE series, Hastelloy C, 400 psi, 225°C	5062-9509
10-port replacement valve WE series, 400 psi, 225°C	5062-9510
10-port replacement valve WE series, Hastelloy C, 400 psi, 225°C	5062-9511
6-port replacement valve WT series, 300 psi, 350°C	0101-0584
10-port replacement valve WT series, 300 psi, 350°C	0101-0585



General purpose liquid sampling valves

Liquid Sampling General Purpose Valves

Description	Part No.
0.2 µL replacement valve UWP series, 1,000 psi, 175°C	0101-0636
0.5 µL replacement valve UWP series, 1,000 psi, 175°C	0101-0637
1.0 µL replacement valve UWP series, 1,000 psi, 175°C	0101-0638
0.5 µL replacement valve UW series, 5,000 psi, 75°C	0101-0639

Parts for Interfacing Capillary Columns to W-Series Valves

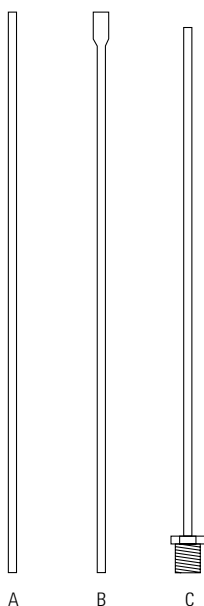
Description	Part No.
Stainless steel bulkhead ZDV union, for interfacing 530 μ m columns with 1/16 in. transfer line	0100-1515
Stainless steel bulkhead ZDV union, for interfacing 320 μ m columns with 1/16 in. transfer line	0100-1527
Polymide ferrule, 1/16 in.	0100-1512
Polyimide liner for 530 μ m columns	0100-1513
Polyimide liner for 320 μ m columns	0100-1514
1/16 in. stainless steel counterbored nut	0100-1511
Installation tool for liners	18900-20850



Front ferrules, stainless steel, 5181-1292

Valve Supplies

Description	Part No.
1/16 in. stainless steel nut	5181-1291
1/16 in. front ferrule, stainless steel	5181-1292
Straight metering valve, 1/16 in., stainless steel, for LSVs as a sample-out restrictor or as a flow-balancer for 10-100 mL/min	0101-0355
Micrometering valve, for flow balancing gas flows of 2-50 mL/min	0101-0633
Air actuator	19325-60660
Solenoid valve for controlling actuator	05890-61090
Solenoid valve for controlling actuator, for GCs after serial number 3223A43573	05890-61095
Angle metering valve, 1/16 in., stainless steel	0101-0403



Valve Loops for GC (Includes loop, nut and ferrule, 1/16 in.)

Description	Part No.
Sample loop, 0.25 cc	0101-0303
Sample loop, 0.50 cc	0101-0282
Sample loop, 1.00 cc	0101-0299
Sample loop, 2.00 cc	0101-0300
Sample loop, 5.00 cc	0101-0301
Sample loop, 10.00 cc	0101-0302
A. Tube, 1/16 in. stainless steel, 280 mm long	18900-20250
Tube, 1/16 in. stainless steel, 400 mm long	18900-20280
Tube, 1/16 in. stainless steel, 375 mm long	18900-20281
Tube, 1/16 in. stainless steel, 560 mm long	18900-20300
B. Tube, 1/16 in. with 1/8 in. flare, stainless steel, 360 mm long	1530-2163
Tube, 1/16 in. with 1/8 in. flare, stainless steel, 520 mm long	1530-2167
C. Tube, 1/16 in. with 1/8 in. bulkhead fitting, 520 mm long	07675-80050
Tube, 1/16 in. with 1/8 in. bulkhead fitting, nickel, 460 mm long	18900-80255

Replacement Rotors for Gas Sampling Valves

Description	Part No.
6-port replacement rotor WE series, 400 psi, 225°C	5181-7459
10-port replacement rotor WE series, 400 psi, 225°C	5181-7460
6-port replacement rotor WT series, 300 psi, 350°C	1535-4952
10-port replacement rotor WT series, 300 psi, 350°C	1535-4954

Sample Introduction Systems



7693A Automatic Liquid Sampler

7693A Automatic Liquid Sampler Replacement Parts and Supplies

To support the higher productivity, performance, and flexibility offered by the 7693A ALS, Agilent has expanded its supplies offering. Agilent Blue Line autosampler syringes are specifically designed to support the 7693A, while increasing plunger life and reducing costly downtime. For cost-conscious laboratories, economical shell vials and caps provide quality at an attractive price. Additional accessories, such as color-coded sample trays and vial caps, add to system ease-of-use.

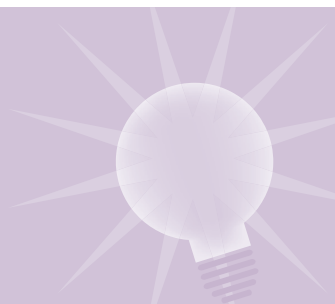
7693A Replacement Parts and Supplies

Description	Unit	Part No.
Gripper finger caps	16/pk	G4514-60710
Injector mounting post		G4513-20561
Dual parking post for autosampler		05890-61525
Needle support insert, standard		G4513-40525
Needle support insert, on-column		G4513-40529
Vial rack, set of 3		G4514-67505
Includes 12 label tags (4 colors)		
Vial rack label kit		G4525-60701
Vial rack label kit, red	3/pk	G4525-60702
Vial rack label kit, yellow	3/pk	G4525-60703
Vial rack label kit, green	3/pk	G4525-60704

Tips & Tools

Agilent Blue Line autosampler syringes are designed to support the 7693A.

Turn to page 64.



Shell Vials for 7693A Automatic Liquid Sampler

Description	Unit	Part No.
Clear, glass shell vials and caps	200/pk	5190-1570

Wash Vials (also for standards, diluents)

Description	Unit	Part No.
4 mL wash vials with fill markings and caps	25/pk	5182-0551
Diffusion caps for 4 mL vials	12/pk	07673-40180
Septa for 4 mL vials*	144/pk	9301-1031

*Septa for 4 mL vials should only be used for sample storage



Automatic Liquid Sampler Supplies

Automatic Liquid Sampler Supplies

Description	Unit	Part No.
4 mL wash vial with screw caps	144/pk	9301-0723
Diffusion caps for 4 mL vials	12/pk	07673-40180
Septa for 4 mL vials	144/pk	9301-1031
4 mL wash vials with fill markings and caps	25/pk	5182-0551
Screw for mounting syringe		07673-20570
Quadrant tray (4 tray sections)		18596-40015
7673 Basic Supply Kit		07673-60840
Contains 10 μ L syringes (6/ea), 23/26 gauge needles, 4 mL vials with diffusion caps (144/pk), 2 mL automatic sampler vials with screw caps (1,000/pk), GC septa (25/pk), vial racks (5/pk)		



Bar code reader labels

Bar Code Reader Labels

Description	Part No.
Labels numbered (1,000/roll)	
1 to 1,000	5958-9450
1,001 to 2,000	5958-9441
2,001 to 3,000	5958-9442
3,001 to 4,000	5958-9443
4,001 to 5,000	5958-9444
5,001 to 6,000	5958-9445



7697A Headspace Sampler

7697A Headspace Sampler Supplies

The new 7697A Headspace Sampler from Agilent utilizes advanced designs based on our industry-leading gas chromatography architecture. The headspace sampling technique allows introduction of volatile compounds to the GC or GC/MS from virtually any sample matrix, while leaving unwanted components in a disposable sample vial. With up to 111 sample vial positions and removable vial racks, the 7697A supports nearly continuous operation to satisfy even the busiest laboratory.

- Built-in legendary Agilent pneumatics for superior control and easier setup
- Proven valve and loop sampling technology
- Fully-automatic sample vial leak checking and available bar code reader help ensure greater confidence in results method compatibility
- Instrument control software that is fully integrated in Agilent data systems
- Resource conserving programmable instrument scheduler

7697A Headspace Replacement Parts and Supplies

Description	Part No.
Tray vial racks	G4556-60019
Vial rack label	G4556-90500
Universal/external split vent trap with 3 cartridges, 1/8 in. Swagelok fitting	RDT-1020
Leak test kit	G4556-67010
Includes instruction sheet, no-hole ferrule, 1/8 in. nylon tube fitting plug, headspace leak test vial, 1/16 in. stainless steel ZDV plug, 11 mm low bleed septa (5/pk)	
Sample probe, deactivated SN 1030	G4556-60690
Sample probe, deactivated SN 2000	G4556-60125
6-port valve, replacement rotor, WT series, 300 psi, 350°C	1535-4952

(Continued)





7697A Headspace Sampler

The transfer line heater assembly is 1 m in length and accommodates the following tubing types:

- Fused silica capillary of 0.25 mm, 0.32 mm, and 0.53 mm ID with maximum OD of 0.67 mm
- Metal capillary of 0.53 mm ID, such as Agilent UltiMetal or ProSteel, with maximum OD of 0.67 mm

For one transfer line, a piece of fused silica or ProSteel approximately 1 m in length is required in addition to one ferrule and one nut and reducing union. Order a ProSteel sleeve to protect the transfer line when operating above 200°C. ProSteel operated above 200°C in the transfer line without the sleeve can permanently bind to the heated conduit tube.

7697A Headspace Replacement Parts and Supplies

Description	Part No.
Transfer Line Components	
Deactivated fused silica, 5 m length	
0.25 mm	160-2255-5
0.32 mm	160-2325-5
0.45 mm	160-2455-5
0.53 mm	160-2535-5
ProSteel deactivated stainless steel, 5 m length	
0.53 mm	160-4535-5
Polyimide sleeve for ProSteel	4177-0607
Polyimide, Valcon ferrule, 5/pk	
1/32 in. for tubing OD 0.50 ≤ 0.80 mm	0100-2595
1/32 in. for tubing OD 0.25 ≤ 0.40 mm	0100-2610
Nut and reducing union for 6 port valve and transfer line connection	0100-2594
Septum nut, transfer line, split/splitless and multimode inlets	G3452-60835
Sampling Loops, SN 2000	
Sample loop, 0.025 mL	G4556-80101
Sample loop, 0.05 mL	G4556-80102
Sample loop, 0.10 mL	G4556-80103
Sample loop, 0.50 mL	G4556-80105
Sample loop, 1.00 mL	G4556-80106
Certified sample loop, 1.00 mL	G4556-80126
Sample loop, 3.00 mL	G4556-80108
Certified sample loop, 3.00 mL	G4556-80128
Sample loop, 5.00 mL	G4556-80109
Sampling Loops, SN 1030	
Sample loop, 0.025 mL	G4556-80111
Sample loop, 0.05 mL	G4556-80112
Sample loop, 0.10 mL	G4556-80113
Sample loop, 0.50 mL	G4556-80115
Sample loop, 1.00 mL	G4556-80116
Sample loop, 3.00 mL	G4556-80118
Sample loop, 5.00 mL	G4556-80119

Vials and Caps for 7697A

Description	Unit	Part No.
Vial kit	100/pk	5182-0840
20 mL Headspace crimp top, flat bottom vials, silver aluminum one-piece crimp caps with safety feature, PTFE/white silicone septa		
Headspace crimp top, flat bottom vials, 10 mL	100/pk	5182-0838
Headspace crimp top, flat bottom vials, 20 mL	100/pk	5182-0837
Silver aluminum crimp caps with 20 mm, PTFE/silicone septa	100/pk	5183-4477
20 mm electronic crimper		5062-0208
Ergonomic manual crimper for 20 mm caps		5040-4669



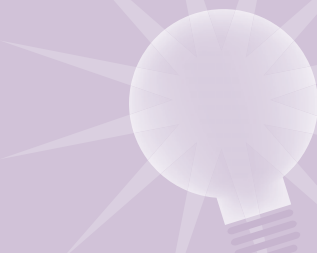
G1888A Headspace unit

G1888A Network Headspace Sampler Supplies

Description	Part No.
Stainless Steel Sample Loops	
Certified sample loop, 1 mL, deactivated	5190-2265
Certified sample loop, 3 mL, deactivated	5190-2266
Sample loop, 1 mL, deactivated	2321700003
Sample loop, 3 mL, deactivated	2321700004
Probes and Unions	
Sample probe, deactivated	2322700011
M6 union, brass	2302533140
Union, zero dead volume, deactivated	2307230001
Union	2307232901
Transfer Line Needles and Unions	
Needle only, headspace transfer line, deactivated 0.5 mm OD	2322590004
Needle only, headspace transfer line, deactivated 0.7 mm OD	2322590005
Strain relief septum nut	6410090050
Tubing	
Tubing, solenoids to 6-port valve, deactivated	0410105017
Tubing, probe to 6-port valve, deactivated	1300502506
Standards	
OQ/PV Headspace Sample	5182-9733
Contains 0.2-0.3% t-butyl disulfide, 1,2-dichlorobenzene, and nitrobenzene in ethanol	
PM Kits	
G1888A PM kit with 1 mL loop	G1888-60702
G1888A PM kit with 3 mL loop	G1888-60703
G1888A enhanced PM kit	G1888-60704

Tips & Tools

For a complete selection of headspace vials, turn to page 49.

**7694 Headspace Sampler Supplies**

Description	Part No.
Needles	
Needle only, headspace transfer line, deactivated 0.5 mm OD	2322590004
Needle for transfer line, 0.25 mm ID, 0.5 mm OD, nickel	301-016-HSP
Needle only, headspace transfer line, deactivated 0.7 mm OD	2322590005
Needle for transfer line, 0.4 mm ID, 0.8 mm OD, nickel	301-015-HSP
Needle assembly vial probe, deactivated	301-220-HSP
Needle assembly (vial probe)	301-013-HSP
Fittings	
Zero dead volume union	325-045-HSP
Transfer line nut	19258-20830
Transfer line ferrule	19258-20870
Union FF 6MB, 5-piece set	325-062-HSP
Union T6 MB, 5-piece set, brass	325-132-HSP
Union T5 MA	325-185-HSP
Valves	
Valve, solenoid vent Kalrez	3600500001
Valve, solenoid vial pressurization	3600500002
Tubing and Transfer Lines	
Sample loop, 1 mL, deactivated	2321700003
Sample loop, 1 mL, nickel	321-055-HSP
Sample loop, 3 mL, deactivated	2321700004
Sample loop, 3 mL, nickel	321-056-HSP
Tube, needle, 6-port valve, deactivated	301-212-HSP
Tube, needle, 6-port valve, nickel	301-169-HSP
Tube, vent-valve stainless steel	301-170-HSP
Sensor tube, 125 mm PTFE	321-057-HSP
Restrictor, stainless steel	321-002-HSP
Transfer line, deactivated, 1 m	301-211-HSP
Transfer line, 1 m, nickel	301-152-HSP
Transfer line, 80 cm, nickel	301-011-HSP
Repair, Leak Test, and OQ/PV Supplies	
Strain relief septum nut	301-205-HSP
Oven adaptor for 10 mL vials	301-017-HSP
Tray adaptors for 10 mL vials, 25/pk	300-301-HSP
Headspace leak test kit	G1888-60701
OQ/PV Headspace Sample	5182-9733

G1883A Network Headspace Supplies

Description	Part No.
Needles	
Needle only, headspace transfer line, deactivated 0.5 mm OD	2322590004
Needle for transfer line, 0.25 mm ID, 0.5 mm OD, nickel	301-016-HSP
Needle only, headspace transfer line, deactivated 0.7 mm OD	2322590005
Needle for transfer line, 0.4 mm ID, 0.8 mm OD, nickel	301-015-HSP
Needle assembly vial probe, deactivated	232-2790012-EHS
Needle assembly vial probe, nickel	232-2790010-EHS
Fittings	
Union elbow M5	998-0000053-EHS
Transfer line nut	19258-20830
Transfer line ferrule	19258-20870
Union FF 6MB, 5-piece set	325-062-HSP
Union T6 MB, 5-piece set, brass	325-132-HSP
Union T5 MA	325-185-HSP
Valves	
Restrictor, stainless steel	321-002-HSP
Valve, solenoid vent Kalrez	3600500001
Valve, solenoid vial pressurization	3600500002
Tubing and Transfer Lines	
Sample loop, 1 mL, deactivated	2321700003
Sample loop, 1 mL, nickel	321-055-HSP
Sample loop, 3 mL, deactivated	2321700004
Sample loop, 3 mL, nickel	321-056-HSP
Oven adaptor for 10 mL vials	301-017-HSP
Tube, needle, 6-port valve, deactivated	301-212-HSP
Tube, needle, 6-port valve, nickel	301-169-HSP
Tube, vent-valve stainless steel	301-170-HSP
Sensor tube, 125 mm PTFE	321-057-HSP
Transfer line, deactivated, 1 m	301-211-HSP
Transfer line, 1 m, nickel	301-152-HSP
Transfer line, 80 cm, nickel	301-011-HSP
Repair, Leak Test, and OQ/PV Supplies	
Strain relief septum nut	301-205-HSP
Headspace leak test kit	G1888-60701
OQ/PV Headspace Sample	5182-9733



Stratum PTC Sample Concentrator



Trap, BTEX + MTBE, 5188-8813

Tips & Tools

Compared to a frit sparger, the fritless sparger may be the better choice when a water sample has a tendency to foam. This sparger is not appropriate for soil samples, which tend to clog the capillary tube.

Teledyne Tekmar Purge and Trap Supplies

Glassware for Teledyne Tekmar Purge and Trap Concentrators, 1/2 in. Mount

Description	Part No.
5 mL frit sparger (glassware only)	5182-0852
5 mL frit sparger kit with fittings	5182-0846
25 mL frit sparger (glassware only)	5182-0851
25 mL frit sparger kit with fittings	5182-0845
5 mL fritless sparger (glassware only)	5182-0850
5 mL fritless sparger kit with fittings	5182-0844
25 mL fritless sparger (glassware only)	5182-0849
25 mL fritless sparger kit with fittings	5182-0796
5 mL needle sparger (glassware only)	5182-0848
5 mL needle sparger kit	5182-0795
25 mL needle sparger (glassware only)	5182-0847
25 mL needle sparger kit	5182-0794

Traps for Teledyne Tekmar Stratum Purge and Trap Concentrator

Description	Part No.
Trap, BTEX + MTBE	5188-8813
Trap #5, OV-1/Tenax/Silica Gel/Charcoal	5188-8814
Trap #8, Carboxpak B/Carbosieve S-III	5188-8815
Trap #9, Proprietary	5188-8816
Trap, Tenax/Silica Gel/Carbosieve S-III	5188-8817
Strat-Trap, Tenax/Silica Gel, #2	5188-8818
Strat-Trap, Tenax/Silica Gel/Charcoal, #3	5188-8819
Strat-Trap, OV-1/Tenax, #7	5190-1445
Strat-Trap, Tenax, #1	5190-1446
Trap, VOCARB 3000	5188-8820
Trap, VOCARB 4000	5188-8821
Trap, BTEX	5188-8822

Stratum traps are U-shaped

Atomx VOC Autosampler Supplies

Description	Part No.
Antifoam agent, Antifoam 1520, 10 mL	5190-2235
Syringe with side port, 27 mL	5190-2234
Vessel, amber IS, 15 mL	5190-2233
Frit sparge glassware kit, 25 mL	5190-2232
Fritless sparge glassware kit, 25 mL	5190-2231

Traps for Teledyne Tekmar Velocity Purge and Trap Concentrator

Description	Part No.
Trap, Vocab 3000 (K Trap)	5182-0775
Trap, Vocab 4000 (I Trap)	5182-0774
Trap, Tenax (A Trap)	5182-0783
Trap, Tenax/Silica Gel/Charcoal (C Trap)	5182-0781
Trap, BTEX	5182-0773
DryFlow moisture trap	14-8911-003

Velocity traps are straight



Markes Thermal Desorption system



Sampling tube, MKI-UTD-5105



Silcosteel difflok cap, MKI-MTD-1204

Markes Thermal Desorption

Agilent now offers a comprehensive line of supplies for Markes Thermal Desorption (TD) instrumentation. Thermal desorption allows the introduction of volatile and semi-volatile compounds from a wide range of sample matrices, directly into a GC or GC/MS.

Markes Thermal Desorption Supplies

Description	Unit	Part No.
O-rings, Markes 7 mm cold trap seals	10/pk	MKI-U-COV07
O-rings, Markes 6 mm cold trap seals	10/pk	MKI-U-COV06
PTFE filter disks, 5.1 mm Markes TD	10/pk	MKI-U-DISK1
PTFE filter disks, 6.3 mm Markes TD	10/pk	MKI-U-DISK3
Spare general purpose carbon cold trap		MKI-U-T11GPC
Sampling tube, Tenax TA, Markes Unity		MKI-UTD-5105
Quick fit connectors, Markes Unity	10/pk	MKI-C-QSC10
Stainless steel Difflok cap, Markes Unity	10/pk	MKI-MTD-1169
Silcosteel Difflok cap, Markes Unity	10/pk	MKI-MTD-1204
O-ring insertion tool, Markes Unity TDI		MKI-Z-0285
O-ring extraction tool, Markes Unity TDI		MKI-Z-0351
Cold trap alignment tool, Markes Unity		MKI-UTD-5064
Cold trap, air toxics, C ₂ -C ₁₄ , Unity 2		MKI-U-T3ATX-2S
Cold trap, air toxics, C ₂ -C ₁₄ , Unity		MKI-U-T3ATX
Cold trap, materials emissions, Unity		MKI-U-T12ME
Cold trap, GP Carbon, C _{4/5} -C _{30/32} , Unity 2		MKI-U-T11GPC-2S
O-rings, 010 Markes Unity	10/pk	MKI-U-COV10
Cold trap, materials emissions, Unity 2		MKI-U-T12ME-2S
Empty stainless steel TD tubes	10/pk	C-TBE10
Tenax stainless steel tubes, preconditioned/capped	10/pk	C-TBP1TC
Empty glass TD tubes	10/pk	C-GT010
PTFE inserts	10/pk	C-PL010
Long term TD tube storage caps	10/pk	C-CF020
Cap-LOK Tool for long term storage caps		C-CPLOK
Diffusive sampling caps	10/pk	C-DF010
Bio-VOC breath samplers	10/pk	C-BIO10
Disposable card mouth piece for Bio-VOC	10/pk	C-B010M
Tenax TA 34-60 Mesh, 10 g		C-TNXTA

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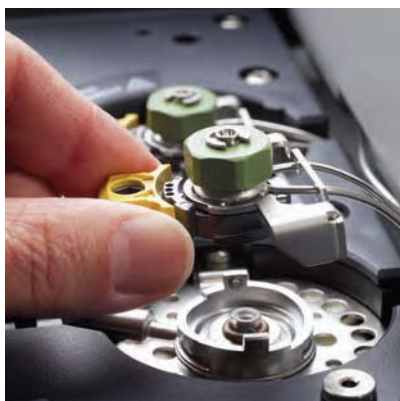


Markes Thermal Desorption Supplies

Description	Unit	Part No.
General purpose hydrophobic tubes, stainless steel Preconditioned and capped with 1/4 in. brass storage caps. For pumped sampling n-C ₅ to n-C ₂₀ .	10/pk	C-HY010C
Tenax/S'carb 'Sulphur' tubes Preconditioned and capped with 1/4 in. brass storage caps. For odor and landfill gas analysis.	10/pk	C-102SSC
Carbograph 1 stainless steel tubes Preconditioned and capped with 1/4 in. brass storage caps. For pumped sampling C ₅ to C ₁₄ , plus diffusion of BTX.	10/pk	C-TBP1C1C
Carb X stainless steel tubes Preconditioned and capped with 1/4 in. brass storage caps. For pumped/diffusion of 1,3-butadiene & benzene.	10/pk	C-TBP1CXC
Air toxics (TO-17) stainless steel tubes Preconditioned and capped with 1/4 in. brass storage caps. For pumped sampling VOCs n-C ₃ to n-C ₁₂ .	10/pk	C-AT010C
Universal stainless steel tubes Preconditioned and capped with 1/4 in. brass storage caps	10/pk	C-UN010C
Glass tubes with 1 cm Tenax For direct liquid injection	10/pk	C-G1CM10
Glass air toxics (TO-17) tubes Pre-packed with 2 carbon-based sorbents; preconditioned and capped with 1/4 in. brass storage caps	10/pk	C-GAT010C
CRS BTX Standards, 1 µg	10/pk	C-BTX1UG

Inlet Systems

7890 Turn Top Inlet System



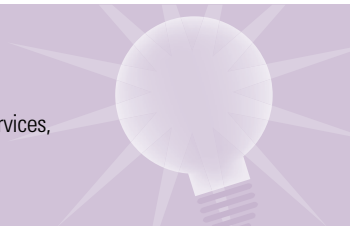
Convenient new turn top design is built into every 7890 Split/Splitless and Multimode Inlet, allowing you to change liners in less than 30 seconds without special tools or training.

7890 Turn Top Inlet System

Description	Unit	Part No.
Turn top		G3430-40035
Split ring		0510-1306
Certified non-stick fluorocarbon O-ring	10/pk	5188-5365
	100/pk	5190-2769

Tips & Tools

To learn more about Agilent's complete portfolio of services, please visit www.agilent.com/chem/services





Flip Top Inlet Sealing System

Agilent's Flip Top Inlet Sealing System is the faster, smarter way to change inlet liners on Agilent 6890, 6850 and 5890 GC systems.

- Cuts liner replacement time to as little as 30 seconds
- Eliminates frustrating searches for special wrenches or tools
- Improves inlet ergonomics – no more handling of heated parts, no more burns or scrapes
- Decreases downtime and increases productivity
- Minimizes exposure to ambient air, extending column life
- Easily installed by user in 15 minutes

Available exclusively from Agilent, the Flip Top has a levered arm that attaches to any 6890/6850/5890 insert weldment and locks to the injection port using an adapter ring screwed onto the inlet. Once installed, simply lift the arm of the Flip Top which releases the insert weldment from the injection port, and allows instant access to the liner. The process is simply reversed to reseal the weldment to the port.



Flip Top Inlet Sealing System installation kit,
5188-2717

Flip Top Inlet Sealing System

Description	Unit	Part No.
Flip Top Inlet Sealing System For 6890, 6850, 5890 only; not compatible with 7890		5188-2717
Non-stick fluorocarbon liner O-ring for Flip Top	10/pk	5188-5366
	100/pk	5190-2268



QuickPick Splitless PM Kit, 5188-6497



QuickPick Purged Packed PM Kit, 5188-6498



Split Vent Trap PM Kit, 5188-6495

Agilent Inlet Convenience Kits

Convenience kits are an easy way to get all the supplies you need using one part number. Agilent's new PM kits include septa, liners, O-rings, gold seals and traps.

Agilent Inlet Convenience Kits

Description	Part No.
QuickPick Split Inlet PM Kit Includes 5 non-stick BTO septa, 1 split liner, 1 non-stick liner O-ring, and inlet gold seal kit	5188-6493
QuickPick Split Vent and Inlet PM Kit Includes 5 non-stick BTO septa, 1 split liner, 1 non-stick liner O-ring, inlet gold seal kit, and split vent trap with 2 O-rings	5188-6496
QuickPick Splitless Inlet PM Kit Includes 5 non-stick BTO septa, 1 splitless liner, 1 non-stick liner O-ring, and inlet gold seal kit	5188-6494
QuickPick Splitless Vent and Inlet PM Kit Includes 5 non-stick BTO septa, 1 splitless liner, 1 non-stick liner O-ring, inlet gold seal kit, and split vent trap with 2 O-rings	5188-6497
QuickPick Purged Packed Inlet PM Kit Includes 5 non-stick BTO septa, 1 O-ring, 1 ferrule, and 1 disposable glass liner	5188-6498
Internal split vent trap PM kit for split/splitless, volatiles, and PTV septumless inlet split vent line Includes 1 cartridge and 2 O-rings	5188-6495

Split/Splitless Inlet Seals

To ensure that you have a consistent and inert surface to properly seal the inlet and prevent sample degradation, Agilent has revolutionized production of the gold inlet seal. Unlike traditional machined seals, the new format Agilent Gold Inlet Seal has a very reproducible smooth surface, eliminating traces of machining grooves that can be the source of minute leaks. With Agilent's proprietary metal injection molding (MIM) manufacturing process, every gold inlet seal provides a high quality, leak-free seal so critical for reproducible results.

Our new package keeps the gold seal clean and scratch-free. For your added convenience, an inlet washer is provided with each inlet seal.



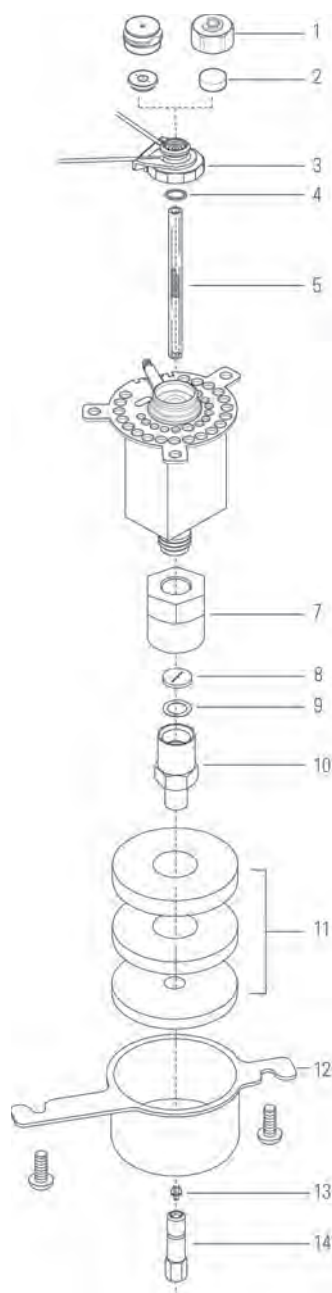
Gold plated seal kit, 5188-5367

Split/Splitless Inlet Seals

Description	Unit	Part No.
Certified gold plated seal kit, includes washer		5188-5367
	10/pk	5190-2209
Gold plated seal with cross*		5182-9652
Stainless steel seal		18740-20880

*Use with total flow rates above 200 mL/min

Split/Splitless Inlets



Split/Splitless Inlet assembly

The combined split/splitless inlet is the most popular inlet for capillary column gas chromatography. Because it can be used in either split or splitless mode, it provides a very effective combination that can cover most analysis requirements.

7890/6890/6850 Split/Splitless Inlet Supplies

Item	Description	Unit	Part No.
	QuickPick Split Inlet PM Kit		5188-6493
	QuickPick Split Vent and Inlet PM Kit		5188-6496
	QuickPick Splitless Inlet PM Kit		5188-6494
	QuickPick Splitless Vent and Inlet PM Kit		5188-6497
1	Headspace septum retainer nut		18740-60830
	Septum retainer nut		18740-60835
	Strain relief septum nut		301-205-HSP
2	11 mm Certified BTO septa	50/pk	5183-4757
	For complete offering of premium septa, see pages [4177]		
3	7890 Insert Weldment		
	Top insert weldment assembly, standard		G3452-60730
	Top insert weldment assembly, headspace		G3452-60100
	Top insert, AC gang fitting weldment		G3430-60011
	Top insert assembly, valve		G3480-67585
	6890 Insert Weldment		
	S/SL insert weldment		G1544-60585
	Used with large charcoal canister type filter, for 6890/6850		
	S/SL insert assembly for G1540A with valved system option		G1580-60585
	This insert assembly uses the large charcoal canister split vent filter, for 6890/6850		
	Similar to G1544-60575 except carrier lines separated for interface to valved systems of a G1540A instrument		G1580-60575
	Original standard EPC using 1/4 in. split vent filter		G1544-60575
	Similar to G1544-60575 except allows insertion of 1/4 in. chemical filters to clean carrier gas for ECD operation		G1544-80580
	Insert Weldment Standard manual pneumatics		19251-60575

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Item 6, split vent trap, G1544-60610



Reducing nut, 18740-20800

7890/6890/6850 Split/Splitless Inlet Supplies

Item	Description	Unit	Part No.
4	Certified non-stick fluorocarbon O-ring	10/pk	5188-5365
	Graphite O-ring for split liner	10/pk	5180-4168
	Graphite O-ring for splitless liner	10/pk	5180-4173
5	Split liner, single taper, low pressure drop, glass wool	1/pk	5183-4647
		25/pk	5183-4702
	Splitless liner, single taper, without glass wool	1/pk	5181-3316
		25/pk	5183-4696
	For complete offering of liners, see pages [4173]		
6	Split vent trap kit		G1544-60610
	Replacement cartridge		G1544-80530
	Includes 2 cartridges and 4 O-rings		
	Split vent trap PM kit		5188-6495
7	Includes 1 cartridge and 2 O-rings		
	Retaining nut		G1544-20590
	Stainless steel seal		18740-20880
8	Certified gold plated seal kit, includes washer ¹		5188-5367
	Replacement for 18740-20885		
	Gold plated seal with cross ²		5182-9652
9	Washers, 0.375 OD	12/pk	5061-5869
10	Reducing nut		18740-20800
11	Insulation kit, 3 pieces		5188-5241
12	Lower insulation cover		19243-00070
13	Ferrules		
	For complete offering of ferrules, see pages [8580]		
14	Universal column nut	2/pk	5181-8830
	6850 column nut	2/pk	5183-4732
	Split/splitless septum nut angled wrench		19251-00100
	Flip Top Inlet Sealing System		5188-2717
	For 6890, 6850, 5890 only; not compatible with 7890		
	Capillary Inlet Evaluation Sample (Split Mode)		8500-4789

¹Use with total inlet flow rates below 200 mL/min²Use with total flow rates above 200 mL/min

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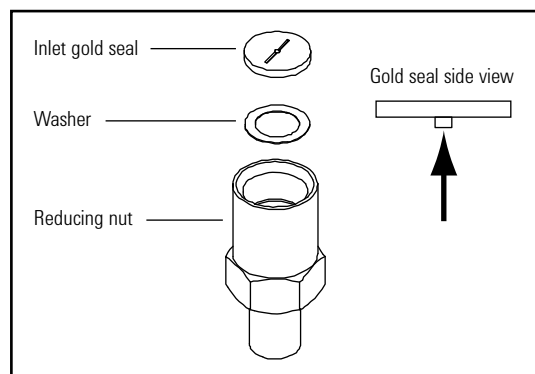


Gold plated seal kit, 5188-5367

7890/6890/6850 Split/Splitless Inlet Supplies

Item	Description	Unit	Part No.
	Capillary Inlet Supplies Kit, Includes:		5181-8838
	Certified gold plated seal kit, includes washer		5188-5367
	Liner, split, straight, glass wool, non-deactivated	5 each*	19251-60540
	Liner, splitless, single-taper, glass wool, deactivated	2 each*	5062-3587
	Certified non-stick fluorocarbon O-ring	10/pk*	5188-5365
	Liner, direct, 2 mm ID, deactivated		5181-8818
	11 mm Certified BTO septa	50/pk*	5183-4757
	Capillary inlet cleaning wires	5/pk*	5180-4153

*Quantity when part ordered individually



Gold seal on the split/splitless inlet

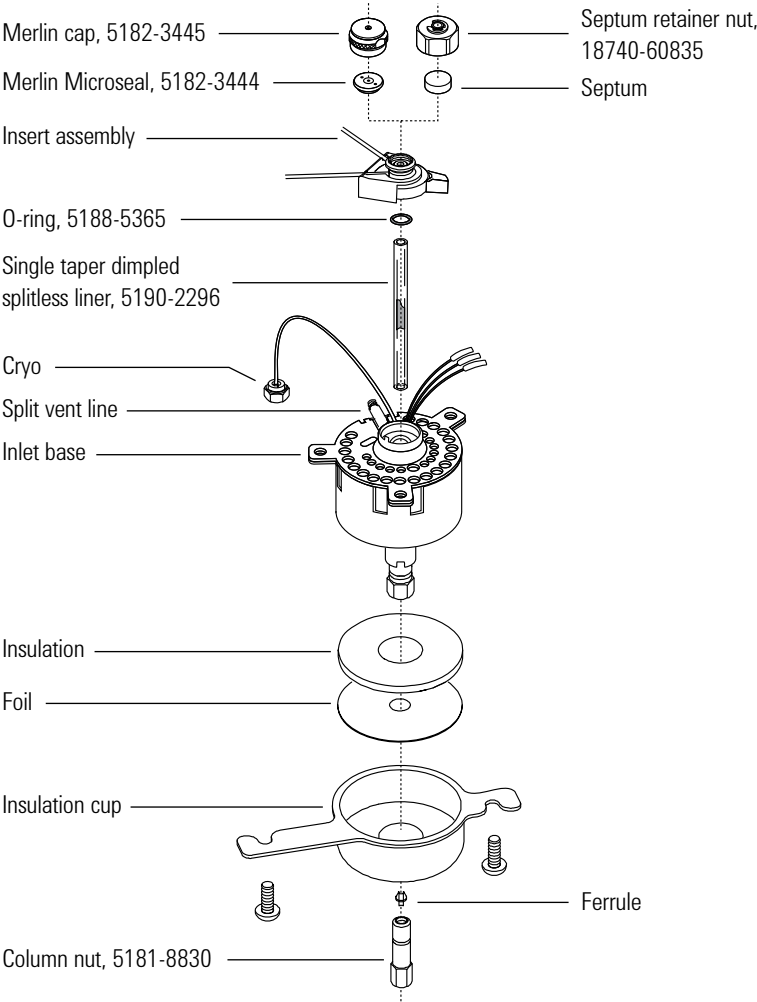
Multimode Inlet

Agilent's premium inlet – two inlets in one
for maximum performance and flexibility for the 7890A

Whether you need to increase your system sensitivity with large volume injection capabilities, analyze thermally labile compounds or inject dirty samples, the Multimode Inlet delivers the performance and flexibility you need.

Tips & Tools

The multimode inlet and the split/splitless inlet use the same supplies including septa, liners, and O-rings. Please refer to split/splitless inlet ordering information for more details. Turn to pages 296–298.



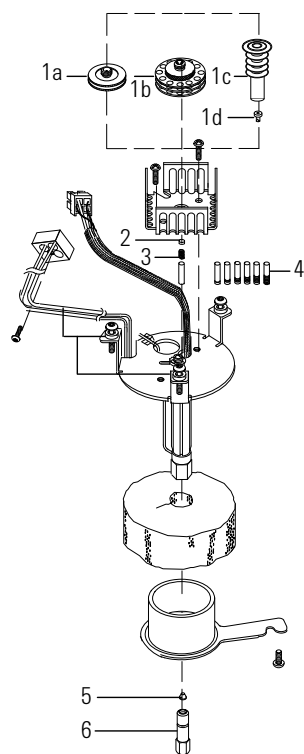
Exploded Parts View of the Multimode Inlet

Cool On-Column Inlets

Cool on-column injection is superior in many ways to other sample introduction techniques.

Advantages include:

- Elimination of sample discrimination
- Elimination of sample alteration
- Solvent focusing of early eluting solutes
- High analytical precision



Cool On-Column Inlet assembly

7890/6890 Cool On-Column Inlet Supplies

Item	Description	Unit	Part No.
Automatic Injection			
1a	Septum nut for 320 µm columns		19245-80521
1b	Septum nut base for 530 µm assembly		G1545-80520
2	5 mm Advanced Green septa	50/pk	5183-4760
	5 mm BTO septa	50/pk	5183-4758
Manual Injection			
1c	Cooling tower assembly		19320-80625
1d	Duck bill	10/pk	19245-40050
	Fused silica syringe needles	6/pk	19091-63000
	On-column syringe, fused silica (barrel only)		9301-0658
Common Supplies			
3	Spring		19245-60760
4	Inserts for capillary columns		
	For 200 µm columns, 1 ring		19245-20510
	For 250 µm columns, 6 rings		19245-20515
	For 320 µm columns, 5 rings		19245-20525
	For 530 µm columns, no rings		19245-20580
	For 530 µm Al clad columns, 4 rings		19245-20780
5	320 µm, 0.5 mm ID graphite ferrule		5080-8853
6	Universal column nut	2/pk	5181-8830

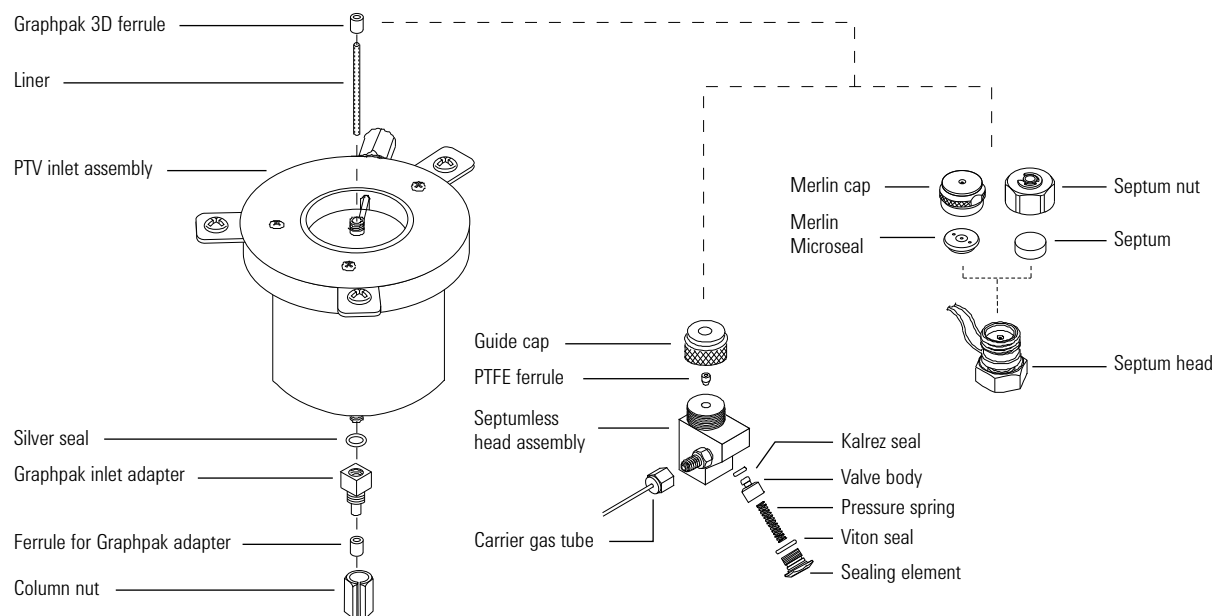
Programmed Temperature Vaporizer (PTV) Inlets

PTV inlets combine the benefits of split, splitless and on-column inlets. The sample is usually injected into a cool liner, so syringe needle discrimination does not occur. Then the inlet temperature is increased to vaporize the sample. The user programs vent times and temperature to achieve the equivalent of split or splitless transfer of sample vapors to the column. PTV injection is considered the most universal sample introduction system because of its flexibility.

7890/6890 Septumless PTV Inlet Supplies

Description	Column ID (mm)	Unit	Part No.
Microseal high pressure nut			5182-3445
Merlin Microseal			5182-3444
Septumless head			G2617-60507
Septum head			G2618-80500
Septum retainer nut			18740-60835
PTV inlet assembly			G2617-60506
PTV LCO ₂ cooling jacket			G2617-60508
PTV LN ₂ cooling jacket			G2619-60501
Silver seal		5/pk	5182-9763
Graphpak 2M inlet adapter	0.20		5182-9754
	0.25-0.33		5182-9761
	0.53		5182-9762
Ferrules for Graphpak 2M inlet	0.20		5182-9756
	0.25		5182-9768
	0.32		5182-9769
	0.53		5182-9770
Replacement Graphpak column nut			5062-3525
PTV insulation block			G2617-20510
PTV Cryo insulator			G2617-60510
Teflon ferrule (needle seal)		10/pk	5182-9748
Kalrez seal			5182-9759
Valve body			5182-9757
Pressure spring			5182-9758
Viton seal		5/pk	5182-9775
Sealing element			5182-9760
CO ₂ Cryo inline filter			3150-0602
Service kit for septumless head			5182-9747
Contains Kalrez seal, valve body, and pressure spring			
Graphpak 3D ferrules		5/pk	5182-9749
Assembly tool for Graphpak 3D ferrules			G2617-80540

Septumless Programmable Temperature Vaporizing (PTV) Inlet assembly



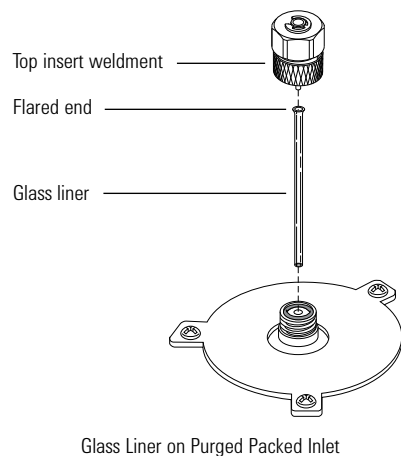
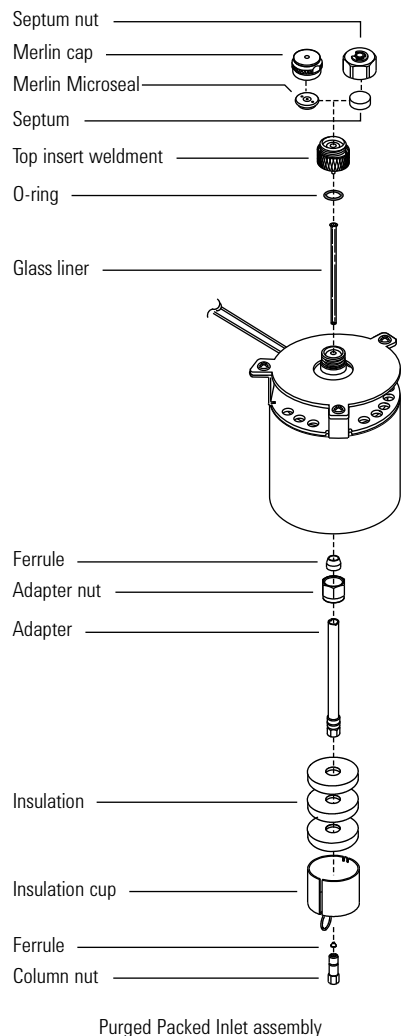
Programmable Temperature Vaporizing (PTV) Liners

Description	ID (mm)	Volume (µL)	Part No.
Liners for Septumless PTV Inlet, G3501A, G3502A, G3503A			
PTV liner, single baffle, glass wool, deactivated	2	180	5183-2038
PTV liner, single baffle, deactivated	2	200	5183-2036
PTV liner, multi baffled, deactivated	1.8	150	5183-2037
PTV liner, sintered glass, deactivated	1.5	112	5190-1426
Liners for High Temperature PTV Inlet, G3506A			
PTV liner, high temperature, quartz	3.4	713	5188-5313
PTV liner, high temperature, borosilicate	3.4	668	5188-5356

Syringes for Septumless and High Temperature PTV Inlets

Volume (µL)	Description	Needle	Part No.
0.5	Removable	23/70/HP	5182-9651
5	Straight, fixed	23/42/HP	9301-0892
10	Straight, fixed	23/42/HP	9301-0713
50	Straight, fixed, for large volume injections	23/42/HP	5183-0318
100	Straight, fixed, for large volume injections	23/42/HP	5183-2058

Purged Packed Inlets



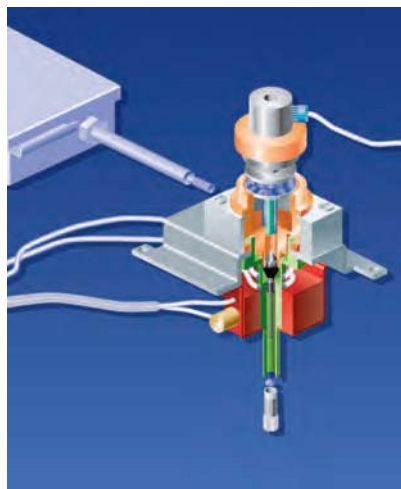
Packed column analysis is frequently done when high efficiency separations are not needed or when gases are analyzed by gas-solid chromatography. Purged packed inlets are simple in both design and use. Few parameters need to be set, and all carrier gas flow flushes through the inlet into the column in the standard configuration.

7890/6890/6850 Purged Packed Inlet Supplies

Description	Unit	Part No.
QuickPick Purged Packed Inlet PM Kit Includes 5 non-stick BTO septa, 1 O-ring, 1 ferrule, and 1 disposable glass liner		5188-6498
Merlin Microseal		5182-3444
Microseal high pressure nut		5182-3445
Septum retainer nut		18740-60835
11 mm Certified BTO septa	50/pk	5183-4757
Top insert weldment		19243-80570
O-ring, Fluorocarbon	12/pk	5080-8898
Disposable glass liner, 170 μ L internal volume	25/pk	5080-8732
Disposable glass insert, deactivated, 170 μ L internal volume	5/pk	5181-3382
Ferrule, 1/4 in. Vespel	10/pk	5080-8774
1/4 in. nut, brass	10/pk	5180-4105
530 μ m column adapter for use with glass liners		19244-80540
1/8 in. column adapter for use with glass liners		19243-80530
1/4 in. column adapter for use with glass liners		19243-80540
Insulating cup		19234-60720
Universal column nut	2/pk	5181-8830

Nuts and Ferrules for 1/8 in. Packed Columns

Description	Unit	Part No.
1/8 in. stainless steel nut and ferrule set	20/pk	5080-8751
1/8 in. brass nut and ferrule set	20/pk	5080-8750
Vespel/graphite ferrule, 1/8 in.	10/pk	0100-1332



Flame Ionization Detector (FID)

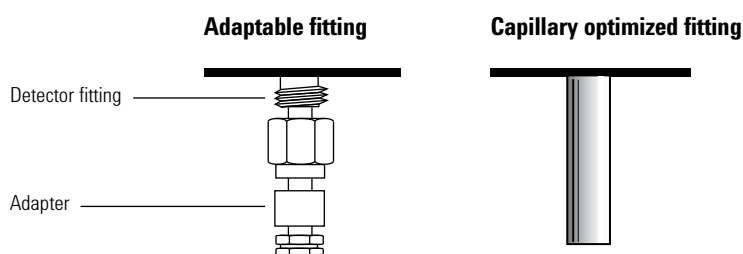
FID Jet Identification and Selection

Before ordering parts for FID maintenance, determine which type of FID is installed on your GC. The FID is available in two versions:

- Dedicated, Capillary Optimized: for capillary columns only
- Adaptable: for packed or capillary columns

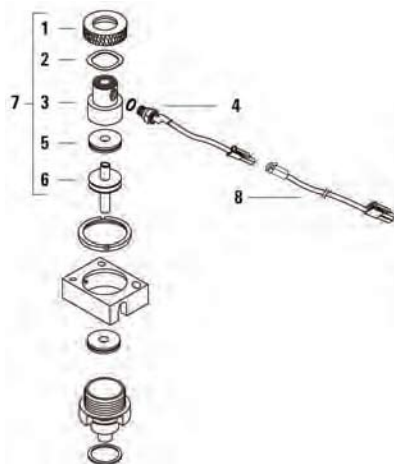
To determine the type of FID installed on your GC, open the oven door and examine the fitting at the base of the detector. Compare to the following diagram.

Hint: Adaptable jets are longer than dedicated capillary jets.



FID Jets

Description	Jet Tip ID	Length (mm)	Part No.
Jets for capillary optimized fittings			
Capillary	0.29 mm (0.011 in.)	42.8	G1531-80560
Capillary, high temperature Use with simulated distillation	0.47 mm (0.018 in.)	42.8	G1531-80620
Jets for adaptable fittings			
Capillary	0.29 mm (0.011 in.)	61.5	19244-80560
Capillary, high temperature Use with simulated distillation	0.47 mm (0.018 in.)	61.5	19244-80620
Packed	0.46 mm (0.018 in.)	63.5	18710-20119
Packed, wide-bore Use with high-bleed applications	0.76 mm (0.030 in.)	63.5	18789-80070



Flame Ionization Detector (FID) assembly

7890/6890/6850 Flame Ionization Detector (FID) Supplies

Item	Description	Unit	Part No.
	PTFE chimney (optional)		19231-21050
1	Collector nut		19231-20940
2	Spring washer	10/pk	5181-3311
3	Ignitor castle		19231-20910
	Hastelloy ignitor castle (optional)		19231-21060
4	Ignitor glow plug assembly		19231-60680
5	Collector insulator		G1531-20700
6	Collector body		G1531-20690
	Hastelloy collector body		G1531-21090
7	FID collector assembly		G1531-60690
	FID collector cleaning brush	2/pk	8710-1346
	Collector housing		G1531-20740
	FID retainer nut wrench 5880, 5890, 6890		19301-00150
	1/4 in. nut driver for FID jet, drilled shaft		8710-1561
8	FID ignitor cable for 6890/6850 only		G1531-60680
	FID ignitor cable, 7890A only		G3431-60680
	FID performance evaluation sample kit This sample is used for the HP 5880, 5890 and 6890 with a FID or TCD. Solution of 0.033% C14, C15, and C16 normal alkanes in hexane. Three 0.5 mL ampoules.		18710-60170
	FID MDL test sample for 7890 only 3 x 0.5 mL ampoules. Contains 2.36 mg/L n-Tridecane, 2.36 mg/L n-Tetradecane, 23.6 mg/mL n-Penta-decane, 23.6 mg/mL n-Hexadecane in iso-octane		5188-5372

(Continued)



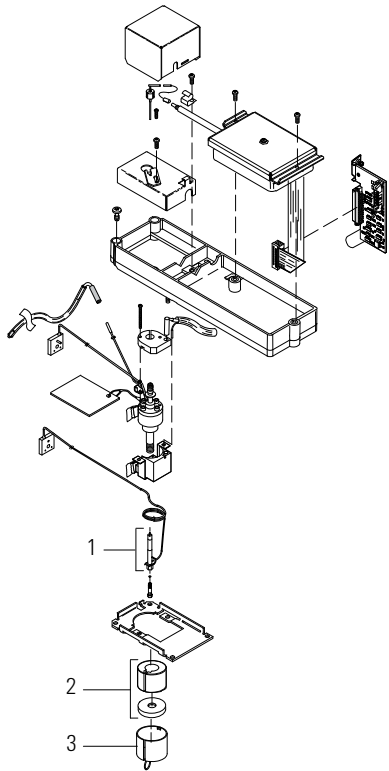
FID cleaning kit, 9301-0985

7890/6890/6850 Flame Ionization Detector (FID) Supplies

Item	Description	Unit	Part No.
	O-rings	12/pk	5080-4978
	FID/NPD adapter for capillary column		19244-80610
	FID/NPD 1/8 in. packed column		19231-80520
	FID/NPD 1/4 in. packed column		19231-80530
	1/4 in. nut driver for FID jet, drilled shaft		8710-1561
	FID collector cleaning brush	2/pk	8710-1346
	FID Supplies Kit, Includes:		5182-3450
	Jet, packed standard 0.018 in. ID tip	3 each	18710-20119
	FID and TCD sample	2 each	18710-60170
	Ignitor glow plug assembly	2 each	19231-60680
	Jet, 0.011 in. ID tip, capillary adaptable	3 each	19244-80560
	FID flow measuring insert	2 each	19301-60660
	Cleaning wires for 0.03 in. ID jet	5/pk	5180-4150
	Cleaning wire for 0.018 in. ID/530 µm jet	5/pk	5180-4152
	For use with 0.018 and 0.011 in. ID jets		
	Cleaning wire for 0.011 in. ID jet	5/pk	19301-20720
	Capillary inlet cleaning wires	5/pk	5180-4153
	FID cleaning kit		9301-0985

Electron Capture Detector (ECD)

The Agilent micro ECD is the most sensitive on the market, with a detection zone volume 10 times smaller than any other ECD. The replaceable liner serves as a physical stop for the column, ensuring reproducible column installation and decreasing column contamination of the cell.



Electron Capture Detector (ECD) assembly

7890/6890/6850 Electron Capture Detector (ECD) Supplies

Item	Description	Part No.
1	Standard ECD makeup gas adapter*	G1533-80565
	Micro ECD makeup gas adapter	G2397-80520
	Micro ECD mixing liner, also compatible with standard ECD design	G2397-20540
	Gigabore liner for standard ECD, polyamide coating, not compatible with micro ECD	19233-20625
	ECD makeup gas adapter, 7890 only	G3433-63000
2, 3	Insulating cup	19234-60720
	ECD adapter end cap	19233-20755
	Vespel ferrule, 1/4 in.	5080-8774
	1/4 in. nut, brass	5180-4105
	Electron Capture Detector sample	18713-60040
	ECD test sample	5183-0379
	Micro ECD wipe test kit	18713-60050

*Includes one each of P/N 19233-20625 and 19233-20755

Thermal Conductivity Detector (TCD)

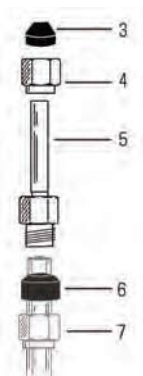
The TCD compares the thermal conductivities of two gas flows – pure carrier gas (also called the reference gas) and carrier gas plus sample components (also called column effluent).

7890/6890/6850 Thermal Conductivity Detector (TCD) Supplies

Item	Description	Unit	Part No.
For 1/8 in. SS Packed Column Installation			
1	Vespel/graphite ferrule, 1/8 in.	10/pk	0100-1332
2	1/8 in. nut, brass	10/pk	5180-4103
For 1/4 in. SS Packed Column Installation			
3	Vespel/graphite ferrule, 1/8 in.	10/pk	0100-1332
4	1/8 in. nut, brass	10/pk	5180-4103
5	1/4 in. packed column adapter		G1532-20710
6	Vespel ferrule, 1/4 in.	10/pk	5080-8774
7	1/4 in. nut, brass	10/pk	5180-4105
For Capillary Column Installation (Standard)			
	TCD capillary column adapter		G1532-80540
8	Vespel/graphite ferrule, 1/8 in.	10/pk	0100-1332
9	1/8 in. nut, brass	10/pk	5180-4103
	Universal column nut	2/pk	5181-8830
	6850 column nut	2/pk	5183-4732
	530 μ m, 1.0 mm ID graphite ferrule	10/pk	5080-8773
	320 μ m, 0.5 mm ID graphite ferrule	10/pk	5080-8853
	TCD sample		18711-60060
	FID and TCD sample		18710-60170



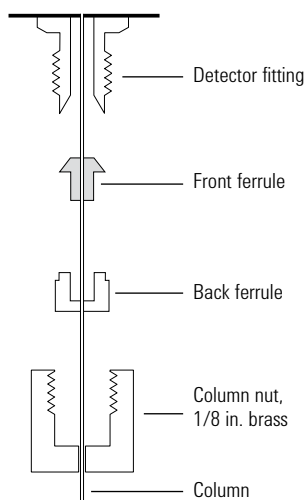
1/8 in. SS packed column



1/4 in. SS packed column



Standard design



TCD Ferrules

Column ID (mm)	Back Ferrules	Front Ferrules 10/pk
0.53	5182-3477	5182-9673
0.32	5182-3477	5182-9676
0.25/0.2/0.1	5182-3477	5182-9677
No hole	5182-3477	5182-9679
TCD back ferrule for 1/8 in. detector fitting, 10/pk	5180-4103	

Determining the TCD Electronic Pressure Control (EPC)

If you have a 6890A or 6890A Plus GC, you may have an older design EPC flow manifold for the TCD. The older design requires removal of sheet metal panels to attach the TCD reference flow gas supply inside the GC. The new "Minifold" design allows TCD reference gas to be connected directly to the back of the GC. Replacement TCD filament block assemblies have different part numbers depending on the EPC design type.

Once you have determined the type of EPC module, consider ordering a passivated filament block assembly, which is recommended for fatty acid analysis or reactive/acidic samples.

TCD Filament Block Assemblies

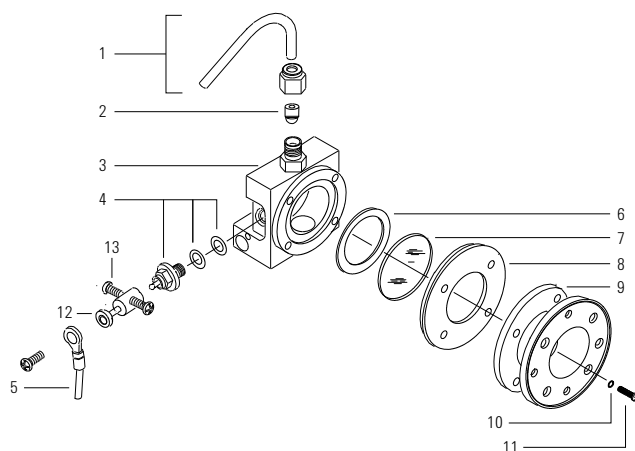
Instrument	Passivated	Applications	Specifications	EPC Design	Part No.
7890A	Yes	Standard TCD Analysis Gases/Hydrocarbons	Complete Detector Assembly Includes detector palette and heater/sensor assembly	Original	G3432-60220
7890A	Yes	Standard TCD Analysis Gases/Hydrocarbons	Complete Detector Assembly Includes detector palette and heater/sensor assembly Third detector, side mounted	Original	G3432-60221
6890	No	Standard TCD Analysis Gases/Hydrocarbons	Filament Block Only Must reuse heater/sensor	Original	G1532-60675
6890	No	Standard TCD Analysis Gases/Hydrocarbons	Filament Block Only Must reuse heater/sensor	Minifold	G1532-60685
6890	Yes	Recommended for Fatty Acid Analysis	Filament Block Only Must reuse heater/sensor	Original	G1532-60690
6890/6850	Yes	Recommended for Fatty Acid Analysis	Filament Block Only Must reuse heater/sensor	Minifold	G1532-60695
6890/6850	No		Complete Detector Assembly Includes detector palette and heater/sensor assembly	Minifold	G2630-61230

Flame Photometric Detector (FPD)

In 2005, Agilent released an improved FPD with minimum detectable levels (MDL) of 3.6 pg/s for sulfur and 60 fg/s for phosphorus. This is more than a 5 times improvement for sulfur. The updated design is based on a one-piece, deactivated transferline jet assembly and improved optics. Upgrade kits are available.

7890/6890/6850 FPD Ignitor and Heat Shield Assembly

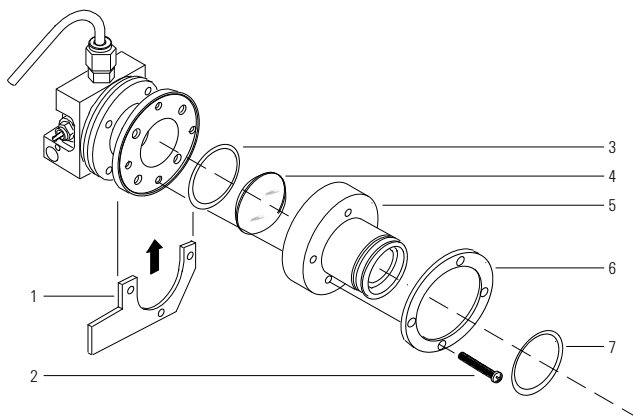
Item	Description	Part No.
1	FPD Exit Tube Assembly	
	Aluminum	19256-60700
	Stainless steel	19256-20705
2	Vespel ferrule, 1/4 in., 10/pk	5080-8774
3	Emission chamber	
	FPD, single	19256-80560
	FPD, dual	19256-80600
5	FPD ignitor replacement kit	19256-60800
	O-ring, size 2-010	0905-1610
	Spacer, ignitor	19256-20590
	Glow plug	0854-0141
5	Ignitor cable assembly	G1535-60600
6	Heat shield gasket, white	19256-80045
7	First heat shield window	19256-80030
8	Heat shield disk	19256-20580
9	Stainless steel coupling	19256-20550
10	Lock washer (4 required)	2190-0584
11	Screw, M3 x 12 mm, T10 (4 required)	0515-1084
12	Collar	19256-20690
13	Screw, M3 x 66 mm, T10	0515-0680
	FPD check out sample	5188-5953
	FPD sample	5188-5245



FPD ignitor and heat shield assembly

FPD Lens Assembly

Item	Description	Part No.
1	Clamp	19256-00090
2	Screw, M3 x 25 mm (4 required)	0515-0683
3	Window O-ring, inner, 0.926 in. ID, orange	5061-5886
4	Convex lens	1000-1438
5	Lens housing	19256-20900
6	Flange ring	19256-00200
7	Fluorocarbon Elastomer O-ring, brown, 1.239 in. ID	5061-5890



FPD lens assembly

FPD Photomultiplier Tube (PMT) and Bracket Assemblies

Description	Part No.
Chimney back cover	G1535-80520
Heator/sensor assembly	G1535-60610
Transfer line support bracket	19256-00320
Bracket/support	G1535-00010
Sulfur filter, 7890 and late model 6890*	1000-1437
Sulfur filter, blue, early model 6890*	19256-80000
Phosphorus filter, yellow	19256-80010
Filter spacer (used only with sulfur filter)	19256-20910
PMT housing assembly	19256-60510
Dual FPD chimney front	G1535-00030

*Please contact Agilent technical support for assistance in selecting the correct sulfur filter for your 6890 FPD detector.



BloS NPD bead assembly, G3434-60806

Nitrogen Phosphorus Detector (NPD)

NPD Beads

The NPD for the 7890/6890 GC features a ceramic bead selective for nitrogen and phosphorous compounds. Agilent offers three beads:

- BloS bead
- White ceramic bead
- Black ceramic bead

Compared to the white ceramic bead, the new BloS bead provides:

- Superior bead lifetime
- Faster attainment of stable operation at initial start-up, as well as more stable operation throughout bead's lifetime
- Superior sensitivity and selectivity for phosphorous-containing compounds
- Similar sensitivity and selectivity for nitrogen-containing compounds
- Superior immunity to moisture

The white ceramic bead exhibits some tailing for phosphorous compounds. The black ceramic bead does not exhibit peak tailing and typically has a longer lifetime than the white bead; however, it is less sensitive.

All Agilent NPD beads are preconditioned, self-aligning for installation and include a proof-of-performance chromatogram.

NPD Beads

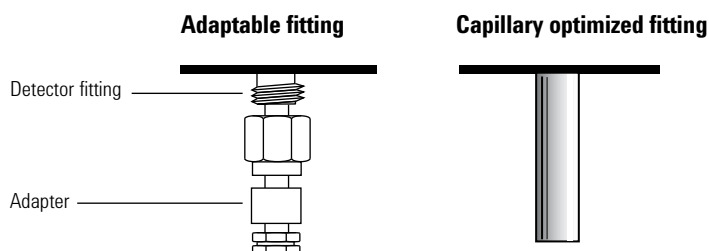
Description	Part No.
BloS NPD bead assembly	G3434-60806
NPD white ceramic bead assembly	G1534-60570
NPD black ceramic bead assembly	5183-2007

NPD Jet Identification and Selection

Before ordering parts for NPD maintenance, determine which type of NPD is installed on your GC. The NPD is available in two versions:

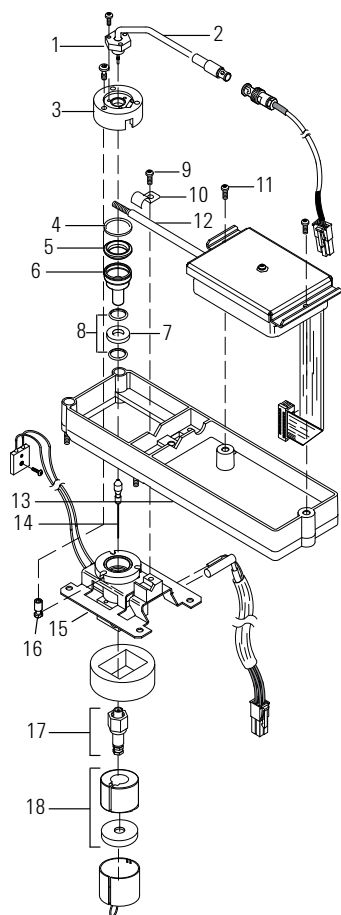
- Dedicated, Capillary Optimized: for capillary columns only
- Adaptable: for packed or capillary columns

Hint: Adaptable jets are longer than dedicated capillary jets.



NPD Jets

Description	Jet Tip ID	Length (mm)	Part No.
Jets for capillary optimized fittings			
Capillary with extended jet (recommended)	0.29 mm (0.011 in.)	51.5	G1534-80580
Capillary	0.29 mm (0.011 in.)	42.8	G1531-80560
Capillary, high temperature	0.47 mm (0.018 in.)	42.8	G1531-80620
Jets for adaptable fittings			
Capillary with extended jet (recommended)	0.29 mm (0.011 in.)	70.5	G1534-80590
Capillary	0.29 mm (0.011 in.)	61.5	19244-80560
Capillary, high temperature	0.47 mm (0.018 in.)	61.5	19244-80620
Packed	0.46 mm (0.018 in.)	63.5	18710-20119



Nitrogen Phosphorus Detector (NPD) assembly

7890/6890/6850 Nitrogen Phosphorus Detector (NPD) Supplies

Item	Description	Part No.
1	Screws, M3 x 0.5, 8 mm (Pozidriv)	0515-0655
2	NPD white ceramic bead assembly	G1534-60570
	NPD black ceramic bead assembly	5183-2007
3	Lid weldment	G1534-80510
4	Metal C-ring, top	0905-2580
5	Alumina insulator, upper	G1534-40020
6	Collector funnel	G1534-20530
7	Alumina insulator, lower	G1534-40030
8	Metal C-ring, bottom	0905-1284
9	Screw, M4 x 07, 10 mm	0515-2495
10	J-Clamp	1400-0015
11	Screw, M4 x 07, 10 mm	0515-2495
12	NPD interconnect assembly	G1534-60610
13	Mounting pallet	G1531-40020
14	Jet, 0.011 in./0.29 mm ID tip, capillary dedicated	G1531-80560
	Jet, 0.011 in. ID tip, capillary adaptable	19244-80560
	Jet, packed standard 0.018 in. ID tip	18710-20119
15	Base weldment, capillary NPD for 6890/6850 only	G1534-80500
	Base weldment, packed NPD for 6890/6850 only	G1534-80540
	Base weldment, capillary NPD, 7890A	G3434-67500
	Base weldment, packed NPD, 7890A	G3434-67540
16	Lid stop	G1534-20590
	NPD ceramic insulator kit	5182-9722
	Includes items 4, 5, 7, and 8	
17	FID/NPD adapter for capillary column	19244-80610
	FID/NPD 1/8 in. packed column	19231-80520
	FID/NPD 1/4 in. packed column	19231-80530
18	Insulating cup	19234-60720
	Vespel ferrule, 1/4 in., 10/pk	5080-8774
	530 µm, 1.0 mm ID graphite ferrule, 10/pk	5080-8773
	320 µm, 0.5 mm ID graphite ferrule, 10/pk	5080-8853
	1/4 in. nut, brass, 10/pk	5180-4105
	Universal column nut, 2/pk	5181-8830
	Nitrogen Phosphorus Detector sample	18789-60060



Nitrogen Chemiluminescence Detector (NCD)

Nitrogen and Sulfur Chemiluminescence Detectors

The Agilent 355 Sulfur Chemiluminescence Detector (SCD) is the most sensitive and selective chromatographic sulfur detector available for the analysis of sulfur compounds.

The Agilent 255 Nitrogen Chemiluminescence Detector (NCD) is a nitrogen-specific detector that produces a linear and equimolar response to nitrogen compounds based on a chemiluminescent reaction of NO with ozone. Even complex sample matrices can be analyzed with little or no interference.



Dual plasma burner accessory kit, G6600-60038



Replacement oil coalescing filter, G6600-80042



Replacement oil coalescing filter for oil mist filter, G6600-80044



Replacement odor filtration element, G6600-80045

Nitrogen Chemiluminescence Detector (NCD) Supplies

Description	Part No.
Dual plasma burner accessory kit Includes ferrules, fittings and quartz tube	G6600-60038
PM Kit, dry piston pump Includes dry piston seal, 6 Moleculite vacuum pump traps and 1 set of ceramic tubes	G6600-67006
PM Kit, DP RV5 oil pump Includes 6 chemical traps for ozone destruction, 3 oil coalescer elements and 4 (1 qt) bottles of synthetic oil	G6600-67007
PM Kit, dry piston pump Includes 4 chemical traps for ozone destruction and 2 repair kits for pump	G6600-67008
12-month maintenance kit Includes 6 qt oil, 12 chemical traps, 4 oil filter elements, 2 sets of ceramic tubes, and 2 O-rings	G6600-67009
Replacement oil coalescing filter	G6600-80042
Oil mist filter for RV5 pump	G6600-80043
Replacement oil coalescing filter for oil mist filter	G6600-80044
Replacement odor filtration element	G6600-80045
O-ring, 1.3614 in. ID	G6600-80050
O-ring, 1.301 in. ID	G6600-80051
Dual plasma quartz tube	G6600-80063
Mobil 1 synthetic oil	G6600-85001
Oil, Edwards Ultragrade for RV3 and RV5 pumps	G6600-85002
Spare column nut and ferrule kit	G6600-80018



Sulfur Chemiluminescence Detector (SCD)



PM kit, G6600-67008



Dual plasma burner accessory kit, G6600-60037



Oil mist filter, G6600-80043

Sulfur Chemiluminescence Detector (SCD) Supplies

Description	Part No.
PM Kit, dry piston pump	G6600-67006
Includes dry piston seal, 6 Moleculite vacuum pump traps and 1 set of ceramic tubes	
PM Kit, dry piston pump	G6600-67008
Includes 4 chemical traps for ozone destruction and 2 repair kits for pump	
12-month maintenance kit	G6600-67009
Includes 6 qt oil, 12 chemical traps, 4 oil filter elements, 2 sets of ceramic tubes, and 2 O-rings	
Dual plasma burner accessory kit	G6600-60037
Mobil 1 synthetic oil	G6600-85001
Oil mist filter for RV5 pump	G6600-80043
Oil, Edwards Ultragrade for RV3 and RV5 pumps	G6600-85002
O-ring, 1.301 in. ID	G6600-80051
Ozone destruction chemical trap	G6600-85000
Replacement oil coalescing filter for oil mist filter	G6600-80044
Sulfur chemiluminescence test sample	G2933-85001
Sulfur trap	G2933-85003
For carrier H ₂ and air gases; one required for each cylinder of gas (3 total)	
Spare column nut and ferrule kit	G6600-80018

Miscellaneous Instrument Parts and Supplies

Description	Part No.
Oven exhaust deflector for 6890	G1530-80650
Oven exhaust deflector for 6850	G2630-60710

GC Standards

GC Qualitative Standards

Description	Part No.
Qualitative Simulated Distillation Standards	
Boiling Point Calibration Sample No. 1	5080-8716
Low Boiling Point Calibration Sample No. 220	5080-8768
Boiling Point Calibration Sample No. 320	5080-8769
PolyWax 500, 1 g, neat	5188-5316
PolyWax 655, 1 g, neat	5188-5317
Qualitative Petrochemical Standards	
Alcohol in Gasoline Sample	18900-60640
Natural Gas Sample	5080-8756
Transformer Gas Sample	5080-8759
Refinery Gas Sample	5080-8755
Reference Gas Oil No. 1, Batch 2	5060-9086
Miscellaneous Qualitative Standards	
Nickel Catalyst Test Sample	19354-60510
Nickel Catalyst refill	5080-8761
MIDI System Calibration Standard	19298-60500
Oral Fluids Analyzer Test Sample	G1540-85010



GC/MS Parts and Supplies

Your mass spectrometer is a sensitive, specialized device that delivers a higher level of functionality than other GC detectors. To continue achieving optimal results, it is critical to maintain your system properly by performing the essential tasks within this section. Some of the benefits of maintaining your GC/MSD include:

- Less downtime for repairs
- Longer lifetime for your MSD system
- Reduction in overall operating costs

It is advisable to keep a log book of system performance, Autotune, and maintenance operations performed. This makes it easier to identify variations from normal performance and to take corrective action.

Maintenance Schedule

Task	Every week	Every 6 months	Every year	As needed
Tune the MSD				◆
Change injection port liners	◆			
Check the foreline pump oil level	◆			
Gas ballast the foreline pump	◆			
Check the calibration vial		◆		
Replace the foreline pump oil		◆		
Check the diffusion pump fluid	◆			
Replace the diffusion pump fluid			◆	
Replace the dry pump diaphragm seals (MVP55)				◆
Replace the dry pump tip seals (IDP3)			◆	
Replace the traps and filters			◆	
Clean the ion source				◆
Change the carrier gas trap(s) and purifier				◆
Replace worn out parts				◆
Lubricate seals (where appropriate)				◆
Replace column				◆



For in-depth information about maintaining your GC/MS, request *"Maintaining Your Agilent GC and GC/MS Systems"* from your Agilent Representative (**publication number 5990-5451EN**).



MSD Contamination

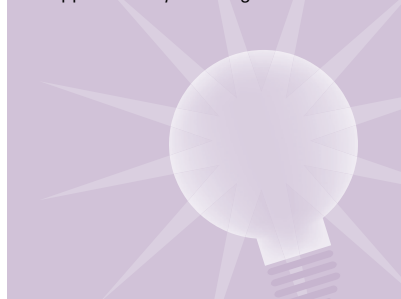
Contamination is usually identified by excessive background in the mass spectra, which can come from the GC or MSD. The source of contamination can sometimes be determined by identifying the contaminants. Some contaminants are much more likely to originate in the GC, while others are likely to originate in the MSD.

MSD Contamination Identification

The following table lists some of the more common contaminants, the ion characteristics of those contaminants, and the likely sources of those contaminants.

Tips & Tools

A crude sign of a "leak-free" MS system is when the ion ratio of m/z 28 (nitrogen) over m/z 32 (oxygen) is approximately two or greater.



Common Contaminants

Ions (m/z)	Compound	Possible Source
13, 14, 15, 16	Methane	CI gas
18, 28, 32, 44 or 14, 16	H ₂ O, N ₂ , O ₂ , CO ₂ , CO ₂ or N, O	Residual air and water, air leaks, outgassing from Vespel ferrules
31, 51, 69, 100, 119, 131, 169, 181, 214, 219, 264, 376, 414, 426, 464, 502, 576, 614	PFTBA and related ions	PFTBA (tuning compound)
31	Methanol	Cleaning solvent
43, 58	Acetone	Cleaning solvent
78	Benzene	Cleaning solvent
91, 92	Toluene or Xylene	Cleaning solvent
105, 106	Xylene	Cleaning solvent
151, 153	Trichloroethane	Cleaning solvent
69	Foreline pump fluid or PFTBA	Foreline pump oil vapor or calibration valve leak
73, 147, 207, 221, 281, 295, 355, 429	Dimethylpolysiloxane	Septum bleed or methyl silicone column coating
77, 94, 115, 141, 168, 170, 262, 354, 446	Diffusion pump fluid	Diffusion pump fluid and related ions
149	Plasticizer (phthalates)	Vacuum seals (O-rings) damaged by high temperatures, use of vinyl or plastic gloves
Peaks spaced 14 amu apart	Hydrocarbons	Fingerprints, foreline pump oil

Cleaning and Maintenance Supplies

Description	Part No.
One Year Maintenance Kit (for diffusion pump systems) Includes Big Universal Trap for He (1/8 in.), abrasive sheets (5/pk), lint-free cloths (15/pk), cotton swabs (100/pk), SantoVac Ultra, 18.5 mL (2 each), rough pump oil (1 L), filament assembly, octafluoronaphthalene (OFN)	5183-2096
Nylon gloves, lint-free, large, 1 pair	8650-0030
Nylon gloves, lint-free, small, 1 pair	8650-0029
Lint-free industrial wipes, 100% cotton, 9 x 9 in., 300/pk	9310-4828
Ion source cleaning kit Includes lint-free cloths (15/pk), abrasive sheets (5/pk), cotton swabs (100/pk), lint-free nylon gloves, abrasive Alumina powder	5181-8863
Cloths, lint-free, 15/pk	05980-60051
Cotton swabs, 100/pk	5080-5400
Abrasive sheets, aluminum oxide green lapping paper, 600 mesh, 5/pk	5061-5896
Alumina powder, abrasive, 1 kg	8660-0791
PFTBA sample, certified, 10 g, 5.32 mL	8500-0656
Replacement glass bulb for PFTBA and PFDTD test sample	G3170-80002
Replacement glass vial for PFTBA and PFDTD test sample	05980-20018
Activated alumina, absorbent pellets for Edwards rough pump traps, non-LC/MS, 1 lb can	8500-1233
MSD Tool Kit, 5975/5973 Includes source hold tool, lint-free cloth, cotton swabs, lint-free nylon gloves, abrasive sheets, wrenches and driving tools	G1099-60566
MSD Tool Kit, 5972/5971 Includes small cleaning rod, large cleaning rod, source hold tool, cotton swabs, lint-free nylon gloves, abrasive sheets, wrenches and driving tools	05971-60561
MS Interface Supplies	
MS interface column nut, female	05988-20066
Inlet column nut for long or long two-hole ferrules	05921-21170
Universal column nut, 2/pk	5181-8830
MS interface column installation tool for 5973 and 5975	G1099-20030
Column installation tool for 5975T	G3880-20030

(Continued)



MS interface column nut, 05988-20066



Universal column nut, 5181-8830



Column installation tool, G1099-20030



Vespe/Graphite ferrules, 5181-3323

Cleaning and Maintenance Supplies

Description	Part No.
Tools	
Screwdriver, 3 in. Pozidriv shaft No. 1 pt, fits no. 2-4 screws	8710-0899
Screwdriver, 4 in. Pozidriv shaft No. 2 pt, fits no. 5-10 screws	8710-0900
Open end wrench, 1/4 and 5/16 in.	8710-0510
Hex nut driver, 5.5 mm	8710-1220
Screwdriver, Torx T20	8710-1615
Screwdriver, Torx T15	8710-1622
Screwdriver, Torx T10	5182-3466
Ferrules	
0.4 mm Vespe/Graphite ferrule for 200/250 μ m columns, 10/pk	5062-3508
0.5 mm Vespe/Graphite ferrule for 320 μ m columns, 10/pk	5062-3506
250 μ m Vespe/Graphite ferrule, 10/pk	5181-3323
SilTite metal ferrules for 1/16 in. OD tubing, 10/pk Includes 2 column nuts	5184-3571
SilTite metal ferrules, 1/16 in. x 0.4 mm ID, 10/pk Includes 2 column nuts	5184-3569
SilTite metal ferrules, 1/16 in. x 0.5 mm ID, 10/pk Includes 2 column nuts	5184-3570
Ferrule pre-swaging tool	G2855-60200
Plug for microfluidic manifold or unions	G2855-60570

Tips & Tools

Even preconditioned ferrules can shrink slightly at very high temperatures. If leak problems persist upon a new column installation, check this fitting first.





Electron Impact (EI) Ion Source

Ion Source

The ion source operates by electron ionization (EI) or chemical ionization (CI). The sample enters the ion source from the GC/MSD interface. Electrons emitted by a filament enter the ionization chamber, guided by a magnetic field. The high-energy electrons interact with the sample molecules, ionizing and fragmenting them. The positive voltage on the repeller pushes the positive ions into the lens stack, where they pass through several electrostatic lenses. These lenses concentrate the ions into a tight beam, which is directed into the mass filter.

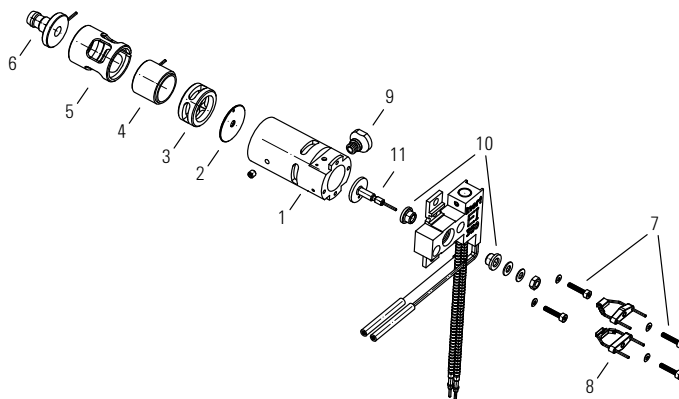
Electron Impact (EI) Ion Source

The recommended cleaning material for the EI ion source is abrasive, aluminum oxide powder.

Do not immerse filaments or lens insulators in solvent. If insulators are dirty, clean them with a cotton swab dampened with reagent-grade methanol. If that does not clean the insulators, replace them.

5975/5973 MSD Electron Impact Ion Source Parts (EI)

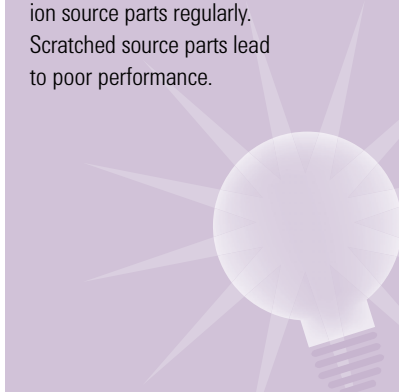
Item	Description	Part No.	Inert Part No.
1	Ion source body	G1099-20130	G2589-20043
2	Drawout plate, 3 mm	05971-20134	G2589-20100
	Drawout plate, 6 mm	G3163-20530	G2589-20045
3	Drawout cylinder	G1072-20008	G1072-20008
4	Ion focus lens	05971-20143	05971-20143
5	Lens insulator	G3170-20530	G3170-20530
6	Entrance lens	G3170-20126	G3170-20126
7	Cap screw, gold plated	G1999-20021	G1999-20021
8	High temperature filament	G2590-60053	G2590-60053
9	Transfer line socket	G1099-20136	G1099-20136
10	Repeller insulator	G1099-20133	G1099-20133
11	Repeller	G1099-20132	G2589-20044



5975/5973 MSD Electron Impact (EI) ion source assembly

Tips & Tools

It is good practice to replace scratched lenses and other ion source parts regularly. Scratched source parts lead to poor performance.

**5972/5971/GCD MSD Ion Source Parts (EI)**

Description	Part No.
Entrance lens	05971-20126
Lens insulator	G3170-20530
Ion focus lens	05971-20143
Drawout cylinder	G1072-20008
Drawout plate, 3 mm	05971-20134
Set screw	0515-1446
Repeller assembly	05971-60170
Screw for filament on the source	0515-1046
Transfer line tip, gold plated	05971-20305

Warnings & Caution

Important: Do not abrasively or ultrasonically clean the insulators.

Abrasively clean the surfaces that contact the sample or ion beam. Use an abrasive slurry of alumina powder and reagent-grade methanol on a cotton swab. Use enough force to remove all discoloration. Polishing the parts is not necessary; small scratches will not harm performance. Abrasively clean discoloration where electrons from filaments enter the source body.

Take care to avoid contaminating cleaned and dried parts. Put on new, clean gloves before handling the parts. Do not put the cleaned parts on a dirty surface. Place them only on clean, lint-free cloths.



Tips & Tools

Visual appearance is not an accurate guide to cleanliness of the CI ion source. The CI ion source can show little or no discoloration, yet still need cleaning.

Chemical Ionization (CI) Ion Source

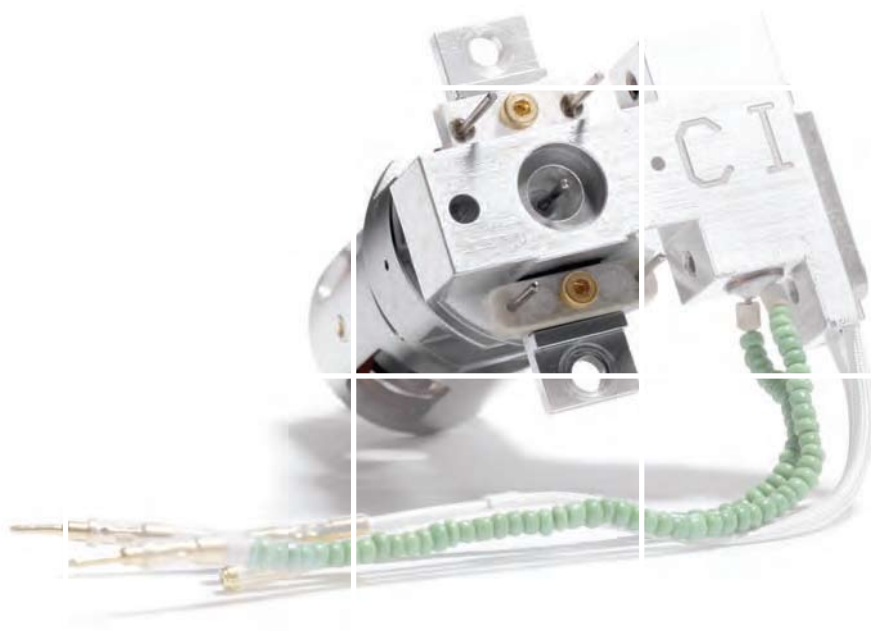
Because the CI ion source operates at much higher pressures than the EI ion source, it will probably require more frequent cleaning than the EI ion source.

The source should be cleaned whenever there are performance anomalies that are associated with a dirty ion source. Let analytical performance be your guide.

When cleaning the CI ion source, concentrate on the CI repeller, ion source body, and drawout plate. Be sure to clean the 0.5 mm diameter holes in the ion source body and drawout plate.

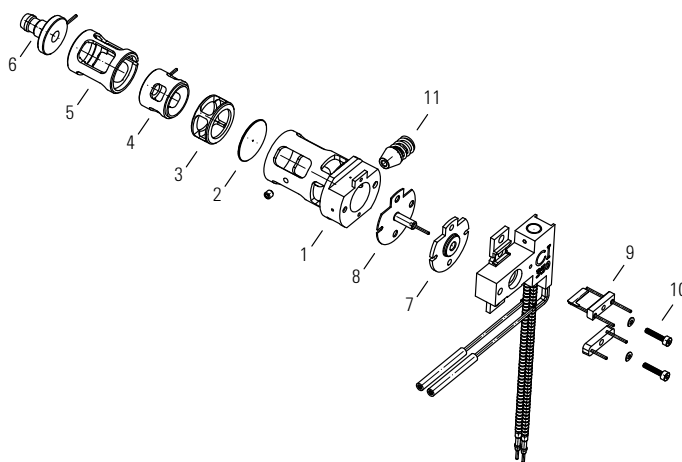
Cleaning the ion source is very similar to cleaning the EI ion source. Use the same EI cleaning procedure with the following exceptions:

- The CI ion source may not look dirty, but deposits left by chemical ionization are very difficult to remove. Clean the CI ion source thoroughly.
- Use a round wooden toothpick to gently clean out the electron entrance hole in the source body and the ion exit hole in the drawout plate.
- Do not use halogenated solvents. Use hexane for the final rinse.



5975/5973 MSD Chemical Ionization Ion Source Parts (CI)

Item	Description	Part No.
1	Source body	G1999-20430
2	Drawout plate	G1999-20446
3	Drawout cylinder	G1999-20444
5	Ion focus lens	G1999-20443
4	Lens insulator	G3170-20540
6	Entrance lens	G3170-20126
7	Repeller insulator	G1999-20433
8	Repeller	G1999-20432
9	High temperature filament	G1099-80053
10	Cap screw, gold plated	G1099-20021
11	Interface tip seal/spring	G1999-60412



5975/5973 MSD Chemical Ionization (CI) ion source assembly

QuickSwap MS Interface Restrictors

Agilent's QuickSwap Capillary Flow Technology module and pre-swaged fused silica tubing restrictors can increase the productivity of your Agilent 5973N and 5975 Inert MSD Systems, allowing you to change columns without venting the MSD. QuickSwap not included.

These restrictors are prefabricated for convenience and ease-of-use. For applications requiring other restrictor sizes, Agilent offers a wide variety of deactivated fused silica tubing, SilTite ferrules and swaging tools.

QuickSwap MS Interface Restrictors

Description	ID (mm)	Unit	Part No.
QuickSwap restrictor	0.092	4/pk	G3185-60361
QuickSwap restrictor	0.100	4/pk	G3185-60362
QuickSwap restrictor	0.110	4/pk	G3185-60363
QuickSwap restrictor	0.120	4/pk	G3185-60364
QuickSwap restrictor variety pack, 2 each of the above ID restrictors			G3185-60300

SilTite Metal Ferrules

Description	Unit	Part No.
For use with 0.25 mm ID capillary columns	10/pk	5188-5361
For use with 0.32 mm ID capillary columns	10/pk	5188-5362
For use with 1/16 in. OD stainless steel tubing Includes 2 column nuts	10/pk	5184-3571
For use with 0.53 mm ID capillary columns	10/pk	5188-5363



Filament assembly (EI), G3170-60050

MSD Filaments

Like the filaments in an incandescent light bulb, the ion source filaments will eventually burn out. Certain practices will reduce the chance of early failure.

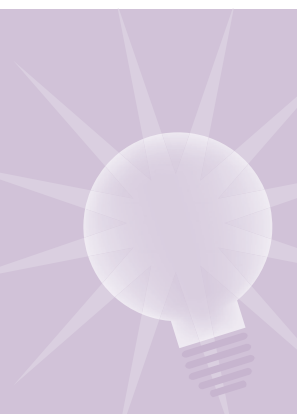
- When setting up data acquisition parameters, set the solvent delay so that the analyzer will not turn on while the solvent peak is eluting
- When the software prompts 'Override solvent delay at the beginning of a run' always select 'No'
- Higher emission current will reduce filament life
- If you control your MSD from the Edit Parameters screen, always select 'MS Off' before changing any of the filament parameters

MSD Filaments

Description	5975 Series	5975T Series	5973 Series	5972 Series	5971 Series
Filament assembly (EI)	G3170-60050		G3170-60050	G3170-60050	05971-60140
Filament assembly (CI)	G1099-80053		G1099-80053		
Micro ion vacuum gauge	G3170-80001				
Triode gauge tube for measuring vacuum			0960-0897		
Ion gauge controller		G3880-80010			
Ion gauge tube		G3880-80011			

Tips & Tools

It is very useful to switch from one filament to the other every three months so that when a filament fails, you know the other will fail soon. This will allow you to change both filaments at the same time. Since the GC/MS system is already vented, it's a good idea to replace other supplies in the flowpath at the same time as the filaments.





Electron multiplier replacement horn

MSD Electron Multipliers and Replacement Horn

The lifetime of an electron multiplier is directly related to the current that flows through it and the extent of contamination or condensation that it experiences. Replace the electron multiplier or replacement horn when voltage is over 2500 V. To maximize electron multiplier life:

- Maintain the best possible vacuum, especially in the analyzer manifold
- Use extreme caution and be conservative with venting, pumpdown, and all vacuum system procedures to keep pump fluid background to a minimum
- After venting, allow four hours for pumpdown and thermal equilibration before scanning
- Actively look for background contamination and leaks and repair them immediately
- Don't tune excessively – PFTBA can result in higher background over an extended period of time
- Replace the electron multiplier if vacuum is poor or voltage is over 2500 V

MSD Electron Multipliers and Replacement Horn

Description	5975 Series	5973 Series	5972/5971 Series
Electron multiplier replacement horn	05971-80103	05971-80103	05971-80103
Use with electron multipliers with "straight" horns			
Triple axis detector assembly*	G3170-80100		
Triple axis electron multiplier	G3170-80103		
EM signal wire, low noise detector	G3170-80008		
High energy dynode		G1099-80001	
Electron multiplier			05971-80102

*Included on 5975 triple axis detector systems

Tips & Tools

The Agilent multipliers and horns listed are recommended for your MSD. Other manufacturers' products may be incompatible with Agilent instruments and can result in reduced sensitivity, lifetime, and noise problems.





Foreline Pump

Vacuum Systems and Pumps

Diffusion Pump

It is not necessary to change the diffusion pump fluid more than once a year, unless you observe symptoms that suggest a problem with the fluid. The MSD must be vented in order to check the diffusion pump fluid (except for the 5975/5973). Therefore, the best time to check the fluid is when the instrument is already vented for other maintenance.

Foreline Pump

The oil in the foreline or rough pump should be replaced on average once every six months, but can vary depending upon applications. If a foreline trap is present, the molecular sieves should also be replaced after an oil change.

Avoid contact with the pump oil. The residue from some samples may be toxic. Dispense of used oil properly.

Pump Oils

Description	Part No.
Foreline pump oil, Inland 45, 1 L	6040-0834
High vacuum grease, 25 g	6040-0289
Diffusion pump fluid, 18.5 mL	6040-0809*
IDP Series tip seal kit for 5975T	IDP3TS

*2 required for 5975 and 5973 Series



7000A Triple Quadrupole GC/MS Parts and Supplies

Engineered from the ground up for ease-of-use and routine high performance operation, the 7000A Triple Quadrupole GC/MS delivers advanced high-speed GC/MS/MS quantitation for ultra-trace analysis of even the most complex samples. Combined with the Agilent 7890 GC, the result is an optimally robust GC/MS/MS system.

Gas Filters

Description	Part No.
Chemical Ionization Gas Purifier	G1999-80410
Big Universal Trap, 1/8 in. fittings, Helium (Ar/Me)	RMSH-2
Big universal trap, 1/8 in. fittings, Nitrogen	RMSN-2
Mounting clip	UMC-2

Foreline Pump Supplies

Description	Part No.
Diffusion pump fluid, 18.5 mL	6040-0809
Foreline pump oil, P3, 0.5 L	6040-0621
Rough pump inlet flange	0905-1463
Oil return kit	3162-1057
Pump oil drip pan	G1946-00034
Oil mist exhaust filter	G1099-80039
Oil mist filter for RV5 pump	G6600-80043



Low noise EM horn, G3170-80103



Filament assembly (EI), G3170-60050

Maintenance Supplies

Description	Part No.
Abrasive sheets	5061-5896
Alumina powder, abrasive, 1 kg	8660-0791
Cloths, lint-free	05980-60051
Lint-free industrial wipes, 100% cotton	9310-4828
Cotton swabs	5080-5400
Nylon gloves, lint-free, large	8650-0030
Nylon gloves, lint-free, small	8650-0029
High vacuum grease, 25 g	6040-0289
Electron multiplier replacement horn	05971-80103
Low noise EM horn	G3170-80103
Filament assembly, high temperature (EI)	G3170-60050
Filament assembly (CI)	G1099-80053
Micro ion vacuum gauge	G3170-80001
Replacement glass bulb for PFTBA and PFDTD test sample	G3170-80002



240-MS Ion Trap Parts and Supplies

The Agilent 240-MS Ion Trap delivers unparalleled capabilities for both research and routine applications. Advanced ionization, including positive and negative chemical ionization, improves selectivity and limits of detection. Enhanced scanning techniques ensure compound confirmation. The MS/MS and MSⁿ reduce matrix influences and provide more detailed structural information. The software comes with a full complement of productivity, reporting, and regulatory compliance tools.

- Accurate identification and quantification of trace analytes
- Unsurpassed sensitivity (200 femtogram OFN full scan)
- Choice of internal or external ionization configurations
- Powerful MS/MS and CI options
- Low maintenance and high reliability
- Intuitive software for increased productivity

240-MS Ion Trap Parts and Supplies

Description	Part No.
Manifold O-ring	393010924
Transfer line inner O-ring	393010920
Transfer line outer O-ring	393010918
Internal filaments (2 filaments on one disk)	392017401
Internal transfer line tip	393171201
External filament (single filament)	393161001
Electrode, end cap, Silchrom	393164493
Electrode set kit, Silchrom, DFC (inert) tested	9300003590
Includes 2 end cap electrodes, 1 RF electrode, cleaning instructions	
Electrode, RF, Silchrom	393167593
Spacer, RF, Silco-quartz	393053502
Electron multiplier	393175101
Transfer line assembly upgrade field kit	393101291
Contains a complete transfer line and side-mounted block for vacuum manifold	
EPA volatile kit for EPA methods 524.2 & 8260B	393082491
ChromatoProbe microvials, 100/pk	392567111

240-MS Ion Trap Parts and Supplies

Description	Part No.
GC/MS Standards	
Evaluation standard (Internal EI & CI) 2 pg/μL OFN, 5 pg/μL	393112601
Test standard for external EI (5 pg/μL OFN)	393112702
Benzophenone CI sensitivity standard 50 pg/mL	392030500
Test standard for external NCI (1 pg /μL DFB)	393113001
Tuning calibration compound PFTBA (FC-43)	392035300
GC/MS column test mix	392027300
Vacuum Supplies	
Oil mist exhaust filter, DS42	393847701
Oil mist eliminator	2735000500
Replacement cartridge for oil exhaust filter, 2/pk	2710100200
Foreline (roughing) pump oil, 1 L	8829951700
Premium foreline (roughing) pump oil, 1 L	8829953800
IDP-3 dry scroll pump tip seal maintenance kit	2710100400
IDP-3 dry scroll replacement module	2710100500





220-MS Parts and Supplies

The 220-MS is a high sensitivity, flexible gas chromatograph/mass spectrometer that delivers outstanding qualitative and quantitative data in a range of applications. This simple and robust system is easy to operate and maintain.

- Accurately identify and quantify trace analytes
- Take advantage of powerful CI and MS/MS upgrades for advanced applications
- Spend less time on maintenance and more time on analysis

220-MS Parts and Supplies

Description	Part No.
Electron multiplier assembly	393031501
Exit end cap electrode, chrome	393050292
Exit end cap electrode, SilChrom	393050293
Filament end cap electrode, chrome	393050392
Filament end cap electrode, SilChrom	393050393
RF ring electrode, chrome	393050492
RF ring electrode, SilChrom	393050493
Complete set of SilChrom electrodes and Silco-quartz spacers	393001991
Spacer, RF, quartz	393053501
Spacer, RF, Silco-quartz	393053502
Filament disk assembly with wire connectors	393060191
Filament disk assembly	392043700
User must solder on 3 wire connectors	
Thermocouple vacuum gauge	2722990700
Mass spectrometer expendable supplies kit for 2x0MS	393011391
Includes PFTBA calibration compound, cal-gas glass chamber, capillary injector nut, O-rings, cotton tipped applicators, end cap insulator, vacuum pump oil	
GC/MS Standards	
Hexachlorobenzene EI sensitivity standard 100 pg/mL	392027500
Benzophenone CI sensitivity standard 50 pg/mL	392030500
Tuning calibration compound PFTBA (FC-43)	392035300
Hexachlorobenzene EI sensitivity standard 2 pg/mL	392047100
GC/MS column test mix	392027300



MS standards

GC/MS Standards

GC/MS Analyzer Kit Standards

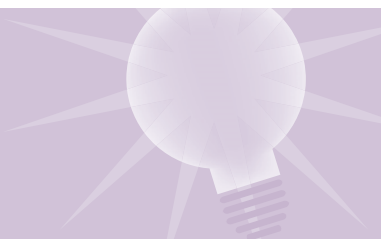
Description	Part No.
GC/MS semivolatiles analyzer checkout mixture	5190-0473
GC/MS pesticide analyzer internal standard	5190-0472
Pesticide analyzer checkout solution	5190-0468
Pesticide checkout standard, 100 µg/L, 3 x 1 mL	5190-0494
GC/MS toxicology checkout mixture	5190-0471
Residual solvent revised method 467, class C	5190-0493
Residual solvent revised method 467, class 1	5190-0490
Butanetriol internal standard #1 for biodiesel	5982-0024
Tricaprin internal standard #2 for biodiesel	5982-0025

MS Test and Performance Samples

	Description	Part No.	5975 Series	5973 Series	5972 Series	5971 Series	GCD	7000 Series
Tuning Samples								
El Tune	PFTBA sample, certified, 10 g, 5.32 mL	8500-0656	◆	◆	◆	◆	◆	◆
CI Tune	PFTBA MS Sample Kit, 0.942 g, 0.5 mL	05971-60571	◆	◆			◆	◆
	PFTD calibrant	8500-8510	◆	◆				◆
Performance Verification Samples								
EI	OFN, 1 pg/μL	5188-5348	◆	◆				
	Hexachlorobenzene 10 pg/μL, 1 ng/μL	8500-5808			◆			
	Methyl stearate (in methanol); 1 ng/μL, 2 ea	05990-60075				◆		
	Sample A, 10 ng/μL	05970-60045					◆	◆
Negative Mode CI	OFN, 100 fg/μL	5188-5347	◆					
Positive Mode CI	Benzophenone, 100 pg/μL	8500-5440	◆	◆	◆	◆		◆
Checkout Samples								
HighMass	PHFT, 100 pg/μL	5188-5357	◆					
Semi-Volatile	GC/MS tuning standard, DFTPP	8500-5995	◆	◆	◆	◆	◆	
Volatile	p-Bromofluorobenzene (BFB), 25 μg/mL	8500-5851	◆	◆	◆	◆	◆	
Evaluation sample	Solution of dodecane, biphenyl, p-chlorodiphenyl, and Methyl palmitate in isooctane. Six 1.0 mL ampoules: 4 at 10 ng/μL, 1 at 100 ng/μL, 1 at 100 pg/μL.	05970-60045	◆	◆	◆	◆		

Tips & Tools

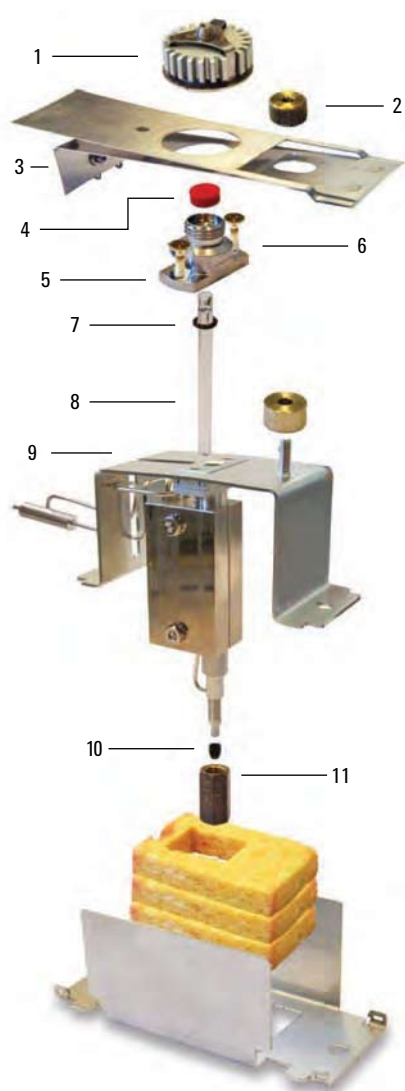
Each GC/MS has a specific test and performance sample. Refer to the chart above for the exact sample. All volumes are approximately 0.5-1 mL unless otherwise specified.



GC Parts and Supplies for Varian Instruments

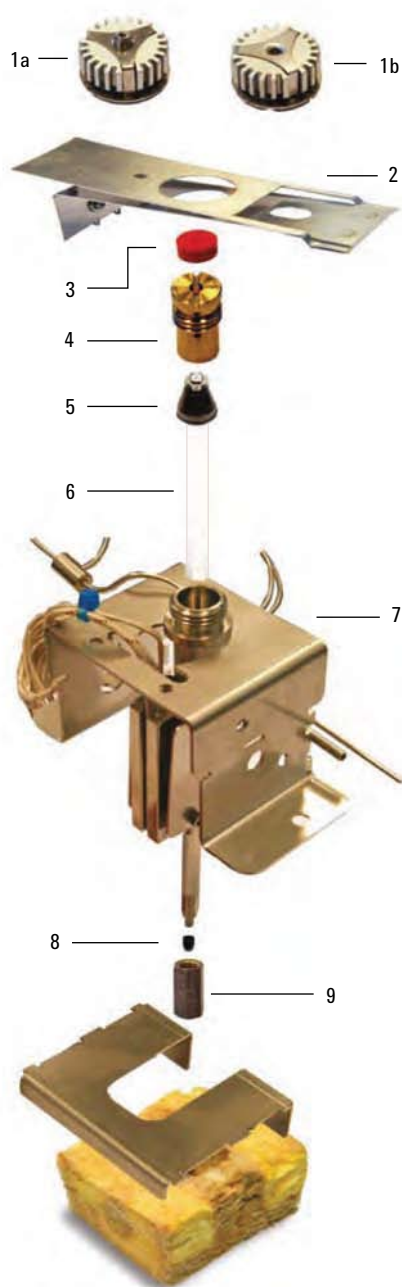
Agilent now provides replacement parts and supplies for GC instruments formerly manufactured by Varian. The following section includes ordering information for GC injectors, detectors and GC/MS systems.

Injector Replacement Parts and Supplies



1177 Split/Splitless Injector

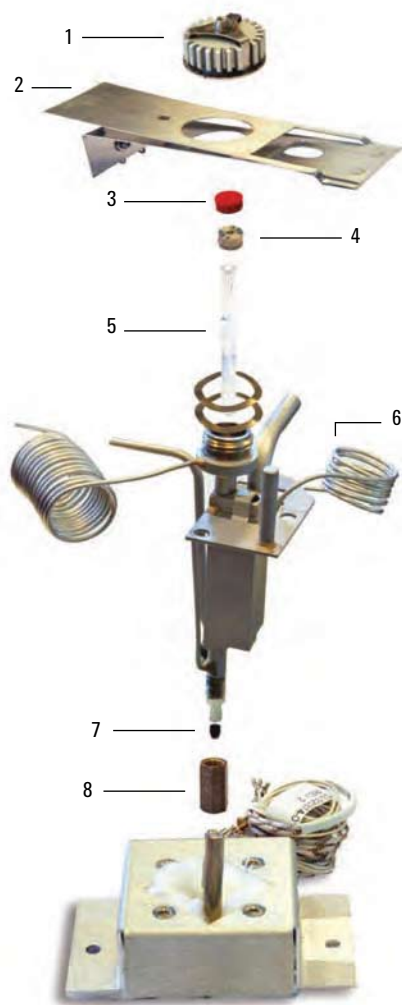
Item	Description	Part No.
1	Injector nut	392597501
	Injector nut wrench	390842300
2	Knob	392597101
3	Automatic start switch	390820601
4	Septum, 9 mm	
	BTO	8010-0217
	Long Life	8010-0233
	Advanced Green	8010-0201
	Septum pick	7200008400
5	Septum purge head	
	EFC21 (stainless steel)	392597301
	EFC21 (UltiMetal)	392597303
	EFC25 or Manual Pneumatics	392597302
6	Purge head screw	391866308
7	Graphite liner O-ring, splitless, 6.5 mm	8004-0202
	Viton liner O-ring, 6.3 mm	8004-0201
8	Glass liner	8004-0165
9	Injector body	
	Stainless steel	392599401
	UltiMetal	392599411
	Manual	392599501
10	For replacement ferrules, see Agilent's new line of CrossLab Supplies	
11	Bottom nut	8004-0311

**1079 Large Volume Injector (LVI)**

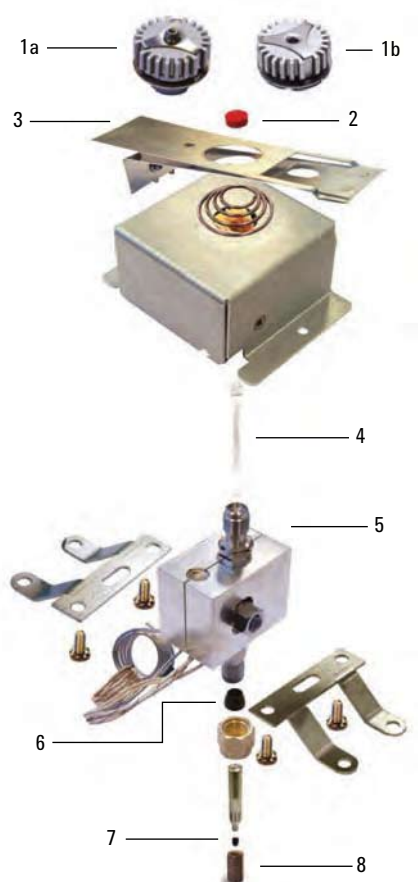
Item	Description	Part No.
1a	Injector nut	394966601
1b	Injector nut	394966601
	Injector nut wrench	390842300
2	Automatic start switch	390820601
3	Septum, 11.5 mm	
	BTO	8010-0225
	Long Life	8010-0241
	Advanced Green	8010-0209
	Septum pick	7200008400
4	Septum support	391867600
5	Insert ferrule	8004-0204
6	Glass liner	8004-0164
7	Injector body, EFC type	
	Stainless steel	392544001
	UltiMetal	392544011
8	For replacement ferrules, see Agilent's new line of CrossLab Supplies	
9	Bottom nut	8004-0311

To learn more about Agilent CrossLab and to request your copy of the Agilent CrossLab product catalog, visit www.agilent.com/chem/CrossLab

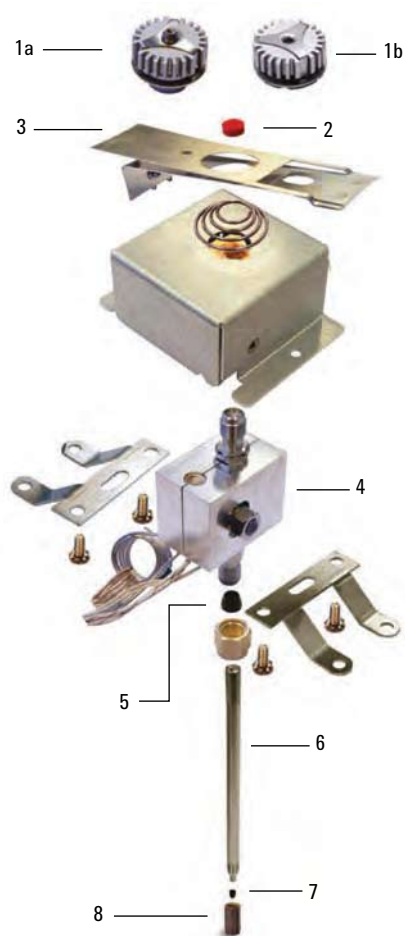


**1093 Cool On-Column (COC) Injector**

Item	Description	Part No.
1	Injector nut	394966601
	Injector nut wrench	390842300
2	Automatic start switch	390820601
3	Septum, 11.5 mm	
	BTO	8010-0225
	Long Life	8010-0241
	Advanced Green	8010-0209
	Septum pick	7200008400
4	Septum support	391821100
5	Glass liner	
	Default	8004-0162
	High performance	8004-0167
	On-column	8004-0166
6	Screw	391866306
7	Graphite/Vespel ferrule	8004-0217
	Graphite ferrule	8010-0305
8	Bottom nut	
	Brass	8004-0311
	Stainless steel	8004-0312

**1061 Packed/530 µm Capillary Column Injector**

Item	Description	Part No.
1a	Injector nut	390812700
1b	Injector nut	392595501
	Injector nut wrench	390842300
2	Septum, 9.5 mm	
	BTO	8010-0219
	Long Life	8010-0235
	Advanced Green	8010-0203
	Septum pick	7200008400
3	Automatic start switch	390820601
4	Glass liner	8004-0168
5	Injector body, EFC23	392548301
6	Graphite/Vespel ferrule	8004-0217
	Graphite ferrule	8010-0305
7	For replacement ferrules, see Agilent's new line of CrossLab Supplies	
8	Bottom nut	8004-0311

**1041 Packed/Wide Bore On-Column (PWOC) Injector**

Item	Description	Part No.
1a	Injector nut	390812700
1b	Injector nut	392595501
	Injector nut wrench	390842300
2	Septum, 9.5 mm	
	BTO	8010-0219
	Long Life	8010-0235
	Advanced Green	8010-0203
	Septum pick	7200008400
3	Automatic start switch	390820601
4	Injector body, EFC type	392548201
5	Graphite/Vespel ferrule	8004-0217
	Graphite ferrule	8010-0305
6	Injector insert, stainless steel	392543101
7	For replacement ferrules, see Agilent's new line of CrossLab Supplies	
8	Bottom nut	8004-0311

Detector Replacement Parts and Supplies

Thermal Conductivity Detector (TCD)

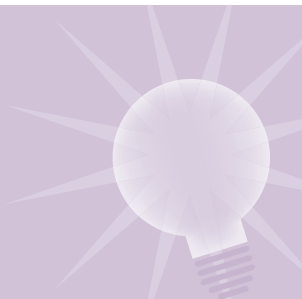
Description	Part No.
Adapter TCD/DEFC capillary make-up	392585291
Adapter TCD/DEFC reference gas kit	392585292
Adapter TCD capillary make-up, MPC, 3800	392560591
TCD DEFC 14 (Non-H ₂), 2 channels	392561290

Flame Ionization Detector (FID)

Description	Part No.
Tube collector	394958700
Lower FID insulator 17311	2100003200
FID flame tip jet, 0.010 in.	200187500
FID flame tip jet with nut, 0.020 in.	200193800
Crunch washer, 25/pk	1500334701

Tips & Tools

To learn more about Agilent's complete portfolio of services, please visit www.agilent.com/chem/services



Pulsed Flame Photometric Detector (PFPD)

Description	Part No.
Photomultiplier tube (PFPD) #R647-08	392517100
O-Ring, silicone, 0.53 in. ID, PFPD	2740292400
PFPD light pipe	392515500
Sapphire window assembly	392514500
Sapphire window washer	392514300
Wrench, PFPD combustor support	392519200
Seal, combustor support	392513800
Combustor holder (2 mm)	392517800
Combustor Sulfur (2 mm), cleaned	392517600
Holder, combustor, 3 mm, cleaned	392517901
Combustor Phosphorus, 3 mm, cleaned	392517700

PFPD Filter Assemblies

Description	Part No.
Arsenic (As)	392515105
Manganese (Mn)	392544391
Nitrogen (N)	392511901
Sulfur and Phosphorus (S and P)	392515104
Phosphorus (P)	392515102
Sulfur (S)	392515101
Tin (Sn)	392515103

PFPD Nitrogen Mode Maintenance

Description	Part No.
Photomultiplier tube, Nitrogen R-5070A	392512800
O-Ring, 0.987 in. ID	2740236100
PFPD filter assembly, Nitrogen	392511901
PFPD light pipe	392515500
Sapphire window assembly	392514500
Sapphire window washer	392514300

Thermionic Specific Detector (TSD)

Description	Part No.
TSD bead probe, unconditioned and untested	390607400
TSD bead probe, conditioned and tested	390607401
Upper TSD insulator #17310 TSD	2100003100
O-Ring, 30/pk	2740928202
TSD collector assembly	390607900
Lower FID insulator #17311	2100003200
Crunch washer, 25/pk	1500334701
FID flame tip jet with nut, 0.020 in.	200193800
Flow tube assembly	200187600

GC/MS System Replacement Parts and Supplies

210/220/225 GC/MS Systems

Description	Part No.
Electron multiplier assembly	393031501
Exit end cap electrode, chrome	393050292
Exit end cap electrode, SilChrom	393050293
Filament end cap electrode, chrome	393050392
Filament end cap electrode, SilChrom	393050393
RF ring electrode, chrome	393050492
RF ring electrode, SilChrom	393050493
Complete set of SilChrom electrodes and Silco-quartz spacers	393001991
Spacer, RF, quartz	393053501
Spacer, RF, Silco-quartz	393053502
Filament disk assembly with wire connectors	393060191
Filament disk assembly	392043700
User must solder on 3 wire connectors	
Thermocouple vacuum gauge	2722990700
Mass spectrometer expendable supplies kit for 2x0MS	393011391
Includes PFTBA calibration compound, cal-gas glass chamber, capillary injector nut, O-rings, cotton tipped applicators, end cap insulator, vacuum pump oil	
GC/MS Standards	
Hexachlorobenzene EI sensitivity standard 100 pg/mL	392027500
Benzophenone CI sensitivity standard 50 pg/mL	392030500
Tuning calibration compound PFTBA (FC-43)	392035300
Hexachlorobenzene EI sensitivity standard 2 pg/mL	392047100
GC/MS column test mix	392027300

240 GC/MS and 4000 GC/MS Systems

Description	Part No.
Manifold O-ring	393010924
Transfer line inner O-ring	393010920
Transfer line outer O-ring	393010918
Internal filaments (2 filaments on one disk)	392017401
Internal transfer line tip	393171201
External filament (single filament)	393161001
Electrode, end cap, SilChrom	393164493
Electrode set kit, SilChrom, DFC (inert) tested Includes 2 end cap electrodes, 1 RF electrode, cleaning instructions	9300003590
Electrode, RF, SilChrom	393167593
Spacer, RF, Silco-quartz	393053502
Electron multiplier	393175101
Transfer line assembly upgrade field kit Contains a complete transfer line and side-mounted block for vacuum manifold	393101291
EPA volatile kit for EPA methods 524.2 & 8260B	393082491
ChromatoProbe microvials, 100/pk	392567111
GC/MS Standards	
Evaluation standard (Internal EI & CI) 2 pg/μL OFN, 5 pg/μL	393112601
Test standard for external EI (5 pg/μL OFN)	393112702
Benzophenone CI sensitivity standard 50 pg/mL	392030500
Test standard for external NCI (1 pg /μL DFB)	393113001
Tuning calibration compound PFTBA (FC-43)	392035300
GC/MS column test mix	392027300
Vacuum Supplies	
Oil mist exhaust filter, DS42	393847701
Oil mist eliminator	2735000500
Replacement cartridge for oil exhaust filter, 2/pk	2710100200
Foreline (roughing) pump oil, 1 L	8829951700
Premium foreline (roughing) pump oil, 1 L	8829953800
IDP-3 dry scroll pump tip seal maintenance kit	2710100400
IDP-3 dry scroll replacement module	2710100500

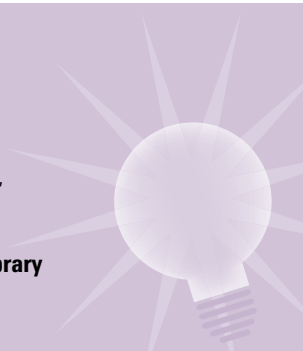
Saturn 2000 Series MS Systems

Description	Part No.
Mass spectrometer expendable supplies kit for 2x0MS Includes PFTBA calibration compound, cal-gas glass chamber, capillary injector nut, O-rings, cotton tipped applicators, end cap insulator, vacuum pump oil	393011391
Electron multiplier assembly	393031501
Filament disk assembly with wire connectors	393060191
Filament disk assembly User must solder on 3 wire connectors	392043700
Exit end cap electrode, SilChrom	393050293
Filament end cap electrode, SilChrom	393050393
RF ring electrode, SilChrom	393050493
Exit end cap electrode, chrome	393050292
Filament end cap electrode, chrome	393050392
RF ring electrode, chrome	393050492
Spacer, RF, quartz	393053501
Spacer, RF, Silco-quartz	393053502
Complete set of SilChrom electrodes and Silco-quartz spacers	393001991
GC/MS Standards	
Tuning calibration compound PFTBA (FC-43)	392035300
Benzophenone CI sensitivity standard 50 pg/mL	392030500
Hexachlorobenzene EI sensitivity standard 2 pg/mL	392047100
Hexachlorobenzene EI sensitivity standard 100 pg/mL	392027500
GC/MS column test mix	392027300

Tips & Tools

More information is a click away. We have a variety of educational primers, application notes, maintenance guides, and literature available from Agilent for free.

To learn more, visit www.agilent.com/chem/OnlineLibrary



■ AGILENT J&W GC AND GC/MS COLUMNS



A legacy of confidence: The continuing story of Agilent J&W GC Columns

In 2000, Agilent Technologies, the inventor of low-bleed HP-5ms columns, merged with J&W Scientific, the creator of DB-5ms – the first GC stationary phase to use arylene technology for lower column bleed.

Thanks to this partnership, you can find both the renowned HP and DB column families under the Agilent J&W name. And they're all brought to you by Agilent Technologies – a company with over 40 years of gas chromatography experience.

In 2010, a new chapter began with the addition of Varian, Inc.

This key acquisition enabled Agilent to expand its GC column portfolio to include three highly respected column families:

- FactorFour GC columns employ advanced proprietary manufacturing techniques to ensure low background and high signal-to-noise values for your routine or trace analysis.
- Select GC columns offer guaranteed performance for specific methods and applications.
- PoraBOND GC columns are highly retentive Porous Layer Open Tubular (PLOT) columns. Because they do not shed any particles, they can improve the quality of your data for volatile compounds.



The Agilent J&W column difference

Low bleed and high inertness for sensitivity and performance

Column bleed can decrease data integrity, reduce uptime, and shorten column life, while column activity contributes to severe peak tailing, compound loss, and degradation of active compounds, all of which raise detection limits and reduce method linearity.

Agilent J&W columns have the widest range of GC/MS and Ultra Inert stationary phases proven to deliver consistent column inertness, exceptionally low column bleed, and high upper temperature limits to ensure accurate peak identification and quantification, improved sensitivity, and extended linearity.

Better precision for better results and greater productivity

Every Agilent J&W GC column adheres to tight retention factor (*k*) specifications, promoting consistent retention and separation. They also feature narrow retention indexes and a high number of theoretical plates per meter, both of which provide narrow peaks, improve the resolution of closely eluting peaks, and simplify data interpretation.

The industry's tightest quality control specifications

Agilent's stringent testing ensures reliable qualitative and quantitative results — even for your most challenging compounds. For example, we measure peak height ratios for acids and bases to achieve top performance for the widest range of analytes.

In 2008, Agilent also ushered in a new era of column inertness QC testing with the industry's most rigorous test probe mixture.

Tighter GC Column Performance Criteria

Feature	Advantage	Benefit
Narrow Retention Index and Retention Factor Window	• Highest level of column-to-column reproducibility	• Confidence in analytical results
	• Minimal method adjustment when changing columns	• Improved sample throughput, reduced downtime
	• Specify J&W chemistry for intra-company methodologies	• Confidence in method transfer and intra-company results
Increased Plates per Meter	• Highest level of "resolving power" • Improved sample throughput	• Accurate quantification • Potentially shorter run times
Lowest Bleed	• Increased analytical sensitivity for all detectors	• Improved detection limits • Reliable compound identification
	• Fast baseline stabilization	• Minimized conditioning time
	• Faster column exchange	• Increased sample throughput
	• Excellent thermal stability	• Increased column lifetime, reduced downtime • Increased sample throughput
Highest Degree of Inertness	• Better peak shape for active compounds • Minimum compound adsorption	• Improved detection limit, more accurate quantification, and more instrument uptime • More accurate quantification for trace samples and unknown sample screening



Agilent J&W Ultra Inert GC Capillary Columns

The only GC columns that deliver on the promises of consistent column inertness and exceptionally low column bleed

Agilent J&W Ultra Inert GC columns give you outstanding sensitivity and peak shape, allowing you to confidently perform trace-level analysis of acids, bases, and other active compounds.

Like all Agilent columns, Ultra Inert GC columns undergo tight QC testing procedures. However, Ultra Inert columns must also pass through a more difficult set of test parameters, including:

- A demanding test probe mixture that contains compounds with low molecular weights, low boiling points, and no steric shielding of active functional groups, which prevents masking effects and reveals true column quality.
- Testing at lower isothermal temperatures (65°C vs. 120°C for GC/MS columns). Lower-temperature testing decreases the kinetic energy of probes in the mobile phase, preventing molecules from sweeping past active sites on the column. This allows a true evaluation of column surface activity and ensures consistent column inertness.

Together, these conditions enhance the opportunity for solute/column interactions, and expose column deficiencies that traditional GC/MS testing might not detect.

Agilent J&W High Efficiency GC Capillary Columns

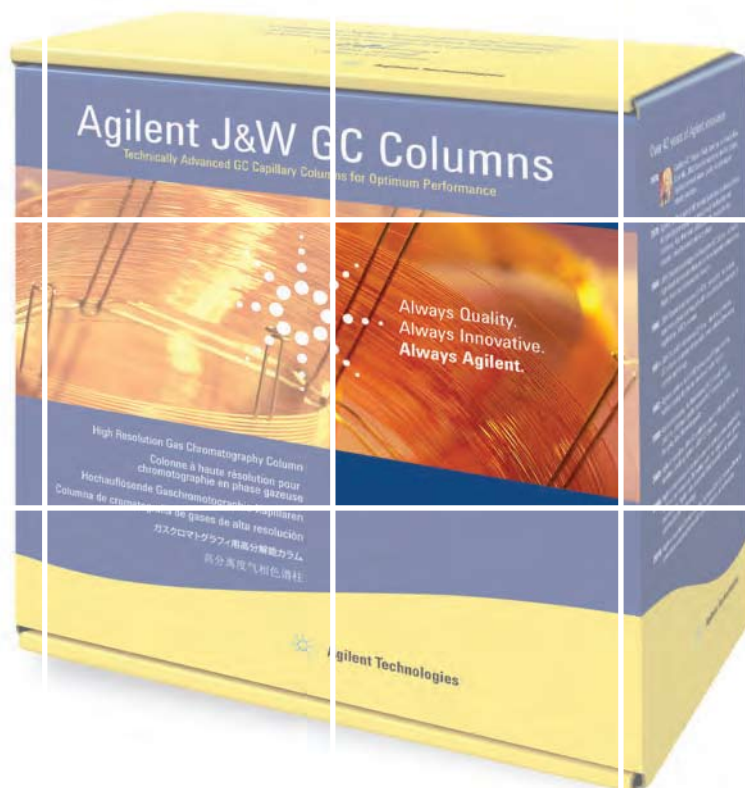
High efficiency, high throughput, and high resolution without the high costs

This leading-edge column technology is ideal for applications that require faster run times, such as high-throughput screening, fast process monitoring, and fast method development. In fact, Agilent High Efficiency columns can reduce your sample run time by 50% or more without compromising resolution.

Unlike other manufacturers' 0.1 mm ID columns, Agilent High Efficiency Capillary GC columns are compatible with all standard-pressure capillary GC and GC/MS instruments – without expensive high-pressure modifications. They also give you:

- The flexibility to choose between helium and hydrogen carrier gases. You can stay with a helium carrier if you wish to simplify method development, or switch to a hydrogen carrier to further reduce your analysis time.
- The ability to separate samples using less carrier gas, which can lead to longer intervals between cylinder changes, increased uptime, and a lower cost per sample.

In addition, these flexible columns easily adapt to a wide variety of environmental, petrochemical, flavor/fragrance, clinical toxicology, and pharmaceutical sample matrices.



Agilent J&W FactorFour GC Columns

Low-bleed performance for all areas of GC and GC/MS analysis

With Agilent J&W FactorFour columns, you get the throughput you need to analyze more compounds in less time — and the analytical accuracy you need to get the right results every time. They are manufactured from detailed specifications and high-quality materials to ensure the reproducibility, low bleed, and high inertness that today's applications demand.

FactorFour columns are available in a variety of general and application-specific phases — including VF-WAXms, the only GC/MS-compatible Wax column — to meet your lab's every requirement.

Double your sample throughput and reduce your cost per analysis with FactorFour 0.15 mm ID columns

In addition to standard dimensions, FactorFour columns are available in an extended range of 0.15 mm ID choices specifically designed to reduce run times and increase throughput.



Agilent J&W LTM Column Modules

Shorten analytical cycle times and boost your high speed gas chromatography capabilities

Agilent J&W LTM column modules combine a high quality fused silica capillary column with heating and temperature sensing components for a low thermal mass column assembly. The LTM column module contains a patented design which heats and cools the column very efficiently for significantly shorter analytical cycle times compared to conventional air-bath GC oven techniques, while simultaneously using less power.

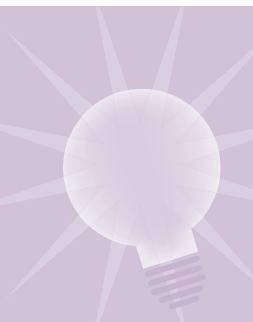
Agilent offers LTM technology for our popular 7890 and 6890 Series GC systems, as well as the new 5875T GC/MS.

All LTM column modules are packaged with:

- Two 1 m guard columns (one each for the inlet and detector) made from deactivated fused silica tubing of the same ID as the analytical column
- Five non-reusable ferrules that fit the dimensions of the analytical and guard columns

Tips & Tools

Agilent LTM column module technology is compatible with metal capillary columns. However, LTM modules are generally not recommended for fast GC applications because of their poor cooling performance compared to fused silica capillaries.





Agilent J&W LTM Column Modules for 7890 and 6890 GC Systems

This groundbreaking column technology is designed specifically for Agilent 7890A and 6890 series gas chromatographs, and delivers:

- The capacity to run up to four column modules simultaneously – with four different temperature programs – to maximize your productivity
- Rapid temperature programming rates of up to 1800°C/min for higher analysis speeds
- Faster cooling times – as low as one minute or less – to decrease idling and downtime
- Shorter analytical cycle times than conventional air-bath GC oven techniques
- Excellent retention time repeatability and performance – comparable to conventional GC
- Strong synergy with Agilent Capillary Flow Technology, which can enhance your ability to perform multi-dimensional and comprehensive GC
- The ability to use the same 6890/7890 GC injectors and detectors with little change to your existing methods

Most Agilent J&W Capillary GC columns – including Wall Coated Open Tubular (WCOT) and Porous Layer Open Tubular (PLOT) columns – can be used for LTM column modules.

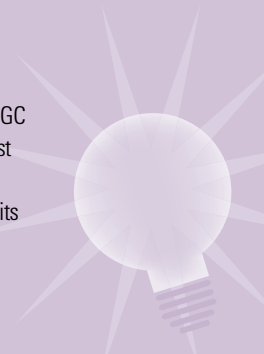
Module assemblies are available in two sizes that deliver equal chromatographic quality:

- 5 inch diameter (standard): features faster cooling speeds, and is recommended for most applications. The 5 inch format allows two column modules to be installed per Agilent LTM system, and can be used with any capillary GC column up to 30 m long.
- 3 inch diameter (small): enables multidimensional GC applications by allowing up to four column modules to be installed per Agilent LTM system. The 3 inch format is limited to capillary GC columns with a 0.32 mm or smaller ID, and is not recommended for fragile capillary columns or PLOT columns.

Module sizes can also be mixed; for example, you can use one 5 inch module with either one or two 3 inch modules.

Tips & Tools

LTM column modules should never be programmed beyond the GC column temperature limits recommended by Agilent. For very fast ramping applications (e.g. 600°C/min), limiting the maximum temperatures to 10-20°C below the GC column temperature limits can increase the lifetime of the column modules.



NEW!

Agilent J&W LTM Column Modules for 5975T Transportable GC/MS Systems

This groundbreaking column technology is designed specifically for Agilent 5975T GC/MS systems. These modules include integrated 3 inch LTM capillary column toroid assembly with heated transfer lines, cooling fan assembly and sheet metal enclosure. Replacement column toroid assemblies are also available. Benefits of the LTM column modules include:

- Rapid temperature programming rates of up to 1200°C/min
- Faster heating and cooling times — as low as one minute or less — for more rapid analytical cycle times than standard air-bath GC oven techniques
- Excellent retention time repeatability and performance comparable to conventional GC
- Less power consumption for longer in-field operation
- Integrated module design to facilitate easy column module change in the field

The entire assembly is leak tested and ready for installation into your Agilent 5975T instrument. LTM column modules for the 5975T include:

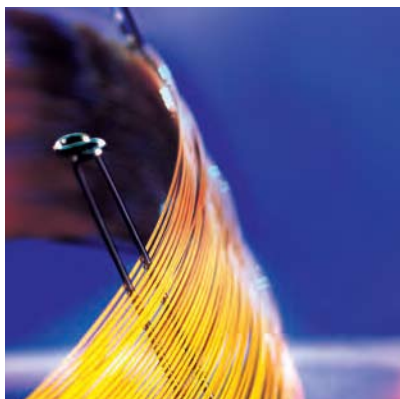
- 2 heated transfer lines
- Transferline base assembly
- 3 inch LTM column toroid assembly
- 2 ultimate unions
- Cooling fan assembly
- Sheet metal enclosure

For more information, visit www.agilent.com/chem/LTMcol



Agilent J&W LTM Column Modules for 5975T Transportable GC/MS Systems

Phase	ID (mm)	Length (m)	Film (µm)	Toroid Assembly	Column Module
DB-5ms Ultra Inert	0.18	20	0.18	221-5522UILTM	G3900-63014
	0.25	15	0.25	222-5512UILTM	G3900-63031
		30	0.25	222-5532UILTM	G3900-63005
HP-5ms Ultra Inert	0.18	20	0.18	29091S-577UILTM	G3900-63039
	0.25	15	0.25	29091S-431UILTM	G3900-63038
		30	0.25	29091S-433UILTM	G3900-63001
DB-1	0.25	30	0.25	222-1032LTM	G3900-63002
DB-1ms	0.18	20	0.18	221-0122LTM	G3900-63009
	0.25	15	0.25	222-0112LTM	G3900-63016
		30	0.25	222-0132LTM	G3900-63017
DB-1ht	0.25	15	0.10	222-1111LTM	G3900-63018
		30	0.10	222-1131LTM	G3900-63019
HP-1ms	0.18	20	0.18	29091S-677LTM	G3900-63040
	0.25	30	0.10	29091S-833LTM	G3900-63041
		15	0.25	29091S-931LTM	G3900-63042
DB-5ms	0.18	20	0.18	221-5522LTM	G3900-63013
	0.25	15	0.25	222-5512LTM	G3900-63030
		30	0.25	222-5532LTM	G3900-63004
DB-5ht	0.25	15	0.10	222-5731LTM	G3900-63033
		30	0.10	222-5711LTM	G3900-63032
HP-5ms	0.25	30	0.25	29091S-433LTM	G3900-63007
DB-35ms	0.18	20	0.18	221-3822LTM	G3900-63011
	0.25	15	0.25	222-3812LTM	G3900-63026
		30	0.25	222-3832LTM	G3900-63027
DB-17ms	0.18	20	0.18	221-4722LTM	G3900-63012
	0.25	15	0.25	222-4712LTM	G3900-63028
		30	0.25	222-4732LTM	G3900-63029
DB-225ms	0.25	15	0.25	222-2912LTM	G3900-63022
		30	0.25	222-2932LTM	G3900-63023
DB-1701	0.25	30	0.25	222-0732LTM	G3900-63003
DB-WAX	0.25	15	0.50	222-7013LTM	G3900-63034
		30	0.50	222-7033LTM	G3900-63035
HP-INNOWax	0.18	20	0.18	29091N-577LTM	G3900-63036
	0.25	30	0.25	29091N-133LTM	G3900-63008
DB-FFAP	0.25	15	0.25	222-3212LTM	G3900-63024
		30	0.25	222-3232LTM	G3900-63025
DB-608	0.18	20	0.18	221-6822LTM	G3900-63015
DB-VRX	0.18	20	1.00	221-1524LTM	G3900-63006
	0.25	30	1.40	222-1534LTM	G3900-63021
DB-624	0.18	20	1.00	221-1324LTM	G3900-63010
	0.25	30	1.40	222-1334LTM	G3900-63020
HP-VOC	0.20	30	1.12	29091R-303LTM	G3900-63037



Choosing a Capillary GC Column

The first step should always be to refer to what has already been done. Our chemists have put together a variety of resources to help you find the right column for your analysis.

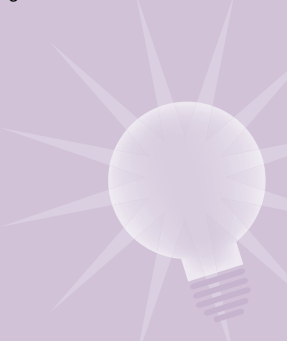
- **Chromatograms** – Find some of the more common chromatograms with column recommendations and method parameters for your reference in this catalog. For a more extensive chromatogram library and a compound search function, go to www.agilent.com/chem, then click Library.
- **Method Guides** – We've evaluated the most common Environmental/EPA methods, ASTM methods, USP methods and general compound analyses and compiled simple guides which specify the best column recommendation for these methods.
- **Retention Data Lists** – We've analyzed hundreds of compounds on several different phases to help you determine which column will be the best choice for your list of compounds.
- **Column Selection Guide** – Our *Agilent J&W GC Column Selection Guide* gives you helpful hints for choosing a stationary phase, selecting the right column dimensions, developing temperature programs and determining the right inlet and detector for the application. To order this guide, use publication number 5989-6159EN.

Our Technical Support Chemists have more than 100 years of combined experience running samples and developing methods. We are the gas chromatography column experts and we are at your disposal.

Send in questions via the Technical Support form on our website www.agilent.com/chem, via email at gc-column-support@agilent.com, or contact your local Agilent office or Authorized Agilent Distributor.

Tips & Tools

Agilent Ultra Inert Liners are the perfect companion to Agilent J&W Ultra Inert GC Columns, providing reproducible inertness liner after liner, maintained through a sequence of samples, and for a range of analytes. Turn to page 261.



Agilent J&W Ultra Inert Capillary GC Columns

- Individually tested with a unique, demanding test probe mixture
- Consistent column inertness performance
- Exceptionally low column bleed
- Great peak shapes for challenging active analytes
- Excellent signal-to-noise ratios
- Minimum compound adsorption or degradation
- Support of 0.18 mm ID column configuration for higher sample throughput

Ultra Inert Chromatograms

Environmental

Trace Level Polycyclic Aromatic Hydrocarbon (PAH) Analyses	Page 589
US EPA Method 8270 Short Mix	Page 589
US EPA Method 551.1	Page 590

Life Sciences

Benzodiazepines I	Page 671
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Food, Flavors and Fragrances

Lavender Oil Characterization	Page 622
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DB-1ms Ultra Inert

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.18	20	0.18	-60 to 325/350	121-0122UI	
0.25	15	0.25	-60 to 325/350	122-0112UI	122-0112UIE
	30	0.25	-60 to 325/350	122-0132UI	122-0132UIE
	60	0.25	-60 to 325/350	122-0162UI	
0.32	15	0.25	-60 to 325/350	123-0112UI	
	30	0.25	-60 to 325/350	123-0132UI	

HP-1ms Ultra Inert

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.18	20	0.18	-60 to 325/350	19091S-677UI	19091S-677UIE
0.25	15	0.25	-60 to 325/350	19091S-931UI	19091S-931UIE
	30	0.25	-60 to 325/350	19091S-933UI	19091S-933UIE
		0.50	-60 to 325/350	19091S-633UI	
		1.00	-60 to 325/350	19091S-733UI	19091S-733UIE
0.32	15	0.25	-60 to 325/350	19091S-911UI	
	25	0.52	-60 to 325/350	19091S-612UI	
	30	0.25	-60 to 325/350	19091S-913UI	19091S-913UIE
		1.00	-60 to 325/350	19091S-713UI	

DB-35ms Ultra Inert

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.18	20	0.18	50 to 340/360	121-3822UI
0.25	15	0.25	50 to 340/360	122-3812UI
	30	0.25	50 to 340/360	122-3832UI
0.32	15	0.25	50 to 340/360	123-3812UI
	30	0.25	50 to 340/360	123-3832UI

DB-5ms Ultra Inert

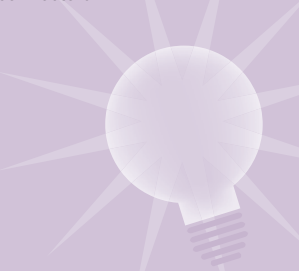
ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.18	20	0.18	-60 to 325/350	121-5522UI		121-5522UILTM	221-5522UILTM
		0.36	-60 to 325/350	121-5523UI		121-5523UILTM	
	40	0.18	-60 to 325/350	121-5542UI			
0.25	15	0.25	-60 to 325/350	122-5512UI		122-5512UILTM	222-5512UILTM
		1.00	-60 to 325/350	122-5513UI		122-5513UILTM	
	25	0.25	-60 to 325/350	122-5522UI		122-5522UILTM	
	30	0.25	-60 to 325/350	122-5532UI	122-5532UIE	122-5532UILTM	222-5532UILTM
		0.50	-60 to 325/350	122-5536UI		122-5536UILTM	
		1.00	-60 to 325/350	122-5533UI	122-5533UIE	122-5533UILTM	
	50	0.25	-60 to 325/350	122-5552UI			
	60	0.25	-60 to 325/350	122-5562UI			
		1.00	-60 to 325/350	122-5563UI			
0.32	30	0.25	-60 to 325/350	123-5532UI	123-5532UIE	123-5532UILTM	
		0.50	-60 to 325/350	123-5536UI		123-5536UILTM	
		1.00	-60 to 325/350	123-5533UI		123-5533UILTM	
	60	1.00	-60 to 325/350	123-5563UI			

HP-5ms Ultra Inert

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
HP-5ms Ultra Inert							
0.18	20	0.18	-60 to 325/350	19091S-577UI		19091S-577UILTM	29091S-577UILTM
0.25	15	0.25	-60 to 325/350	19091S-431UI		19091S-431UILTM	29091S-431UILTM
	30	0.25	-60 to 325/350	19091S-433UI	19091S-433UIE	19091S-433UILTM	29091S-433UILTM
		0.50	-60 to 325/350	19091S-133UI		19091S-133UILTM	
		1.00	-60 to 325/350	19091S-233UI	19091S-233UIE	19091S-233UILTM	
	60	0.25	-60 to 325/350	19091S-436UI			
0.32	30	0.25	-60 to 325/350	19091S-413UI		19091S-413UILTM	
		1.00	-60 to 325/350	19091S-213UI		19091S-213UILTM	

Tips & Tools

Column contamination from sample matrix components is the number one cause of column failure. Use Agilent DuraGuard GC columns with built-in guard if you do not want to use column connectors.



Guard Columns

- Columns with "built-in" guard columns, no press-fit connectors
- Minimize front-end contamination and increase column lifetime
- Aid in focusing sample onto the front of the column for better peak shape
- Minimize MSD contamination originating from the column (when used in transfer line)

Guard columns (or retention gaps) are often added to the front of the analytical column to protect against contamination, or to act as a band-focusing device for liquid samples introduced by on-column and splitless injection techniques.

When resolution or response in a chromatogram diminishes, remove a coil from the guard column so that peak shapes will improve. By removing a coil, the column length is shortened and peaks will elute somewhat faster. For best results, check the integration time windows of your data system.

DuraGuard

DuraGuard columns of different phases and dimensions are available through Agilent Technologies' custom column shop. Any DB polysiloxane or GC/MS phase can be made as a DuraGuard column with 0.18 mm ID or larger fused silica tubing. Ask for a custom column quote using part number 100-2000. Specify the phase, ID, length, and film thickness of analytical column, and desired length of DuraGuard.

DuraGuard

Phase	ID (mm)	Length (m)	Film (µm)	Guard Length (m)	Part No.
DB-1	0.25	30	0.25	10	122-1032G
DB-XLB	0.25	30	0.25	10	122-1232G
DB-5ms	0.25	30	0.25	10	122-5532G
			0.50	10	122-5536G
			1.00	10	122-5533G
		60	0.25	10	122-5562G
	0.32	30	1.00	10	123-5533G
	0.53	30	0.50	10	125-5537G
DB-5.625	0.18	20	0.36	5	121-5622G5
	0.25	30	0.25	5	122-5631G5
DB-1701	0.53	30	1.00	10	125-0732G
DB-624	0.53	30	3.00	5	125-1334G5

EZ-Guard

EZ-Guard columns combine a FactorFour column with a built-in guard column. The first five or ten meter section of the EZ-Guard column (guard length depends on the column you select) is not coated with stationary phase, but has been deactivated. The lack of a column connection between the guard and analytical section results in a 100% leak-free column.

Every EZ-Guard column features a unique uncoated and deactivated outlet section, approximately 100 cm long, which acts as an integrated transfer line. This provides a shorter stabilization time with all types of detectors. The absence of a stationary phase in the last part of the column significantly reduces background noise. The impact of water, oxygen or other polar or aggressive components that move through the end of the column at high temperature will also be greatly reduced.

EZ-Guard

Phase	ID (mm)	Length (m)	Film (µm)	Guard Length (m)	Part No.
VF-1ms	0.20	12	0.33	5	CP9023
			0.25	5	CP9010
			0.25	10	CP9011
VF-5ms	0.25	15	0.25	5	CP9021
			0.25	5	CP9012
			0.25	10	CP9013
			0.50	5	CP9014
			0.50	10	CP9015
		60	0.25	5	CP9016
			0.25	10	CP9020
VF-Xms	0.25	30	0.10	10	CP9022
			0.25	5	CP9018
			0.25	10	CP9019
VF-17ms	0.25	30	0.25	5	CP9024
			0.25	10	CP9025
VF-1701ms	0.25	30	0.25	5	CP9176
			0.25	10	CP9177
VF-35ms	0.25	30	0.25	5	CP9026
			0.25	10	CP9027

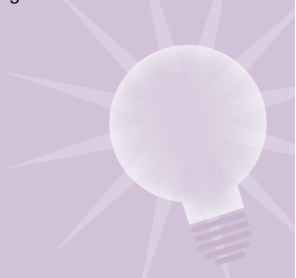
Low-bleed GC/MS Columns



Tips & Tools

Agilent MS Certified Liners are lot-tested with MSD and FID for superior acid/base deactivation, response linearity and peak symmetry.

Turn to page 262.



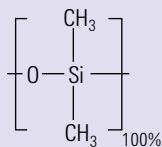
There is a rapidly increasing population of benchtop GC/MS instruments in analytical laboratories that analyze a widening range of trace level, higher temperature samples. These samples require increasingly inert, lower bleed, higher temperature columns. In response to this growing need, Agilent Technologies designed several "ms" columns to chromatograph a broader range of low level samples and generate lower bleed even at higher temperatures.

What makes an Agilent J&W low bleed column unique?

What makes an Agilent J&W low bleed column exceptional? Unique polymer chemistry and proprietary surface deactivation, both of which have contributed to columns that adhere to the tightest quality control specifications in the industry for bleed, inertness, selectivity and efficiency. Agilent J&W "ms" columns utilize special surface deactivation and siloxane chemistries which enhance the chromatographic performance of siloxane polymers.

While some of the GC/MS phases utilize different polymer chemistries, their selectivity mimics the standard polysiloxane phases and offers the advantages of low column bleed and, in some cases, extended temperature ranges.

The mass spectrum of septum bleed can look very much like GC column bleed, so the two are often confused. An easy way to tell the two apart: column bleed will be a rise in the baseline, not peaks. If you see bleed peaks, these generally come from lower quality septa or septa being used beyond their operating limits. To minimize septa contributions to background bleed, use quality Agilent BTO, Long Life, or Advanced Green septa.



Structure of DB-1ms

DB-1ms

- 100% Dimethylpolysiloxane
- Identical selectivity to DB-1
- Non-polar
- Very low bleed characteristics, ideal for GC/MS
- Improved acid performance compared to standard 100% Dimethylpolysiloxane columns
- Improved signal-to-noise ratio for better sensitivity and mass spectral integrity
- 340/360°C upper temperature limit
- Excellent general purpose column
- Bonded and cross-linked
- Solvent rinsable

DB-1ms Chromatograms

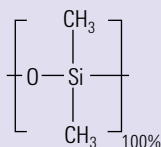
Life Sciences

Drug Screen

Page 673

DB-1ms

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.10	10	0.10	-60 to 340/360	127-0112		127-0112LTM	
		0.40	-60 to 340/360	127-0113		127-0113LTM	
	20	0.10	-60 to 340/360	127-0122		127-0122LTM	
		0.40	-60 to 340/360	127-0123		127-0123LTM	
0.18	20	0.18	-60 to 340/360	121-0122	121-0122E	121-0122LTM	221-0122LTM
0.20	12	0.33	-60 to 340/350	128-0112		128-0112LTM	
	25	0.33	-60 to 340/350	128-0122	128-0122E	128-0122LTM	
0.25	15	0.25	-60 to 340/360	122-0112	122-0112E	122-0112LTM	222-0112LTM
	30	0.10	-60 to 340/360	122-0131		122-0131LTM	
		0.25	-60 to 340/360	122-0132	122-0132E	122-0132LTM	222-0132LTM
	60	0.25	-60 to 340/360	122-0162			
0.32	15	0.25	-60 to 340/360	123-0112		123-0112LTM	
	30	0.10	-60 to 340/360	123-0131		123-0131LTM	
		0.25	-60 to 340/360	123-0132		123-0132LTM	
	60	0.25	-60 to 340/360	123-0162			



Structure of HP-1ms

HP-1ms

- 100% Dimethylpolysiloxane
- Identical selectivity to HP-1
- Non-polar
- Low bleed characteristics
- Excellent general purpose column
- Improved signal-to-noise ratio for better sensitivity and mass spectral integrity
- Bonded and cross-linked
- Solvent rinsable

HP-1ms Chromatograms

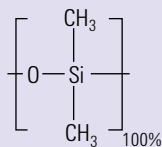
Environmental

Nitrogen Containing Herbicides (EPA Method 507)

Page 586

HP-1ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.18	20	0.18	-60 to 325/350	19091S-677	19091S-677E	19091S-677LTM	29091S-677LTM
0.20	25	0.33	-60 to 325/350	19091S-602	19091S-602E	19091S-602LTM	
0.25	15	0.25	-60 to 325/350	19091S-931	19091S-931E	19091S-931LTM	29091S-931LTM
	30	0.10	-60 to 325/350	19091S-833		19091S-833LTM	29091S-833LTM
		0.25	-60 to 325/350	19091S-933	19091S-933E	19091S-933LTM	29091S-433LTM
		0.50	-60 to 325/350	19091S-633		19091S-633LTM	
		1.00	-60 to 325/350	19091S-733	19091S-733E	19091S-733LTM	
0.32	60	0.25	-60 to 325/350	19091S-936	19091S-936E		
	15	0.25	-60 to 325/350	19091S-911		19091S-911LTM	
	25	0.52	-60 to 325/350	19091S-612		19091S-612LTM	
	30	0.25	-60 to 325/350	19091S-913	19091S-913E	19091S-913LTM	
		1.00	-60 to 325/350	19091S-713		19091S-713LTM	
	60	0.25	-60 to 325/350	19091S-916			



Structure of VF-1ms



Column shown with EZ-GRIP

VF-1ms

- Lowest guaranteed bleed specification for trace analysis with MS
- Wide range of applications ensures near universal applicability
- Highly inert for accurate analysis, even at trace levels

VF-1ms is a highly inert, non-polar, low bleed GC column providing increased sensitivity over a broad array of applications. The 100% dimethylpolysiloxane phase delivers a guaranteed bleed specification of 1 pA @ 325°C (30 m, 0.25 mm, 0.25 µm).

The VF-1ms comes with an EZ-GRIP to simplify installation, coupling and operation of capillary columns. For guaranteed performance, the retention index, efficiency, selectivity and bleed is measured and specified on the test report supplied with every column.

VF-1ms is also available with 0.15 mm ID for fast GC and GC/MS that can double sample throughput when compared to 0.25 and 0.32 mm ID columns.

VF-1ms Chromatograms

Food, Flavors and Fragrances

Triglycerides C28-C54	Page 639
Separation of TMS-derivatized sugars	Page 630

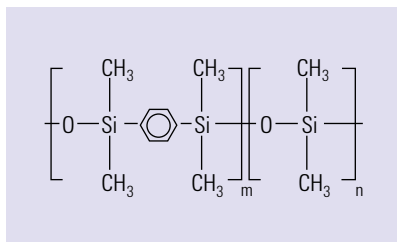
VF-1ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.10	10	0.10	-60 to 325/350	CP8900	
		0.40	-60 to 325/350	CP8901	
	20	0.10	-60 to 325/350	CP8902	
		0.40	-60 to 325/350	CP8903	
0.15	10	0.15	-60 to 325/350	CP9030	
	15	0.15	-60 to 325/350	CP5881	
	20	0.15	-60 to 325/350	CP9031	
		0.60	-60 to 325/350	CP9032	CP9032I5

(Continued)

VF-1ms

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.20	12	0.33	-60 to 325/350	CP8904	
	25	0.33	-60 to 325/350	CP8905	
0.25	15	0.10	-60 to 325/350	CP8906	CP8906I5
		0.25	-60 to 325/350	CP8907	CP8907I5
		1.00	-60 to 325/350	CP8908	CP8908I5
	25	0.25	-60 to 325/350	CP8909	
		0.40	-60 to 325/350	CP8910	
	30	0.10	-60 to 325/350	CP8911	CP8911I5
		0.25	-60 to 325/350	CP8912	CP8912I5
		1.00	-60 to 325/350	CP8913	CP8913I5
	50	0.25	-60 to 325/350	CP8914	
		0.40	-60 to 325/350	CP8915	
	60	0.25	-60 to 325/350	CP8916	CP8916I5
		1.00	-60 to 325/350	CP8917	CP8917I5
0.32	15	0.10	-60 to 325/350	CP8918	CP8918I5
		0.25	-60 to 325/350	CP8919	
		1.00	-60 to 325/350	CP8920	CP8920I5
	25	0.25	-60 to 325/350	CP8921	
		0.40	-60 to 325/350	CP8922	
	30	0.10	-60 to 325/350	CP8923	
		0.25	-60 to 325/350	CP8924	
		0.50	-60 to 325/350	CP8925	
		1.00	-60 to 325/350	CP8926	
	50	0.25	-60 to 325/350	CP8927	
		0.40	-60 to 325/350	CP8928	
	60	0.25	-60 to 325/350	CP8929	
		1.00	-60 to 325/350	CP8930	
0.53	15	0.50	-60 to 325/350	CP8965	
		1.50	-60 to 325/350	CP8967	
	30	0.50	-60 to 325/350	CP8968	
		1.00	-60 to 325/350	CP8969	
		1.50	-60 to 310/335	CP8970	



Structure of DB-5ms

DB-5ms

- Phenyl Arylene polymer virtually equivalent to a (5%-Phenyl)-methylpolysiloxane
- Non-polar
- Very low bleed characteristics, ideal for GC/MS
- Excellent inertness for active compounds
- Improved signal-to-noise ratio for better sensitivity and mass spectral integrity
- Bonded and cross-linked
- Solvent rinsable
- MSD testing and certification available
- Exact replacement of HP-5TA
- Close equivalent to USP Phase G27
- Test mix available

DB-5ms Chromatograms

Environmental

Diesel Fuel	Page 570
EPA Air Analysis Method TO-15 (1 ppbV Standard)	Page 612
EPA Method 525.2	Page 598
EPA Method 8061 (Phthalate Esters)	Page 599
Formaldehyde, 50ppb	Page 613
Organochlorine Pesticides II EPA Method 8081A	Page 575
Organophosphorous Pesticides I, EPA Method 8141A	Page 583
Phenols	Page 601
Sulfur in Air	Page 613

Industrial Chemicals

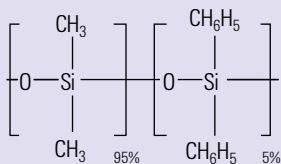
Amines and Nitriles	Page 646
Phenols II	Page 666
Polyethyleneamines	Page 646
Substituted Anilines	Page 665

Life Sciences

Narcotics	Page 679
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DB-5ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.18	20	0.18	-60 to 325/350	121-5522	121-5522E	121-5522LTM	221-5522LTM
		0.36	-60 to 325/350	121-5523		121-5523LTM	
		40	0.18	121-5542			
0.20	12	0.33	-60 to 325/350	128-5512		128-5512LTM	
	25	0.33	-60 to 325/350	128-5522		128-5522LTM	
	50	0.33	-60 to 325/350	128-5552			
0.25	15	0.10	-60 to 325/350	122-5511		122-5511LTM	
		0.25	-60 to 325/350	122-5512		122-5512LTM	222-5512LTM
		0.50	-60 to 325/350	122-5516		122-5516LTM	
		1.00	-60 to 325/350	122-5513		122-5513LTM	
	25	0.25	-60 to 325/350	122-5522		122-5522LTM	
		0.40	-60 to 325/350	122-552a		122-552aLTM	
	30	0.10	-60 to 325/350	122-552A		122-552ALTM	
		0.25	-60 to 325/350	122-5532	122-5532E	122-5532LTM	222-5532LTM
		0.50	-60 to 325/350	122-5536	122-5536E	122-5536LTM	
		1.00	-60 to 325/350	122-5533	122-5533E	122-5533LTM	
	50	0.25	-60 to 325/350	122-5552			
	60	0.10	-60 to 325/350	122-5561			
		0.25	-60 to 325/350	122-5562	122-5562E		
		1.00	-60 to 325/350	122-5563			
0.32	15	0.10	-60 to 325/350	123-5511		123-5511LTM	
		0.25	-60 to 325/350	123-5512		123-5512LTM	
		1.00	-60 to 325/350	123-5513	123-5513E	123-5513LTM	
	25	0.52	-60 to 325/350	123-5526		123-5526LTM	
	30	0.10	-60 to 325/350	123-5531		123-5531LTM	
		0.25	-60 to 325/350	123-5532	123-5532E	123-5532LTM	
		0.50	-60 to 325/350	123-5536		123-5536LTM	
		1.00	-60 to 325/350	123-5533		123-5533LTM	
	60	0.10	-60 to 325/350	123-5561			
		0.25	-60 to 325/350	123-5562			
		0.50	-60 to 325/350	123-5566			
		1.00	-60 to 325/350	123-5563			
0.53	15	1.50	-60 to 300/320	125-5512		125-5512LTM	
	30	0.50	-60 to 300/320	125-5537		125-5537LTM	
		1.00	-60 to 300/320	125-553J		125-553JLTM	
		1.50	-60 to 300/320	125-5532		125-5532LTM	



Structure of HP-5ms

HP-5ms

- (5%-Phenyl)-methylpolysiloxane
- Identical selectivity to HP-5
- Non-polar
- Very low bleed characteristics, ideal for GC/MS
- Excellent inertness for active compounds including acidic and basic compounds
- Improved signal-to-noise ratio for better sensitivity and mass spectral integrity
- Bonded and cross-linked
- Solvent rinsable
- Equivalent to USP Phase G27

HP-5ms Chromatograms

Environmental

Chlorinated Pesticides, EPA Method 508	Page 578
Nitrogen/Phosphorus Containing Pesticides, EPA Method 507	Page 582
Organohalide Pesticides in Water, EPA Method 505	Page 578
Semivolatile Compounds, EPA Method 8270	Page 597

Food, Flavors and Fragrances

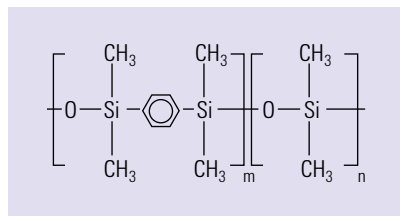
Fragrance Allergens	Page 618
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Industrial Chemicals

Trace Active Amines, 10 ng on-column	Page 645
Phenols I	Page 666

HP-5ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.18	20	0.18	-60 to 325/350	19091S-577		19091S-577LTM	
0.20	12	0.33	-60 to 325/350	19091S-101		19091S-101LTM	
	25	0.33	-60 to 325/350	19091S-102	19091S-102E	19091S-102LTM	
	50	0.33	-60 to 325/350	19091S-105			
0.25	15	0.10	-60 to 325/350	19091S-331		19091S-331LTM	
		0.25	-60 to 325/350	19091S-431		19091S-431LTM	
		1.00	-60 to 325/350	19091S-231		19091S-231LTM	
	30	0.10	-60 to 325/350	19091S-333		19091S-333LTM	
		0.25	-60 to 325/350	19091S-433	19091S-433E	19091S-433LTM	29091S-433LTM
		0.50	-60 to 325/350	19091S-133		19091S-133LTM	
		1.00	-60 to 325/350	19091S-233	19091S-233E	19091S-233LTM	
	60	0.10	-60 to 325/350	19091S-336			
		0.25	-60 to 325/350	19091S-436	19091S-436E		
0.32	25	0.52	-60 to 325/350	19091S-112	19091S-112E	19091S-112LTM	
	30	0.10	-60 to 325/350	19091S-313		19091S-313LTM	
		0.25	-60 to 325/350	19091S-413	19091S-413E	19091S-413LTM	
		0.50	-60 to 325/350	19091S-113		19091S-113LTM	
		1.00	-60 to 325/350	19091S-213		19091S-213LTM	
	60	0.25	-60 to 325/350	19091S-416			



Structure of VF-5ms

VF-5ms

- Excellent selectivity for aromatic compounds
- Minimal column bleed improves sensitivity
- Individual test certificates guarantee performance

VF-5ms is a highly inert 5% phenyl-methyl column for increased sensitivity, accuracy and instrument uptime. The columns have the lowest guaranteed bleed specification of 1 pA @ 325°C (30 m, 0.25 mm, 0.25 µm). VF-5ms has a slightly higher polarity than VF-1ms, resulting in a better selectivity for aromatic compounds. This selectivity, combined with superior inertness, also makes these columns applicable for a wide range of semi-polar and even polar components, such as phenols.

VF-5ms is also available with 0.15 mm ID for fast GC and GC/MS that can at least double sample throughput when compared to 0.25 and 0.32 mm ID columns.

VF-5ms Chromatograms

Environmental

High resolution phenol analysis by GC/MS

Page 602

Food, Flavors and Fragrances

Pesticides in sunflower oil

Page 640

VF-5ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.10	10	0.40	-60 to 325/350	CP8934	
	20	0.40	-60 to 325/350	CP8933	
0.15	10	0.15	-60 to 325/350	CP9034	CP9034I5
	15	0.15	-60 to 325/350	CP9035	
	20	0.15	-60 to 325/350	CP9036	CP9036I5
		0.30	-60 to 325/350	CP9037	
		0.60	-60 to 325/350	CP9038	
	40	0.15	-60 to 325/350	CP9039	CP9039I5
		0.60	-60 to 325/350	CP9040	
0.20	12	0.33	-60 to 325/350	CP8935	CP8935I5
	25	0.33	-60 to 325/350	CP8936	CP8936I5
	50	0.33	-60 to 325/350	CP8937	

(Continued)

VF-5ms

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	15	0.10	-60 to 325/350	CP8938	
		0.25	-60 to 325/350	CP8939	
		0.50	-60 to 325/350	CP8963	
		1.00	-60 to 325/350	CP8940	
	25	0.25	-60 to 325/350	CP8941	CP8941I5
		0.40	-60 to 325/350	CP8942	
	30	0.10	-60 to 325/350	CP8943	CP8943I5
		0.25	-60 to 325/350	CP8944	CP8944I5
		0.50	-60 to 325/350	CP8945	
		1.00	-60 to 325/350	CP8946	
	50	0.25	-60 to 325/350	CP8947	
	60	0.10	-60 to 325/350	CP8948	CP8948I5
		0.25	-60 to 325/350	CP8960	CP8960I5
		1.00	-60 to 325/350	CP8949	
0.32	15	0.10	-60 to 325/350	CP8950	
		0.25	-60 to 325/350	CP8951	
		1.00	-60 to 325/350	CP8952	
	25	0.52	-60 to 325/350	CP8953	
	30	0.10	-60 to 325/350	CP8954	CP8954I5
		0.25	-60 to 325/350	CP8955	CP8955I5
		0.50	-60 to 325/350	CP8956	
		1.00	-60 to 325/350	CP8957	CP8957I5
	50	0.25	-60 to 325/350	CP8958	
		0.40	-60 to 325/350	CP8959	
	60	0.25	-60 to 325/350	CP8961	CP8961I5
		1.00	-60 to 325/350	CP8962	
0.53	15	0.50	-60 to 325/350	CP8971	
		1.00	-60 to 325/350	CP8972	
		1.50	-60 to 325/350	CP8973	
	30	0.50	-60 to 325/350	CP8974	
		1.00	-60 to 325/350	CP8975	
		1.50	-60 to 310/335	CP8976	

DB-XLB

- Exceptionally Low Bleed
- Low polarity
- Extended temperature limit of 340/360°C
- Unique selectivity
- Excellent inertness for active compounds
- Ideal for confirmational analyses
- Excellent for pesticides, herbicides, PCBs and PAHs
- Ideal for GC/MS
- MSD testing and certification available
- Bonded and cross-linked
- Solvent rinsable

Note: "DB-XLB is designed for inhibiting column bleed at high temperatures.

It also appears to have inadvertently inherited an exceptional ability for separating many PCB congeners when used with MS detection. This stellar performance was maximized after careful optimization of the column dimensions, temperature programs, and carrier gas flow conditions."

(Frame, G. Analytical Chemistry News & Features, Aug. 1, 1997, 468A-475A)

DB-XLB Chromatograms

Environmental

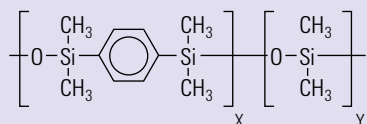
Aroclors 1016-1268 (without 1221)	Page 592
CLP Pesticides	Page 574
CLP Pesticide Analysis	Page 573
Congeners in DIN Method PCBs	Page 593
EPA Method 552.2	Page 603
Herbicides I	Page 585
PBDEs	Page 592
PCBs by EPA Method 8082	Page 594
Pesticides, EPA 508.1	Page 577
Phenols	Page 601
Phenoxy Acid Herbicides – Methyl Derivatives, EPA 8151A	Page 584

Food, Flavors and Fragrances

Ylang Ylang Oil	Page 626
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DB-XLB

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890
						LTM Module
0.18	20	0.18	30 to 340/360	121-1222	121-1222E	121-1222LTM
	30	0.18	30 to 340/360	121-1232		121-1232LTM
0.20	12	0.33	30 to 340/360	128-1212	128-1212E	128-1212LTM
	25	0.33	30 to 340/360	128-1222		128-1222LTM
0.25	15	0.10	30 to 340/360	122-1211		122-1211LTM
		0.25	30 to 340/360	122-1212		122-1212LTM
	30	0.10	30 to 340/360	122-1231		122-1231LTM
		0.25	30 to 340/360	122-1232		122-1232LTM
		0.50	30 to 340/360	122-1236		122-1236LTM
		1.00	30 to 340/360	122-1233		122-1233LTM
	60	0.25	30 to 340/360	122-1262	122-1262E	
0.32	30	0.25	30 to 340/360	123-1232		123-1232LTM
		0.50	30 to 340/360	123-1236		123-1236LTM
	60	0.25	30 to 340/360	123-1262		
0.53	15	1.50	30 to 320/340	125-1212		125-1212LTM
	30	1.50	30 to 320/340	125-1232		125-1232LTM



Structure of VF-Xms



Column shown with EZ-GRIP

VF-Xms

- High arylene modified phase for accurate results
- Isothermal applications up to 340°C for a broad application range
- Ideal for confirmational analysis for ultimate confidence

The VF-Xms has the lowest bleed of all FactorFour columns. VF-Xms delivers the ultimate in sensitivity and signal-to-noise ratio, and is the low bleed, more polar alternative to the VF-5ms. Compared to non-polar "ms" type phases, VF-Xms provides exceptionally high selectivity for pesticides and delivers high resolution in the shortest analysis time.

The VF-Xms comes with an EZ-GRIP, simplifying installation, coupling and operation of capillary columns. For guaranteed performance, the retention index, efficiency, selectivity and bleed is measured and specified on the test report supplied with each column.

VF-Xms Chromatograms

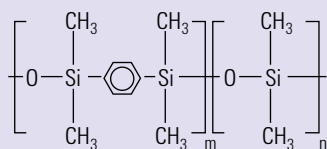
Environmental

Analysis of Polycyclic Aromatic Hydrocarbons

Page 570

VF-Xms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.15	20	0.15	30 to 340/360	CP9041	
0.20	12	0.33	30 to 340/360	CP8800	
	25	0.33	30 to 340/360	CP8801	
0.25	15	0.10	30 to 340/360	CP8802	
		0.25	30 to 340/360	CP8803	
	30	0.10	30 to 340/360	CP8805	
		0.25	30 to 340/360	CP8806	CP880615
		0.50	30 to 340/360	CP8807	
		1.00	30 to 340/360	CP8808	
0.32	15	0.25	30 to 340/360	CP8810	
		1.00	30 to 340/360	CP8811	
	30	0.10	30 to 340/360	CP8812	
		0.25	30 to 340/360	CP8813	
		0.50	30 to 340/360	CP8814	
		1.00	30 to 340/360	CP8815	
	60	0.25	30 to 340/360	CP8816	
0.53	15	1.50	30 to 325/340	CP8817	
	30	1.50	30 to 325/340	CP8818	



Structure of DB-35ms

DB-35ms

- Virtually equivalent to a (35%-Phenyl)-methylpolysiloxane
- Mid-polarity
- Very low bleed characteristics, ideal for GC/MS
- Extended temperature limit of 340/360°C
- Excellent inertness for active compounds
- Ideal for confirmational analyses
- Bonded and cross-linked
- Solvent rinsable
- Replaces HP-35ms
- Close equivalent to USP Phase G42

DB-35ms Chromatograms

Environmental

CLP Pesticides	Page 574
EPA Method 552.2	Page 603
Organochlorine Pesticides I EPA Method 8081A	Page 575
Organophosphorous Pesticides I, EPA Method 8141A	Page 583
PCBs by EPA Method 8082	Page 594
Pesticides, EPA 508.1	Page 577
Phenoxy Acid Herbicides – Methyl Derivatives, EPA 8151A	Page 584

Industrial Chemicals

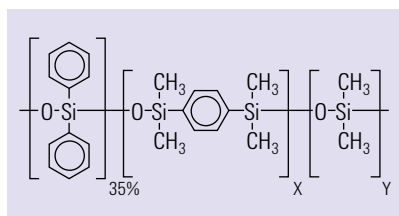
Anilines	Page 665
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Life Sciences

Barbiturates	Page 677
Benzodiazepines II	Page 677

DB-35ms

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.18	20	0.18	50 to 340/360	121-3822	121-3822E	121-3822LTM	221-3822LTM
0.20	15	0.33	50 to 340/360	128-3812		128-3812LTM	
	25	0.33	50 to 340/360	128-3822		128-3822LTM	
0.25	15	0.25	50 to 340/360	122-3812		122-3812LTM	222-3812LTM
	30	0.15	50 to 340/360	122-3831		122-3831LTM	
		0.25	50 to 340/360	122-3832	122-3832E	122-3832LTM	222-3832LTM
	60	0.25	50 to 340/360	122-3862			
0.32	15	0.25	50 to 340/360	123-3812		123-3812LTM	
	30	0.25	50 to 340/360	123-3832	123-3832E	123-3832LTM	
0.53	30	0.50	50 to 320/340	125-3837		125-3837LTM	
		1.00	50 to 320/340	125-3832		125-3832LTM	



Structure of VF-35ms

VF-35ms

- Ideal for dual column confirmational analysis for ultimate confidence
- High maximum temperature for broad applicability
- Stabilized arylene-modified equivalent of a 35% phenylmethyl phase for longevity

The VF-35ms is a medium polarity column, which is the ideal choice for trace environmental and chemical analyses, and as a confirmation column. The VF-35ms uses FactorFour technology to produce a low bleed, highly stable column with a programmable maximum temperature of 360°C.

VF-35ms is also available with 0.15 mm ID for fast GC and GC/MS that can double sample throughput when compared to 0.25 and 0.32 mm ID columns.

VF-35ms Chromatograms

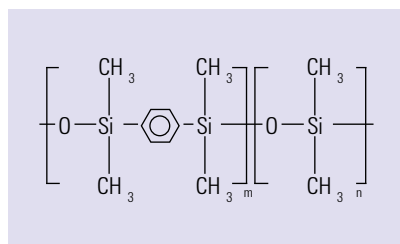
Environmental

Organochlorine pesticides to EPA 625 via GC/MS

Page 588

VF-35ms

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.15	10	0.15	40 to 340/360	CP5887	
	15	0.15	40 to 340/360	CP5888	
	20	0.15	40 to 340/360	CP5889	
0.20	15	0.33	40 to 340/360	CP8872	
	25	0.33	40 to 340/360	CP8873	
0.25	15	0.25	40 to 340/360	CP8874	
	30	0.10	40 to 340/360	CP8875	
		0.15	40 to 340/360	CP8876	
		0.25	40 to 340/360	CP8877	CP8877I5
		0.50	40 to 340/360	CP8878	CP8878I5
		1.00	40 to 340/360	CP8879	
	60	0.25	40 to 340/360	CP8880	
0.32	15	0.25	40 to 340/360	CP8881	
	30	0.25	40 to 340/360	CP8882	
		0.50	40 to 340/360	CP8883	CP8883I5
		1.00	40 to 340/360	CP8884	
	60	0.25	40 to 340/360	CP8885	
0.53	15	1.00	40 to 325/350	CP8886	
	30	0.50	40 to 325/350	CP8887	
		1.00	40 to 325/350	CP8888	



Structure of DB-17ms

DB-17ms

- Virtually equivalent to (50%-Phenyl)-methylpolysiloxane
- 320/340°C upper temperature limit
- Very low bleed mid-polarity column, ideal for GC/MS
- Excellent inertness for active compounds
- Enhanced mass spectral integrity
- Bonded and cross-linked
- Solvent rinsable
- Best column for CLP pesticides

DB-17ms Chromatograms

Environmental

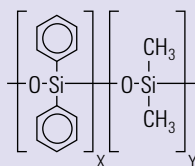
PAHs	Page 600
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Life Sciences

Hallucinogens	Page 678
Tocopherols	Page 678

DB-17ms

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.18	20	0.18	40 to 320/340	121-4722	121-4722E	121-4722LTM	221-4722LTM
0.25	15	0.15	40 to 320/340	122-4711		122-4711LTM	
		0.25	40 to 320/340	122-4712		122-4712LTM	222-4712LTM
	30	0.15	40 to 320/340	122-4731		122-4731LTM	
		0.25	40 to 320/340	122-4732	122-4732E	122-4732LTM	222-4732LTM
	60	0.25	40 to 320/340	122-4762			
0.32	15	0.25	40 to 320/340	123-4712		123-4712LTM	
	30	0.25	40 to 320/340	123-4732		123-4732LTM	



Structure of VF-17ms

VF-17ms

- Deactivation technology improves data quality
- Ideal EPA confirmation column for ultimate confidence
- Bonded and cross-linked to allow solvent rinsing, reducing replacement costs

VF-17ms is a 50% phenyl, 50% dimethylpolysiloxane, medium polarity, low bleed column for increased sensitivity, accuracy and instrument uptime. VF-17ms is often referenced in environmental and clinical methods. The use of new deactivation technology improves column stability, resulting in improved repeatability and column lifetimes. VF-17ms has a very low bleed specification at 2 pA @ 325°C (0.25 mm x 30 m x 0.25 µm).

VF-17ms is also available with 0.15 mm ID for fast GC and GC/MS that can double sample throughput when compared to 0.25 and 0.32 mm ID columns.

VF-17ms Chromatograms

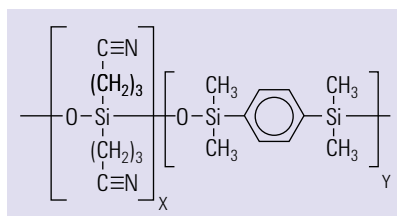
Environmental

Organochlorine pesticides

Page 582

VF-17ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.10	10	0.20	40 to 330/360	CP8977	
0.15	10	0.15	40 to 330/360	CP5882	
	15	0.15	40 to 330/360	CP5883	
	20	0.15	40 to 330/360	CP5884	
0.25	15	0.25	40 to 330/360	CP8979	
	15	0.50	40 to 330/360	CP8980	
	30	0.15	40 to 330/360	CP8981	
		0.25	40 to 330/360	CP8982	CP8982I5
		0.50	40 to 330/360	CP8983	
	60	0.25	40 to 330/360	CP8984	
0.32	15	0.15	40 to 330/360	CP8986	
		0.25	40 to 330/360	CP8987	
	30	0.25	40 to 330/360	CP8990	CP8990I5
		0.50	40 to 330/360	CP8991	
0.53	15	0.25	40 to 330/360	CP8994	
		1.00	40 to 330/360	CP8996	
		1.50	40 to 310/340	CP8998	
	30	0.50	40 to 330/360	CP9000	
		1.00	40 to 310/340	CP9001	
		1.50	40 to 310/340	CP9002	



Structure of VF-23ms

VF-23ms

- 100% bonded phase permits column rinsing to enhance column lifetime
- Fast run times improve productivity
- Operating temperature up to 260°C expands the application range

The VF-23ms column has a high polarity and highly substituted cyanopropyl low bleed phase. VF-23ms features a unique combination of high polarity and low bleed to enable more accurate analysis of very polar analytes. The enhanced stabilization of the VF-23ms permits splitless injection, column rinsing and temperatures up to 260°C to be used. Compared to other 23ms type phases, this expands the range of possible applications by enabling the analysis of higher molecular weight compounds.

VF-23ms is also available with 0.15 mm ID for fast GC and GC/MS that can double sample throughput when compared to 0.25 and 0.32 mm ID columns.

VF-23ms Chromatograms

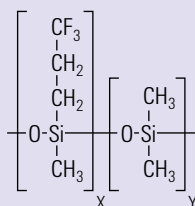
Food, Flavors and Fragrances

Fast screening of FAME isomers in butter

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VF-23ms

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.10	10	0.10	40 to 260/260	CP8819	
0.15	15	0.15	40 to 260/260	CP5886	
	20	0.15	40 to 260/260	CP9042	
	40	0.15	40 to 260/260	CP5885	
0.25	15	0.25	40 to 260/260	CP8820	CP882015
	30	0.15	40 to 260/260	CP8821	CP882115
		0.25	40 to 260/260	CP8822	CP882215
		0.15	40 to 260/260	CP8823	
	60	0.25	40 to 260/260	CP8824	CP882415
0.32	15	0.25	40 to 260/260	CP8825	
	30	0.15	40 to 260/260	CP8826	
		0.25	40 to 260/260	CP8827	
		0.15	40 to 260/260	CP8828	
	60	0.25	40 to 260/260	CP8829	
0.53	15	0.50	40 to 245/245	CP8830	
	30	0.50	40 to 245/245	CP8831	



Structure of VF-200ms

VF-200ms

- Superior deactivation delivers symmetrical peaks to improve data accuracy
- Ultra-low background noise for trace analysis maximizes sensitivity
- Ideal for sensitive and selective detector systems for enhanced productivity

The VF-200ms is designed with a unique selectivity for compounds rich in dipole-dipole interactions, resulting from the electrophilic nature of the trifluoropropyl stationary phase. VF-200ms is especially suited for electron rich, high dipole moment compounds like ketones, aldehydes, nitro- or chloro-containing compounds, PAHs, unsaturated compounds, silanes and CFCs. VF-200ms, as with all FactorFour columns, offers superior surface deactivation and thereby symmetrical peak shapes. The high inertness of the VF-200ms leads to more accurate peak identification and reliable analysis. The VF-200ms trifluoropropyl phase has very high temperature stability and can be used routinely up to 350°C.

VF-200ms is also available with 0.15 mm ID for fast GC and GC/MS that can double sample throughput when compared to 0.25 and 0.32 mm ID columns.

VF-200ms Chromatograms

Industrial Chemicals

Fast separation of silanes

Page 670

VF-200ms

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.15	10	0.15	0 to 325/350	CP5893	
		0.15	0 to 325/350	CP5891	
		0.60	0 to 325/350	CP5892	
0.25	15	0.25	0 to 325/350	CP8855	CP8855I5
		0.50	0 to 325/350	CP8856	
	30	0.10	0 to 325/350	CP8857	
		0.25	0 to 325/350	CP8858	
		0.50	0 to 325/350	CP8859	CP8859I5
		1.00	0 to 325/350	CP8860	CP8860I5
	60	0.25	0 to 325/350	CP8861	
0.32	15	0.25	0 to 325/350	CP8862	
	30	0.25	0 to 325/350	CP8863	
		0.50	0 to 325/350	CP8864	
		1.00	0 to 325/350	CP8865	CP8865I5
0.53	15	1.00	0 to 300/325	CP8866	
		0.50	0 to 300/325	CP8867	
		1.00	0 to 300/325	CP8868	CP8868I5

DB-225ms

- Virtually equivalent to (50%-Cyanopropylphenyl)-methylpolysiloxane
- Mid/high polarity
- Excellent for separations of cis- and trans-fatty acid methyl esters (FAMES)
- Low bleed
- Bonded and cross-linked
- Solvent rinsable
- Close equivalent to USP Phase G7

DB-225ms Chromatograms**Environmental**

Tetrachlorodibenzo-p-furans

Page 591

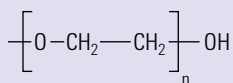
Food, Flavors and Fragrances

FAMES II

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DB-225ms

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.25	15	0.25	40 to 240	122-2912		122-2912LTM	222-2912LTM
	30	0.25	40 to 240	122-2932	122-2932E	122-2932LTM	222-2932LTM
	60	0.25	40 to 240	122-2962			
0.32	30	0.25	40 to 240	123-2932		123-2932LTM	



Structure of VF-WAXms

VF-WAXms

- Specially designed for MS for more accurate results with polar compounds
- Operating temperature range of 20°C to 250°C for maximum flexibility
- Better signal-to-noise ratio for trace analyses improves productivity

The VF-WAXms is a high performance column for applications in the food, flavors and fragrances markets, and especially where trace analyses are required. These applications often require higher temperatures to analyze polar compounds, and therefore need an ultra-stable wax as a stationary phase. The very low bleed of VF-WAXms provides increased sensitivity, extended column lifetime and greater accuracy, even at higher temperatures.

Advanced coating technology means that VF-WAXms columns are highly inert. Such inertness gives better chromatograms, enhancing critical pair separation. With the introduction of the VF-WAXms column, wax applications such as food, flavors and fragrances can now benefit from the use of GC/MS detectors. Impurities can easily be identified using an MS detector when a wax column is required for separation. Significantly improved performance is achieved with VF-WAXms columns, yet the typical selectivity of PEG is unchanged.

VF-WAXms is also available with 0.15 mm ID for fast GC and GC/MS that can double sample throughput when compared to 0.25 and 0.32 mm ID columns.

VF-WAXms Chromatograms

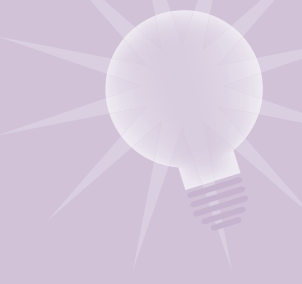
Food, Flavors and Fragrances

Acids

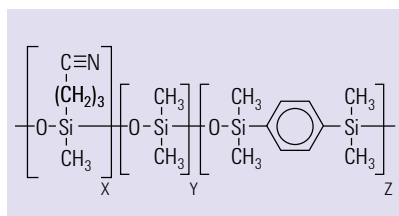
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Tips & Tools

As a special MS-type phase, the VF-WAXms column generates less bleed, and therefore less noise and higher signal-to-noise ratios for critical components.

**VF-WAXms**

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.10	10	0.10	20 to 250/260	CP9219	
		0.20	20 to 250/260	CP9218	
	20	0.10	20 to 250/260	CP9229	CP9229i5
0.15	10	0.15	20 to 250/260	CP9200	
	15	0.15	20 to 250/260	CP9201	
	20	0.15	20 to 250/260	CP9220	
	30	0.15	20 to 250/260	CP9202	
0.25	15	0.25	20 to 250/260	CP9203	
		0.50	20 to 250/260	CP9221	
	25	0.20	20 to 250/260	CP9204	
	30	0.25	20 to 250/260	CP9205	CP9205i5
		0.50	20 to 250/260	CP9222	
		1.00	20 to 240	CP9206	
	60	0.25	20 to 250/260	CP9207	
		0.50	20 to 240	CP9223	
0.32	15	0.25	20 to 250/260	CP9209	
		0.50	20 to 250/260	CP9224	
		1.00	20 to 250/260	CP9208	
	30	0.25	20 to 250/260	CP9212	CP9212i5
		0.50	20 to 250/260	CP9210	
		1.00	20 to 240	CP9211	
	60	0.25	20 to 250/260	CP9214	
		0.50	20 to 240	CP9225	CP9225i5
		1.00	20 to 230	CP9213	
0.53	15	1.00	20 to 250/260	CP9226	CP9226i5
		2.00	20 to 240	CP9227	
	30	1.00	20 to 240	CP9215	
		2.00	20 to 230	CP9216	
	60	1.00	20 to 230	CP9228	
		2.00	20 to 220	CP9217	



Structure of VF-624ms and VF-1301ms

VF-624ms and VF-1301ms

- Improved signal-to-noise ratio for more accurate trace analysis
- Eliminate ghost peaks and unstable baselines for best data accuracy
- Enhanced selectivity eliminating co-eluters such as benzene and 1,2-dichloroethane for improved productivity

The VF-624ms and VF-1301ms are the world's first ultra-low bleed 6% cyanopropyl/phenyl, 94% PDMS GC columns. VF-624ms columns set a new standard for the analysis of volatile organic compounds. Improved phase technology reduces bleed, thereby increasing signal-to-noise ratios. These columns are especially suited for analyzing solvents according to EPA Methods 524, 624 and 8260, as well as USP 467.

The ultra low bleed, thin filmed, VF-1301ms column has a similar selectivity and is suitable for semi-volatile organic solvents, as well as PCBs and pesticides.

VF-624ms and VF-1301ms are also available with 0.15 mm ID for fast GC and GC/MS that can boost sample throughput when compared to 0.25 and 0.32 mm ID columns.

VF-624ms and VF-1301ms Chromatograms

Environmental

FactorFour cyano columns eliminate unstable baselines

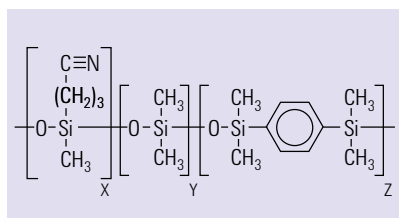
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VF-624ms

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.15	15	0.84	-40 to 280/300	CP9101	CP9101I5
	20	0.84	-40 to 280/300	CP9100	
	30	0.84	-40 to 280/300	CP9109	
	40	0.84	-40 to 280/300	CP9110	
0.25	30	1.40	-40 to 280/300	CP9102	CP9102I5
	60	1.40	-40 to 280/300	CP9103	CP9103I5
0.32	30	1.80	-40 to 280/300	CP9104	CP9104I5
	60	1.80	-40 to 280/300	CP9105	CP9105I5
0.53	30	3.00	-40 to 280/300	CP9106	CP9106I5
	60	3.00	-40 to 265/280	CP9107	
	75	3.00	-40 to 265/280	CP9108	

VF-1301ms

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.10	10	1.00	-40 to 280/300	CP9066	
0.15	15	0.15	-40 to 280/300	CP9050	
	20	0.15	-40 to 280/300	CP9051	
0.25	15	1.00	-40 to 280/300	CP9052	
	30	0.25	-40 to 280/300	CP9053	
		1.00	-40 to 280/300	CP9054	
		0.25	-40 to 280/300	CP9055	
	60	1.00	-40 to 280/300	CP9056	
0.32	15	0.25	-40 to 280/300	CP9057	
		1.00	-40 to 280/300	CP9058	
	30	0.25	-40 to 280/300	CP9059	
		1.00	-40 to 280/300	CP9060	CP9060I5
	60	1.00	-40 to 280/300	CP9061	
0.53	15	1.00	-40 to 280/300	CP9062	
	30	1.00	-40 to 280/300	CP9063	
		1.50	-40 to 280/300	CP9064	



Structure of VF-1701ms

VF-1701ms

- Highly inert for difficult analytes such as p,p'-DDT to improve productivity
- Column deactivation for more accurate trace analysis
- Eliminate ghost peaks and unstable baselines for more reliable data

The VF-1701ms is the world's first ultra-low bleed 14% cyanopropyl/phenyl, 86% PDMS GC column for pesticides, PCBs and semi-volatile organic compounds. Improved phase technology delivers increased inertness and reduced bleed, resulting in more accurate trace analysis. The bleed specification is 2 pA @ 280°C for a 0.25 mm x 60 m x 0.25 µm ID column.

VF-1701ms is also available with 0.15 mm ID for fast GC and GC/MS that can double sample throughput when compared to 0.25 and 0.32 mm ID columns.

VF-1701ms Chromatograms

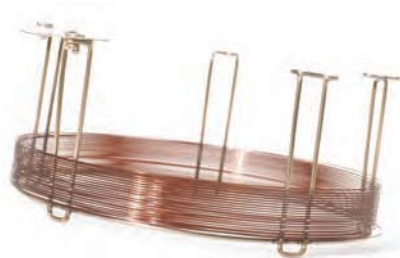
Environmental

Analysis of pesticides using EPA 8081 with ECD

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VF-1701ms

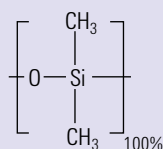
ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.10	10	0.20	-20 to 280/300	CP9140	
		0.40	-20 to 280/300	CP9141	
	20	0.10	-20 to 280/300	CP9142	
0.15	15	0.10	-20 to 280/300	CP9175	
		0.15	-20 to 280/300	CP9143	
		0.60	-20 to 280/300	CP9144	
	20	0.15	-20 to 280/300	CP9145	
		0.60	-20 to 280/300	CP9146	
0.25	15	0.15	-20 to 280/300	CP9147	
		0.25	-20 to 280/300	CP9148	
		1.00	-20 to 280/300	CP9149	CP9149I5
	30	0.15	-20 to 280/300	CP9150	
		0.25	-20 to 280/300	CP9151	CP9151I5
		1.00	-20 to 280/300	CP9152	CP9152I5
	60	0.15	-20 to 280/300	CP9153	
		0.25	-20 to 280/300	CP9154	CP9154I5
		0.50	-20 to 280/300	CP9155	CP9155I5
		1.00	-20 to 280/300	CP9156	
0.32	15	0.15	-20 to 280/300	CP9157	
		0.25	-20 to 280/300	CP9158	
		1.00	-20 to 280/300	CP9159	
	30	0.10	-20 to 280/300	CP9160	
		0.15	-20 to 280/300	CP9161	
		0.25	-20 to 280/300	CP9162	
		1.00	-20 to 280/300	CP9163	
	60	0.15	-20 to 280/300	CP9164	
		0.25	-20 to 280/300	CP9165	
		1.00	-20 to 280/300	CP9166	CP9166I5
0.53	15	1.00	-20 to 280/300	CP9167	
	30	0.10	-20 to 280/300	CP9168	
		0.25	-20 to 280/300	CP9169	
		0.50	-20 to 280/300	CP9170	
		1.00	-20 to 280/300	CP9171	
		1.50	-20 to 280/300	CP9172	
	60	1.00	-20 to 280/300	CP9173	
		1.50	-20 to 265/280	CP9174	



Polysiloxane Polymers Columns

Polysiloxanes are the most common stationary phases. They are available in the greatest variety and are stable, robust and versatile. Standard polysiloxanes are characterized by the repeating siloxane backbone. Each silicon atom contains two functional groups. The type and amount of the groups distinguish each stationary phase and its properties.

With the merger of Agilent and J&W Scientific there were many similar columns with the same type of polymer. In some cases the manufacturing and QC processes were exactly the same. In these cases the DB version was kept. In the cases where the HP and the DB columns had any manufacturing or QC differences, we opted to keep both phases available, as in the case of DB-1 and HP-1. Each of these columns is a high-quality product made to meet exacting quality control testing. However, there may be some subtle performance differences. For example the DB-35 and the HP-35 have slightly different selectivities. Therefore, we are still offering both DB and HP versions for our customers who have methods already developed on these columns.



Structure of DB-1

DB-1

- 100% Dimethylpolysiloxane
- Non-polar
- Excellent general purpose column
- Wide range of applications
- Low bleed
- High temperature limit
- Bonded and cross-linked
- Solvent rinsable
- Wide range of column dimensions available
- Equivalent to USP Phase G2

DB-1 Chromatograms**Environmental**

EPA Air Analysis Compendium Method TO-14 Standard	Page 611
EPA Method 551	Page 609
Pyrethrins	Page 595

Food, Flavors and Fragrances

Fragrance Reference Standard I	Page 620
Spearmint Oil	Page 617

Industrial Chemicals

Aldehydes and Ketones	Page 648
Aromatics in Finished Gasoline – ASTM Method 5769	Page 702
Esters I	Page 653
PFBHA Derivative	Page 649
Glycols III	Page 656
Halogenated Hydrocarbons II	Page 658
Nitrogen Based Solvents I	Page 662
Triethylene Glycol and Impurities	Page 656
Volatile Amines	Page 645

Life Sciences

Anabolic Steroids	Page 681
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Petroleum

Aromatics in Finished Gasoline – ASTM Method 5769	Page 702
DNPH Derivative	Page 649
Polyethylene	Page 706
Regular Unleaded Gasoline (California Phase 1) – "Normal" GC Run II	Page 704
Volatile Sulfur Compounds	Page 694

DB-1

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.05	10	0.05	-60 to 325/350	126-1012		126-1012LTM
		0.05	-60 to 325/350	126-10SP		
		0.20	-60 to 325/350	126-1013		126-1013LTM
0.10	5	0.12	-60 to 325/350	127-100a		127-100aLTM
	10	0.10	-60 to 325/350	127-100A	127-1012E	127-100aLTM
		0.40	-60 to 325/350	127-1013	127-1013E	127-1013LTM
	20	0.10	-60 to 325/350	127-101A	127-1022E	127-1022LTM
		0.40	-60 to 325/350	127-1023	127-1023E	127-1023LTM
	40	0.20	-60 to 325/350	127-1046	127-1046E	
		0.40	-60 to 325/350	127-1043		
0.15	10	1.20	-60 to 325/350	12A-1015		12a-1015LTM
0.18	10	0.18	-60 to 325/350	121-1012	121-1012E	12A-1015LTM
		0.20	-60 to 325/350	121-101A		121-101aLTM
		0.40	-60 to 325/350	121-1013	121-1013E	121-1013LTM
	20	0.18	-60 to 325/350	121-1022	121-1022E	121-101aLTM
		0.40	-60 to 325/350	121-1023		121-1023LTM
	40	0.40	-60 to 325/350	121-1043	121-1043E	
0.20	12	0.33	-60 to 325/350	128-1012		128-1012LTM
	25	0.33	-60 to 325/350	128-1022		128-1022LTM
	30	0.8	-60 to 325/350	128-1034		128-1034LTM
	50	0.33	-60 to 325/350	128-1052		
0.25	15	0.10	-60 to 325/350	122-1011		122-1011LTM
		0.25	-60 to 325/350	122-1012		122-1012LTM
		1.00	-60 to 325/350	122-1013		122-1013LTM
	25	0.25	-60 to 325/350	122-1022		122-1022LTM
	30	0.10	-60 to 325/350	122-1031		122-1031LTM
		0.25	-60 to 325/350	122-1032	122-1032E	122-1032LTM*
		0.50	-60 to 325/350	122-103E		122-103ELTM
		1.00	-60 to 325/350	122-1033	122-1033E	122-1033LTM
	50	0.25	-60 to 325/350	122-1052		
	60	0.10	-60 to 325/350	122-1061		
		0.25	-60 to 325/350	122-1062		
		0.50	-60 to 325/350	122-106E		
		1.00	-60 to 325/350	122-1063		
	100	0.50	-60 to 325/350	122-10AE		
	150	1.00	-60 to 325/350	122-10G3		

*Also available as LTM column toroid assembly for Agilent 5975T, 0.25 mm x 30 m, 0.25 µm, P/N 222-1032LTM

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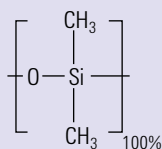
DB-1

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.32	10	0.5	-60 to 325/350	123-100E		123-100ELTM
		15	-60 to 325/350	123-1011		123-1011LTM
		0.25	-60 to 325/350	123-1012		123-1012LTM
		1.00	-60 to 325/350	123-1013		123-1013LTM
		3.00	-60 to 280/300	123-1014		123-1014LTM
		5.00	-60 to 280/300	123-1015		123-1015LTM
	25	0.12	-60 to 325/350	123-1027		123-1027LTM
		0.25	-60 to 325/350	123-1022		123-1022LTM
		0.52	-60 to 325/350	123-1026		123-1026LTM
		1.05	-60 to 325/350	123-102F		123-102FLTM
	30	0.10	-60 to 325/350	123-1031		123-1031LTM
		0.25	-60 to 325/350	123-1032		123-1032LTM
		0.50	-60 to 325/350	123-103E		123-103ELTM
		1.00	-60 to 325/350	123-1033	123-1033E	123-1033LTM
		1.50	-60 to 300/320	123-103B		123-103BLTM
		3.00	-60 to 280/300	123-1034		123-1034LTM
		5.00	-60 to 280/300	123-1035		123-1035LTM
	50	0.25	-60 to 325/350	123-1052		
		0.52	-60 to 325/350	123-1056		
		1.05	-60 to 325/350	123-105F		
		1.20	-60 to 325/350	123-105C		
		5.00	-60 to 280/300	123-1055		
	60	0.10	-60 to 325/350	123-1061		
		0.25	-60 to 325/350	123-1062	123-1062E	
		0.50	-60 to 325/350	123-106E		
		1.00	-60 to 325/350	123-1063	123-1063E	
		1.50	-60 to 300/320	123-106B	123-106BE	
		2.00	-60 to 280/300	123-106G		
		3.00	-60 to 280/300	123-1064	123-1064E	
		5.00	-60 to 280/300	123-1065	123-1065E	

(Continued)

DB-1

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.45	30	1.27	-60 to 325/350	124-1032		124-1032LTM
		2.55	-60 to 260/280	124-1034		124-1034LTM
0.53	5	0.88	-60 to 325/350	125-100a		125-100aLTM
		2.65	-60 to 325/350	125-100A		125-100ALTM
		5.00	-60 to 325/350	125-1005		125-1005LTM
	7.5	1.50	-60 to 325/350	125-1002		125-1002LTM
	10	2.65	-60 to 260/280	125-10HB	125-10HBE	125-10HBLTM
		5.00	-60 to 260/280	125-10H5		125-10H5LTM
	15	0.15	-60 to 340/360	125-1011	125-1011E	125-1011LTM
		0.25	-60 to 320/340	125-101K		125-101KLTM
		0.50	-60 to 300/320	125-1017		125-1017LTM
		1.00	-60 to 300/320	125-101J		125-101JLTM
		1.50	-60 to 300/320	125-1012	125-1012E	125-1012LTM
		3.00	-60 to 260/280	125-1014		125-1014LTM
	25	5.00	-60 to 260/280	125-1015		125-1015LTM
		1.00	-60 to 300/320	125-102J		125-102JLTM
		5.00	-60 to 260/280	125-1025		125-1025LTM
	30	0.10	-60 to 340/360	125-1039		125-1039LTM
		0.25	-60 to 320/340	125-103K	125-103KE	125-103KLTM
		0.50	-60 to 300/320	125-1037		125-1037LTM
		1.00	-60 to 300/320	125-103J		125-103JLTM
		1.50	-60 to 300/320	125-1032		125-1032LTM
		2.65	-60 to 260/280	125-103B		125-103BLTM
		3.00	-60 to 260/280	125-1034	125-1034E	125-1034LTM
		5.00	-60 to 260/280	125-1035	125-1035E	125-1035LTM
	50	5.00	-60 to 260/280	125-1055		
	60	1.00	-60 to 300/320	125-106J	125-106JE	
		1.50	-60 to 300/320	125-1062	125-1062E	
		3.00	-60 to 260/280	125-1064		
		5.00	-60 to 260/280	125-1065	125-1065E	
	105	5.00	-60 to 260/280	125-10B5		



Structure of HP-1

HP-1

- 100% Dimethylpolysiloxane
- Non-polar
- Excellent general purpose column – "Industry Standard"
- Wide range of applications
- Superior performance for low molecular weight alcohols (<C5)
- High temperature limit
- Bonded and cross-linked
- Solvent rinsable
- Wide range of column dimensions available
- Equivalent to USP Phase G2

HP-1 Chromatograms

Environmental

Organotin Compounds I	Page 595
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Industrial Chemicals

Common Industrial Solvents	Page 661
Inorganic Hydride Gases	Page 669
Solvents IV	Page 660

Petroleum

Denatured Fuel Ethanol – ASTM D5501	Page 701
Glycols/Diols	Page 657
Oxygenates in Gasoline ASTM D5599 (GC-OFID)	Page 701
Sulfur Compounds in Natural Gas – Synthetic Mixture	Page 698

HP-1

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.18	20	0.18	-60 to 325/350	19091Z-577	19091Z-577E	19091Z-577LTM
0.20	12	0.33	-60 to 325/350	19091-60312		
	17	0.11	-60 to 325/350	19091Z-008		19091Z-008LTM
	25	0.11	-60 to 325/350	19091Z-002		19091Z-002LTM
		0.33	-60 to 325/350	19091Z-102	19091Z-102E	19091Z-102LTM
		0.50	-60 to 325/350	19091Z-202		19091Z-202LTM
	50	0.11	-60 to 325/350	19091Z-005		
		0.33	-60 to 325/350	19091Z-105		
		0.50	-60 to 325/350	19091Z-205		

(Continued)

HP-1

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.25	15	0.10	-60 to 325/350	19091Z-331		19091Z-331LTM
		0.25	-60 to 325/350	19091Z-431		19091Z-431LTM
		1.00	-60 to 325/350	19091Z-231		19091Z-231LTM
	30	0.10	-60 to 325/350	19091Z-333		19091Z-333LTM
		0.25	-60 to 325/350	19091Z-433	19091Z-433E	19091Z-433LTM
		1.00	-60 to 325/350	19091Z-233	19091Z-233E	19091Z-233LTM
	60	0.25	-60 to 325/350	19091Z-436		
		1.00	-60 to 325/350	19091Z-236	19091Z-236E	
	100	0.50	-60 to 325/350	19091Z-530	19091Z-530E	
0.32	15	0.25	-60 to 325/350	19091Z-411	19091Z-411E	19091Z-411LTM
		1.00	-60 to 325/350	19091Z-211		19091Z-211LTM
	25	0.17	-60 to 325/350	19091Z-012	19091Z-012E	19091Z-012LTM
		0.52	-60 to 325/350	19091Z-112	19091Z-112E	19091Z-112LTM
		1.05	-60 to 325/350	19091Z-212		19091Z-212LTM
	30	0.10	-60 to 325/350	19091Z-313	19091Z-313E	19091Z-313LTM
		0.25	-60 to 325/350	19091Z-413	19091Z-413E	19091Z-413LTM
		1.00	-60 to 325/350	19091Z-213	19091Z-213E	19091Z-213LTM
		3.00	-60 to 260/280	19091Z-513	19091Z-513E	19091Z-513LTM
		4.00	-60 to 260/280	19091Z-613		19091Z-613LTM
		5.00	-60 to 260/280	19091Z-713	19091Z-713E	19091Z-713LTM
	50	0.17	-60 to 325/350	19091Z-015		
		0.52	-60 to 325/350	19091Z-115	19091Z-115E	
		1.05	-60 to 325/350	19091Z-215		
	60	0.25	-60 to 325/350	19091Z-416		
		1.00	-60 to 325/350	19091Z-216	19091Z-216E	
		5.00	-60 to 260/280	19091Z-716		
0.53	5	0.15	-60 to 320/400	19095Z-220		
		0.88	-60 to 320/400	19095Z-020		19095Z-020LTM
			-60 to 325/350	125-100a		
		2.65	-60 to 260/280	19095S-100	19095S-100E	19095S-100LTM
	7.5	5.00	-60 to 260/280	19095Z-627	19095Z-627E	19095Z-627LTM
	10	0.88	-60 to 300/320	19095Z-021	19095Z-021E	19095Z-021LTM
		2.65	-60 to 260/280	19095Z-121	19095Z-121E	19095Z-121LTM
	15	0.15	-60 to 320/400	19095Z-221	19095Z-221E	
		1.50	-60 to 300/320	19095Z-321		19095Z-321LTM
		3.00	-60 to 260/280	19095Z-421	19095Z-421LTM	19095Z-421LTM
		5.00	-60 to 260/280	19095Z-621		19095Z-621LTM
	30	0.88	-60 to 300/320	19095Z-023	19095Z-023E	19095Z-023LTM
		1.50	-60 to 300/320	19095Z-323	19095Z-323E	19095Z-323LTM
		2.65	-60 to 260/280	19095Z-123	19095Z-123E	19095Z-123LTM
		3.00	-60 to 260/280	19095Z-423	19095Z-423E	19095Z-423LTM
		5.00	-60 to 260/280	19095Z-623	19095Z-623E	19095Z-623LTM
	60	5.00	-60 to 260/280	19095Z-626		

CP-Sil 5 CB

- Extended column lifetime reduces replacement costs
- Wide application range improves productivity
- Available in Fused Silica or UltiMetal to maximize choice

The CP-Sil 5 CB high efficiency column contains a 100% dimethylpolysiloxane phase. Separation is almost entirely based on boiling points, making this column suitable for a wide range of applications with a broad temperature range. Due to intensive cross-linking, CP-Sil 5 CB is highly inert and withstands large solvent injections, guaranteeing reproducibility and ensuring maximum column lifetime. For the highest operating temperatures, use our UltiMetal columns.

CP-Sil 5 CB Chromatograms

Industrial Chemicals

Analysis of amino alcohols in water

Page 643

CP-Sil 5 CB

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.10	5	0.12	-60 to 330/350	CP7300	
	10	0.10	-60 to 330/350	CP7311	
		0.12	-60 to 330/350	CP7310	CP7310I5
		0.40	-60 to 325/350	CP7312	
	20	0.10	-60 to 330/350	CP7313	
0.15	10	0.12	-60 to 330/350	CP7684	CP7684I5
		2.00	-60 to 325/350	CP7682	CP7682I5
	25	0.12	-60 to 330/350	CP7694	
		1.20	-60 to 325/350	CP7693	
		2.00	-60 to 325/350	CP7692	CP7692I5
0.20	12	0.33	-60 to 325/350	CP7602	
	15	0.20	-60 to 330/350	CP7604	
	25	0.33	-60 to 325/350	CP7622	
	30	0.80	-60 to 325/350	CP7633	
	50	0.11	-60 to 330/350	CP7642	
		0.33	-60 to 325/350	CP7643	CP7643I5
		0.50	-60 to 325/350	CP7644	CP7644I5

(Continued)

CP-Sil 5 CB

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	10	0.12	-60 to 330/350	CP7700	
	15	0.25	-60 to 330/350	CP8510	
	25	0.12	-60 to 330/350	CP7710	CP7710I5
		0.25	-60 to 330/350	CP7441	
		0.40	-60 to 325/350	CP7709	
		1.20	-60 to 325/350	CP7670	CP7670I5
	30	0.10	-60 to 330/350	CP8710	
		0.25	-60 to 330/350	CP8741	CP8741I5
		1.00	-60 to 325/350	CP8770	
	50	0.12	-60 to 330/350	CP7720	
		0.25	-60 to 330/350	CP7443	CP7443I5
		0.40	-60 to 325/350	CP7719	CP7719I5
	60	0.25	-60 to 330/350	CP8743	CP8743I5
		1.00	-60 to 325/350	CP8780	CP8780I5
0.32	10	0.12	-60 to 330/350	CP7730	
		1.20	-60 to 325/350	CP7758	CP7758I5
	15	0.10	-60 to 330/350	CP8529	
		0.25	-60 to 325/350	CP8530	
		3.00	-60 to 325/350	CP8550	CP8550I5
		1.00	-60 to 325/350	CP8540	
		5.00	-60 to 300/325	CP8560	CP8560I5
	25	0.12	-60 to 330/350	CP7740	
		0.25	-60 to 325/350	CP7442	
		0.40	-60 to 325/350	CP7739	
		0.52	-60 to 325/350	CP8430	CP8430I5
		1.20	-60 to 325/350	CP7760	CP7760I5
		5.00	-60 to 300/325	CP7680	CP7680I5
	30	0.25	-60 to 325/350	CP8742	CP8742I5
		1.00	-60 to 325/350	CP8760	CP8760I5
		3.00	-60 to 310/335	CP8687	CP8687I5
		5.00	-60 to 300/325	CP8688	CP8688I5
	50	0.12	-60 to 330/335	CP7750	CP7750I5
		0.25	-60 to 325/350	CP7444	CP7444I5
		0.40	-60 to 325/350	CP7749	CP7749I5
		1.20	-60 to 325/350	CP7770	CP7770I5
		5.00	-60 to 300/325	CP7690	CP7690I5
	60	0.25	-60 to 325/350	CP8744	CP8744I5
		1.00	-60 to 325/350	CP8870	
		3.00	-60 to 310/335	CP8689	
		5.00	-60 to 300/325	CP8690	CP8690I5

(Continued)

CP-Sil 5 CB

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.53	10	1.00	-60 to 315/340	CP7625	
		2.00	-60 to 305/330	CP7620	CP7620I5
		5.00	-60 to 290/325	CP7645	
	15	0.15	-60 to 330/350	CP8673	CP8673I5
		1.50	-60 to 305/330	CP8674	CP8674I5
		3.00	-60 to 300/325	CP8675	
		5.00	-60 to 290/325	CP8676	
	20	5.00	-60 to 290/325	CP8774	
	25	1.00	-60 to 315/340	CP7635	CP7635I5
		2.00	-60 to 305/330	CP7630	
		5.00	-60 to 290/325	CP7675	CP7675I5
	30	1.50	-60 to 305/330	CP8735	CP8735I5
		2.00	-60 to 305/330	CP8730	CP8730I5
		3.00	-60 to 300/325	CP8677	CP8677I5
		5.00	-60 to 290/325	CP8775	CP8775I5
	50	1.00	-60 to 315/340	CP7695	
		2.00	-60 to 305/330	CP7640	
		5.00	-60 to 290/325	CP7685	CP7685I5
	60	1.50	-60 to 305/330	CP8799	
		5.00	-60 to 290/325	CP8685	
	100	0.50	-60 to 325/350	CP7608	
		2.00	-60 to 305/330	CP7650	
		5.00	-60 to 290/325	CP7688	

CP-Sil 5 CB UltiMetal

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.53	10	1.00	-60 to 325/350	CP7120	
		2.00	-60 to 325/350	CP7150	
		5.00	-60 to 325/350	CP6666	CP6666I5
	25	0.50	-60 to 325/350	CP7135	CP7135I5
		2.00	-60 to 325/350	CP7160	
		5.00	-60 to 325/350	CP6670	
	50	0.50	-60 to 325/350	CP7195	
		1.00	-60 to 325/350	CP7140	
		2.00	-60 to 325/350	CP7170	
		5.00	-60 to 325/350	CP6671	

Ultra 1

- 100% Dimethylpolysiloxane
- Non-polar
- Equivalent to HP-1 with tighter specifications for retention index and capacity factors
- Bonded and cross-linked
- Solvent rinsable

Ultra 1 Chromatograms

Industrial Chemicals

Ethylene Glycol Mixture	Page 657
Pyrolysates of Polystyrene	Page 652

Ultra 1

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.20	12	0.33	-60 to 325/350	19091A-002		19091A-008LTM
	17	0.11	-60 to 325/350	19091A-112LTM		19091A-002LTM
		0.33	-60 to 325/350	19091a-108		19091A-008
	25	0.11	-60 to 325/350	19091A-108		19091A-115
		0.33	-60 to 325/350	19091A-005	19091A-012	19091A-101LTM
	50	0.11	-60 to 325/350	19091A-101		
		0.33	-60 to 325/350	19091A-015		
0.32	25	0.17	-60 to 325/350	19091A-102		19091A-102LTM
		0.52	-60 to 325/350	19091A-105		19091A-012LTM
	50	0.17	-60 to 325/350	19091A-102E		
		0.52	-60 to 325/350	19091A-112		

Ultra 2

- (5%-Phenyl)-methylpolysiloxane
- Non-polar
- Equivalent to HP-5 with tighter specifications for retention index and capacity factors
- Bonded and cross-linked
- Solvent rinsable

Ultra 2 Chromatograms

Food, Flavors and Fragrances

Flavor Mixture Page 623

Life Sciences

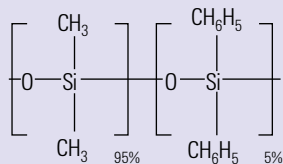
Antiepileptic Drugs Page 676

Tricyclic Antipsychotics Page 676

Urine Drug Screen Page 673

Ultra 2

ID (mm)	Length (m)	Film (μ m)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.20	12	0.33	-60 to 325/350	19091B-101		19091B-101LTM
	25	0.11	-60 to 325/350	19091B-002		19091B-002LTM
		0.33	-60 to 325/350	19091B-102	19091B-102E	19091B-102LTM
	50	0.11	-60 to 325/350	19091B-005		
		0.33	-60 to 325/350	19091B-105	19091A-108LTM	
0.32	25	0.17	-60 to 325/350	19091B-012	19091B-012E	19091B-012LTM
		0.52	-60 to 325/350	19091B-112		19091B-112LTM
	50	0.17	-60 to 325/350	19091B-015		
		0.52	-60 to 325/350	19091B-115	19091B-115E	



Structure of DB-5

DB-5

- (5%-Phenyl)-methylpolysiloxane
- Non-polar
- Excellent general purpose column
- Wide range of applications
- Low bleed
- High temperature limit
- Bonded and cross-linked
- Solvent rinsable
- Wide range of column dimensions available
- Equivalent to USP Phase G27

DB-5 Chromatograms

Environmental

Organochlorine Pesticides, DB5/1701P	Page 581
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Food, Flavors and Fragrances

Bacterial Fatty Acid Methyl Esters	Page 632
Cold-Pressed Orange Oil	Page 625
Lemon Oil	Page 624

Life Sciences

Amphetamines and Precursors – TMS Derivatives	Page 674
Antihistamines	Page 676
Common Drug Screen	Page 672
Marijuana (Δ^9 -THC) and Major Metabolites – TMS Derivatives	Page 681
Narcotics and Adulterants	Page 680
Over-the-Counter Pain Killers – TMS Derivatives	Page 680

DB-5

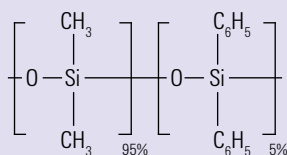
ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.10	10	0.10	-60 to 325/350	127-500A	127-5012E	127-5012LTM
		0.17	-60 to 325/350	127-501E	127-501EE	127-501ELTM
		0.33	-60 to 325/350	127-501N		127-501NLTM
		0.40	-60 to 325/350	127-5013		127-5013LTM
	20	0.10	-60 to 325/350	127-5022	127-5022E	127-5022LTM
		0.40	-60 to 325/350	127-5023		127-5023LTM
0.15	10	1.20	-60 to 300/320	12a-5015		12a-5015LTM
0.18	10	0.18	-60 to 325/350	121-5012	121-5012E	12A-5015LTM
		0.40	-60 to 325/350	121-5013		121-5013LTM
	20	0.18	-60 to 325/350	121-5022	121-5022E	121-5022LTM
		0.40	-60 to 325/350	121-5023	121-5023E	121-5023LTM
	40	0.18	-60 to 325/350	121-5042		
0.20	12	0.33	-60 to 325/350	128-5012		128-5012LTM
	15	0.20	-60 to 325/350	128-50H7		128-50H7LTM
	25	0.33	-60 to 325/350	128-5022		128-5022LTM
	50	0.33	-60 to 325/350	128-5052		
0.25	15	0.10	-60 to 325/350	122-5011		122-5011LTM
		0.25	-60 to 325/350	122-5012		122-5012LTM
		0.50	-60 to 325/350	122-501E		122-501ELTM
		1.00	-60 to 325/350	122-5013		122-5013LTM
	25	0.25	-60 to 325/350	122-5022		122-5022LTM
	30	0.10	-60 to 325/350	122-5031		122-5031LTM
		0.25	-60 to 325/350	122-5032	122-5032E	122-5032LTM
		0.50	-60 to 325/350	122-503E		122-503ELTM
		1.00	-60 to 325/350	122-5033	122-5033E	122-5033LTM
	50	0.25	-60 to 325/350	122-5052		
	60	0.10	-60 to 325/350	122-5061		
		0.25	-60 to 325/350	122-5062		
		0.50	-60 to 325/350	122-506E		
		1.00	-60 to 325/350	122-5063		

(Continued)



DB-5

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.32	10	0.5	-60 to 325/350	123-500E		123-500ELTM
		15	-60 to 325/350	123-5011		123-5011LTM
	15	0.10	-60 to 325/350	123-5012	123-5012E	123-5012LTM
		0.25	-60 to 325/350	123-5013	123-5013E	123-5013LTM
		1.00	-60 to 325/350			
	25	0.17	-60 to 325/350	123-502D		123-502DLTM
		0.25	-60 to 325/350	123-5022		123-5022LTM
		0.52	-60 to 325/350	123-5026		123-5026LTM
		1.05	-60 to 325/350	123-502F		123-502FLTM
	30	0.10	-60 to 325/350	123-5031		123-5031LTM
		0.25	-60 to 325/350	123-5032	123-5032E	123-5032LTM
		0.50	-60 to 325/350	123-503E		123-503ELTM
		1.00	-60 to 325/350	123-5033	123-5033E	123-5033LTM
		1.50	-60 to 325/350	123-503B		123-503BLTM
	50	0.25	-60 to 325/350	123-5052		
		0.52	-60 to 325/350	123-5056		
		1.00	-60 to 325/350	123-5053		
	60	0.25	-60 to 325/350	123-5062		
		1.00	-60 to 325/350	123-5063	123-5063E	
0.45	15	1.27	-60 to 300/320	124-5012		124-5012LTM
	30	0.42	-60 to 300/320	124-5037		124-5037LTM
		1.27	-60 to 300/320	124-5032		124-5032LTM
0.53	10	2.65	-60 to 260/280	125-50HB		125-50HBLTM
		15	-60 to 300/320	125-501K		125-501KLTM
		0.25	-60 to 300/320	125-5017		125-5017LTM
		1.00	-60 to 300/320	125-501J		125-501JLTM
		1.50	-60 to 300/320	125-5012	125-5012E	125-5012LTM
	25	5.00	-60 to 260/280	125-5025		125-5025LTM
	30	0.25	-60 to 300/320	125-503K		125-503KLTM
		0.50	-60 to 300/320	125-5037		125-5037LTM
		0.88	-60 to 300/320	125-503D		125-503DLTM
		1.00	-60 to 300/320	125-503J		125-503JLTM
		1.50	-60 to 300/320	125-5032	125-5032E	125-5032LTM
		2.65	-60 to 260/280	125-503B		125-503BLTM
		3.00	-60 to 260/280	125-5034	125-5034E	125-5034LTM
		5.00	-60 to 260/280	125-5035	125-5035E	125-5035LTM
	60	1.50	-60 to 300/320	125-5062	125-5062E	
		5.00	-60 to 260/280	125-5065	125-5065E	



Structure of HP-5

HP-5

- (5%-Phenyl)-methylpolysiloxane
- Non-polar
- Excellent general purpose column
- Wide range of applications
- High temperature limit
- Bonded and cross-linked
- Solvent rinsable
- Wide range of column dimensions available
- Equivalent to USP Phase G27

HP-5 Chromatograms

Environmental

Organotin Compounds II

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HP-5

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.18	20	0.18	-60 to 325/350	19091J-577	19091J-577E	19091J-577LTM
0.20	12	0.33	-60 to 325/350	19091J-101		19091J-101LTM
	17	0.33	-60 to 325/350	19091J-108		
	25	0.11	-60 to 325/350	19091J-002		19091J-002LTM
		0.33	-60 to 325/350	19091J-102	19091J-102E	19091J-102LTM
		0.50	-60 to 325/350	19091J-202		19091J-202LTM
	50	0.11	-60 to 325/350	19091J-005		
		0.33	-60 to 325/350	19091J-105	19091J-105E	
		0.50	-60 to 325/350	19091J-205		
0.25	5	0.10	-60 to 325/350	19091J-330		19091J-330LTM
	15	0.25	-60 to 325/350	19091J-431	19091J-431E	19091J-431LTM
		1.00	-60 to 325/350	19091J-231		19091J-231LTM
	30	0.10	-60 to 325/350	19091J-333		19091J-333LTM
		0.25	-60 to 325/350	19091J-433	19091J-433E	19091J-433LTM
		1.00	-60 to 325/350	19091J-233		19091J-233LTM
	60	0.25	-60 to 325/350	19091J-436	19091J-436E	
		1.00	-60 to 325/350	19091J-236	19091J-236E	

(Continued)

HP-5

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.32	15	0.25	-60 to 325/350	19091J-411		19091J-411LTM
	25	0.17	-60 to 325/350	19091J-012	19091J-012E	19091J-012LTM
		0.52	-60 to 325/350	19091J-112	19091J-112E	19091J-112LTM
		1.05	-60 to 325/350	19091J-212		19091J-212LTM
	30	0.10	-60 to 325/350	19091J-313		19091J-313LTM
		0.25	-60 to 325/350	19091J-413	19091J-413E	19091J-413LTM
		0.50	-60 to 325/350	19091J-113	19091J-113E	19091J-113LTM
		1.00	-60 to 325/350	19091J-213	19091J-213E	19091J-213LTM
	50	0.17	-60 to 325/350	19091J-015	19091J-015E	
		0.52	-60 to 325/350	12A-5015	19091J-115E	
		1.05	-60 to 325/350	19091J-215	19091J-215E	
	60	0.25	-60 to 325/350	19091J-416		
		1.00	-60 to 325/350	19091J-216	19091J-216E	
0.53	10	2.65	-60 to 260/280	19095J-121	19095J-121E	19095J-121LTM
	15	1.50	-60 to 300/320	19095J-321		19095J-321LTM
		5.00	-60 to 260/280	19095J-621		19095J-621LTM
	30	0.88	-60 to 300/320	19095J-023	19095J-023E	19095J-023LTM
		1.50	-60 to 300/320	19095J-323	19095J-323E	19095J-323LTM
		2.65	-60 to 260/280	19095J-123	19095J-123E	19095J-123LTM
		5.00	-60 to 260/280	19095J-623	19095J-623E	19095J-623LTM

CP-Sil 8 CB

- High efficiency increases data accuracy
- Wide choice of dimensions for maximum utility
- Ultimate reproducibility, selectivity and retention times enhance productivity

By incorporating 5% phenyl groups in the dimethylpolysiloxane polymer, the CP-Sil 8 CB column has a slightly higher polarity than CP-Sil 5 CB columns. This results in better selectivity for aromatic compounds and is generally the best choice when developing a method.

CP-Sil 8 CB shows excellent column-to-column reproducibility and very high column efficiencies. We recommend the UltiMetal column for the highest operating temperatures, and when working in rugged environments with process or portable instruments.

CP-Sil 8 CB Chromatograms

Environmental

Phenols according to EPA Method 8040

Page 602

CP-Sil 8 CB

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.10	20	0.10	-60 to 330/350	CP7319	CP731915
0.15	10	0.12	-60 to 330/350	CP7884	
		1.20	-60 to 325/350	CP7885	
		25	0.12	-60 to 330/350	CP7894
0.20	12	0.33	-60 to 325/350	CP7900	
	25	0.33	-60 to 325/350	CP7921	
	50	0.33	-60 to 325/350	CP7941	
	60	0.20	-60 to 330/350	CP7950	
0.25	15	0.25	-60 to 330/350	CP8511	
		1.00	-60 to 325/350	CP8521	
	25	0.12	-60 to 330/350	CP7711	
		0.25	-60 to 330/350	CP7451	CP745115
		0.40	-60 to 325/350	CP7759	
		1.20	-60 to 325/350	CP7671	
	30	0.25	-60 to 330/350	CP8751	CP875115
		1.00	-60 to 325/350	CP8771	CP877115
	50	0.12	-60 to 330/350	CP7721	
		0.25	-60 to 330/350	CP7453	CP745315
		0.40	-60 to 325/350	CP7769	
	60	0.10	-60 to 325/350	CP8750	
		0.25	-60 to 330/350	CP8753	
		1.00	-60 to 325/350	CP8781	

(Continued)

CP-Sil 8 CB

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.32	10	0.12	-60 to 330/350	CP7731	
		5.00	-60 to 300/325	CP8014	CP8014I5
	15	0.25	-60 to 325/350	CP8531	
		1.00	-60 to 325/350	CP8541	
	25	0.12	-60 to 330/350	CP7741	CP7741I5
		0.25	-60 to 325/350	CP7452	
		0.40	-60 to 325/350	CP7779	
		0.52	-60 to 325/350	CP8431	
		1.20	-60 to 325/350	CP7761	
		5.00	-60 to 300/325	CP7681	CP7681I5
	30	0.10	-60 to 330/350	CP8791	
		0.25	-60 to 325/350	CP8752	CP8752I5
		1.00	-60 to 325/350	CP8761	CP8761I5
	50	0.12	-60 to 330/350	CP7751	CP7751I5
		0.25	-60 to 325/350	CP7454	
		0.40	-60 to 325/350	CP7789	
		1.20	-60 to 325/350	CP7771	
		5.00	-60 to 300/325	CP7691	CP7691I5
	60	0.25	-60 to 325/350	CP8754	
		1.00	-60 to 325/350	CP8871	CP8871I5
0.53	10	2.00	-60 to 305/330	CP7621	
		5.00	-60 to 290/325	CP7646	
	15	1.50	-60 to 305/330	CP8678	
	25	0.15	-60 to 325/350	CP7634	
		2.00	-60 to 305/330	CP7631	
		1.00	-60 to 315/340	CP7636	
		5.00	-60 to 290/325	CP7656	
	30	0.50	-60 to 325/350	CP8716	
		1.50	-60 to 305/330	CP8736	CP8736I5
		5.00	-60 to 290/325	CP8756	CP8756I5
	50	1.00	-60 to 315/340	CP7696	
		2.00	-60 to 305/330	CP7641	
		5.00	-60 to 290/325	CP7666	
	60	1.50	-60 to 305/330	CP8796	
	100	5.00	-60 to 290/325	CP7676	

CP-Sil 8 CB UltiMetal

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.53	25	5.00	-60 to 325/350	CP6680
	50	5.00	-60 to 325/350	CP7196

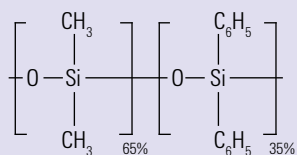
CP-Sil 13 CB

- Bonded and cross-linked for solvent rinsing that extends column lifetime
- Ideal confirmation column for complete confidence
- Non-cyano phase for the best sensitivity with ECD

The CP-Sil 13 CB was specially developed for the analysis of medium polarity compounds where halocarbon-sensitive detectors are used (e.g. ECD). It is a non-cyano containing, medium polarity column with a 14% phenyl, 86% dimethylpolysiloxane phase, preventing raised baselines due to the column bleed on an ECD.

CP-Sil 13 CB

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.15	25	0.40	-25 to 300/330	CP7813	
0.25	25	0.20	-25 to 300/330	CP7906	
		0.40	-25 to 300/330	CP7916	
		1.20	-25 to 300/330	CP7977	CP7977I5
		0.20	-25 to 300/330	CP7907	
	50	0.40	-25 to 300/330	CP7917	
0.32	25	0.20	-25 to 300/330	CP7926	CP7926I5
		0.40	-25 to 300/330	CP7936	
		1.20	-25 to 300/330	CP7946	
	50	0.20	-25 to 300/330	CP7927	
		0.40	-25 to 300/330	CP7937	
		1.20	-25 to 300/330	CP7947	
0.53	10	1.00	-25 to 300/330	CP7609	
	25	1.00	-25 to 300/330	CP7619	
		2.00	-25 to 300/330	CP7649	
	50	1.00	-25 to 300/330	CP7629	
		2.00	-25 to 300/330	CP7659	
	100	2.00	-25 to 300/330	CP7669	



Structure of DB-35

DB-35

- (35%-Phenyl)-methylpolysiloxane
- Mid-polarity – slightly more polar than HP-35
- Low bleed
- Inert to active solutes
- Ideal for confirmational analyses
- Bonded and cross-linked
- Solvent rinsable
- Equivalent to USP Phase G42

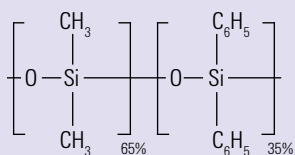
DB-35 Chromatograms

Environmental

Organochlorine Pesticides IV	Page 580
Nitrogen/Phosphorus Containing Pesticides, EPA Method 507	Page 586

DB-35

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.25	30	0.25	40 to 300/320	122-1932		122-1932LTM
	60	0.25	40 to 300/320	122-1962		
0.32	30	0.25	40 to 300/320	123-1932		123-1932LTM
		0.50	40 to 300/320	123-1933	123-1933E	123-1933LTM
0.53	15	1.00	40 to 280/300	125-1912		125-1912LTM
	30	0.50	40 to 280/300	125-1937		125-1937LTM
		1.00	40 to 280/300	125-1932		125-1932LTM



Structure of HP-35

HP-35

- (35%-Phenyl)-methylpolysiloxane
- Mid-polarity – slightly less polar than DB-35
- Inert to active solutes
- Ideal for confirmational analyses
- Bonded and cross-linked
- Solvent rinsable
- Equivalent to USP Phase G42

HP-35 Chromatograms

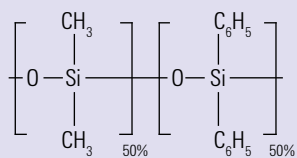
Industrial Chemicals

Polymer Additives

Page 669

HP-35

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.25	15	0.25	40 to 300/320	19091G-131	19091G-131E	19091G-131LTM
	30	0.25	40 to 300/320	19091G-133		19091G-133LTM
0.32	30	0.25	40 to 300/320	19091G-113		19091G-113LTM
		0.50	40 to 300/320	19091G-213		19091G-213LTM



Structure of DB-17

DB-17

- (50%-Phenyl)-methylpolysiloxane
- Mid-polarity – slightly more polar than HP-50+
- Excellent for confirmational analyses
- Bonded and cross-linked
- Solvent rinsable
- Equivalent to USP Phase G3

DB-17 Chromatograms

Life Sciences

Common Drug Screen	Page 672
Free Steroids	Page 681

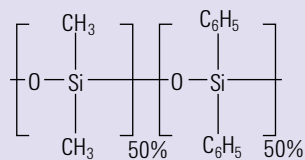
DB-17

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.05	10	0.10	40 to 280/300	126-1713		126-1713LTM
0.10	10	0.10	40 to 280/300	127-1712		127-1712LTM
		0.20	40 to 280/300	127-1713		127-1713LTM
		20	40 to 280/300	127-1722		127-1722LTM
0.18	20	0.18	40 to 280/300	121-1722		121-1722LTM
		0.30	40 to 280/300	121-1723		121-1723LTM
0.25	15	0.15	40 to 280/300	122-1711		122-1711LTM
		0.25	40 to 280/300	122-1712		122-1712LTM
		0.50	40 to 280/300	122-1713	122-1713E	122-1713LTM
	30	0.15	40 to 280/300	122-1731	122-1731E	122-1731LTM
		0.25	40 to 280/300	122-1732	122-1732E	122-1732LTM
		0.50	40 to 280/300	122-1733		122-1733LTM
60	60	0.25	40 to 280/300	122-1762		

(Continued)

DB-17

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.32	15	0.15	40 to 280/300	123-1711		123-1711LTM
		0.25	40 to 280/300	123-1712		123-1712LTM
		0.50	40 to 280/300	123-1713		123-1713LTM
	30	0.15	40 to 280/300	123-1731		123-1731LTM
		0.25	40 to 280/300	123-1732	123-1732E	123-1732LTM
		0.50	40 to 280/300	123-1733	123-1733E	123-1733LTM
	60	0.25	40 to 280/300	123-1762		
0.53	5	2.00	40 to 280/300	125-1704		125-1704LTM
	15	0.25	40 to 260/280	125-1711		125-1711LTM
		0.50	40 to 260/280	125-1717		125-1717LTM
		1.00	40 to 260/280	125-1712		125-1712LTM
		1.50	40 to 260/280	125-1713		125-1713LTM
	30	0.25	40 to 260/280	125-1731		125-1731LTM
		0.5	40 to 260/280	125-1737		125-1737LTM
		1.00	40 to 260/280	125-1732	125-1732E	125-1732LTM
		1.50	40 to 260/280	125-1733		125-1733LTM
	60	1.00	40 to 260/280	125-1762		



Structure of HP-50+

HP-50+

- (50%-Phenyl)-methylpolysiloxane
- Mid-polarity – slightly less polar than DB-17
- Excellent for conformational analyses
- Bonded and cross-linked
- Solvent rinsable
- Equivalent to USP Phase G3

HP-50+

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.18	20	0.18	40 to 280/300	19091L-577		19091L-577LTM
0.20	12	0.31	40 to 280/300	19091L-101		19091L-101LTM
0.25	5	0.15	40 to 280/300	19091L-330		19091L-330LTM
	15	0.25	40 to 280/300	19091L-431		19091L-431LTM
	30	0.15	40 to 280/300	19091L-333		19091L-333LTM
		0.25	40 to 280/300	19091L-433		19091L-433LTM
		0.50	40 to 280/300	19091L-133		19091L-133LTM
0.32	15	0.50	40 to 280/300	19091L-111		19091L-111LTM
	30	0.25	40 to 280/300	19091L-413	19091L-413E	19091L-413LTM
		0.50	40 to 280/300	19091L-113	19091L-113E	19091L-113LTM
	60	0.25	40 to 280/300	19091L-416		
0.53	15	1.00	40 to 260/280	19095L-021		19095L-021LTM
	30	0.50	40 to 260/280	19095L-523	19095L-523E	19095L-523LTM
		1.00	40 to 260/280	19095L-023	19095L-023E	19095L-023LTM

CP-Sil 24 CB

- Bonded and cross linked for extended longevity
- Lowest detection limits using ECD
- Good inertness for highly accurate results

CP-Sil 24 CB is a medium polarity, 50% phenyl/50% dimethylpolysiloxane phase with no cyano groups, making it ideal for use with ECD. The CP-Sil 24 CB column produces perfect peak shapes for amines as shown by the Grob test mixture. It is especially suitable for the analysis of drugs and pesticides and is an excellent confirmation column in combination with CP-Sil 5 CB or CP-Sil 8 CB.

CP-Sil 24 CB Chromatograms

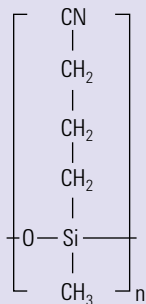
Environmental

Phenols according to EPA Method 8040

Page 602

CP-Sil 24 CB

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	15	0.25	40 to 280/300	CP7820	
	30	0.25	40 to 280/300	CP7821	
		0.50	40 to 280/300	CP7824	
	60	0.25	40 to 280/300	CP7822	CP7822I5
		0.50	40 to 280/300		CP7825I5
0.32	15	0.25	40 to 280/300	CP7830	CP7830I5
	30	0.25	40 to 280/300	CP7831	CP7831I5
	60	0.25	40 to 280/300	CP7832	
0.53	15	1.00	40 to 265/290	CP7870	
	30	0.50	40 to 280/300	CP7834	CP7834I5
		1.00	40 to 265/290	CP7871	CP7871I5
	60	1.00	40 to 265/290	CP7872	



Structure of DB-23

DB-23

- (50%-Cyanopropyl)-methylpolysiloxane
- High polarity
- Designed for separation of fatty acid methyl esters (FAMES)
- Excellent resolution for cis- and trans-isomers
- Bonded and cross-linked
- Solvent rinsable
- Replaces HP-23
- Close equivalent to USP Phase G5

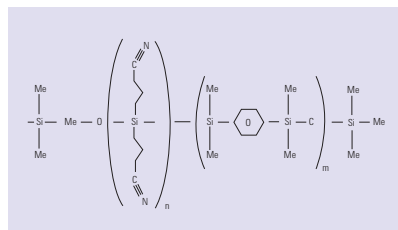
DB-23 Chromatograms

Food, Flavors and Fragrances

Canola Oil Margarine Partially Hydrogenated FAMES AOCS Method 1c-89	Page 637
FAMES I	Page 633

DB-23

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.18	20	0.20	40 to 250/260	121-2323		121-2323LTM
0.25	15	0.25	40 to 250/260	122-2312		122-2312LTM
		0.15	40 to 250/260	122-2331		122-2331LTM
	60	0.25	40 to 250/260	122-2332	122-2332E	122-2332LTM
		0.15	40 to 250/260	122-2361	122-2361E	
		0.25	40 to 250/260	122-2362	122-2362E	
0.32	30	0.25	40 to 250/260	123-2332	123-2332E	123-2332LTM
	60	0.25	40 to 250/260	123-2362		
0.53	15	0.50	40 to 230/240	125-2312		125-2312LTM
	30	0.50	40 to 230/240	125-2332		125-2332LTM



Structure of HP-88

HP-88

- (88%-Cyanopropyl)aryl-polysiloxane
- 250/320°C upper temperature limits
- High polarity
- Designed for separation of cis-trans fatty acid methyl esters (FAMES)
- Even better separation than DB-23 of cis-trans isomers

HP-88 Chromatograms

Food, Flavors and Fragrances

69 Component FAME Mix

Page 634

HP-88

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.25	100	0.25	0 to 250/260	112-88A7	112-88A7E	
	60	0.2	0 to 250/260	112-8867	112-8867E	
	30	0.2	0 to 250/260	112-8837	112-8837E	112-8837LTM

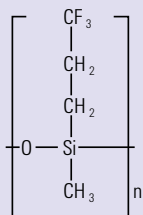
CP-Sil 88

- High selectivity towards positional and geometric isomers for ease-of-use
- Highly substituted cyanopropyl phase
- Highest polarity, non-chemically bonded and stabilized

The CP-Sil 88 column contains a highly substituted cyanopropyl phase that has been stabilized. It has the highest polarity and is non-chemically bonded. The extremely high polarity of this column offers maximum resolution in separations where the boiling point and polarity of the analytes are nearly equal (for example, in the separation of positional and geometric isomers).

CP-Sil 88

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	25	0.20	50 to 225/240	CP6172	CP6172I5
	50	0.20	50 to 225/240	CP6173	CP6173I5
0.32	25	0.20	50 to 225/240	CP6174	CP6174I5
	50	0.20	50 to 225/240	CP6175	



Structure of DB-200

DB-200

- (35% Trifluoropropyl)-methylpolysiloxane
- 300/320°C temperature limit
- Mid-polarity – more polar than DB-1701 or DB-17
- Ideal for difficult-to-separate positional isomers
- Unique interactions with compounds containing nitro, halogen and carbonyl groups
- Low ECD bleed
- Unique selectivity
- Close equivalent to USP Phase G6

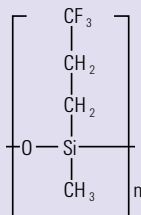
DB-200 Chromatograms

Industrial Chemicals

Acrylate Impurities I	Page 663
Aromatic Solvents	Page 661
Solvents I	Page 659

DB-200

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	7890/6890 LTM Module
0.25	30	0.25	30 to 300/320	122-2032	122-2032LTM
		0.50	30 to 300/320	122-2033	122-2033LTM
0.32	30	0.25	30 to 300/320	123-2032	123-2032LTM
		0.50	30 to 300/320	123-2033	123-2033LTM
0.53	30	1.00	30 to 280/300	125-2032	125-2032LTM



Structure of DB-210

DB-210

- (50%-Trifluoropropyl)-methylpolysiloxane
- High polarity
- Excellent for U.S. EPA Methods 8140 and 609
- Bonded and cross-linked
- Solvent rinsable
- Exact replacement of HP-210
- Close equivalent to USP Phase G6

DB-210 Chromatograms

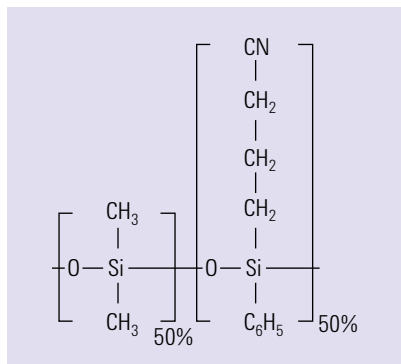
Environmental

Herbicides II

Page 586

DB-210

ID (mm)	Length (m)	Film (μ m)	Temp Limits ($^{\circ}$ C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.25	15	0.25	45 to 240/260	122-0212		122-0212LTM
	30	0.25	45 to 240/260	122-0232	122-0232E	122-0232LTM
		0.50	45 to 240/260	122-0233		122-0233LTM
0.32	15	0.50	45 to 240/260	123-0213		123-0213LTM
	30	0.25	45 to 240/260	123-0232		123-0232LTM
		0.50	45 to 240/260	123-0233		123-0233LTM
0.53	15	1	45 to 220/240	125-0212		125-0212LTM
	30	1.00	45 to 220/240	125-0232		125-0232LTM



Structure of DB-225

DB-225

- (50%-Cyanopropylphenyl)-dimethylpolysiloxane
- Mid/high polarity
- Excellent for separations of cis- and trans-fatty acid methyl esters (FAMES)
- Bonded and cross-linked
- Solvent rinsable
- Exact replacement of HP-225
- Close equivalent to USP Phase G7

DB-225 Chromatograms

Environmental

Tetrachlorodibenzo-p-furans Page 591

Food, Flavors and Fragrances

Alditol Acetates Page 629

FAME Standard II Page 636

Tips & Tools

Need assistance selecting a column for your method? Contact our chromatography technical specialists at www.agilent.com/chem/TechRep

DB-225

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.10	20	0.10	40 to 220/240	127-2222		127-2222LTM
0.18	20	0.20	40 to 220/240	121-2223		121-2223LTM
0.25	15	0.25	40 to 220/240	122-2212		122-2212LTM
		0.15	40 to 220/240	122-2231		122-2231LTM
		0.25	40 to 220/240	122-2232		122-2232LTM
0.32	30	0.25	40 to 220/240	123-2232	123-2232E	123-2232LTM
0.53	30	1.00	40 to 200/220	125-2212		125-2212LTM
		0.50	40 to 200/220	125-2237		125-2237LTM
		1.00	40 to 200/220	125-2232		125-2232LTM

CP-Sil 43 CB

- Moderate polarity for specific selectivity
- Separates aromatic from aliphatic compounds
- Bonded and cross-linked for extended longevity

CP-Sil 43 CB is a chemically bonded, moderately polar column with a 25% cyanopropyl/25% phenyl/50% dimethylpolysiloxane phase for specific selectivity. It separates aromatic from aliphatic hydrocarbons and is equivalent to a OV-255 column.

CP-Sil 43 CB

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	25	0.20	45 to 200/225	CP7715	CP7715I5
	50	0.20	45 to 200/225	CP7725	CP7725I5
0.32	10	0.20	45 to 200/225	CP7735	
	25	0.20	45 to 200/225	CP7745	

DB-1301

- (6%-Cyanopropyl-phenyl) methylpolysiloxane
- Equivalent to USP Phase G43
- Low/mid-polarity
- Bonded and cross-linked
- Exact replacement of HP-1301 and HP-1701
- Solvent rinsable

DB-1301

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.18	10	0.40	-20 to 280/300	121-1313		121-1313LTM
0.25	30	0.25	-20 to 280/300	122-1332	122-1332E	122-1332LTM
		1.00	-20 to 280/300	122-1333		122-1333LTM
	60	0.25	-20 to 280/300	122-1362		
		1.00	-20 to 280/300	122-1363	122-1363E	
0.32	30	0.25	-20 to 280/300	123-1332		123-1332LTM
		1.00	-20 to 280/300	123-1333		123-1332LTM
	60	1.00	-20 to 280/300	123-1363	123-1363E	
0.53	15	1.00	-20 to 260/280	125-1312		125-1312LTM
	30	1.00	-20 to 260/280	125-1332		125-1332LTM
		1.50	-20 to 260/280	125-1333		125-1333LTM

CP-1301

- Thin film, medium polarity GC column for fast analysis
- Good reproducibility improves workflow
- Good inertness for better quality of data

The CP-1301 is a non-bonded, 6% cyanopropyl-phenyl phase that delivers lower bleed and improved column-to-column reproducibility. This medium polarity column is ideal for the analysis of herbicides, pesticides and many pharmaceutical products.

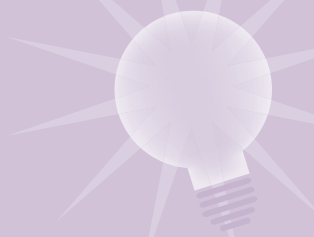
CP-1301

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.25	30	1.00	-25 to 265/280	CP8604
	60	0.25	-25 to 280/280	CP8602
		1.00	-25 to 265/280	CP8605
0.32	30	0.25	-25 to 280/280	CP8607
		1.00	-25 to 265/280	CP8610
	60	0.25	-25 to 280/280	CP8608
		1.00	-25 to 265/280	CP8611
		1.00	-25 to 265/280	CP8613

Tips & Tools

Agilent also offers DB-624 columns for the analysis of volatile priority pollutants and residual solvents.

Turn to pages 511–512.



DB-1701

- (14%-Cyanopropyl-phenyl)-methylpolysiloxane
- Low/mid-polarity
- Bonded and cross-linked
- Exact replacement of HP-1301 and HP-1701
- Solvent rinsable

DB-1701 Chromatograms

Environmental

Organochlorine Pesticides III Page 580

Phenoxy Acid Herbicides Page 585

Industrial Chemicals

Acrylate Impurities II Page 664

Life Sciences

Fentanyls Page 678

DB-1701

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.10	20	0.10	-20 to 280/300	127-0722		127-0722LTM
		0.40	-20 to 280/300	127-0723		127-0723LTM
0.18	10	0.40	-20 to 280/300	121-0713		121-0713LTM
	20	0.18	-20 to 280/300	121-0722		121-0722LTM
0.25	15	0.25	-20 to 280/300	122-0712		122-0712LTM
		1.00	-20 to 280/300	122-0713		122-0713LTM
	30	0.15	-20 to 280/300	122-0731		122-0731LTM
		0.25	-20 to 280/300	122-0732	122-0732E	122-0732LTM*
		1.00	-20 to 280/300	122-0733	122-0733E	122-0733LTM
	60	0.15	-20 to 280/300	122-0761		
		0.25	-20 to 280/300	122-0762		
		0.50	-20 to 280/300	122-0766		
		1.00	-20 to 280/300	122-0763	122-0763E	

*Also available as LTM column toroid assembly for Agilent 5975T, 0.25 mm x 30 m, 0.25 µm, P/N 222-0732LTM

(Continued)

DB-1701

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.32	15	0.25	-20 to 280/300	123-0712		123-0712LTM
		1.00	-20 to 280/300	123-0713		123-0713LTM
	30	0.15	-20 to 280/300	123-0731		123-0731LTM
		0.25	-20 to 280/300	123-0732	123-0732E	123-0732LTM
		1.00	-20 to 280/300	123-0733	123-0733E	123-0733LTM
	50	1.00	-20 to 280/300	123-0753		
	60	0.25	-20 to 280/300	123-0762		
		1.00	-20 to 280/300	123-0763	123-0763E	
0.53	15	1.00	-20 to 260/280	125-0712	125-0712E	125-0712LTM
	30	0.25	-20 to 260/280	125-0731		125-0731LTM
		0.50	-20 to 260/280	125-0737		125-0737LTM
		1.00	-20 to 260/280	125-0732	125-0732E	125-0732LTM
		1.50	-20 to 260/280	125-0733		125-0733LTM
	60	1.00	-20 to 260/280	125-0762	125-0762E	

CP-Sil 19 CB

- Confirmation column for highly reliable results
- Bonded and cross-linked phase for longevity
- Broad range of dimensions for ultimate utility

The medium polarity, 14% cyanopropyl-phenyl/86% dimethylpolysiloxane stationary phase of the CP-Sil 19 CB column shows a different selectivity than phenyl/dimethylsiloxane based phases because of the cyano functional groups. Its long history yields many practical applications for environmental, food and beverage and pharmaceutical laboratories.

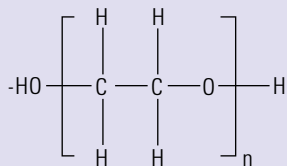
CP-Sil 19 CB

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.10	10	0.20	-25 to 275/300	CP7331	
0.15	25	0.50	-25 to 275/300	CP7340	
0.20	25	0.20	-25 to 275/300	CP7360	
0.25	10	0.20	-25 to 275/300	CP7702	
	15	0.15	-25 to 275/300	CP8502	
		0.25	-25 to 275/300	CP8512	CP8512I5
	25	0.20	-25 to 275/300	CP7712	
		0.40	-25 to 275/300	CP7809	
		1.20	-25 to 275/300	CP7672	
	30	0.25	-25 to 275/300	CP8712	CP8712I5
		1.00	-25 to 275/300	CP8562	CP8562I5
	50	0.20	-25 to 275/300	CP7722	
		0.40	-25 to 275/300	CP7819	CP7819I5
60		0.15	-25 to 275/300	CP8592	CP8592I5
		0.25	-25 to 275/300	CP8722	

(Continued)

CP-Sil 19 CB

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.32	10	0.20	-25 to 275/300	CP7732	
	15	0.25	-25 to 275/300	CP8542	CP8542I5
	25	0.20	-25 to 275/300	CP7742	
		0.40	-25 to 275/300	CP7829	
		1.20	-25 to 275/300	CP7762	
	30	0.25	-25 to 275/300	CP8842	
		1.00	-25 to 275/300	CP8762	
	50	0.20	-25 to 275/300	CP7752	
		0.40	-25 to 275/300	CP7839	
		1.20	-25 to 275/300	CP7772	
	60	0.15	-25 to 275/300	CP8662	
		0.25	-25 to 275/300	CP8852	
		1.00	-25 to 275/300	CP8772	CP8772I5
0.53	10	2.00	-25 to 275/300	CP7647	
	15	0.50	-25 to 275/300	CP8663	
	25	1.00	-25 to 275/300	CP7637	
		2.00	-25 to 275/300	CP7657	
	30	1.00	-25 to 275/300	CP8737	
	50	2.00	-25 to 275/300	CP7667	
		1.00	-25 to 275/300	CP7697	



Structure of Polyethylene Glycol (PEG)

Polyethylene Glycol (PEG) Columns

Agilent offers a full range of PEG columns. Even though each phase is based on the polyethylene glycol polymer, strict control of the cross-linking and deactivation processes result in a variety of unique phase characteristics to meet your varying analysis needs.

DB-WAX and DB-WaxFF

- Polyethylene glycol (PEG)
- Equivalent to USP Phase G16
- High polarity
- Lower temperature limit of 20°C is the lowest of any bonded PEG phase; improves resolution of low boiling point analytes
- Column-to-column reproducibility
- Bonded and cross-linked
- Exact replacement of HP-WAX
- Solvent rinsable
- DB-WaxFF is a highly reproducible, specially tested microbore DB-Wax for fragrance analysis



Tips & Tools

Ghost peaks can be caused by cored septa material accumulating in the inlet. To prevent coring, use Agilent Premium Non-Stick Septa with CenterGuide.

Turn to page 255.



DB-WAX and DB-WaxFF Chromatograms

Food, Flavors and Fragrances

FAME Standard I	Page 635
Fragrance Reference Standard II	Page 621
Lavender Oil Spiked with Camphor	Page 622
Peppermint Oil	Page 625
Spearmint Oil (Western)	Page 626
Ylang Ylang Oil II	Page 627

Industrial Chemicals

Aldehydes and Ketones	Page 648
Aromatics II	Page 651
Ethylene Oxide	Page 667
Formaldehyde Underivatized	Page 649
Glycols I	Page 655
Impurities in Styrene	Page 652
Phenols III	Page 667

DB-WAX and DB-WaxFF

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
DB-WAX							
0.05	10	0.05	20 to 250/260	126-7012		126-7012LTM	
		0.10	20 to 240/250	126-7013		126-7013LTM	222-7013LTM
0.10	10	0.10	20 to 250/260	127-7012	127-7012E	127-7012LTM	
		0.20	20 to 240/250	127-7013		127-7013LTM	
	20	0.10	20 to 250/260	127-7022		127-7022LTM	
		0.20	20 to 240/250	127-7023	127-7023E	127-7023LTM	
0.18	10	0.18	20 to 250/260	121-7012		121-7012LTM	
	20	0.18	20 to 250/260	121-7022	121-7022E	121-7022LTM	
		0.30	20 to 240/250	121-7023	121-7023E	121-7023LTM	
	40	0.18	20 to 250/260	121-7042	121-7042E		
		0.30	20 to 240/250	121-7043			
0.20	25	0.20	20 to 250/260	128-7022		128-7022LTM	
	30	0.20	20 to 250/260	128-7032		128-7032LTM	
	50	0.20	20 to 250/260	128-7052			
0.25	15	0.25	20 to 250/260	122-7012	122-7012E	122-7012LTM	
		0.50	20 to 240/250	122-7013		122-7013LTM	
	30	0.15	20 to 250/260	122-7031		122-7031LTM	
		0.25	20 to 250/260	122-7032	122-7032E	122-7032LTM	
		0.50	20 to 240/250	122-7033	122-7033E	122-7033LTM	222-7033LTM
	60	0.15	20 to 250/260	122-7061			
		0.25	20 to 250/260	122-7062	122-7062E		
		0.50	20 to 240/250	122-7063	122-7063E		
0.32	15	0.25	20 to 250/260	123-7012		123-7012LTM	
		0.50	20 to 240/250	123-7013		123-7013LTM	
	30	0.15	20 to 250/260	123-7031		123-7031LTM	
		0.25	20 to 250/260	123-7032	123-7032E	123-7032LTM	
		0.50	20 to 240/250	123-7033	123-7033E	123-7033LTM	
	60	0.25	20 to 250/260	123-7062			
		0.50	20 to 240/250	123-7063	123-7063E		
0.45	30	0.85	20 to 230/240	124-7032		124-7032LTM	
0.53	15	0.50	20 to 230/240	125-7017		125-7017LTM	
		1.00	20 to 230/240	125-7012	125-7012E	125-7012LTM	
	30	0.25	20 to 230/240	125-7031		125-7031LTM	
		0.50	20 to 230/240	125-7037		125-7037LTM	
		1.00	20 to 230/240	125-7032	125-7032E	125-7032LTM	
	60	1.00	20 to 230/240	125-7062	125-7062E		
DB-WaxFF							
0.10	20	0.20	20 to 240/250	127-7023FF			

DB-WAXetr

- Polyethylene glycol (PEG)
- Extended Temperature Range (etr)
- High polarity
- Excellent column-to-column repeatability
- Bonded and cross-linked
- Solvent rinsable
- Equivalent to USP Phase G16

DB-WAXetr Chromatograms

Industrial Chemicals

Alcohols II	Page 642
Impurities in Mixed Xylenes	Page 668
Impurities in Styrene	Page 652
Organic Acids	Page 644
Solvents I	Page 659
Solvents II	Page 659

DB-WAXetr

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.20	25	0.40	30 to 250/260	128-7323		128-7323LTM
0.25	30	0.25	30 to 260/280	122-7332	122-7332E	122-7332LTM
		0.50	30 to 250/260	122-7333		122-7333LTM
	60	0.25	30 to 260/280	122-7362		
		0.50	30 to 250/260	122-7363		
0.32	15	0.25	30 to 260/280	123-7312		123-7312LTM
		1.00	30 to 250/260	123-7314		123-7314LTM
	30	0.25	30 to 260/280	123-7332		123-7332LTM
		0.50	30 to 250/260	123-7333		123-7333LTM
		1.00	30 to 250/260	123-7334		123-7334LTM
	50	1.00	30 to 250/260	123-7354	123-7354E	
	60	0.25	30 to 260/280	123-7362		
		0.50	30 to 250/260	123-7363		
0.53	15	1.00	30 to 240/260	125-7312		125-7312LTM
		2.00	50 to 230/250	125-7314		125-7314LTM
	30	1.00	30 to 240/260	125-7332	125-7332E	125-7332LTM
		1.50	30 to 230/240	125-7333		125-7333LTM
		2.00	50 to 230/250	125-7334	125-7334E	125-7334LTM
	60	1.00	30 to 240/260	125-7362		

HP-INNOWax

- Polyethylene glycol (PEG)
- High polarity
- Highest upper temperature limits of the bonded PEG phases
- Column-to-column repeatability
- Bonded and cross-linked
- Solvent rinsable
- Close equivalent to USP Phase G16

HP-INNOWax Chromatograms

Food, Flavors and Fragrances

Bourbon	Page 629
Free Fatty Acids	Page 630
Perfume	Page 623
Strawberry Syrup	Page 629

Industrial Chemicals

Alcohols III	Page 642
Aldehydes and Acids	Page 647
Free Organic Acids/C4-C5 Isomers	Page 644
Chlorinated Isooctane	Page 659
Esters III	Page 654
Impurities in Ethylbenzene	Page 652

Petroleum

Aromatics Analysis – Ethylbenzene Impurities	Page 699
Aromatics Analysis – ASTM D16 Analytes	Page 699
Fast Analysis of Aromatic Solvent	Page 708
Impurities in p-Xylene – ASTM D3798	Page 700

HP-INNOWax

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.18	20	0.18	40 to 260/270	19091N-577	19091N-577E	19091N-577LTM	29091N-577LTM
0.20	25	0.20	40 to 260/270	19091N-102		19091N-102LTM	
		0.40	40 to 260/270	19091N-202		19091N-202LTM	
	50	0.20	40 to 260/270	19091N-105	19091N-105E		
		0.40	40 to 260/270	19091N-205	19091N-205E		
0.25	4	0.25	40 to 260/270	19091N-130		19091N-130LTM	
	5	0.1	40 to 260/270	19091N-330			
		0.15	40 to 260/270	19091N-030		19091N-030LTM	
	15	0.1	40 to 260/270	19091N-331			
		0.25	40 to 260/270	19091N-131	19091N-131E	19091N-131LTM	
		0.50	40 to 260/270	19091N-231		19091N-231LTM	
	30	0.15	40 to 260/270	19091N-033		19091N-033LTM	
		0.25	40 to 260/270	19091N-133	19091N-133E	19091N-133LTM	29091N-133LTM
		0.50	40 to 260/270	19091N-233	19091N-233E	19091N-233LTM	
	60	0.15	40 to 260/270	19091N-036			
		0.25	40 to 260/270	19091N-136	19091N-136E		
		0.50	40 to 260/270	19091N-236			
0.32	15	0.25	40 to 260/270	19091N-111		19091N-111LTM	
	30	0.15	40 to 260/270	19091N-013		19091N-013LTM	
		0.25	40 to 260/270	19091N-113	19091N-113E	19091N-113LTM	
		0.50	40 to 260/270	19091N-213	19091N-213E	19091N-213LTM	
	60	0.25	40 to 260/270	19091N-116			
		0.50	40 to 260/270	19091N-216	19091N-216E		
0.53	15	1.00	40 to 240/250	19095N-121	19095N-121E	19095N-121LTM	
	30	1.00	40 to 240/250	19095N-123	19095N-123E	19095N-123LTM	
	60	1.00	40 to 240/250	19095N-126			

CP-Wax 52 CB

- For enhanced column lifetime and better detection limits
- High polarity provides wide application area
- Broad temperature range for enhanced productivity

The CP-Wax 52 CB column has a lower minimum temperature and a higher maximum temperature than non-bonded polyethylene glycols due to extensive cross-linking, delivering higher resolution of low boiling point analytes. With guaranteed reproducibility and excellent temperature stability, CP-Wax 52 CB is ideal for EPA and ASTM methods.

We recommend the UltiMetal column when working in rugged environments with process or portable instruments.

CP-Wax 52 CB

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.10	10	0.10	20 to 250/265	CP7334	CP7334I5
		0.20	20 to 250/265	CP7335	
0.15	15	0.15	20 to 250/265	CP7791	CP7791I5
	25	0.25	20 to 250/265	CP7792	CP7792I5
0.20	25	0.20	20 to 250/265	CP7765	
	30	0.20	20 to 250/265	CP7775	
	50	0.20	20 to 250/265	CP7785	
0.25	10	0.20	20 to 250/265	CP7703	
	15	0.25	20 to 250/265	CP8513	
	25	0.20	20 to 250/265	CP7713	CP7713I5
		1.20	20 to 250/265	CP7673	CP7673I5
	30	0.15	20 to 250/265	CP8745	
		0.25	20 to 250/265	CP8713	CP8713I5
		0.50	20 to 250/265	CP8746	CP8746I5
	50	0.20	20 to 250/265	CP7723	CP7723I5
	60	0.25	20 to 250/265	CP8723	CP8723I5
		0.50	20 to 250/265	CP8748	

(Continued)

CP-Wax 52 CB

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.32	10	0.20	20 to 250/265	CP7733	CP7733I5
		1.00	20 to 250/265	CP7628	
	15	0.15	20 to 250/265	CP8533	
		0.25	20 to 250/265	CP8543	
		0.50	20 to 250/265	CP8553	
	25	0.20	20 to 250/265	CP7743	
		0.40	20 to 250/265	CP7879	
		1.20	20 to 250/265	CP7763	CP7763I5
	30	0.25	20 to 250/265	CP8843	CP8843I5
		0.50	20 to 250/265	CP8763	CP8763I5
	50	0.20	20 to 250/265	CP7753	CP7753I5
		0.40	20 to 250/265	CP7889	
		1.20	20 to 250/265	CP7773	CP7773I5
	60	0.25	20 to 250/265	CP8853	
		0.50	20 to 250/265	CP8773	
		1.20	20 to 250/265	CP8073	CP8073I5
0.53	10	2.00	20 to 250/265	CP7648	
	15	1.00	20 to 250/265	CP8718	
	25	1.00	20 to 250/265	CP7638	
		2.00	20 to 250/265	CP7658	CP7658I5
	30	1.00	20 to 250/265	CP8738	CP8738I5
	50	1.00	20 to 250/265	CP7698	CP7698I5
		2.00	20 to 250/265	CP7668	
	60	1.00	20 to 250/265	CP8798	
	100	2.00	20 to 250/265	CP7678	

CP-Wax 52 CB UltiMetal

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	Part No.
0.53	10	0.50	20 to 250/275	CP7128
		1.00	20 to 250/275	CP7148
		2.00	20 to 250/275	CP7177
	25	0.50	20 to 250/275	CP7138
		1.00	20 to 250/275	CP7158
		2.00	20 to 250/275	CP7178
	50	0.50	20 to 250/275	CP7198
		1.00	20 to 250/275	CP7168
		2.00	20 to 250/275	CP7179

DB-FFAP

- Nitroterephthalic acid modified polyethylene glycol
- High polarity
- Temperature range from 40°C to 250°C
- Designed for the analysis of volatile fatty acids and phenols
- Replaces OV-351
- Bonded and cross-linked
- Solvent rinsable
- Close equivalent to USP Phase G35

We do not recommend the use of water or methanol to rinse DB-FFAP GC columns.

DB-FFAP Chromatograms

Food, Flavors and Fragrances

Organic Acids Page 631

Life Sciences

Aspirin and Ibuprofen in Methanol Page 680

DB-FFAP

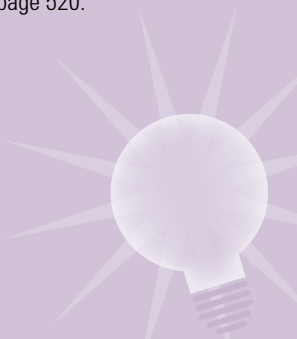
ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.10	10	0.10	40 to 250	127-3212		127-3212LTM	
	15	0.10	40 to 250	127-32H2		127-32H2LTM	
0.25	15	0.25	40 to 250	122-3212		122-3212LTM	222-3212LTM
	30	0.25	40 to 250	122-3232	122-3232E	122-3232LTM	222-3232LTM
		0.50	40 to 250	122-3233		122-3233LTM	
	60	0.25	40 to 250	122-3262	122-3262E		
		0.50	40 to 250	122-3263			

DB-FFAP

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.32	15	0.25	40 to 250	123-3212		123-3212LTM	
	25	0.50	40 to 250	123-3223		123-3223LTM	
	30	0.25	40 to 250	123-3232	123-3232E	123-3232LTM	
		0.50	40 to 250	123-3233		123-3233LTM	
		1.00	40 to 250	123-3234		123-3234LTM	
	50	0.50	40 to 250	123-3253			
	60	0.25	40 to 250	123-3262			
		0.50	40 to 250	123-3263			
		1.00	40 to 250	123-3264			
0.45	30	0.85	40 to 250	124-3232		124-3232LTM	
0.53	10	1.00	40 to 250	125-32H2		125-32H2LTM	
	15	0.50	40 to 250	125-3217		125-3217LTM	
		1.00	40 to 250	125-3212		125-3212LTM	
	30	0.25	40 to 250	125-3231		125-3231LTM	
		0.50	40 to 250	125-3237		125-3237LTM	
		1.00	40 to 250	125-3232	125-3232E	125-3232LTM	
		1.50	40 to 250	125-3233		125-3233LTM	
	60	1.00	40 to 250	125-3262			

Tips & Tools

Agilent also offers CAM columns for amine analysis. Turn to page 520.

**HP-FFAP**

- Nitroterephthalic acid modified polyethylene glycol
- High polarity
- Temperature range from 60°C to 240/250°C (230/240°C for 0.53 mm)
- Designed for the analysis of volatile fatty acids and phenols
- Replaces OV-351
- Bonded and cross-linked
- Solvent rinsable
- Close equivalent to USP Phase G35

We do not recommend the use of water or methanol to rinse HP-FFAP GC columns.

HP-FFAP Chromatograms**Food, Flavors and Fragrances**

Alcohol Beverage Standard	Page 628
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Industrial Chemicals

Acrylates	Page 664
Ethoxyethanol	Page 644

HP-FFAP

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.20	25	0.30	60 to 240/250	19091F-102	19091F-102E	19091F-102LTM
	50	0.30	60 to 240/250	19091F-105	19091F-105E	
0.25	30	0.25	60 to 240/250	19091F-433	19091F-433E	19091F-433LTM
0.32	25	0.50	60 to 240/250	19091F-112	19091F-112E	19091F-112LTM
	30	0.25	60 to 240/250	19091F-413		19091F-413LTM
	50	0.50	60 to 240/250	19091F-115	19091F-115E	
0.53	10	1.00	60 to 240	19095F-121		19095F-121LTM
	15	1.00	60 to 240	19095F-120	19095F-120E	19095F-120LTM
	30	1.00	60 to 240	19095F-123	19095F-123E	19095F-123LTM

CP-Wax 58 FFAP CB

- Highest polarity bonded wax column for more productivity when analyzing polar compounds
- Chemically-bonded for enhanced longevity
- High inertness provides excellent peak shapes for highest accuracy

The phase of the CP-Wax 58 FFAP CB column is a nitroterephthalic acid-modified, chemically bonded polyethylene glycol. It is designed for the analysis of acidic compounds, such as phenols, underivatized and derivatized free fatty acids.

CP-Wax 58 FFAP CB

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.20	25	0.30	20 to 250/275	CP7787	CP7787I5
	50	0.30	20 to 250/275	CP7797	
0.25	25	0.20	20 to 250/275	CP7717	CP7717I5
	50	0.20	20 to 250/275	CP7727	
0.32	25	0.20	20 to 250/275	CP7747	CP7747I5
		1.20	20 to 250/275	CP7767	
	50	0.20	20 to 250/275	CP7757	
		0.50	20 to 250/275	CP7778	
		1.20	20 to 250/275	CP7777	
0.53	15	0.50	20 to 250/275	CP7665	
		1.00	20 to 250/275	CP7614	CP7614I5
		2.00	20 to 250/275	CP7654	
	50	1.00	20 to 250/275	CP7624	
		2.00	20 to 250/275	CP7664	

CP-Wax 57 CB

- Unique high polarity wax column enhances productivity
- 100% chemically-bonded polyethylene glycol for excellent longevity
- Excellent peak shape for alcohols and glycols for accurate results

The CP-Wax 57 CB column has a unique selectivity, especially for the analysis of alcohols in the brewing and wines/spirits industry. The high inertness of this column offers excellent peak shapes for these very polar compounds, ensuring high precision. The 0.15 mm ID version offers a significant gain in analysis speed.

CP-Wax 57 CB

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.15	15	0.12	20 to 200/225	CP97711	CP97711I5
	30	0.12	20 to 200/225	CP97721	
0.25	25	0.20	20 to 200/225	CP97713	
	50	0.20	20 to 200/225	CP97723	CP97723I5
	60	0.40	20 to 200/225	CP8120	
0.32	25	0.20	20 to 200/225	CP97743	
		1.20	20 to 200/225	CP97763	CP97763I5
	50	0.20	20 to 200/225	CP97753	CP97753I5
		1.20	20 to 200/225	CP97773	CP97773I5
0.53	25	1.00	20 to 200/225	CP97638	CP97638I5
	25	2.00	20 to 200/225	CP97658	CP97658I5



PLOT Columns

PLOT columns are ideal for separating compounds that are gases at room temperatures. Agilent Technologies offers a comprehensive line of PLOT columns for analysis of fixed gases, low molecular weight hydrocarbon isomers, volatile polar compounds and reactive analytes such as sulfur gases, amines and hydrides. Our PLOT phases are offered in dimensions from 0.25 to 0.53 mm ID, allowing for easy column selection for various detector and system requirements. For GC/MS systems, we offer several small diameter columns with truly bonded and immobilized stationary phases, eliminating potential detector fouling due to particle generation.

CP-PoraBOND Q

- Bonded PLOT column for more reliable results
- Extended analysis of hydrocarbons for broader application range
- Increased maximum temperature for greater productivity

CP-PoraBOND Q is the long-term solution for analyzing volatile solvents and hydrocarbons. It is the most stable column of its kind and withstands repeated later injections. Due to our manufacturing techniques, the porous polymer is very pure and has virtually no catalytic activity, allowing temperatures up to 320°C without decomposition.

The use of bonding technology in the CP-PoraBOND Q also reduces the presence of loose particles that cause detector spiking, so there is no need for particle traps.

CP-PoraBOND Q Chromatograms

Industrial Chemicals

Analysis of solvents

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CP-PoraBOND Q

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	10	3.00	-100 to 300/300	CP7347	CP7347I5
	25	3.00	-100 to 300/320	CP7348	CP7348I5
0.32	10	5.00	-100 to 300/320	CP7350	CP7350I5
	25	5.00	-100 to 300/320	CP7351	CP7351I5
	50	5.00	-100 to 300/320	CP7352	CP7352I5
0.53	10	10.00	-100 to 300/320	CP7353	CP7353I5
	25	10.00	-100 to 300/320	CP7354	CP7354I5
	50	10.00	-100 to 300/320	CP7355	

CP-PoraBOND U

- Increased maximum temperature widens application range
- Reduced bleed delivers lower detection limits and more accurate results
- Bonded PLOT phase for longevity

CP-PoraBOND U is a highly stable polar-bonded porous polymer with the maximum temperature extended from 190°C to 300°C. The reduction of bleed provides lower detection limits and faster stabilization times. Because the porous polymer is bonded to the column, the CP-PoraBOND U is ideal for use with pressure programs, GC/MS applications and valve switching.

CP-PoraBOND U

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.25	10	3.00	-100 to 300/300	CP7347

CP-PoraPLOT Q and CP-PoraPLOT Q-HT

- Analysis of polar and non-polar volatile compounds delivers broad applicability
- Water elutes as a sharp peak and can therefore be quantified, improving productivity
- Repeatable retention times for long-term stability that enhances efficiency

CP-PoraPLOT Q

CP-PoraPLOT Q is recommended for column switching systems that analyze polar and apolar volatile compounds. Water elutes as a sharp and quantifiable peak. In addition, retention times are repeatable, as retention is not influenced by water in the sample.

CP-PoraPLOT Q Chromatograms

Petroleum

Analysis of gases C1 to C4

Page 709

CP-PoraPLOT Q

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	10	8.00	-100 to 250/250	CP7548	
	25	8.00	-100 to 250/250	CP7549	CP7549I5
0.32	10	10.00	-100 to 250/250	CP7550	CP7550I5
	25	10.00	-100 to 250/250	CP7551	CP7551I5
	50	10.00	-100 to 250/250	CP7552	
0.53	10	20.00	-100 to 250/250	CP7553	CP7553I5
	25	20.00	-100 to 250/250	CP7554	CP7554I5
	50	20.00	-100 to 250/250	CP7555	

CP-PoraPLOT Q UltiMetal

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.53	10	20.00	-100 to 250/250	CP6953	CP6953I5
	25	20.00	-100 to 250/250	CP6954	CP6954I5
	50	20.00	-100 to 250/250	CP6955	

CP-PoraPLOT Q-HT

CP-PoraPLOT Q-HT is the high temperature version of CP-PoraPLOT Q, offering the same benefits but operating up to 290°C.

CP-PoraPLOT Q-HT

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.32	10	10.00	-100 to 290/290	CP7556	
	25	10.00	-100 to 290/290	CP7557	CP7557I5
0.53	10	20.00	-100 to 290/290	CP7558	CP7558I5
	25	20.00	-100 to 290/290	CP7559	CP7559I5

HP-PLOT Q

- Bonded polystyrene-divinylbenzene based column
- Polarity between Porapak-Q and Porapak-N
- Excellent column for C₁ to C₃ isomers and alkanes to C₁₂, CO₂, methane, air/CO, oxygenated compounds, sulfur compounds and solvents
- Replaces packed gas-solid columns
- Separates ethane, ethylene and ethyne (acetylene)
- Improved resolution in less time than conventional packed columns
- Minimal conditioning time required – 1 hour
- Preferred "Q" column due to its robust nature

HP-PLOT Q Chromatograms

Environmental

N ₂ O I	Page 615
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Petroleum

Baseline Resolution of Air/CO, CO ₂ , and Methane in a Natural Gas Sample	Page 687
Ethylene Oxide Synthetic Standard	Page 700
Oxygenates	Page 700

HP-PLOT Q

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.32	15	20.00	-60 to 270/290	19091P-Q03		19091P-Q03LTM
	30	20.00	-60 to 270/290	19091P-Q04	19091P-Q04E	19091P-Q04LTM
0.53	15	40.00	-60 to 270/290	19095P-Q03	19095P-Q03E	19095P-Q03LTM
	30	40.00	-60 to 270/290	19095P-Q04	19095P-Q04E	19095P-Q04LTM

GS-Q

- Porous divinylbenzene homopolymer
- Polarity between Porapak-Q and Porapak-N
- Separates ethane, ethylene and ethyne (acetylene)
- Not recommended for quantification of polar compounds
- Minimal conditioning time required – 1 hour

GS-Q Chromatograms

Petroleum

Sulfur Gas Analysis in Light Hydrocarbon Streams II

Page 696

GS-Q

ID (mm)	Length (m)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.32	10	-60 to 250	113-3432	113-3432E	113-3432LTM
0.53	10	-60 to 250	115-34H2		115-34H2LTM
	15	-60 to 250	115-3412		115-3412LTM
	25	-60 to 250	115-3422		115-3422LTM
	30	-60 to 250	115-3432	115-3432E	115-3432LTM

CP-PoraPLOT U and CP-PoraPLOT S

- Symmetrical peaks from polar and non-polar volatiles for ultimate accuracy
- Minimal particle loss reduces detector spiking for reliable results
- Repeatable retention times for better long-term stability

CP-PoraPLOT U

CP-PoraPLOT U provides symmetrical peaks with polar volatiles. Water has no effect on retention times and elutes as a sharp and quantifiable peak. CP-PoraPLOT U is the most polar porous polymer PLOT column and is designed for halogenated compounds, hydrocarbons C1-C6, ketones and solvents.

CP-PoraPLOT U Chromatograms

Industrial Chemicals

Sulfur gases

Page 670

CP-PoraPLOT U

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	25	8.00	-100 to 190/190	CP7579	
0.32	10	10.00	-100 to 190/190	CP7580	
	25	10.00	-100 to 190/190	CP7581	
0.53	10	20.00	-100 to 190/190	CP7583	CP7583I5
	25	20.00	-100 to 190/190	CP7584	CP7584I5

CP-PoraPLOT S

CP-PoraPLOT S is a divinylbenzene/vinylpyridine polymer for hydrocarbons and ketones. This phase is ideal for the analysis of medium polarity volatiles, including hydrocarbons and ketones, at higher temperatures than CP-PoraPLOT U.

CP-PoraPLOT S

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.53	25	20.00	-100 to 250/250	CP7574	CP7574I5

HP-PLOT U

- Bonded divinylbenzene/ethylene glycol dimethacrylate
- More polar than HP-PLOT Q
- Excellent column for C₁ to C₇ hydrocarbons, CO₂, methane, air/CO, water, oxygenates, amines, solvents, alcohols, ketones, and aldehydes
- Improved resolution in less time than conventional packed columns

HP-PLOT U

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.32	30	10	-60 to 190	19091P-U04	19091P-U04E	19091P-U04LTM
0.53	15	20	-60 to 190	19095P-U03		19095P-U03LTM
	30	20	-60 to 190	19095P-U04	19095P-U04E	19095P-U04LTM

HP-PLOT Al₂O₃ KCl

- Least "polar" Alumina phase
- Aluminum oxide deactivated with KCl
- Standard column choice for light hydrocarbon analysis – C₁ to C₈ hydrocarbon isomers
- Low retention of olefins relative to comparable paraffin
- Excellent for quantitation of dienes, especially propadiene and butadiene from ethylene and propylene streams
- Recommended phase for many ASTM methods
- Preferred KCl deactivated Alumina

HP-PLOT Al₂O₃ KCl

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.25	30	5.00	-60 to 200	19091P-K33	19091P-K33E	19091P-K33LTM
0.32	50	8.00	-60 to 200	19091P-K15	19091P-K15E	
0.53	30	15	-60 to 200	19095P-K23		19095P-K23LTM
	50	15	-60 to 200	19095P-K25	19095P-K25E	

GS-Alumina KCl

- Least "polar" Alumina phase
- Aluminum oxide deactivated with KCl
- Good choice for light hydrocarbon analysis
- Good resolution of propadiene and butadiene from ethylene and propylene streams

GS-Alumina KCl Chromatograms

Petroleum

Impurities in Ethylene	Page 688
Impurities in Propylene	Page 689

GS-Alumina KCl

ID (mm)	Length (m)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.53	30	-60 to 200	115-3332		115-3332LTM
	50	-60 to 200	115-3352	115-3352E	



CP-Al₂O₃/KCl and CP-Al₂O₃/Na₂SO₄

- High analytical capacity improves efficiency
- No need for sub-ambient cooling simplifies operation
- Choice of two polarities for a broad range of applications

Aluminum oxide PLOT columns offer high selectivity for separating ppm levels of C₁ to C₅ hydrocarbons in a main stream of C₁ to C₅ hydrocarbons. These columns analyze more compounds in a single run than packed columns, while still delivering higher resolution and faster analysis times. When compared to liquid stationary phases, the CP-Al₂O₃ PLOT column offers increased selectivity and allows all C₁ to C₅ hydrocarbon isomers to be separated. CP-Al₂O₃ operates without the need for sub-ambient cooling and is available in two unique selectivities.

Selectivity Through KCl or Na₂SO₄ Deactivation

Aluminum oxide PLOT columns are deactivated using very small salt crystals, providing a reproducible and stable deactivation up to 200°C. Depending on the type of deactivation salt, the CP-Al₂O₃ PLOT column will show a particular selectivity. The KCl salt results in a relatively apolar Al₂O₃ surface, while Na₂SO₄ deactivation provides a polar surface. Unsaturated compounds such as ethylene and acetylene (ethyne) are retained longer.

CP-Al₂O₃/Na₂SO₄

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	25	4.00	-100 to 200/200	CP7586	
	50	4.00	-100 to 200/200	CP7587	
0.32	10	5.00	-100 to 200/200	CP7561	
	50	5.00	-100 to 200/200	CP7565	CP756515
0.53	25	10.00	-100 to 200/200	CP7567	
	50	10.00	-100 to 200/200	CP7568	

CP-Al₂O₃/Na₂SO₄ UltiMetal

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.53	50	10.00	-100 to 200/200	CP6968

CP-Al₂O₃/KCl

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	25	4.00	-100 to 200/200	CP7576	
	50	4.00	-100 to 200/200	CP7577	CP7577I5
0.32	10	5.00	-100 to 200/200	CP7511	CP7511I5
	25	5.00	-100 to 200/200	CP7515	CP7515I5
	50	5.00	-100 to 200/200	CP7519	CP7519I5
0.53	10	10.00	-100 to 200/200	CP7516	
	25	10.00	-100 to 200/200	CP7517	
	50	10.00	-100 to 200/200	CP7518	

CP-Al₂O₃/KCl UltiMetal

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.53	50	10.00	-100 to 200/200	CP6918

HP-PLOT Al₂O₃ S

- Middle range of "polarity" for Alumina phases
- Aluminum oxide deactivated with sodium sulfate
- Excellent general use column for light hydrocarbon analysis – C₁ to C₈ hydrocarbon isomers
- Best for resolving acetylene from butane and propylene from isobutane

HP-PLOT Al₂O₃ S Chromatograms

Petroleum

Ethylene	Page 688
Natural Gas	Page 687

HP-PLOT Al₂O₃ S

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.25	30	5.00	-60 to 200	19091P-S33		19091P-S33LTM
0.32	25	8.00	-60 to 200	19091P-S12		19091P-S12LTM
	50	8.00	-60 to 200	19091P-S15	19091P-S15E	
0.53	15	15.00	-60 to 200	19095P-S21		19095P-S21LTM
	30	15.00	-60 to 200	19095P-S23		19095P-S23LTM
	50	15.00	-60 to 200	19095P-S25	19095P-S25E	





GS-Alumina

- Most "polar" Alumina phase
- Aluminum oxide with proprietary deactivation
- Excellent general use column for light hydrocarbon analysis – C₁ to C₈ hydrocarbon isomers
- Separates C₁ to C₄ saturated and unsaturated hydrocarbons
- Best for resolving cyclopropane from propylene
- Faster, more efficient and provides more sensitivity than packed equivalents
- Minimal conditioning time required
- Preferred substitution for sodium sulfate deactivated Alumina because of its regenerative nature

Note: Alumina columns have a tendency to adsorb water and CO₂ which, over time, results in changes in retention time. We use an advanced, proprietary deactivation process which allows for rapid regeneration. Fully water saturated GS-Alumina columns regenerate in 7 hours or less at 200°C.

GS-Alumina Chromatograms

Petroleum

1,3-Butadiene Purity	Page 691
Extended Hydrocarbon Analysis I	Page 692
Propylene	Page 689

GS-Alumina

ID (mm)	Length (m)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890
					LTM Module
0.53	30	-60 to 200	115-3532	115-3532E	115-3532LTM
	50	-60 to 200	115-3552		

HP-PLOT Al₂O₃ M

- Most "polar" Alumina phase (similar to GS-Alumina)
- Aluminum oxide deactivated with proprietary deactivation
- Good general use column for light hydrocarbon analysis – C₁ to C₈ hydrocarbon isomers
- Good for resolving acetylene from butane and propylene from isobutane

HP-PLOT Al₂O₃ M

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.32	50	8.00	-60 to 200	19091P-M15	19091P-M15E	
0.53	30	15.00	-60 to 200	19095P-M23		19095P-M23LTM
	50	15.00	-60 to 200	19095P-M25		

GS-GasPro

- Unique bonded silica PLOT column technology
- Excellent choice for light hydrocarbons and sulfur gases
- Retention stability not affected by water
- Separates CO and CO₂ on a single column
- Ideal PLOT column for GC/MS – no particles

GS-GasPro Chromatograms

Environmental

C1 and C2 Halocarbons (Freons)	Page 614
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Industrial Chemicals

Halocarbons	Page 667
Halothane	Page 668
Inorganic Gases	Page 669

Petroleum

Extended Hydrocarbon Analysis II	Page 693
Mercaptans	Page 697
Sulfur Compounds in Propylene (1 ppm)	Page 697
Sulfur Gas Analysis in Light Hydrocarbon Streams I	Page 695

GS-GasPro

ID (mm)	Length (m)	Temp Limits (°C)	7 in. Cage
0.32	5	-80 to 260/300	113-4302
	15	-80 to 260/300	113-4312
	30	-80 to 260/300	113-4332
	60	-80 to 260/300	113-4362

CP-SilicaPLOT

- No influence of water on retention times for robust methodology
- Elution of CO₂ and sulfur gases at ppm levels for improved productivity
- Separates cyclopropane from propylene for accurate results

CP-SilicaPLOT brings the benefits of capillary PLOT columns (higher efficiency and faster analysis time) to many applications that previously could only be done by packed columns. It is ideal for COS in ethylene, freons/CFCs, hydrocarbons, propylene and sulfur gases. The column offers high selectivity of C₁ to C₄ isomers in the presence of water, with water having no influence on retention times. CP-SilicaPLOT elutes CO₂ and sulfur gases at ppm levels and separates cyclopropane from propylene. Decomposition of pentadienes or CFCs is absent.

CP-SilicaPLOT Chromatograms

Environmental

Halogenated hydrocarbons C1 to C2

Page 610

CP-SilicaPLOT

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	30	3.00	-80 to 225/225	CP8564	
	60	3.00	-80 to 225/225	CP8565	
0.32	10	4.00	-80 to 225/225	CP8574	
	15	4.00	-80 to 225/225	CP8566	CP8566I5
	30	4.00	-80 to 225/225	CP8567	CP8567I5
	60	4.00	-80 to 225/225	CP8568	CP8568I5
0.53	30	6.00	-80 to 225/225	CP8570	CP8570I5
	60	6.00	-80 to 225/225	CP8571	

CP-CarboBOND and CP-CarboPLOT P7

- Single column solution for ASTM D 2505 for higher productivity
- Stable and robust for high repeatability of results
- Available in bonded and PLOT versions for improved versatility and enhanced productivity

These carbon-based PLOT columns offer a simplified solution for ASTM D 2505, which describes the measurement of ppm CO and CO₂ in ethylene and propylene streams. Compared to a multi-packed column system, the analysis is performed on a single column, providing higher sample throughputs and reduced system maintenance.

CP-CarboBOND

For hydrocarbons in ethylene and trace gases in ethylene and propylene, He, Xe, CO, Ne, CH₄, CO₂, O₂/Ar, N₂, Kr, and hydrocarbons C₂ and C₃ (ASTM D 2505). The bonded CP-CarboBOND offers significant improvement in column stability with a maximum temperature of 300°C, reducing cycle times by speeding up the elution of high boiling contaminants. Retention times are repeatable because water has no influence on retention. High stability makes this bonded PLOT column equally suited for both laboratory and online applications.

CP-CarboBOND

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage
0.53	25	5.00	-100 to 200/300	CP7371
		10.00	-100 to 200/300	CP7374
	50	5.00	-100 to 200/300	CP7372
		10.00	-100 to 200/300	CP7375

CP-CarboPLOT P7

For the separation of N₂, O₂, CO, CO₂, He, Xe, Ne, CH₄, O₂/Ar, Kr and C₁ to C₂ hydrocarbons, such as C₂H₆, C₂H₄, C₂H₂. CP-CarboPLOT is recommended in cases where air or oxygen are present. The high separation efficiency of the column is revealed in the separation of CO from nitrogen peak, allowing CO to be determined at ppm levels. Because the CP-CarboPLOT P7 column exhibits a specific retention for CO and CO₂, it is possible to analyze both compounds in one run in the presence of air.

CP-CarboPLOT P7

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage
0.53	10	25.00	-200 to 115/115	CP7513
	25	25.00	-200 to 115/115	CP7514

GS-CarbonPLOT

- High stability, bonded carbon layer stationary phase
- Unique selectivity for inorganic and organic gases
- Extended temperature limit of 360°C
- Ideal for GC/MS – no particle generation
- Retention stability not affected by water

GS-CarbonPLOT Chromatograms

Environmental

N2O III

Page 615

GS-CarbonPLOT

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	7890/6890 LTM Module
0.32	15	1.50	0 to 360	113-3112	113-3112LTM
	30	1.50	0 to 360	113-3132	113-3132LTM
		3.00	0 to 360	113-3133	113-3133LTM
	60	1.50	0 to 360	113-3162	
0.53	15	3.00	0 to 360	115-3113	115-3113LTM
	30	3.00	0 to 360	115-3133	115-3133LTM

HP-PLOT Molesieve

- A PLOT column for the analysis of permanent gases
- O₂, N₂, CO and CH₄ resolve in less than 5 minutes
- Durable molecular sieve 5Å coating minimizes baseline spiking and damage to multiport valves
- Select a thick film for Ar/O₂ separation without cryogenic cooling
- Select thin film HP-PLOT Molesieve columns for routine air monitoring applications
- Replaces GS-Molesieve

Note: Molecular sieve columns will absorb water which, over time, results in changes in retention time. We use an advanced, proprietary deactivation process which allows for rapid regeneration. Fully saturated HP-PLOT Molesieve columns regenerate in 7 hours or less at 200°C.

HP-PLOT Molesieve Chromatograms

Environmental

N₂O II Page 615

Petroleum

Noble Gases Page 686

Permanent Gases Page 687

HP-PLOT Molesieve

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.32	15	25.00	-60 to 300	19091P-MS7		19091P-MS7LTM
	30	12.00	-60 to 300	19091P-MS4	19091P-MS4E	19091P-MS4LTM
		25.00	-60 to 300	19091P-MS8		19091P-MS8LTM
0.53	15	25.00	-60 to 300	19095P-MS5		19095P-MS5LTM
		50.00	-60 to 300	19095P-MS9		19095P-MS9LTM
	30	25.00	-60 to 300	19095P-MS6	19095P-MS6E	19095P-MS6LTM
		50.00	-60 to 300	19095P-MS0	19095P-MS0E	19095P-MS0LTM

CP-Molsieve 5Å

- Separate argon and oxygen at ambient temperature to reduce costs
- High efficiency for increased productivity
- Symmetrical peaks for accurate results

This molecular-sieve coated capillary column is especially valuable when separating permanent gases. Analysis times are reduced by up to 75% compared to packed columns. On the CP-Molsieve 5Å, baseline separation of Ar/O₂ is achieved at ambient temperatures. The column's thin layer dimensions produce fast elution of CO with symmetrical peaks. High resolution analysis of permanent gases is assured.

CP-Molsieve 5Å Chromatograms

Environmental

Permanent gases on a thick film Molsieve column

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CP-Molsieve 5Å

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	25	30.00	-200 to 350/350	CP7533	
0.32	10	30.00	-200 to 350/350	CP7535	CP7535I5
	25	30.00	-200 to 350/350	CP7536	CP7536I5
	30	10.00	-200 to 350/350	CP7534	CP7534I5
	50	30.00	-200 to 350/350	CP7540	CP7540I5
0.53	10	50.00	-200 to 350/350	CP7537	
	15	15.00	-200 to 350/350	CP7543	
	25	50.00	-200 to 350/350	CP7538	CP7538I5
	30	15.00	-200 to 350/350	CP7544	CP7544I5
	50	50.00	-200 to 350/350	CP7539	

CP-Molsieve 5Å UltiMetal

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.53	10	50.00	-200 to 350/350	CP6937	CP6937I5
	25	50.00	-200 to 350/350	CP6938	CP6938I5

CP-PoraPLOT Amines

- Guaranteed performance for volatile amines providing ease-of-use
- Very high efficiency at temperatures above ambient for lower cost per analysis
- High sensitivity for amines and ammonia for accurate results

CP-PoraPLOT Amines is a unique column specially designed for the high retention analysis of very volatile amines.

CP-PoraPLOT Amines

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.32	25	10.00	-100 to 220/220	CP7591	CP7591I5
0.53	25	20.00	-100 to 220/220	CP7594	

Particle Traps for Use with PLOT Columns

Though highly stabilized, it is impossible to guarantee that no particles will dislodge from the column wall. When used in valve-switching applications, the use of a particle trap can prevent scarring of the rotors.

Particle Traps for Use with PLOT Columns

ID (mm)	Length (m)	Part No.
0.32	2.5	5181-3351
0.53	2.5	5181-3352

Particle Traps for PoraPLOT Columns

ID (mm)	Length (m)	Material	Part No.
0.32	2.5	Fused Silica	CP4016
0.53	2.5	Fused Silica	CP4017
0.53	2.5	UltiMetal	CP4018*

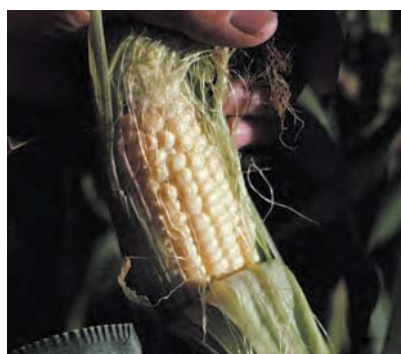
*Includes CP-UltiMetal connector

Particle Trap Connectors for PoraPLOT Columns

ID (mm)	Material	Unit	Part No.
0.25/0.32	Fused Silica	10/pk	CP4788
0.53	Fused Silica	10/pk	CP4789
0.25	UltiMetal	5/pk	CP4795
0.53	UltiMetal	5/pk	CP4796

Special Application Columns

Agilent chemists have developed many columns with unique characteristics designed to solve the most difficult separation problems of a given method. As a result, we offer a comprehensive line of specialty columns for a variety of applications to enhance the standard phase portfolio. From columns for volatiles to pesticides to petrochemical and more – Agilent exceeds standard QA/QC procedures for the manufacturing and testing of all of our specialty columns to ensure they meet the stringent demands for their application. These columns offer reliable, accurate results with the shortest run times possible on complex sample lists and matrices.



Biodiesel Capillary GC Columns

Biofuels are becoming more attractive as a viable supplement or alternative to petroleum-based fuels. Agilent J&W Biodiesel Capillary GC columns are purposely designed and application-optimized for the analysis of biodiesel to meet ASTM and CEN testing standards.

Biodiesel EN14105 Free/Total Glycerin and Biodiesel ASTM D6584 Free/Total Glycerin

- Designed for the analysis of free and total glycerin in B100 according to EN14105 or ASTM D6584
- Specially processed for extended temperature limit of 400°C
- High temperature, polyimide-coated fused silica tubing
- Excellent peak shape and extended column life
- Bonded and cross-linked
- Solvent rinsable
- Retention gaps please order P/N 160-BD65-5 (5 m x 0.53 mm)

Biodiesel EN14103 FAME Analysis

- Specially designed for the analysis of esters and linoleic acid methyl esters in B100 using EN14103
- Bonded and cross-linked
- Solvent rinsable

Biodiesel EN14110 Residual Methanol

- Specially designed for the determination of trace methanol in B100 using EN14110
- Bonded and cross-linked
- Solvent rinsable

Biodiesel Capillary GC Columns

Description	ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage
Biodiesel ASTM D6584 Free/Total Glycerin	0.32	15	0.10	-60 to 400	123-BD11
Biodiesel EN14105 Free/Total Glycerin	0.32	10	0.10	-60 to 400	123-BD01
Biodiesel EN14103 FAME Analysis	0.32	30	0.25	40 to 260/270	1909BD-113
Biodiesel EN14110 Residual Methanol	0.32	30	1.80	20 to 260/280	123-BD34

Biodiesel Test Samples

Description	Part No.
Biodiesel MSTFA kit, 10 x 1 mL ampoules, N-Methyl-N-(trimethylsilyl)trifluoro-acetamide for ASTM method D6584	5190-1407
Biodiesel D6584 kit 2 internal standard solutions, 1 mL, 5/µk and 2 internal standard solutions, 5 mL	5190-1408
Biodiesel E14105 kit, 4 x 1 mL ampoules 4 standard solutions	5190-1409
Biodiesel Monoglyceride kit, 3 x 1 mL ampoules	5190-1410

Select Biodiesel

- Complete set of biodiesel columns for full compliance and ease-of-use
- UltiMetal technology provides high accuracy and longevity
- Designed and pre-tested for complete confidence in results

Select Biodiesel columns address the key challenge of good column lifetime when operating at very high temperatures up to 400°C. Although traditional fused silica can be used, high temperatures often mean shortened column lifetimes. By using an UltiMetal column with an ultra-stable stationary phase, results are more consistent and column breakage is a thing of the past.

Select Biodiesel columns are offered with a pre-coupled retention gap that is leak tested prior to shipment, making life much easier for the operator. This short piece of tubing not only enhances the analytical separation but also dramatically simplifies automation when using the column with a column inlet as specified in the standard methods.

Technical Specifications

Method	Analytes	Column	Injector Type	Analysis Time (min)
ASTM D 6584	Free and total glycerine	Select Biodiesel for Glycerides	On-column	32
EN14103	Ester and linoleic acid methyl esters	Select Biodiesel for FAME	Split/splitless	30
EN14105	Free and total glycerine; mono, di- and tri-glycerides	Select Biodiesel for Glycerides	On-column	35
EN14106	Free glycerol	Select Biodiesel for Glycerides	Split/splitless	10
EN14110	Methanol	Select Biodiesel for Methanol	Headspace with split/splitless	10

Select Biodiesel

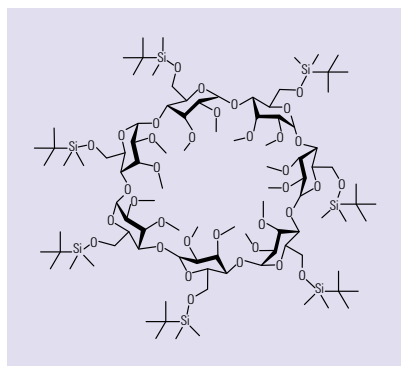
Description	ID (mm)	Length (m)	Film (µm)	7 in. Cage
For glycerides, UltiMetal, with retention gap	0.32	15	0.10	CP9078
For glycerides, UltiMetal	0.32	15	0.10	CP9079
For glycerides, UltiMetal, with retention gap	0.32	10	0.10	CP9076
For glycerides, UltiMetal	0.32	10	0.10	CP9077
For FAME, fused silica	0.32	30	0.25	CP9080
For Methanol, fused silica	0.32	30	3.00	CP9083
UltiMetal retention gap, methyl deactivated	0.53	2		CP6530

Chiral Columns

Our proven Cyclodex-B, CycloSil-B and HP-Chiral β offer the chiral analyst a broad range of chiral separations. Although no single column resolves every enantiomeric pair, our no-hassle return policy allows you to try the column for your application and if it doesn't work, simply return it.

Recommendations for choosing a chiral column

- Contact Technical Support through your local Agilent office for a more specific recommendation
- Refer to existing applications and literature
- Choose CycloSil-B as a general purpose column
- Use HP-Chiral β when using a nitrogen-specific detector



Structure of CycloSil-B

CycloSil-B

- 30% heptakis (2,3-di-O-methyl-6-O-t-butyl dimethylsilyl)- β -cyclodextrin in DB-1701
- Chiral separations without chiral-specific derivatization
- New stationary phase for improved resolution of many chiral separations
- Ideal for many chiral γ -lactones and terpenes

Because CycloSil-B GC columns are not bonded or cross-linked, we do not recommend solvent rinsing.

CycloSil-B Chromatograms

Food, Flavors and Fragrances

Citrus Flavored Carbonated Beverage (Soda)	Page 628
Rosemary Oil	Page 627

CycloSil-B

ID (mm)	Length (m)	Film (μ m)	Temp Limits ($^{\circ}$ C)	7 in. Cage	7890/6890 LTM Module
0.25	30	0.25	35 to 260/280	112-6632	112-6632LTM
0.32	30	0.25	35 to 260/280	113-6632	113-6632LTM

Cyclodex-B

- 10.5% β -cyclodextrin in DB-1701
- Chiral separations without chiral-specific derivatization
- Broad range of resolving potential
- Excellent peak shape

Because Cyclodex-B GC columns are not bonded or cross-linked, we do not recommend solvent rinsing.

Cyclodex-B Chromatograms

Food, Flavors and Fragrances

Menthol

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Cyclodex-B

ID (mm)	Length (m)	Film (μ m)	Temp Limits ($^{\circ}$ C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.25	30	0.25	50 to 230/250	112-2532	112-2532E	112-2532LTM
	60	0.25	50 to 230/250	112-2562		
0.32	30	0.25	50 to 230/250	113-2532	113-2532E	113-2532LTM

HP-Chiral β

- β -cyclodextrin in (35%-Phenyl)-methylpolysiloxane
- Chiral separations without chiral-specific derivatization
- Phenyl-based polymer provides low bleed and does not interfere with nitrogen-specific detectors
- Available in two concentrations of β -cyclodextrin: 10% and 20%
- 20% β -cyclodextrin best choice for initial screening

HP-Chiral β Chromatograms

Food, Flavors and Fragrances

Chiral Compounds in Essential Oils and Fragrances

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HP-Chiral β

ID (mm)	Length (m)	Film (μ m)	Temp Limits ($^{\circ}$ C)	7 in. Cage	5 in. Cage
HP-Chiral 10β					
0.25	30	0.25	30 to 240/250	19091G-B133	
0.32	30	0.25	30 to 240/250	19091G-B113	
HP-Chiral 20β					
0.25	30	0.25	30 to 240/250	19091G-B233	19091G-B233E
0.32	30	0.25	30 to 240/250	19091G-B213	19091G-B213E

Tips & Tools

View up-to-date educational resources such as posters, Application Notes, training tools, seminars, product information and more at www.agilent.com/chem/mygccolumns



CP-Chirasil-Dex CB

- High resolution across a broad application range
- Chemically-bonded phase for excellent longevity
- No need for derivatization improves productivity

The CP-Chirasil-Dex CB phase consists of cyclodextrin directly bonded to dimethylpolysiloxane. This bond prevents the cyclodextrin from migrating to different locations in the surface film, delivering homogeneous enantioselectivity throughout the phase. This provides the highest resolution factor between isomers.

It also guarantees stability of enantioselectivity. As a result, the lifetime of β -cyclodextrin capillary columns is significantly improved. CP-Chirasil-Dex CB permits low elution temperatures of polar compounds and is suitable for all injection techniques.

CP-Chirasil-Dex CB Chromatograms

Industrial Chemicals

High resolution separation of xylene isomers

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CP-Chirasil-Dex CB

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in. Cage	5 in. Cage
0.25	25	0.25	200/200	CP7502	CP7502I5
0.32	25	0.25	200/200	CP7503	CP7503I5

CP-Chirasil Val

- Both antipode phases available (D and L) for maximum versatility
- Stabilized phase, over 50% cross-linked for great longevity
- Specially designed and tested for amino acid enantiomers for the ultimate in reliable data

The CP-Chirasil Val columns are designed for the separation of optically active compounds, especially amino acids. They have lower bleed levels than other phases with a Tmax of 200°C, isothermally and programmed. Both antipodes of the phase are available. On Chirasil-L-Val, D-amino acids elute before the L-amino acids, while on Chirasil-D-Val this elution order is reversed. This is especially valuable when determining the optical purity of compounds. Selecting the column from which the minor component elutes before the major enantiomer results in the lowest detection levels.

CP-Chirasil Val

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	25	0.08	200/200	CP7494	CP7494I5
0.25	25	0.12	200/200	CP7495	CP7495I5

CP-Cyclodextrin-β-2,3,6-M-19

- Unique selectivity for isomer separation with ease-of-use
- High inertness delivers accurate results
- High efficiency for a broad application area

The CP-Cyclodextrin-β-2,3,6-M-19 column separates many optical isomers that could not be analyzed previously. Due to its selectivity, o-, m- and p-xylenes can now be separated. The column is also useful for non-chiral compounds. CP-Cyclodextrin-β-2,3,6-M-19 has a very high inertness, enabling separation of underivatized polar compounds.

CP-Cyclodextrin-β-2,3,6-M-19

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	25	0.25	225/250	CP7500	CP7500I5
0.32	50	0.25	225/250	CP7501	



Food, Flavors and Fragrances Columns

Food and flavor analyses place stringent demands on capillary columns. Samples have many components that are difficult to resolve and column-to-column reproducibility becomes critical. Agilent J&W GC columns are ideal for meeting these needs. Our rigorous quality control specifications and extensive QC testing ensure that the column you buy today will perform just like the column you buy tomorrow.

Recommended Columns for Food, Flavors and Fragrances

- HP-88 for cis- and trans-FAME isomers
- DB-XLB and DB-17ht for triglycerides
- DB-FFAP for organic free fatty acids
- DB-1, DB-WAX for fragrance compounds
- High Efficiency (0.18 mm ID), DB-1, DB-5 or DB-Wax for fast analysis of fragrances and FAMES
- Highly reproducible and specially tested Microbore (0.1 mm ID) DB-WaxFF for fragrance analysis
- DB-XLB and DB-17ms or DB-XLB and DB-35ms for dual column confirmation of CLP pesticide analysis
- HP-INNOWax or DB-WAXetr for higher temperature polar compound analysis

Select FAME

- Long lifetime due to high polarity 100% bonded phase
- Low bleed provides more sensitivity for better detection limits
- Better separation due to high efficiency and loadability for more accurate results

The Select FAME column is tuned for optimal cis-trans separations of FAMEs, especially C18 isomers. The bonded column has an isothermal maximum operation temperature of 275°C and a programmed temperature of 290°C – a dramatic improvement of 50°C compared to non-bonded columns. Select FAME has better detection limits because the column has a very low bleed level. Even though this is a very polar column, the column efficiency is extremely high. Columns up to 200 m are available for detailed analysis of the C18:1 isomer cluster. The Select FAME column also offers three times greater loadability, further improving the shape and separation for FAME isomers – especially if one component is present at a higher concentration.

Select FAME Chromatograms

Food, Flavors and Fragrances

Separation of cis-trans FAME isomers

Page 634

Select FAME

ID (mm)	Length (m)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	50	275/290	CP7419	CP7419I5
	100	275/290	CP7420	CP7420I5
	200	275/290	CP7421	

CP-Sil 88 for FAME

- Guaranteed analysis of FAME cis-trans isomers for complete confidence
- High polarity stationary phase providing more efficiency and higher productivity
- Use for FAME in the C₆ to C₂₆ range

CP-Sil 88 for FAME

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage
0.25	50	0.20	225/240	CP7488
	60	0.20	225/240	CP7487
	100	0.20	225/240	CP7489

CP-Carbowax 400 for Volatiles in Alcohol

- Highest resolution for amyl alcohols for accurate quality inspection
- High plate number, even at 0°C, for reliable analysis of the most volatile compounds
- Specially designed and tested for this application, ensuring ease-of-use

This column is guaranteed for the analysis of volatiles in alcoholic beverages and offers the highest resolution for amyl alcohols, to verify possible falsification.

CP-Carbowax 400 for Volatiles in Alcohol

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.32	50	0.20	60/80	CP7527	CP752715

CP-TAP CB for Triglycerides

- Guaranteed detailed analysis of triglycerides for complete confidence
- Complete triglyceride pattern in about 15 min improves productivity
- Stabilized phase and special fused silica for enhanced longevity at higher temperatures

The resolution of this column depends not only on carbon number — a more refined separation is produced according to the degree of unsaturation. The chemically-bonded phase exhibits low bleed and provides longer column lifetimes. CP-TAP CB is available in special Fused Silica for maximum column strength at temperatures up to 370°C, or UltiMetal capillary for the ultimate robustness.

CP-TAP CB for Triglycerides

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.25	25	0.10	350/360	CP7483

CP-TAP CB UltiMetal

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.25	25	0.10	355/370	CP7463

CP-FFAP CB

- Separates C₂ to C₂₄ acids in one run without derivatization, saving time
- Water and solvent resistant for long lifetimes
- Chemically-bonded for excellent longevity

CP-FFAP CB is ideal for flavors, aromas and free fatty acids C₁ to C₂₆.

CP-FFAP CB

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.15	25	0.25	250/275	CP7686	CP7686I5
0.32	25	0.30	250/275	CP7485	CP7485I5
0.53	25	1.00	250/275	CP7486	CP7486I5

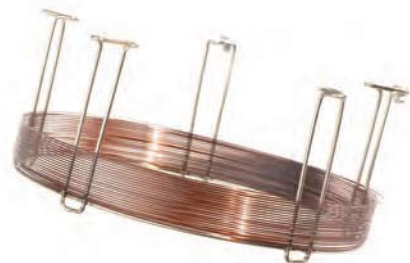
CP-Wax 57 CB for Glycols and Alcohols

- Guaranteed analysis for complete confidence
- Symmetrical peaks providing the most accurate results
- Extensive cross-linking delivers robustness and enhanced column lifetime

CP-Wax 57 CB for Glycols and Alcohols is guaranteed for the analysis of glycols, diols and alcohols. It has a unique, high polarity wax phase that produces symmetrical peaks.

CP-Wax 57 CB for Glycols and Alcohols

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	50	0.25	200/200	CP7615	CP7615I5
0.53	25	0.50	225/250	CP7617	CP7617I5



High Temperature Columns

DB-1ht

- 100% Dimethylpolysiloxane
- Non-polar
- Specially processed for extended temperature limit of 400°C
- High temperature, polyimide-coated, fused silica tubing
- Excellent peak shape and faster elution times for high boilers
- Bonded and cross-linked
- Solvent rinsable

DB-1ht

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.25	15	0.10	-60 to 400	122-1111	122-1111E	122-1111LTM	222-1111LTM
	30	0.10	-60 to 400	122-1131		122-1131LTM	222-1131LTM
0.32	15	0.10	-60 to 400	123-1111		123-1111LTM	
	30	0.10	-60 to 400	123-1131	123-1131E	123-1131LTM	
0.53	30	0.17	-60 to 400	125-1131			

DB-5ht

- (5%-Phenyl)-methylpolysiloxane
- Non-polar
- Specially processed for extended temperature limit of 400°C
- High temperature, polyimide-coated, fused silica tubing
- Excellent peak shape and faster elution times for high boilers
- Bonded and cross-linked
- Solvent rinsable

DB-5ht Chromatograms

Food, Flavors and Fragrances

Butter Triglycerides I

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DB-5ht

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.25	15	0.10	-60 to 400	122-5711	122-5711E	122-5711LTM	222-5711LTM
	30	0.10	-60 to 400	122-5731		122-5731LTM	222-5731LTM
0.32	10	0.10	-60 to 400	123-5701		123-5701LTM	
	15	0.10	-60 to 400	123-5711	123-5711E	123-5711LTM	
	30	0.10	-60 to 400	123-5731	123-5731E	123-5731LTM	



VF-5ht and VF-5ht UltiMetal

- High molecular weight selectivity extends the range of applications
- Enhanced stability improves column longevity and reduces downtime
- Superior detector performance gives you better detection limits and greater accuracy

The VF-5ht improves the analysis of high boiling compounds by exhibiting low bleed, even at high temperatures. Based on ultra-low bleed FactorFour technology, VF-5ht provides unmatched selectivity, sensitivity, and accuracy for the analysis of high-molecular weight compounds.

VF-5ht is a stabilized equivalent of 5% phenyl methyl dimethylpolysiloxane, offering the same polarity as a VF-5ms. The difference is that it can be operated above 350°C yet still offers a low bleed level (bleed specification of a 30 m x 0.25 mm column is <5 pA at 400°C). This enables better separation of high-boiling mixtures. VF-5ht is well suited to the separation of non-polar to mid-polar compounds.

UltiMetal technology renders the stainless steel inert and enhances the bonding of the stationary phase. The result is long column lifetime with excellent peak shape and low column bleed for the best detection limits at high temperatures, and the lowest cost per analysis.

VF-5ht Chromatograms

Petroleum

Diesel analysis

Page 706

VF-5ht

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage
0.25	15	0.10	-60 to 400/400	CP9045
	30	0.10	-60 to 400/400	CP9046
0.32	10	0.10	-60 to 400/400	CP9044
	15	0.10	-60 to 400/400	CP9047
	30	0.10	-60 to 400/400	CP9048

VF-5ht UltiMetal

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	15	0.10	-60 to 430/450	CP9090	
		0.10	-60 to 430/450	CP9091*	
	30	0.10	-60 to 430/450	CP9092	CP909215
		0.10	-60 to 430/450	CP9093*	
0.32	15	0.10	-60 to 430/450	CP9094	CP909415
		0.10	-60 to 430/450	CP9095*	
	30	0.10	-60 to 430/450	CP9096	
		0.10	-60 to 430/450	CP9097*	

*Retention gap 2 x 0.53 mm ID

DB-17ht

- (50%-Phenyl)-methylpolysiloxane
- Mid-polarity
- Extended upper temperature limit of 365°C
- High temperature, polyimide-coated, fused silica tubing
- Excellent peak shape and faster elution times for high boilers
- Improved resolution for triglycerides
- Ideal for confirmational analyses
- Bonded and cross-linked
- Solvent rinsable

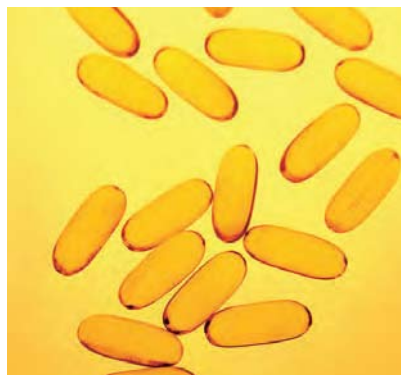
DB-17ht Chromatograms**Food, Flavors and Fragrances**

Butter Triglycerides II

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DB-17ht

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.25	5	0.15	40 to 340/365	122-1801		122-1801LTM
	15	0.15	40 to 340/365	122-1811		122-1811LTM
	30	0.15	40 to 340/365	122-1831		122-1831LTM
0.32	15	0.15	40 to 340/365	123-1811		123-1811LTM
	30	0.15	40 to 340/365	123-1831	123-1831E	123-1831LTM
	60	0.15	40 to 340/365	123-1861		



Life Sciences Columns

The life sciences offer some difficult challenges to capillary GC chromatographers. These include complex sample matrices, the necessity for low level detection and the chemically active characteristics of many of the samples. In response to this, Agilent offers a line of columns which are designed specifically for drugs of abuse testing.

Recommended Columns for Life Sciences

- DB-ALC1 and DB-ALC2 for U.S. Blood Alcohol analysis
- DB-ALC2 and HP-Blood Alcohol column for European Blood Alcohol analysis
- Low-bleed columns for controlled substances
- DB-35ms for barbiturates
- DB-17ms for hallucinogens
- DB-EVDX for analysis of drugs of abuse
- DB-624, DB-1301, DB-1, DB-WAX, DB-WAXetr or HP-INNOWax for Residual Solvent analysis

DB-ALC1 and DB-ALC2

- Reliable blood alcohol analysis
- Optimized primary and confirmation column pair for U.S. blood alcohol analysis
- Faster GC run times
- Improved resolution of key ethanol/acetone peaks
- Available in 0.32 and 0.53 mm ID
- Bonded and cross-linked

DB-ALC1 and DB-ALC2 Chromatograms

Life Sciences

Blood Alcohols I (Static Headspace/Split)	Page 682
Blood Alcohols II (Static Headspace/Split)	Page 682
Blood Pollutants I	Page 683
Blood Pollutants II	Page 683

DB-ALC1 and DB-ALC2

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
DB-ALC1						
0.32	30	1.80	20 to 260/280	123-9134		123-9134LTM
0.53	30	3.00	20 to 260/280	125-9134	125-9134E	125-9134LTM
DB-ALC2						
0.32	30	1.20	20 to 260/280	123-9234	123-9234E	123-9234LTM
0.53	30	2.00	20 to 260/280	125-9234		125-9234LTM

HP-Blood Alcohol

- Reliable blood alcohol analysis
- Excellent confirmation column with DB-ALC2 for method using t-butanol as internal standard

HP-Blood Alcohol

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.32	7.5	2.00	-60 to 270/290	19091S-510	19091S-510E	19091S-510LTM

DB-5ms EVDX

- Specially configured and tested for drugs of abuse confirmation
- Drug test mix included: caffeine, glutethimide, lidocaine, phenobarbital, EDDP, methaqualone, methadone, cocaine, desipramine, carbamazepine
- DB-5ms EVDX is equivalent to (5%-Phenyl)-methylpolysiloxane
- Consistent retention and peak shape
- Low bleed for GC/MS analysis
- Bonded and cross-linked
- Solvent rinsable

DB-5ms EVDX Chromatograms

Life Sciences

Anesthetics	Page 675
Sedative Hypnotics	Page 679

DB-5ms EVDX

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.20	25	0.33	-60 to 325/350	128-8522

HP-Fast Residual Solvent

- Equivalent to USP Phase G43
- Thinner film reduces run time by 2.5 times and increases Minimum Detection Limit (MDL) by 2 times compared to standard film thickness used for this method
- Bonded and cross-linked

HP-Fast Residual Solvent

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.53	30	1.00	-20 to 260	19095V-420	19095V-420E	19095V-420LTM

VF-DA

- Cross-linked and bonded to extend column lifetime
- Minimal bleed to improve detection limits and productivity
- High recovery of trace components to deliver accurate results

VF-DA is a unique, guaranteed low bleed FactorFour GC column for drugs of abuse confirmation testing. The VF-DA column has high recovery for trace components and excellent resistance to direct methanol injections. Drugs of abuse are measured in a variety of matrices. In urine, most general screenings are performed using full-scan GC/MS (EI). Since column bleeding can negatively influence detection limits in full scan mode, the exceptionally low bleed of VF-DA columns is critically important. As column bleed is minimized, all the benefits of low bleed are provided; reduced detection limits, improved accuracy and a cleaner detector.

VF-DA Chromatograms

Life Sciences

Analysis of drugs of abuse in urine via GC/MS

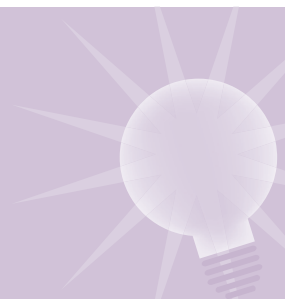
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VF-DA

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.20	12	Optimized	-60 to 325/350	CP8964

Tech Support

Need assistance selecting a column for your method?
Contact our chromatography technical specialists at
www.agilent.com/chem/TechRep





Pesticides Columns

Agilent J&W low bleed columns are ideal for the analysis of pesticides. Not only do they possess less bleed than a standard polymer, which improves the signal-to-noise ratio and minimum detectable quantities, but they also have higher upper temperature limits which allow for faster run times. Agilent also offers several common phases with additional pesticide-specific testing to ensure performance for your application.

Recommended Columns for Pesticides

- DB-35ms (P/N 123-3832) and DB-XLB (P/N 122-1236) for CLP pesticides, chlorinated herbicides, and EPA Method 508.1 pesticides
- High efficiency 0.18 mm ID DB-17ms (P/N 121-4722) and DB-XLB (P/N 121-1222) for faster analysis
- Also ideal for other dual ECD applications such as 8082 PCBs (Aroclors) and haloacetic acids
- DB-5ms (P/N 122-5532) and DB-35ms (P/N 122-3832) for organophosphorous pesticides (EPA Method 8141A)
- HP-5ms for over 550 pesticides using retention time locking software and database

HP-PAS5

- Non-polar
- Specifically designed and processed for the analysis of organochlorine pesticides
- ECD tested to ensure minimal pesticide breakdown and low ECD bleed
- Bonded and cross-linked
- Solvent rinsable

HP-PAS5

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	7890/6890 LTM Module
0.32	25	0.52	-60 to 325/350	19091S-010	19091S-010LTM

DB-1701P

- Low/mid-polarity
- Exact replacement of HP-PAS1701
- Specifically designed and processed for the analysis of organochlorine pesticides
- ECD tested to ensure minimal pesticide breakdown and low ECD bleed
- Bonded and cross-linked
- Solvent rinsable

DB-1701P

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.25	30	0.25	-20 to 280/300	122-7732		122-7732LTM
0.32	25	0.25	-20 to 280/300	123-7722		123-7722LTM
	30	0.25	-20 to 280/300	123-7732	123-7732E	123-7732LTM
0.53	30	1.00	-20 to 260/280	125-7732		125-7732LTM

DB-608

- Specifically designed for the analysis of chlorinated pesticides and PCBs
- U.S. EPA Methods: 608, 508, 8080
- Excellent inertness and recoveries without pesticide breakdown
- Bonded and cross-linked
- Solvent rinsable
- Exact replacement of HP-608

DB-608 Chromatograms

Environmental

Organochlorine Pesticides II

Page 579

DB-608

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.18	20	0.18	40 to 280/300	121-6822	121-6822LTM	221-6822LTM
0.25	30	0.25	40 to 280/300	122-6832	122-6832LTM	
0.32	30	0.50	40 to 280/300	123-1730	123-1730LTM	
0.45	30	0.70	40 to 260/280	124-1730	124-1730LTM	
0.53	15	0.83	40 to 260/280	125-1710	125-1710LTM	
	30	0.50	40 to 260/280	125-6837	125-6837LTM	
		0.83	40 to 260/280	125-1730	125-1730LTM	



VF-5 Pesticides and VF-1701 Pesticides

- Tested with key pesticides for improved efficiency
- Highly inert for enhanced detection
- Proven performance with ECD and MS detection for maximum productivity

These columns are specially designed for the determination of trace levels of pesticide residue. Every column is individually tested before shipment with key pesticides, including endrin and aldrin, ensuring optimal performance and consistency of results. The columns are highly inert for trace pesticide determination, and therefore provide better detection limits. Analyses at extremely low concentrations are easy, regardless of whether your method specifies ECD or MS detection. VF-Pesticides columns benefit from ultra low bleed FactorFour technology to improve sensitivity. VF-1701 Pesticides deliver up to 8 times lower bleed than other columns used for pesticide analysis.

VF-1701 Pesticides Chromatograms

Environmental

EPA 625 halogenated pesticides

Page 587

VF-5 Pesticides

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage
0.25	30	0.25	-60 to 325/350	CP9074
	50	0.25	-60 to 325/350	CP9073
0.32	30	0.25	-60 to 325/350	CP9075

VF-1701 Pesticides

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage
0.25	30	0.25	-20 to 280/300	CP9070
	50	0.25	-20 to 280/300	CP9072
0.32	30	0.25	-20 to 280/300	CP9071

Rapid-MS

- Fast analysis improves productivity
- High loadability for better detection limits
- Easy installation enhances efficiency

Rapid-MS columns reduce analysis duration by 3 to 5 times for temperature programmed, and up to 10 times for isothermal runs. The film thickness from 0.1 μm to 1 μm ensures high loadability and the higher sensitivity typically increases the signal-to-noise ratio by a factor of three or greater.

Rapid-MS columns utilize the high optimal carrier gas velocity obtained when a separation is performed under reduced pressure to reduce analysis times. The low bleed VF-5ms stationary phase is equivalent to a 5% phenyl, 95% dimethylpolysiloxane phase. Rapid-MS requires no changes to your injector procedures or MS methods. Installation is easy, standard fittings and ferrules can be used, and no special skills are required.

Rapid-MS Chromatograms

Food, Flavors and Fragrances

Fast analysis of lemon oil using Rapid-MS

Page 624

Rapid-MS

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in. Cage
0.53	10	0.12	-60 to 325/325	CP8131
		0.25	-60 to 325/325	CP8132
		0.50	-60 to 325/325	CP8133
		1.0	-60 to 325/325	CP8134

Restriction for Rapid-MS

Description	Part No.
Restriction for Rapid-MS, fused silica, 0.1 mm ID, 0.6 m, 5/pk	CP8121

CP-Sil 8 CB for Pesticides

- Linear column response down to femtogram levels improves productivity
- Maximum inertness – tested with DDTs to provide very reliable data
- Can be used with on-column injection techniques for best detection limits

CP-Sil 8 CB delivers a linear column response down to femtogram levels. The column is supplied with a retention gap to avoid problems with solvent condensation, thus allowing repeated splitless injections without phase deterioration. In addition, because of the integrated retention gap, there is no leakage from coupling devices, thereby considerably extending column life.

CP-Sil 8 CB for Pesticides

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage
0.25	50	0.12	300/325	CP7481
0.53	50	0.25	300/325	CP7504

CP-Sil 19 CB for Pesticides

- Ideal as a confirmation column for reliable results
- Specified for EPA and CLP analytes for ultimate compliance
- Supplied with a coupled retention gap for on-column injection for best detection limits

CP-Sil 19 CB for Pesticides

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	30	0.25	275/300	CP7406	
	50	0.20	275/300	CP7407	CP7407I5
0.32	30	0.25	275/300	CP7408	
0.53	30	1.00	260/275	CP7409	

Polycyclic Aromatic Hydrocarbons (PAH) Columns

DB-EUPAH

Polycyclic aromatic hydrocarbons (PAHs) are chemical compounds consisting of fused aromatic rings formed during the incomplete combustion of organic materials. The European Commission (EU) recommends the monitoring of 16 PAHs possessing both genotoxic and carcinogenic properties. Agilent J&W DB-EUPAH capillary GC columns are purposely designed, application optimized and tested to provide the most optimal performance for all EU regulated PAHs.

- Specially designed for analysis of EU regulated PAHs
- Individually tested with application-specific QC test probe mixture
- Great resolution of critical isomers, e.g. benzo(b,j,k)fluoranthenes
- Superb thermal stability for accurate analysis of high boiling PAHs, e.g. dibenzopyrenes
- Excellent signal-to-noise ratio
- Optimized column dimensions for proven performance

DB-EUPAH Chromatograms

Environmental

15+1 EU Priority PAHs

Page 568

DB-EUPAH

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.18	20	0.14	40 to 320/340	121-9627
0.25	60	0.25	40 to 320/340	122-96L2
0.32	15	0.25	40 to 320/340	123-9612

Select PAH

- No time wasted on false positives
- Fast results with no need for further analysis
- Low bleed reduces maintenance time and enhances sensitivity

Select PAH is the first capillary column that provides a single solution for PAH analysis by separating all the isomers, thereby avoiding false positives and inaccurate results. It provides easy, fast, and accurate quantification of PAHs in environmental and food samples by resolving PAH isomers. Select PAH provides full separations of EPA PAHs in less than 7 minutes and EU PAHs in less than 30 minutes, including separation of chrysene, triphenylene, and benzofluoranthene (type b, j and k), with no need for additional analysis.

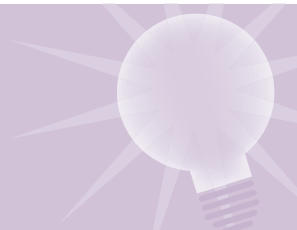
Its one-shot technology saves money on capital investment and cost per analysis, and increases productivity. In addition, the low column bleed of Select PAH reduces the requirement for MS maintenance and enhances sensitivity.

Select PAH

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage
0.15	15	0.10	40 to 325/350	CP7461
0.25	30	0.15	40 to 325/350	CP7462

Tips & Tools

Find all the tools you need for column installation in Agilent's Column Installation Kit, P/N 430-2000.



CP-Sil PAH CB UltiMetal

- High temperature, low bleed phase for extended lifetime
- Virtually unbreakable, inert UltiMetal capillary column, reducing replacement costs
- Maximum temperature of 400/425°C for enhanced productivity

The UltiMetal CP-Sil PAH CB column combines the advantages of a highly thermo-stable stationary phase with UltiMetal as the column material. This unique column can separate all 16 PAHs according to EPA Method 610. It may also be used for fingerprint analysis and pattern recognition of complex hydrocarbon mixtures.

CP-Sil PAH CB UltiMetal

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.25	25	0.12	400/425	CP7440

VF-17ms for PAH

VF-17ms for PAH

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.15	15	0.05	-40 to 290/320	CP9009



Petroleum Columns

Petroleum applications vary greatly in character. From noble gases to simulated distillation, Agilent offers a broad range of columns designed to meet the needs of the petroleum/ petrochemical chromatographer. Refer to the PLOT column section for columns for the analysis of light gases.

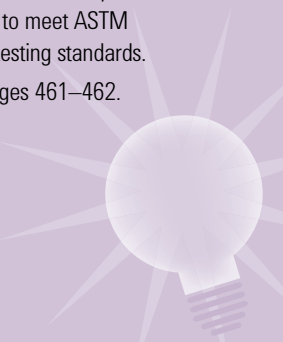
Recommended Columns for Petroleum

- DB-HT SimDis for Simulated Distillation
- HP-PONA, DB-5 or HP-1 for PONA and PIANO analysis

Tips & Tools

Agilent offers a complete line of columns designed and application optimized for the analysis of biodiesels to meet ASTM and CEN testing standards.

Turn to pages 461–462.



DB-2887

- 100% Dimethylpolysiloxane
- Specifically designed for simulated distillation using ASTM Method D 2887
- Rapid conditioning, fast run time and low bleed when compared to packed columns
- Bonded and cross-linked
- Solvent rinsable

DB-2887 Chromatograms

Petroleum

Reference Gas Oil	Page 703
Simulated Distillation	Page 703

DB-2887

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.53	10	3.00	-60 to 350	125-2814	125-2814E	125-2814LTM



DB-HT SimDis

- 100% Dimethylpolysiloxane
- "Boiling point" phase for high temperature simulated distillation
- Durable stainless steel tubing
- 430°C upper temperature limit
- Distillation range of C₆ to C₁₁₀+
- Low bleed, even at 430°C
- Bonded and cross-linked
- Solvent rinsable

DB-HT SimDis Chromatograms

Petroleum

n-Paraffin Standard

Page 705

DB-HT SimDis

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.53	5	0.10	-60 to 400/430	145-1009
		0.15	-60 to 400/430	145-1001

CP-SimDist

- Conforms to ASTM Method D 2887 to provide full compliancy
- High temperature stationary phase for extended column lifetime
- Low bleed makes quantitation easier

CP-SimDist Fused Silica columns are guaranteed for simulated distillation up to C₁₀₀. These columns are low bleed, typically only 4-5 pA at 400°C. The high temperature stationary phase and polyimide coating extend column lifetime.

CP-SimDist

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.32	10	0.10	375/400	CP7521	
0.53	5	0.17	375/400	CP7522	CP7522i5
	10	0.10	375/400	CP7541	

CP-SimDist UltiMetal

- Conforms to ASTM D 2887 and the extended D 2887 method for compliancy
- Lower bleed rate than Fused Silica, best column lifetime and accurate results
- Extended analysis to C120, with maximum temperature of 450°C
- UltiMetal tubing for extreme durability

The internal diameter of UltiMetal tubing is the same as for Fused Silica 0.53 mm ID (wide bore) columns, providing trouble-free automation of on-column injection. Retention time repeatability is better than that of any other high temperature column, due to the special deactivation applied to the UltiMetal surface.

CP-SimDist UltiMetal

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.53	5	0.09	450/450	CP7569	CP7569I5
		0.17	450/450	CP7532	CP7532I5
		0.88	450/450	CP7570	
		2.65	400/400	CP7571	
	10	0.17	450/450	CP7542	CP7542I5
		0.06	450/450	CP6540	
		0.53	450/450	CP7592	
		0.88	450/450	CP7512	CP7512I5
		1.20	450/450	CP7562	
		2.65	400/400	CP7582	CP7582I5
		5.00	400/400	CP7572	
	20	0.11	450/450	CP7593	
	25	0.06	450/450	CP6550	
	50	0.06	450/450	CP6560	

HP-PONA

- 100% Dimethylpolysiloxane
- Configured for the analysis of petroleum process products
- Tested to ensure the resolution of m-xylene from p-xylene and of cyclopentane from 2,3-dimethylbutane
- PONA, PIANO
- High resolution
- Bonded and cross-linked
- Solvent rinsable

Note: 100 psi regulator required to reach optimum carrier gas velocity

HP-PONA Chromatograms

Petroleum

Sulfur Compounds in Naphtha

Page 698

HP-PONA

Description	ID (mm)	Length		Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
		(m)					
HP-PONA	0.20	50		0.50	-60 to 325/350	19091S-001	19091S-001E
HP-1	0.20	50		0.50	-60 to 325/350	19091Z-205	19091Z-205E
HP-1	0.25	100		0.50	-60 to 325/350	19091Z-530	19091Z-530E

CP-Sil PONA CB

- Guaranteed hydrocarbon analysis for ultimate reliability
- Inert to polar compounds for highly accurate data
- Excellent reproducibility increases productivity

CP-Sil PONA CB delivers accurate analysis of paraffins, olefins, naphthalenes and aromatics in complex hydrocarbon mixtures. The column delivers guaranteed hydrocarbon analysis according to ASTM (DHA method).

CP-Sil PONA CB Chromatograms

Petroleum

Gasoline unleaded ASTM D 5769

Page 705

CP-Sil PONA CB

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.21	50	0.50	250/275	CP7531	CP7531I5
0.25	100	0.50	250/275	CP7530	CP7530I5

CP-Sil PONA for ASTM D 5134

- Guaranteed PONA analysis to ASTM D 5134 for ultimate reliability
- Exact dimensions as specified in the ASTM method for complete compliance
- Inert to polar additives for excellent data quality

CP-Sil PONA for ASTM D 5134 Chromatograms

Petroleum

Petroleum naphthas through n-nonane

Page 709

CP-Sil PONA for ASTM D 5134

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.21	50	0.50	250/275	CP7531

DB-Petro

- 100% Dimethylpolysiloxane
- Configured for the analysis of petroleum process products
- PONA, PIANO
- High resolution
- Bonded and cross-linked
- Solvent rinsable

Note: 100 psi regulator required to reach optimum carrier gas velocity

DB-Petro Chromatograms

Petroleum

Regular Unleaded Gasoline (California Phase 1) – "Normal" GC Run I	Page 704
Unleaded Gasoline	Page 701
PONA Mix	Page 702

DB-Petro

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.20	50	0.50	-60 to 325/350	122-10A6E	
0.25	100	0.50	-60 to 325/350	122-10A6	122-10A6

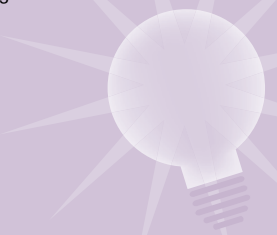




Tips & Tools

For optimum performance, ferrules should be replaced every time the column is replaced and during column maintenance.

Turn to pages 268–270.



HP-1 Aluminum Clad

- 100% Dimethylpolysiloxane
- Aluminum clad fused silica tubing
- For high temperature simulated distillation
- Bonded and cross-linked
- Solvent rinsable

HP-1 Aluminum Clad

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.53	5	0.09	0 to 350/450	19095S-205
	10	0.09	0 to 350/450	19095S-200

Select Al₂O₃ MAPD

- Two-fold improvement of sensitivity for MAPD decreases detection limits
- Faster run times improve operating efficiency
- Improved responses from polar hydrocarbons for better data accuracy

The Select Al₂O₃ MAPD is an aluminum oxide PLOT column for the analysis of reactive hydrocarbons and is especially targeted towards the response for methyl acetylene and propadiene (MAPD). The column is stable up to 200°C for hydrocarbons up to C₁₀. With Select Al₂O₃ MAPD, the adsorption and non-stable response for reactive (polar) hydrocarbons is greatly improved. Select Al₂O₃ MAPD delivers up to a two-fold higher response for MAPD, especially important when running an impurity analysis.

Select Al₂O₃ MAPD Chromatograms

Industrial Chemicals

Analysis of acetylenes mixture

Page 670

Select Al₂O₃ MAPD

ID (mm)	Length (m)	Temp Limits (°C)	7 in. Cage
0.32	50	-100 to 200/200	CP7431
0.53	25	-100 to 200/200	CP7433
	50	-100 to 200/200	CP7432

CP-TCEP for Alcohols in Gasoline

- Guaranteed analysis of alcohols in gasoline
- Perfect peak shape for accurate separations of alcohols
- High temperature stability to 135°C for high productivity and enhanced longevity

To avoid confusing aliphatic and aromatic fractions, the CP-TCEP column is able to separate benzene after n-dodecane. In addition, the excellent separation power provides the necessary resolution for complex mixtures such as gasoline.

CP-TCEP

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	50	0.40	135/140	CP7525	CP7525I5

CP-Sil 5 CB for Sulfur

- Trace analysis of volatile sulfur compounds to C₇ mercaptan for higher productivity
- Non-polar phase providing accurate results based on volatility
- High inertness, elutes SO₂ for high quality data and low detection limits

CP-Sil 5 CB for Sulfur

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.32	30	4.00	-60 to 300/325	CP7529	CP7529I5

Select Silanes

- High capacity and retention provide optimized productivity for silane analysis
- Low bleed analysis to ppm levels for best detection limits and most accurate results
- Reduced surface activity provides better peak shape for more reliable data

The Select Silanes column is a stabilized trifluoropropyl-methyl polysiloxane phase optimized for silanes determination. The Select Silanes column has a very thick film, resulting in high capacity and retention for highly volatile silanes. In addition, the low bleed allows the column to perform compositional as well as impurity analyses down to ppm levels, while reducing surface activity so that you get better peak shapes. Typical applications include alkylated chlorosilanes at % levels or impurity analysis. Valve, direct, and split/splitless injections are possible.

Select Silanes

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.32	30	1.80	0 to 270/300	CP7434
	60	1.80	0 to 270/300	CP7435
0.53	60	3.00	0 to 270/300	CP7437

Select Permanent Gases

- Isothermal separation at temperatures >40°C reduces operating costs
- Temperature stability up to 300°C allows short regeneration times and improves efficiency
- One injector, one detector simplifies operation

Select Permanent Gases/CO₂ is a set of two parallel columns that combine CP-Molsieve 5Å for permanent gas analysis and CP-PoraBOND Q for CO₂ analysis. The selection of column dimensions accords with your need for fast separation, lowest level analysis, and quantification of argon/oxygen. The Select Permanent Gases column separates permanent gases and CO₂ in a single run, and columns are coupled, tested, and securely mounted on the EZ-GRIP column mounting system.

The CP7429 Select Permanent Gases/CO₂ column is designed for fast analysis of permanent gases and CO₂. For resolution of the difficult-to-separate argon/oxygen and helium/neon pairs, use CP7430 Select Permanent Gases/HR (High Resolution) column.

Select Permanent Gases Chromatograms

Environmental

Fast analysis of permanent gases and CO₂

Page 616

Select Permanent Gases

ID (mm)	Temp Limits (°C)	7 in. Cage
Select Permanent Gases/CO ₂	300/325	CP7429
Select Permanent Gases/HR	300/325	CP7430

CP-Volamine

- Excellent stability for samples containing water expands the application range
- Maximum temperature of 265°C for enhanced productivity
- Highly inert providing sharp amine peaks for accurate results

CP-Volamine is optimized for the separation of volatile amines. The column is coated with a non-polar stationary phase and produces symmetrical peaks due to MPD (Multi-Purpose Deactivation) technology. CP-Volamine is the most stable column for analyzing volatile amines even when the sample contains high percentages of water.

The CP-Volamine column is the best choice for analyzing volatile amines like MMA, DMA and TMA (monomethyl, dimethyl and trimethyl amine). On this column other components of interest such as alcohols, water, and ammonia also elute as sharp peaks. CP-Volamine is highly inert, elutes a wide range of compounds, and delivers excellent performance and unique stability for water. Both 15 m and 30 m columns are available to ensure the shortest run times for amine samples that do not require the resolution of the 60 m column.

CP-Volamine Chromatograms

Industrial Chemicals

Amines and alcohols

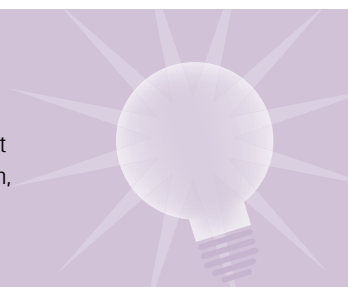
Page 643

CP-Volamine

ID (mm)	Length (m)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.32	15	265/300	CP7446	
	30	265/300	CP7447	CP7447I5
	60	265/275	CP7448	CP7448I5

Tips & Tools

For fast and easy GC pressure and flow calculations at your fingertips with Agilent's GC Calculator Application, visit www.agilent.com/chem/GCapp



CP-Sil 8 CB for Amines

- Good inertness towards basic compounds for best accuracy
- Guaranteed for the analysis of a broad range of amines for reliable results
- Available in non-polar and polar phases for broad application range

CP-Sil 8 CB for Amines is a base-deactivated 5% phenyl polydimethylsiloxane column that can be used for a wide range of amines. Due to a thermal stability up to 350°C, it analyzes a broad range of amines up to C₂₀, as well as alkanolamines.

CP-Sil 8 CB for Amines Chromatograms

Industrial Chemicals

Analysis of ethanolamines

Page 643

CP-Sil 8 CB for Amines

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.15	25	2.00	325/350	CP7599	
0.25	30	0.25	325/350	CP7598	CP7598I5
	30	0.50	325/350	CP7595	CP7595I5
0.32	30	1.00	325/350	CP7596	CP7596I5
0.53	30	1.00	325/350	CP7597	CP7597I5

CP-Wax for Volatile Amines and Diamines

CP-Wax for Volatile Amines and Diamines

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.32	25	1.20	220/220	CP7422	CP7422I5
0.53	25	2.00	220/220	CP7424	

CP-Wax 51 for Amines

CP-Wax 51 for Amines

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	25	0.20	60 to 260/275	CP7405	CP7405I5

CP-Lowox

- Unique selectivity for a wide range of oxygenates maximizes flexibility
- No particle loss preserves detector performance
- Suitable for process applications

CP-Lowox offers a unique solution to the chemical and petrochemical industries. It is now possible to analyze trace level oxygenate impurities in gas and liquid hydrocarbon streams. This high polarity makes the column ideal for the measurement of oxygenated compounds. CP-Lowox can be used for the prevention of catalyst contamination by oxygenates, process/on-line applications or portable GC applications (ASTM D 7059).

CP-Lowox Chromatograms

Petroleum

Analysis of oxygenates in a C1 to C5 hydrocarbon mix

Page 707

CP-Lowox

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.53	10	10.00	0 to 350/350	CP8587	CP8587I5

GS-OxyPLOT

- Accurate analysis of ppm/ppb level oxygenates in C₁ to C₁₀ hydrocarbons
- Strong selectivity for a wide range of oxygenates (ethers, alcohols, aldehydes, and ketones) in complex matrices such as gaseous hydrocarbons, motor fuels, and crude oil
- Suitable for ASTM methods for oxygenates
- Very high column stability (upper temperature limit of 350°C) with no column bleed
- Stable phase coating virtually eliminates particle generation and detector spiking
- Excellent for low concentration, quantitative GC analysis
- Ideal for selective heart-cutting applications

GS-OxyPLOT Chromatograms

Petroleum

Selected Oxygenates

Page 686

Trace Oxygenates in Light Hydrocarbon Matrices

Page 686

GS-OxyPLOT

ID (mm)	Length (m)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.53	10	350	115-4912	115-4912E

CP-Sil 5 CB for Formaldehyde

CP-Sil 5 CB for Formaldehyde

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.32	60	8.00	-60 to 300/325	CP7475	CP7475I5

CP-Squalane

CP-Squalane

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	100	0.20	-15 to 90/95	CP7520	CP7520I5

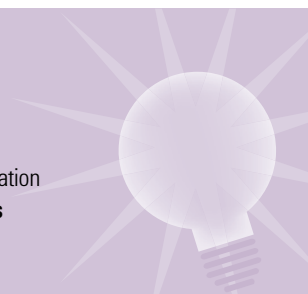
CP-Propox

CP-Propox

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.32	60	8.00	-60 to 300/325	CP7475

Tips & Tools

View up-to-date educational resources such as posters, Application Notes, training tools, seminars, product information and more at www.agilent.com/chem/mygccolumns



Semivolatiles Columns

Recommended Columns for Semivolatiles

- HP-5ms, DB-5.625, DB-5ms Ultra Inert, HP-5ms Ultra Inert for EPA methods 8270 and 525
- DB-XLB for PCB congeners
- HP-5ms, DB-5ms Ultra Inert, HP-5ms Ultra Inert or DB-35ms for PAHs
- DB-5ms, DB-5ms Ultra Inert or DB-XLB for phenols

Semivolatiles are usually extracted from soil samples or other environmental matrices. GC columns with precise retention time reproducibility and good mass spectrometer performance are key enablers for these often demanding analyses.

DB-Dioxin

- Specifically engineered for the analysis of polychlorinated dibenzodioxins (PCDDs) and dibenzofurans (PCDFs)
- Resolves 2,3,7,8-TCDD and 2,3,7,8-TCDF from all other isomers in one run
- Low bleed
- Bonded and cross-linked
- Solvent rinsable

Note: 100 psi regulator required to reach optimum carrier gas velocity

DB-Dioxin

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.25	60	0.15	40 to 250/270	122-2461	122-2461E
		0.25	40 to 250/270	122-2462	
0.32	60	0.15	40 to 250/270	123-2461	
		0.25	40 to 250/270	123-2462	

CP-Sil 88 for Dioxins

- Integrated retention gap eliminates leaks and extends column lifetime
- 2,3,7,8-TCDD can be determined at low concentrations for ease-of-use
- Guaranteed analysis of dioxin isomers for complete confidence in results

The CP-Sil 88 column has a very high polarity and a specific selectivity for dioxins and dibenzofuran separations. The column is supplied with an integrated retention gap to avoid problems with solvent condensation, thus allowing repeated splitless injections without phase deterioration, extending column life. In addition, because of the integrated retention gap, data quality is considerably improved. For the shortest analysis times, a series of thin-film coated columns is available that allow applications up to 270°C in temperature programmed mode.

CP-Sil 88 for Dioxins Chromatograms

Environmental

Dioxins and dibenzofurans

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CP-Sil 88 for Dioxins

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.25	30	0.10	50 to 250/270	CP7497
	50	0.20	50 to 225/240	CP7588
	60	0.10	50 to 250/270	CP7498
0.32	60	0.13	50 to 250/270	CP7499

DB-5.625

- Close equivalent to a (5%-Phenyl)-methylpolysiloxane
- Non-polar
- Specially processed to exhibit excellent inertness for EPA Semivolatiles Methods 625, 1625, 8270 and CLP protocols*
- Surpasses EPA performance criteria for semivolatiles
- Inert for base, neutral and acidic compounds
- High temperature limit with excellent thermal stability and low bleed
- Bonded and cross-linked
- Solvent rinsable

*Pentachlorophenol, 2,4-dinitrophenol, carbazole, and N-nitrosodiphenylamine used to test response factors.

DB-5.625 Chromatograms

Environmental

Analysis of Semivolatiles	Page 591
European Red List Volatiles	Page 609

DB-5.625

					7890/6890
ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	LTM Module
0.18	20	0.18	-60 to 325/350	121-5621	121-5621LTM
		0.36	-60 to 325/350	121-5622	121-5622LTM
0.25	30	0.25	-60 to 325/350	122-5631	122-5631LTM
		0.50	-60 to 325/350	122-5632	122-5632LTM
		1.00	-60 to 325/350	122-5633	122-5633LTM
	60	0.25	-60 to 325/350	122-5661	
0.32	30	0.25	-60 to 325/350	123-5631	123-5631LTM
		0.50	-60 to 325/350	123-5632	123-5632LTM



HP-5ms Semivolatile

- (5%-Phenyl)-methylpolysiloxane, identical selectivity to HP-5
- Non-polar
- Very low bleed characteristics, ideal for GC/MS
- Specifically tested for inertness for active compounds including acidic and basic compounds
- Improved signal-to-noise ratio for better sensitivity and mass spectral integrity
- Bonded and cross-linked
- Solvent rinsable
- Equivalent to USP Phase G27

HP-5ms Semivolatile

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	7890/6890 LTM Module
0.25	30	0.50	-60 to 325/350	19091S-139	19091S-139LTM

CP-Sil 5/C18 CB for PCB

- Guaranteed for very high resolution PCB analysis for ultimate confidence
- 100 m column separates critical isomer pairs for accurate results
- Use with high sensitivity ECD detection for enhanced productivity

CP-Sil 5/C18 CB for PCB has a lower polarity than 100% polydimethylsiloxane due to its C18 substitutions. Due to the absence of cyano groups it provides high signal-to-noise ratios for ECD detectors. The 100 m column separates critical isomer pairs: 28/31, 56/60, 149/118, 105/153/132 and 170/190.

CP-Sil 5/C18 CB for PCB

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
0.25	50	0.10	275/300	CP7477
	100	0.10	275/300	CP7476
0.32	100	0.10	275/300	CP7478

CP-Sil 8 CB for PCB

- Guaranteed for the analysis of PCBs according to DIN Method 51527 for confidence in results
- Suitable for high sensitivity ECD detection for low detection limits
- High temperature stability provides extended lifetime and enhanced productivity

CP-Sil 8 CB has high temperature stability and is resistant to continuous splitless injections. Due to the absence of cyano groups the column provides high signal-to-noise ratios on ECD.

CP-Sil 8 CB for PCB

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage
0.25	50	0.25	300/325	CP7482

Select 28/31

Select 28/31

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage
0.25	50	0.25	300/325	CP7482

Volatiles Columns

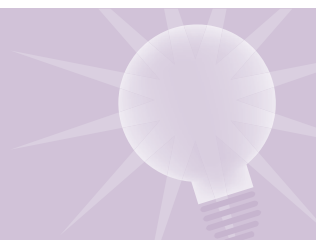
Recommended Columns for Volatiles

- DB-VRX and DB-624 for EPA Methods 502.2 and 8021
- DB-VRX (60 m, 0.25 mm ID) for GC/MS volatiles methods
- DB-VRX (20 m, 0.18 mm ID) for fast GC/MS volatiles analysis using a 5973 MSD (Not recommended for Ion Trap MS or older MSDs)
- DB-MTBE for extended EPA Method 8020
- DB-TPH for the analysis of BTEX and gasoline total petroleum hydrocarbons
- DB-624 (20 m, 0.18 mm ID) for fast GC/MS volatiles analysis

Agilent offers a selection of advanced polymer chemistries for increasingly demanding volatiles applications. Whether for a primary analytical column or as a complementary confirmation column, Agilent J&W capillaries are chromatographers' first choice.

Tips & Tools

Find all the tools you need for column installation in Agilent's Column Installation Kit, P/N 430-2000.



DB-VRX

- Unique selectivity engineered for optimum resolution of volatiles analysis:
U.S. EPA Methods 502.2, 524.2 and 8260
- 0.45 mm ID columns provide more plates per meter compared to 0.53 mm ID columns for the fewest coelutions for GC method (an industry first)*
- No subambient cooling required to resolve the six "gases"
- Fast run time:
<30 minutes for optimum sample throughput
<8 minutes with 0.18 mm ID
- Low polarity
- Excellent peak shape
- Bonded and cross-linked
- Solvent rinsable

*Two coelutions: 1) m- and p-xylene, for which U.S. EPA does not require separation, and 2) 1,1,2,2-tetrachloroethane and o-xylene which are separated by detectors PID and ELCD, respectively. Note to GC/MS analysts: These coeluting compounds have different primary characteristic ions of 83 and 106, respectively.

DB-VRX Chromatograms

Environmental

EPA Volatiles by GC/MS (Split Injector)	Page 604
High Speed VOC, EPA Method 8260	Page 606
Unleaded Gasoline	Page 569
Extended Analyte List for EPA Method 8021	Page 607

DB-VRX

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.18	20	1.00	-10 to 260	121-1524		121-1524LTM	221-1524LTM
	40	1.00	-10 to 260	121-1544	121-1544E	121-1544LTM	
0.25	30	1.40	-10 to 260	122-1534		122-1534LTM	222-1534LTM
	60	1.40	-10 to 260	122-1564	122-1564E		
0.32	30	1.80	-10 to 260	123-1534		123-1534LTM	
	60	1.80	-10 to 260	123-1564	123-1564E		
0.45	30	2.55	-10 to 260	124-1534		124-1534LTM	
	75	2.55	-10 to 260	124-1574			

DB-624

- Specifically designed for the analysis of volatile priority pollutants and residual solvents
- No cryogenics needed for U.S. EPA Method 502.2
- Excellent for U.S. EPA Methods: 501.3, 502.2, 503.1, 524.2, 601, 602, 8010, 8015, 8020, 8240, 8260, and USP 467
- Excellent inertness for active compounds
- Bonded and cross-linked
- Solvent rinsable
- Exact replacement of HP-624
- Equivalent to USP Phase G43

DB-624 Chromatograms

Environmental

EPA Volatiles by GC/MS II (Split Injector)	Page 605
European Red List Volatiles	Page 609
Extended Analyte List for EPA Method 8021	Page 607
Fast VOC Analysis	Page 608

Food, Flavors and Fragrances

Fusel Oil Standard & Brandy Sample	Page 619
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Industrial Chemicals

Alcohols I	Page 641
Esters II	Page 653
Ethers	Page 654
Glycols II	Page 655
Halogenated Hydrocarbons I	Page 658
Nitrogen Based Solvents II	Page 663

Life Sciences

Residual Solvents, DMI Diluent	Page 684
Residual Solvents, USP 467	Page 684

Petroleum

1,3-Butadiene	Page 690
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DB-624

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.18	20	1.00	-20 to 280	121-1324	121-1324E	121-1324LTM	221-1324LTM
0.20	25	1.12	-20 to 260	128-1324	128-1324E	128-1324LTM	
0.25	30	1.40	-20 to 260	122-1334	122-1334E	122-1334LTM	222-1334LTM
	60	1.40	-20 to 260	122-1364	122-1364E		
0.32	30	1.80	-20 to 260	123-1334	123-1334E	123-1334LTM	
	60	1.80	-20 to 260	123-1364	123-1364E		
0.45	30	2.55	-20 to 260	124-1334		124-1334LTM	
	75	2.55	-20 to 260	124-1374			
0.53	15	3.00	-20 to 260	125-1314			
	30	3.00	-20 to 260	125-1334	125-1334E	125-1334LTM	
	60	3.00	-20 to 260	125-1364	125-1364E		
	75	3.00	-20 to 260	125-1374	125-1374E		

CP-Select 624 CB

- Guaranteed for EPA volatiles with methods 524.2, 624 and 8015 for maximum confidence
- Excellent peak shape for polar and basic compounds for accurate results
- Specified by Pharmacopoeia Method V.3.3.9 for residual solvent analysis, providing compliance

The CP-Select 624 CB is a highly reproducible version of the popular 624 phase and has 2-3 times lower bleed (bleed specification for a 30 m, 0.53 mm, df = 3.00 μm is <9 pA) than conventional columns. The Select 624 CB, a 6% cyanopropylphenyl, 94% dimethylsiloxane phase is synthesized and fully characterized to ensure maximum column-to-column reproducibility. For an even lower bleed performance we recommend the VF-624ms.

CP-Select 624 CB

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.15	25	0.84	265/280	CP7411	CP7411I5
0.25	30	1.40	265/280	CP7412	
	60	1.40	265/280	CP7413	CP7413I5
0.32	30	1.80	265/280	CP7414	CP7414I5
	60	1.80	265/280	CP7415	CP7415I5
0.53	30	3.00	265/280	CP7416	CP7416I5
	75	3.00	265/280	CP7417	
	105	3.00	265/280	CP7418	

HP-VOC

- Selectivity engineered for U.S. EPA Methods 502.2, 524.2 and 8260
- Low polarity – slightly more polar than DB-VRX
- Excellent peak shape
- Bonded and cross-linked
- Solvent rinsable

HP-VOC

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.20	30	1.10	-60 to 280/290	19091R-303	19091R-303LTM	29091R-303LTM
	60	1.10	-60 to 280/290	19091R-306		
0.32	60	1.80	-60 to 280/290	19091R-316		
	90	1.80	-60 to 280/290	19091R-319		
0.53	90	3.00	-60 to 280/290	19095R-429		
	105	3.00	-60 to 280/290	19095R-420		

DB-502.2

- Available in 105 m for volatiles analyses
- Excellent peak shape
- Bonded and cross-linked
- Solvent rinsable

DB-502.2

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage
0.25	60	1.40	0 to 260/280	122-1464
0.32	60	1.80	0 to 260/280	123-1464
0.45	75	2.55	0 to 260/280	124-1474
	105	2.55	0 to 260/280	124-14a4
0.53	105	3.00	0 to 260/280	124-14A4

DB-MTBE

- Low polarity stationary phase
- Resolves MTBE from 2-methylpentane and 3-methylpentane for better quantitation
- Engineered for purge and trap injection without the need for cryofocusing
- Bonded and cross-linked
- Solvent rinsable

DB-MTBE Chromatograms

Environmental

Methyl Tert-Butyl Ether (MTBE) FID, Extended 8020 Analysis

Page 569

DB-MTBE

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.45	30	2.55	35 to 260/280	125-14A4		124-0034LTM
0.53	30	3.00	35 to 260/280	125-0034	125-0034E	125-0034LTM

CP-Select CB for MTBE

- Guaranteed analysis of MTBE in reformulated gasolines for reproducible results
- Unique selectivity for ease-of-use with MTBE
- Broad dynamic range for quantification of MTBE for the highest productivity

CP-Select CB for MTBE

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage
0.25	50	0.25	200/200	CP7528

DB-TPH

- Specifically designed for the analysis of total petroleum hydrocarbons (TPHs), soil analysis, and LUFT
- Three analyses in one injection – gas range organics, diesel range organics and motor oil
- Fast run time
- Bonded and cross-linked
- Solvent rinsable

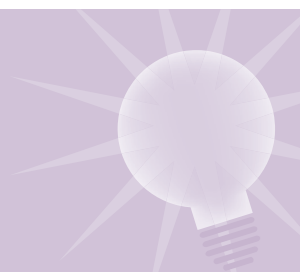
DB-TPH

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	7890/6890 LTM Module
0.32	30	0.25	-10 to 320	123-1632	123-1632LTM
0.45	30	1.00	-10 to 290	124-1632	



Tips & Tools

For a precision cut on your capillary column, use Agilent's GC column cutting tool (P/N 5183-4620).



Select Mineral Oil

- Optimized selectivity for more reliable results
- Low bleed for better accuracy
- Available in UltiMetal for ultimate longevity

Total petroleum hydrocarbon (TPH) analysis is a routine technique used in environmental laboratories screening many samples. A simple and reliable method that provides the shortest analysis time is required. Select Mineral Oil is designed to meet this need, with a stabilized, non-polar bonded phase specifically for fast mineral oil analysis. The column is temperature stable up to 375/400°C and provides speedy analyses according to DIN H53 and DIN-EN-ISO 9377-2 methods. Thanks to the temperature stability of Select Mineral Oil, your C₄ to C₄₀ hydrocarbons can be analyzed in less than ten minutes. The high temperature stability of the column permits faster bakeout. For optimal injection performance be sure to use the special 4 m retention gap. Select Mineral Oils are available in economical three- and six-packs.

Select Mineral Oil

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	Unit	7 in. Cage	5 in. Cage
0.32	15	0.10	-60 to 390/400	1/pk	CP7491	CP749115
	15	0.10	-60 to 390/400	3/pk	CP749103	
	15	0.10	-60 to 390/400	6/pk	CP749106	
Retention gap						
0.53	4		-60 to 325/350	3/pk	CP8015	

Select Mineral Oil UltiMetal

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage
0.32	15	0.10	-60 to 390/400	CP7493

Metal Columns

Recommended Metal Columns

- CP-Sil 13 CB UltiMetal
- CP-Sil 5 CB UltiMetal
- CP-SIL 8 CB UltiMetal
- CP-WAX 52 CB UltiMetal
- FactorFour VF-5HT UltiMetal
- CP-AL₂O₃/KCL UltiMetal
- CP-AL₂O₃/NA₂SO₄ UltiMetal
- CP-PoraPLOT Q UltiMetal
- PLOT Molesieve 5Å UltiMetal



DB-ProSteel

- Excellent inertness
- Virtually unbreakable
- Available in a wide variety of stationary phases
- Bonded and cross-linked
- Ideal for high temperature analysis and process applications

Our easy-to-handle DB-ProSteel metal columns are deactivated with a new formula (this is not glass lined steel) to provide inertness that truly rivals fused silica. DB-ProSteel metal columns can be custom wound upon request for small GC ovens. Several of our most popular bonded phases are available in metal.

DB-ProSteel GC columns have the same outer diameter as standard Megabore (0.53 mm ID), so no special ferrules are required.

DB-ProSteel

Phase	ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage
DB-PS1	0.53	15	0.15	-60 to 340/360	145-1011
			0.50	-60 to 300/320	145-1017
			1.50	-60 to 300/320	145-1012
	0.53	30	0.15	-60 to 340/360	145-1031
			0.50	-60 to 300/320	145-1037
			3.00	-60 to 260/280	145-1034
			5.00	-60 to 260/280	145-1035
DB-PS624	0.53	30	3.00	-20 to 260	145-1334
DB-PSWAX	0.53	30	1.00	20 to 230/240	145-7032
DB-PS2887	0.53	10	3.00	-60 to 350	145-2814

Tips & Tools

For a comprehensive listing of chromatograms searchable by compound name, visit our online Chromatogram Library at www.agilent.com/chem/library



Non-Bonded Stationary Phases

Whenever possible Agilent recommends the use of bonded and cross-linked polymers. Bonded polymers are more rugged, will have longer lifetimes and can be solvent rinsed. However, Agilent recognizes that some methods have been developed on non-bonded phases and therefore maintains these columns to support established methods.

HP-101

- 100% Dimethylpolysiloxane

Because HP-101 columns are not bonded or cross-linked, we do not recommend solvent rinsing.

HP-101

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.20	10	0.20	-60 to 280	19091Y-101		
	25	0.20	-60 to 280	19091Y-102		19091Y-102LTM
	50	0.20	-60 to 280	19091Y-105		
	12	0.25	-60 to 280	19091-60010	19091-60010E	
0.32	25	0.30	-60 to 280	19091Y-012	19091Y-012E	19091Y-012LTM
	50	0.30	-60 to 280	19091Y-015		



HP-17

- 50% Phenyl and 50% Methyl siloxane

Because the HP-17 is not bonded or cross-linked, we do not recommend solvent rinsing.

HP-17

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	7890/6890 LTM Module
0.53	10	2.00	25 to 260/280	19095L-121	19095L-121LTM

CAM

- Base deactivated polyethylene glycol
- Specifically designed for amine analysis
- Excellent peak shape for primary amines
- Replaces HP-Basicwax

Because the CAM is not bonded or cross-linked, we do not recommend solvent rinsing.

CAM Chromatograms

Industrial Chemicals

Amines in Water	Page 647
Primary Amines	Page 645

CAM

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.25	15	0.25	60 to 220/240	112-2112		112-2112LTM
	30	0.25	60 to 220/240	112-2132		112-2132LTM
		0.50	60 to 220/240	112-2133		112-2133LTM
	60	0.25	60 to 220/240	112-2162		
0.32	30	0.25	60 to 220/240	113-2132	113-2132E	113-2132LTM
		0.50	60 to 220/240	113-2133	113-2133E	113-2133LTM
0.53	30	1.00	60 to 200/220	115-2132		115-2132LTM

Carbowax 20M and HP-20M

- Polyethylene glycol, MW 20,000
- Equivalent to USP Phase G16

Because the Carbowax 20M and the HP-20M are not bonded or cross-linked, we do not recommend solvent rinsing. DB-WAX is the recommended bonded alternate for the HP-20M.

Carbowax 20M

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	7890/6890 LTM Module
0.25	30	0.25	60 to 220/240	112-2032	112-2032LTM
0.32	30	0.25	60 to 220/240	113-2032	113-2032LTM
	60	0.25	60 to 220/240	113-2062	

HP-20M

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module
0.20	25	0.10	60 to 220	19091W-102		19091W-102LTM
	50	0.10	60 to 220	19091W-105		
0.32	25	0.30	60 to 220	19091W-012	19091W-012E	19091W-012LTM
	50	0.30	60 to 220	19091W-015	19091W-015E	
0.53	10	1.33	60 to 220	19095W-121		19095W-121LTM
	30	1.33	60 to 220	19095W-123		19095W-123LTM

DX-1 and DX-4

- DX-1: 90% Dimethylpolysiloxane 10% Polyethylene Glycol
- DX-4: 15% Dimethylpolysiloxane 85% Polyethylene Glycol

Because DX series GC columns are not bonded and cross-linked, we do not recommend solvent rinsing.

DX-1

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	7890/6890 LTM Module
0.25	30	1.00	50 to 250/270	122-6133	
0.32	30	1.00	50 to 250/270	123-6133	123-6133LTM

DX-4

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	7890/6890 LTM Module
0.25	30	0.25	50 to 250/270	122-6432	122-6432LTM
	60	0.25	50 to 250/270	122-6462	
0.32	15	0.25	50 to 250/270	123-6412	123-6412LTM
	30	0.25	50 to 250/270	123-6432	123-6432LTM
	60	0.25	50 to 250/270	123-6462	

SE-30 and SE-54

- SE-30: 100% Dimethylpolysiloxane
- SE-54: (5%-Phenyl)(1%-Vinyl)-methylpolysiloxane

Because SE series GC columns are not bonded or cross-linked, we do not recommend solvent rinsing.

SE-30

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	7890/6890 LTM Module
0.32	30	0.25	0 to 325/350	113-3032	113-3032LTM

SE-54

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in. Cage	7890/6890 LTM Module
0.25	30	0.25	0 to 325/350	112-5432	112-5432LTM
	60	0.25	0 to 325/350	112-5462	
0.32	30	0.25	0 to 325/350	113-5432	113-5432LTM

Packed GC Columns

Stationary phases are available for the production of packed columns and coated packings.

Stationary Phases for Packed GC Columns

A	C
Antarox CO 630	CP-Sil 34
Antarox CO 880	CP-Sil 5
Antarox CO 990	CP-Sil 58
Apiezon H	CP-Sil 76
Apiezon J	CP-Sil 8
Apiezon K	CP-Sil 84
Apiezon L	CP-Sil 88
Apiezon M	CP-Wax 4000 M
Apiezon N	CP-Wax 600 M
Armeen SD	Cyano B
B	Cyanoethyl sucrose
Bentone 34	Cyanoethyl sucrose, CES
Benzylcyanide-silver nitrate	Cyclo N
Bis(2-butoxyethylphthalate)	Cyclohexane dimethanol succinate, CDS
Benzylpyridine	D
Bis(2-ethoxyethyladipate)	Decaglycerol
Bis(2-cyanoethyl)formamide N,N-	Decane n-
Bis(2-ethoxyethylsebacate)	Dexsil 300 GC polymethylcarborane
Bis(2-methoxyethyl)adipate	Dexsil 400 GC polymethylcarborane
Butanediol succinate	Dexsil 410 GC polymethylcarborane
Bis(p-butoxybenzidine)- α,α -bi-p-toluidine N,N-	Di isodecyl-phthalate, DIDP
Bis(p-methoxybenzidine)- α,α -bi-p-toluidine N,N-	Di isooctyl-adipate
C	Di isooctyl-phthalate
Carbowax 1000	Di isooctyl-sebacate, DEHS
Carbowax 10000	Di-n-decyl phthalate, DDP
Carbowax 1500	Di-n-octyl adipate
Carbowax 1540	Di-n-propyl phthalate
Carbowax 200	Di-n-propyl tetrachlorophthalate
Carbowax 20M	Dioctoil
Carbowax 20M TPA	Dioctyl phthalate
Carbowax 300	Dioctyl sebacate (Octoil s)
Carbowax 400	Dibenzyl ether
Carbowax 4000	Dibutyl maleate
Carbowax 4000 TPA	Dibutyl phthalate, DBP
Carbowax 550	Dibutyl tetrachlorophthalate, DBTP
Carbowax 600	Diethylene glycol
Carbowax 6000	Diethylene glycol adipate, DEGA, cross linked
Carbowax 750	Diethylene glycol adipate, DEGA
Castorwax	Diethylene glycol sebacate, DEGS
Celanese ester	Diethylene glycol succinate, DEGS

Stationary Phases for Packed GC Columns

D	H
Diglycerol	Hexadecene
Dimer acid	Hexadecanol
Dimethylformamide, DMF	Hexakis(2-cyanoethoxy)cyclohexane 1,2,3,4,5,6-
Dimethyl sulfolane, DMS 2,4-	Hexamethyl phosphoramidate, HMPA
Dimethanol cyclohexane succinate, CDS	HI-EFF 1 AP
Dimethyl sulfoxide, DMSO	HI-EFF 1 BP
Dinonyl phthalate	HI-EFF 3 AP
Dinonyl sebacate	HI-EFF 3 B
DOW corning 705	HI-EFF 8 BP
Dow fax 9 N 40	Hyprose SP-80, (octakis-(2-hydroxypropyl)sucrose)
Dowfax 9N9	I
E	Isoquinoline
EGSS-X	K
Emulphor ON-870	Kel F grease
Epon 1001, epoxy resin	Kel F oil no. 10
Ethofat 60/25	Kel F oil no. 3
Ethylbenzene	Kel F wax
Ethylene glycol adipate, EGA	KOH (potassium hydroxide)
Ethylene glycol isophthalate	L
Ethylene glycol isophthalate EGIP	LAC 1 R 296
Ethylene glycol phthalate	LAC 10 R 744
Ethylene glycol sebacate	LAC 12 R 796
Ethylene glycol succinate	LAC 17-R-770
Ethylene glycol tetrachlorophthalate	LAC 22 R 863
F	Lexan (polycarbonate resin)
FFAP	M
Fluorad FC 431	Mannitol
Fluorene	Montan wax
Fluorolube GR-362	N
Fyrquel 220	Neopentyl glycol adipate
G	Neopentyl glycol sebacate
Glycerol	Neopentyl glycol succinate
H	Nitrobenzene
H ₃ PO ₄ (Phosphoric acid)	Nujol (paraffin oil)
Hallcomid M-18, dimethylstearamide	O
Hallcomid M-18-OL, dimethyloleamide	Octadecane n-
Halocarbon K-352	Octadecene n-
Halocarbon oil 10.25	Octoil
Halocarbon wax	Olive oil
Hexadecane	Oronite NIW

Stationary Phases for Packed GC Columns

O	S
Oronite polybutene 128	Silicone DC 200
Oronite polybutene 32	Silicone DC 410
OS-124 (PMPE 5 ring)	Silicone DC 550
OS-138 (PMPE 6 ring)	Silicone DC 560
P	Silicone DC 702
Palladium	Silicone DC-704
Paraffin oil	Silicone DC 710
Paraffin wax	Silicone fluid MS 550
Pentanedioisuccinate; 1,5-	Silicone OV-1
Phenyl diethanolamine	Silicone OV-101
Phenyl diethanolamine succinate	Silicone OV-105
Pluronic P84	Silicone OV-11
Poly-A 101A (polyamide)	Silicone OV-17
Poly-A 103 (polyamide)	Silicone OV-1701
Poly-A 135 (polyamide)	Silicone OV-202
Poly-L 110 (polyamide)	Silicone OV-210
Poly-m-phenyl ether 5 ring	Silicone OV-215
Poly-m-phenoxyene, PPE-21	Silicone OV-22
Poly-m-phenyl ether 6 ring	Silicone OV-225
Poly-S 179	Silicone OV-25
Polyethylene glycol 2000	Silicone OV-275
Polyethylene glycol 600, Jefferson	Silicone OV-3
Polyethylene imine	Silicone OV-330
Polypropylene glycol 2000	Silicone OV-351
Polypropylene glycol 3500	Silicone OV-61
Polypropylene glycol 4000	Silicone OV-7
Polypropylene imine	Silicone OV-73
Polyvinylpyrrolidone	Silicone QF-1
Q	Silicone SE-30
Quadrol	Silicone SE-30 GC Grade
R	Silicone SE-52
Reoplex 4000	Silicone SE-54
S	Silicone SF-96
Sebaconitrile	Silicone UC W-98
Silar 10 C	Silicone UC W-982
Silar 5 CP highly polar	Silver nitrate
Silar 7 C	Sorbitol
Silar 9 C	SP-1000
Silicone AN-600 (50% cyanoethyl)	SP-1200
Silicone DC 111 grease	SP-2100

Stationary Phases for Packed GC Columns

S	U
SP-2250	UC-L-45
SP-2300	UCON 50 HB 2000
SP-2310	UCON 50 HB 280X
SP-2330	UCON 50 HB 5100
SP-2340	UCON 75 H 90000
SP-2401	UCON LB 1200X
SP-300	UCON LB 1715
Span-80	UCON LB 1800X
Squalane	UCON LB 550X
Squalene	UCW-98
Sucrose acetate isobutyrate	UC W-982
Sucrose-octa acetate	V
Supelco SP-216 PS	Versamid 900 (polyamide resin)
Surfonic N-300	
T	
Terephthalic acid	
Tergitol NP-35	
Tergitol NPX	
Tetra ethylene glycol	
Tetracyanoethyl pentaerythritol	
Tetraethylene glycol dimethyl ether	
Tetraethylene pentamine	
Tetrahydroxyethylenediamine	
Thiodipropionitrile β,β -	
Tri(tetra hydrofuryl)phosphate	
Triacetin	
Tributylphosphate	
Triethanolamine	
Trimer acid	
Trimethylol pelargonate	
Triton X-100	
Tris(2-cyanoethoxy)propane 1,2,3-	
Tritolyl phosphate	
Triton X-305	
Tween-80	

Supports for Packed GC Columns

Supports are available for the production of packed columns and coated packings.

Supports for Packed GC Columns

Description	Mesh Size	Description	Mesh Size
Activated charcoal	40-60	Chromosorb G AW DMCS	80-100
Activated charcoal	60-80	Chromosorb G AW DMCS	100-120
Activated charcoal	80-100	Chromosorb G HP	45-60
Alumina GC	40-60	Chromosorb G HP	60-80
Alumina GC	60-80	Chromosorb G HP	80-100
Alumina GC	80-100	Chromosorb G HP	100-120
Carbopack B	60-80	Chromosorb G NAW	45-60
Carbopack B	80-100	Chromosorb G NAW	60-80
Carbopack C	60-80	Chromosorb G NAW	80-100
Carbopack C	80-100	Chromosorb G NAW	100-120
Carbosieve G	60-80	Chromosorb P	20-40
Carbosieve G	80-100	Chromosorb P	40-60
Carbosieve S II	60-80	Chromosorb P	60-80
Carbosieve S II	80-100	Chromosorb P	80-100
Carbosieve S III	60-80	Chromosorb P	100-120
Carbosieve S III	80-100	Chromosorb P AW	45-60
Carbosphere	60-80	Chromosorb P AW	60-80
Carbosphere	80-100	Chromosorb P AW	80-100
Chromosorb 101	60-80	Chromosorb P AW	100-120
Chromosorb 101	80-100	Chromosorb P AW DMCS	45-60
Chromosorb 101	100-120	Chromosorb P AW DMCS	60-80
Chromosorb 102	20-40	Chromosorb P AW DMCS	80-100
Chromosorb 102	60-80	Chromosorb P AW DMCS	100-120
Chromosorb 102	80-100	Chromosorb P NAW	45-60
Chromosorb 102	100-120	Chromosorb P NAW	60-80
Chromosorb 103	80-100	Chromosorb P NAW	80-100
Chromosorb 103	100-120	Chromosorb P NAW	100-120
Chromosorb 105	80-100	Chromosorb T	30-60
Chromosorb 105	100-120	Chromosorb T	40-60
Chromosorb 106	60-80	Chromosorb W AW	40-60
Chromosorb 106	80-100	Chromosorb W AW	60-80
Chromosorb 106	100-120	Chromosorb W AW	80-100
Chromosorb 107	80-100	Chromosorb W AW	100-120
Chromosorb 107	100-120	Chromosorb W AW DMCS	45-60
Chromosorb 108	80-100	Chromosorb W AW DMCS	60-80
Chromosorb 108	100-120	Chromosorb W AW DMCS	80-100
Chromosorb 750	80-100	Chromosorb W AW DMCS	100-120
Chromosorb G AW	60-80	Chromosorb W HMDS	45-60
Chromosorb G AW	80-100	Chromosorb W HMDS	60-80
Chromosorb G AW	100-120	Chromosorb W HMDS	80-100
Chromosorb G AW DMCS	60-80	Chromosorb W HMDS	100-120

Supports for Packed GC Columns

Description	Mesh Size	Description	Mesh Size
Chromosorb W HP	60-80	Porapak N	50-80
Chromosorb W HP	80-100	Porapak N	80-100
Chromosorb W HP	100-120	Porapak N	100-120
Chromosorb W NAW	60-80	Porapak P	50-80
Chromosorb W NAW	80-100	Porapak P	80-100
Chromosorb W NAW	100-120	Porapak P	100-120
Glass beads regular	45-60	Porapak PS	50-80
Glass beads regular	60-80	Porapak PS	80-100
Glass beads regular	80-100	Porapak Q	50-80
Glass beads regular	100-120	Porapak Q	80-100
Hayesep A	60-80	Porapak Q	100-120
Hayesep A	80-100	Porapak QS	50-80
Hayesep A	100-120	Porapak QS	80-100
Hayesep B	60-80	Porapak QS	100-120
Hayesep B	80-100	Porapak R	50-80
Hayesep B	100-120	Porapak R	80-100
Hayesep C	60-80	Porapak R	100-120
Hayesep C	80-100	Porapak S	50-80
Hayesep C	100-120	Porapak S	80-100
Hayesep N	60-80	Porapak S	100-120
Hayesep N	80-100	Porapak T	50-80
Hayesep N	100-120	Porapak T	80-100
Hayesep P	60-80	Porapak T	100-120
Hayesep P	80-100	Porasil B	80-100
Hayesep P	100-120	Porasil C	80-100
Hayesep Q	60-80	Silica gel GC grade	30-40
Hayesep Q	80-100	Silica gel GC grade	45-60
Hayesep Q	100-120	Silica gel GC grade	60-80
Hayesep R	60-80	Silocel	45-60
Hayesep R	80-100	Silocel	60-80
Hayesep R	100-120	Silocel	80-100
Hayesep S	60-80	Silocel	100-120
Hayesep S	80-100	Spherosil XOB 75	100-120
Hayesep S	100-120	Tenax GR	35-60
Hayesep T	50-80	Tenax GR	60-80
Hayesep T	80-100	Tenax GR	80-100
Hayesep T	100-120	Tenax TA	20-35
Molecular sieve 5Å	45-60	Tenax TA	35-60
Molecular sieve 5Å	60-80	Tenax TA	60-80
Molecular sieve 5Å	80-100	Tenax TA	80-100
Molecular sieve 5Å	100-120	W KOH washed	45-60
Molecular sieve 13X	60-80	W KOH washed	60-80
Molecular sieve 13X	80-100	W KOH washed	80-100
Molecular sieve 13X	100-120	W KOH washed	100-120



Custom GC Column Ordering

Even though we offer over a thousand readily available columns, Agilent recognizes that sometimes you need something a little out of the ordinary. That's why we developed our Custom Column Shop. If you can't find what you're looking for in our standard order guides, we will design, build, and test capillary GC columns to meet your needs.

- We can create columns with non-standard lengths or unusual film thickness.
- We can connect columns together in series or as dual columns.
- We recognize that sometimes customers have specific column performance requirements for their applications that might not be met with standard test mixes. As a result we can also custom-test your columns with your desired test mixture and test conditions to meet your specific performance requirements.
- We can create DuraGuard columns with an integrated guard column. Most phases can be manufactured with a built-in guard column which means you get the advantages of a guard column without the union. Only available in DB-phases.

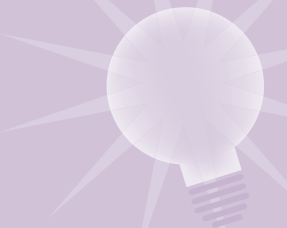
Custom columns are ordered using P/N 100-2000. Be sure to provide the details of your desired custom service or column including phase, length, ID, and film thickness.

Contact your local Agilent office or Authorized Agilent Distributor to receive a quote for your custom column needs. You can find order forms in the back of the catalog.

Customers in the United States, Canada, and Puerto Rico can request a custom column quote online at www.agilent.com/chem/CustomColumn

Tech Support

Need assistance selecting a column for your method? Contact our chromatography technical specialists at www.agilent.com/chem/TechRep



Agilent J&W GC Column Test Standards

Compare your column's performance to the test chromatogram shipped with your J&W column from Agilent. The column test standard contains components that test the column for resolution characteristics, efficiency, and inertness. The test mixes are supplied at a concentration of 250 ng/μL in 2 mL vials. Match the phase and column diameter in the chart below to find the test mix for your column.

Agilent J&W GC Column Test Standards

Column Description	Microbore (0.05 & 0.10 mm ID) Part No.	Capillary (0.18 & 0.32 mm ID) Part No.	Megabore (0.45 & 0.53 mm ID) Part No.
OV-351		200-0032	
DB-1ht		200-0010	
DB-1	200-0010	200-0310	200-0110
DB-5	200-0010	200-0310	200-0110
DB-5ht		200-0010	
DB-5ms		200-0185	200-0185
DB-624		200-0113	200-0113
DB-2887			200-0110
DB-WAX	200-0070	200-0370	200-0070
DB-WAXetr		200-0370	200-0070
SE-30		200-0010	
SE-52		200-0010	
SE-54		200-0010	200-0010
HP-1		5080-8858	8500-6812
HP-5		5080-8858	8500-6812
HP-FFAP	8500-6813	8500-6813	8500-6813
GS-OxyPLOT			5188-5379

Fused Silica Tubing

Deactivated Tubing

Deactivated tubing can be used as retention gaps, guard columns, or transfer lines. Our standard deactivation process is a phenyl methyl deactivation – the preferred choice for most applications due to its inertness and robustness.

Deactivated Fused Silica

ID (mm)	OD (mm)	Length (m)	Part No.
0.05	0.36	1	160-2655-1
		5	160-2655-5
		10	160-2655-10
0.10	0.19	1	160-1010-1
		5	160-1010-5
		10	160-1010-10
	0.36	1	160-2635-1
		5	160-2635-5
		5	19091-60620E
		10	160-2635-10
0.15	0.36	1	160-2625-1
		5	160-2625-5
		10	160-2625-10
0.18	0.34	1	160-2615-1
		5	160-2615-5
		10	160-2615-10
0.20	0.36	1	160-2205-1
		5	160-2205-5
		10	160-2205-10
0.25	0.36	1	160-2255-1
		5	160-2255-5
		10	160-2255-10
		30	160-2255-30
0.32	0.43	1	160-2325-1
		5	160-2325-5
		10	160-2325-10
		30	160-2325-30
0.45	0.67	1	160-2455-1
		5	160-2455-5
		10	160-2455-10
0.53	0.67	1	160-2535-1
		5	160-2535-5
		10	160-2535-10
		30	160-2535-30

Deactivated Fused Silica High Temperature (400°C)

ID (mm)	OD (mm)	Length (m)	Part No.
0.05	0.36	5	160-2815-5
0.10	0.36	5	160-2825-5
0.25	0.35	5	160-2845-5
		10	160-2845-10
0.32	0.43	5	160-2855-5
		10	160-2855-10
0.53	0.67	5	160-2865-5
		10	160-2865-10

ProSteel Deactivated Fused Silica

ID (mm)	OD (mm)	Length (m)	Part No.
0.53	0.67	5	160-4535-5

Undeactivated Fused Silica

Undeactivated tubing or bare fused silica is commonly used for capillary electrophoresis. It can also be used for transfer lines and other applications where inertness is not critical.

Undeactivated Fused Silica

ID (mm)	OD (mm)	Length (m)	Part No.
0.02	0.36	5	160-2660-5
0.05	0.36	5	160-2650-5
		10	160-2650-10
0.075	0.36	5	160-2644-5
		10	160-2644-10
0.10	0.36	5	160-2634-5
		10	160-2634-10
0.18	0.34	5	160-2610-5
		10	160-2610-10
0.20	0.36	5	160-2200-5
		10	160-2200-10
		50	19091-20050
0.25	0.36	5	160-2250-5
		10	160-2250-10
0.32	0.43	5	160-2320-5
		10	160-2320-10
		50	19091-21050
0.45	0.67	5	160-2450-5
		10	160-2450-10
0.53	0.67	5	160-2530-5
		10	160-2530-10

GC Column Application and Method Guides

Application	Specific Application	Agilent Phase
Biodiesel	EN14105 Free/Total Glycerin	Biodiesel, Select Biodiesel
	ASTM D6584 Free/Total Glycerin	Biodiesel, Select Biodiesel
	EN14103 FAME Analysis	Biodiesel, Select Biodiesel
	EN14110 Residual Methanol	Biodiesel, Select Biodiesel
	EN14106 Free Glycerol	Select Biodiesel
Chiral	Chiral γ -lactones and terpenes	CycloSil-B
	Optical isomers of acids, alcohols, amino acids, aromatic hydrocarbons, diols, flavors, aromas, ketones, organic acids and phenols	Cyclodex-B
	Chiral compounds using a nitrogen selective detector	HP-Chiral β
	Optical isomers of acids, alcohols, amino acids, aromatic, diols, flavor, aromas, ketones, organic acids and phenols	CP-Chirasil-Dex CB, CP-Cyclodextrin- β -2,3,6-M-19
	Amino acids, optical isomers	CP-Chirasil-Dex CB, CP-Cyclodextrin- β -2,3,6-M-19
Foods, Flavors and Fragrances	FAME up to C26, cis, trans, fast resolution FAME	Select FAME
	Best separation for cis, trans FAME up to 260°C	CP-Sil 88 for FAME
	Volatiles	CP-Carbowax 400 for Volatiles in Alcohol
	Unsaturated triglycerides	CP-TAP CB for Triglycerides
	Flavors, aromas, free fatty acids C1-C26	CP-FFAP CB
	Glycols, diols, alcohols	CP-Wax 57 CB for Glycols and Alcohols
Life Sciences	Blood alcohol analysis	DB-ALC1 and DB-ALC2
	Blood alcohol analysis	HP-Blood Alcohol
	Drugs of abuse confirmation	DB-5ms EVDX
	USP solvents, common solvents	HP-Fast Residual Solvent
	Drugs of abuse confirmation	VF-DA
Pesticides	Organochlorine pesticides	HP-PAS5
	Organochlorine pesticides	DB-1701P
	Chlorinated pesticides and PCBs	DB-608
	Trace levels of pesticides in food and environmental samples	VF-5 Pesticides and VF-1701 Pesticides
	Chlorinated, nitrogen, phosphorus pesticides and PCBs	Rapid-MS
	Chlorinated, nitrogen, phosphorus pesticides	CP-Sil 8 CB for Pesticides
	Chlorinated, nitrogen, phosphorus pesticides, trace level DDT and Endrin	CP-Sil 19 CB for Pesticides

Application	Specific Application	Agilent Phase
Polycyclic Aromatic Hydrocarbons	EU regulated PAHs	DB-EUPAH
	PAHs in environmental and food samples	Select PAH
	C5-C80, PAH and polar compounds	CP-Sil PAH CB UltiMetal
	EU and EPA regulated PAHs	VF-17ms for PAH
Petroleum	Simulated distillation using ASTM Method D2887	DB-2887
	C6-C110+	DB-HT SimDis
	C5-C100 simulated distillation	CP-SimDist
	C5-C120 simulated distillation	CP-SimDist UltiMetal
	PONA and PIANO analysis	HP-PONA
	Paraffins, aromatics, naphthenes and olefins C4-C20	CP-Sil PONA CB
	ASTM D 5134	CP-Sil PONA for ASTM D 5134
	PONA and PIANO analysis	DB-Petro
	High temperature simulated distillation	HP-1 Aluminum Clad
	C1-C10 hydrocarbons	Select Al2O3 MAPD
	C1-C6 alcohols, aromatic C6-C10	CP-TCEP for Alcohols in Gasoline
	Hydrogen, sulfide, carbonyl sulfide, methanethiol, ethanethiol and thiophenes in LPG	CP-Sil 5 CB for Sulfur
	Polar and non-polar volatile compounds, especially chlorosilanes with different substituents such as alkyl groups, or groups with ether, hydroxy and nitrile bonds	Select Silanes
	C1-C6 amines, alcohols, NH3, water, solvents, ethanol amines	CP-Volamine
	C3-C20 amines, alkanol amines	CP-Sil 8 CB for Amines
	C3-C8 amines and diamines	CP-Wax for Volatile Amines and Diamines
	C4-C10 amines, diamines and aromatic amines	CP-Wax 51 for Amines
	Oxygenates in C1-C10 hydrocarbons	CP-Lowox
	C1-C10 hydrocarbons	GS-OxyPLOT
	Methanol, formaldehyde and formic acid in water	CP-Sil 5 CB for Formaldehyde
	C1-C12 hydrocarbons	CP-Squalane
	Volatile oxygenates and halogenated hydrocarbons	CP-Propox
Semivolatiles	Polychlorinated dibenzodioxins (PCDDs) and dibenzofurans (PCDFs)	DB-Dioxin
	Dioxins and dibenzo furan	CP-Sil 88 for Dioxins
	EPA Semivolatiles Methods 625, 1625, 8270 and CLP protocols	DB-5.625
	EPA Semivolatiles Methods 625, 1625, 8270 and CLP protocols	HP-5ms Semivolatile
	PCB, detailed analysis	CP-Sil 5/C18 CB for PCB
	PCB	CP-Sil 8 CB for PCB

Application	Specific Application	Agilent Phase
Volatiles	EPA Methods 502.2, 524.2 and 8260	DB-VRX
	Volatile priority pollutants and residual solvents	DB-624
	Halogenated hydrocarbons and solvents	CP-Select 624 CB
	EPA Methods 502.2, 524.2 and 8260	HP-VOC
	EPA Method 502.2	DB-502.2
	MTBE in soil and water	DB-MTBE
	Oxygenates and solvents	CP-Select CB for MTBE
	Total petroleum hydrocarbons (TPHs), soil analysis, and LUFT	DB-TPH
	C5-C40 hydrocarbons	Select Mineral Oil
Metal	High temperature analysis and process applications	DB-ProSteel
Non-Bonded	Amino acid derivatives, essential oils	HP-101
	Drugs, glycols, pesticides, steroids	HP-17
	Amines, basic compounds	CAM
	Alcohols, free acids, essential oils, ethers, glycols, solvents	Carbowax 20M and HP-20M
	Generic	SE-30 and SE-54

Agilent Phase	Composition	Application
Ultra Inert Columns		
DB-1ms Ultra Inert	100% Dimethylpolysiloxane	Semivolatiles, halogenated compounds, pesticides, herbicides drugs of abuse, amines, unknown sample screening
HP-1ms Ultra Inert	100% Dimethylpolysiloxane	
DB-5ms Ultra Inert	5% Phenyl 95% dimethyl arylene siloxane	
HP-5ms Ultra Inert	5% Phenyl 95% dimethylpolysiloxane	
DB-35ms Ultra Inert	5% Phenyl 65% dimethylpolysiloxane	
General Application Columns		
DB-1ms	100% Dimethylpolysiloxane	Amines, hydrocarbons, pesticides, PCBs, phenols, sulfur compounds, flavors and fragrances
HP-1ms		
VF-1ms		
DB-5ms	5% Phenyl 95% dimethyl arylene siloxane	Semivolatiles, alkaloids, drugs, FAMES, halogenated compounds, pesticides, herbicides
HP-5ms	5% Phenyl 95% dimethylpolysiloxane	
VF-5ms		
DB-XLB		Pesticides, herbicides, PCBs and PAHs
VF-Xms	High arylene modified	Pesticides, herbicides, PCBs and PAHs
DB-35ms	5% Phenyl 65% dimethylpolysiloxane	Aromatic compounds, pesticides and herbicides, sterols and other substituted aromatic compounds
VF-35ms		

(Continued)

Agilent Phase	Composition	Application
General Application Columns		
DB-17ms VF-17ms	50% Phenyl 50% dimethylpolysiloxane	Antidepressants, herbicides and pesticides
VF-23ms	High cyanopropyl modified	FAME, solvents, sugars
VF-200ms	Trifluoropropyl methyl	Ketones, aldehydes, nitro- or chloro-containing compounds, PAHs, unsaturated compounds, silanes and CFCs
DB-225ms	50% Cyanopropylphenyl 50% dimethylpolysiloxane	FAMEs, alditol acetates, neutral sterols
VF-624ms	6% Cyanopropyl-phenyl 94% dimethylpolysiloxane	Purgeable organic volatiles and semi-volatiles, aromatics, halocarbons, solvents
VF-1301ms	6% Cyanopropyl-phenyl 94% dimethylpolysiloxane	Thin-film version of the VF-624ms suitable for volatile solvents, pesticides, PCBs and other organic compounds requiring thin films
VF-WAXms	Polyethylene glycol	Trace analysis of polar substances
VF-1701ms	14% Cyanopropyl-phenyl 86% dimethylpolysiloxane	Organic compounds in drinking water, base/neutrals and acids, PCBs and chlorinated pesticides, organophosphorus pesticides and herbicides
DB-1 HP-1 CP-Sil 5 CB	100% Dimethylpolysiloxane	Amines, hydrocarbons, pesticides, PCBs, phenols, sulfur compounds, flavors and fragrances
Ultra 1	100% Dimethylpolysiloxane	
Ultra 2	100% Dimethylpolysiloxane	
DB-5 HP-5 CP-Sil 8 CB	5% Phenyl 95% dimethylpolysiloxane	Semivolatiles, alkaloids, drugs, FAMEs, halogenated compounds, pesticides, herbicides
CP-Sil 13 CB	14% Phenyl 86% dimethylpolysiloxane	Analysis of medium-polarity compounds where halocarbon-sensitive detectors are used (e.g. ECD) Amines, aromatic hydrocarbons, EPA methods, fungicides, halogenated compounds, herbicides, pesticides, PCBs, phenols, phthalate esters, steroids, sugars and tranquilizers
DB-35 HP-35	35% Phenyl 65% dimethylpolysiloxane	CLP-pesticides, aroclors, pharmaceuticals, drugs of abuse
DB-17 HP-50+ CP-Sil 24 CB	50% Phenyl 50% dimethylpolysiloxane	Drugs, glycols, pesticides, steroids Antidepressants, herbicides and pesticides
DB-23	50% Cyanopropyl 50% methylpolysiloxane	FAMEs
HP-88	88% Cyanopropyl 12% aryl-polysiloxane	FAMEs
CP-Sil 88	Highly substituted, stabilized cyanopropyl	Dioxins, FAME, PCBs, PCDFs, pyridines and sugars

(Continued)

Agilent Phase	Composition	Application
General Application Columns		
DB-200	35% Trifluoropropyl 65% dimethylpolysiloxane	Residual solvents, pesticides, herbicides
DB-210	50% Trifluoropropyl 50% dimethylpolysiloxane	EPA Methods 8140 and 609
DB-225	50% Cyanopropylphenyl 50% dimethylpolysiloxane	FAMES, alditol acetates, neutral sterols
CP-Sil 43 CB	25% Cyanopropyl 25% phenyl 50% dimethylpolysiloxane	FAME, halogenated compounds, phenols and pyridines
DB-1301	6% Cyanopropylphenyl 94% dimethylpolysiloxane	Aroclors, alcohols, pesticides, VOCs
CP-1301		Herbicides, pesticides and many pharmaceutical products
DB-1701	14% Cyanopropylphenyl 86% dimethylpolysiloxane	Pesticides, herbicides, TMS sugars, aroclors
CP-Sil 19 CB		Trace levels of pesticide residues in food and environmental samples
Polyethylene Glycol (PEG) Columns		
DB-WAX	Polyethylene glycol	Solvents, glycols, alcohols
HP-INNOWax		Alcohols, free organic acids, solvents, essential oils, flavors and fragrances
CP-Wax 52 CB		Alcohols, aldehydes, anesthetics, antidepressants, aromatic hydrocarbons, EPA methods, esters, FAME, flavors and aromas, glycols, halogenated components, ketones, nitro compounds, PAHs, phenols, solvents and sulfur compounds
DB-FFAP	Polyethylene glycol-acid modified	Organic acids, alcohols, aldehydes, ketones, acrylates
HP-FFAP		
CP-Wax 58 FFAP CB		FAME, flavors and aromas, free fatty acids, organic acids and phenols
CP-Wax 57 CB	Polyethylene glycol	Alcohols, aromatic hydrocarbons, esters, FAME, flavors and aromas, free fatty acids, glycols, halogenated compounds, ketones, organic acids and solvents
PLOT Columns		
CP-PoraBOND Q	Styrene-divinylbenzene copolymer	Alcohols, free fatty acids, gases, glycols, halogenated compounds, hydrocarbons, C1-C9, ketones, solvents, sulfur compounds
CP-PoraBOND U	Styrene-glycol methacrylate copolymer	Alcohols, free fatty acids, gases, glycols, halogenated compounds, hydrocarbons, C1-C9, ketones, solvents, sulfur compounds
CP-PoraPLOT Q	Styrene-divinylbenzene copolymer	Alcohols, free fatty acids, gases, glycols, halogenated compounds, hydrocarbons, C1-C9, ketones, solvents, sulfur compounds
CP-PoraPLOT Q-HT	Styrene-divinylbenzene copolymer	Halogenated compounds, hydrocarbons C1-C9, ketones, oxygenated hydrocarbons, permanent gases, solvents

(Continued)

Agilent Phase	Composition	Application
PLOT Columns		
HP-PLOT Q	Polystyrenedivinylbenzene	Hydrocarbons including isomers, CO ₂ , methane, air/CO, water, polar solvents, sulfur compounds
GS-Q	Porous divinylbenzene homopolymer	Hydrocarbons, halogenated hydrocarbons, sulfides except for SO ₂
CP-PoraPLOT U	Ethylene glycol dimethacrylate-divinylbenzene copolymer	Halogenated compounds, hydrocarbons C1-C6, ketones, oxygenated hydrocarbons, permanent gases and solvents
CP-PoraPLOT S	Vinylpyridine-divinylbenzene copolymer	Hydrocarbons, ketones
HP-PLOT U	Divinylbenzene/ethylene glycol dimethacrylate	C1-C7 hydrocarbons, CO ₂ , methane, air/CO, water, oxygenates, amines, solvents, alcohols, ketones, aldehydes
HP-PLOT Al ₂ O ₃ KCl	Aluminum oxide KCl deactivated	C1-C6 hydrocarbons in natural gas, refinery gas, fuel gas, synthetic gas, dienes
GS-Alumina KCl	Aluminum oxide KCl deactivated	C1-C6 hydrocarbons in natural gas, refinery gas, fuel gas, synthetic gas, dienes
CP-Al ₂ O ₃ /KCl	Aluminium oxide	Hydrocarbons C1-C10 and impurities in hydrocarbon mainstreams, benzene and toluene
CP-Al ₂ O ₃ /Na ₂ SO ₄	Aluminium oxide	Hydrocarbons C1-C10 and impurities in hydrocarbon mainstreams, benzene and toluene
HP-PLOT Al ₂ O ₃ S	Aluminum oxide "Sodium Sulfate" deactivated	C1-C6 hydrocarbons in natural gas, refinery gas, fuel gas, synthetic gas, dienes
GS-Alumina	Aluminum oxide with proprietary deactivation	C1-C6 hydrocarbons in natural gas, refinery gas, fuel gas, synthetic gas, dienes
HP-PLOT Al ₂ O ₃ M	Aluminium oxide	C1-C6 hydrocarbons in natural gas, refinery gas, fuel gas, synthetic gas, dienes
GS-GasPro	Proprietary, bonded silica-based	C1-C12 hydrocarbons, CO ₂ , trace-level sulfurs, hydride gases, inorganic gases, halocarbons, SF ₆ , oxygen/nitrogen separation at -80°C
CP-SilicaPLOT	Proprietary, bonded silica-based	COS in ethylene, freons/CFCs, hydrocarbons, propylene and sulfur gases
CP-CarboBOND	Active carbon	Hydrocarbons in ethylene and traces CO and CO ₂ in ethylene and propylene
CP-CarboPLOT P7	Active carbon	He, Xe, CO, Ne, CH ₄ , CO ₂ , O ₂ /Ar, C ₂ H ₆ , N ₂ , C ₂ H ₄ , Kr, and C ₂ H ₂
GS-CarbonPLOT	Bonded monolithic carbon layer	C1-C5 hydrocarbons, CO ₂ , air/CO, trace acetylene in ethylene, methane
HP-PLOT Molesieve	5Å molecular sieve zeolite	Permanent and noble gases. Argon and oxygen separation at 35°C
CP-Molsieve 5Å	Molecular sieve	He, H ₂ , O ₂ , CO, Ne, HD, N ₂ , NO, Ar, D ₂ , CH ₄ , KrHT, Xe, DT, CD ₄ , Rn, T ₂
CP-PoraPLOT Amines	Styrene-divinylbenzene copolymer base deactivated	Amines C1-C6

EPA Method

Drinking Water			
EPA Method	Application	Recommended Column	Part No.
501, 501.3	Measurement of trihalomethanes in drinking water GC/MS and selected ion monitoring	VF-624ms, 30 m x 0.53 mm, 3.00 µm	CP9106
		VF-624ms, 30 m x 0.25 mm, 1.40 µm	CP9102
		DB-VRX, 30 m x 0.45 mm, 2.55 µm	124-1534
		DB-624, 30 m x 0.45 mm, 2.55 µm	124-1334
502.2	Volatile organic compounds in water by purge and trap capillary column GC with photoionization and electrolytic conductivity detectors in series	VF-624ms, 75 m x 0.53 mm, 3.00 µm	CP9108
		VF-624ms, 30 m x 0.53 mm, 3.00 µm	CP9106
		VF-624ms, 30 m x 0.25 mm, 1.40 µm	CP9102
		DB-VRX, 75 m x 0.45 mm, 2.55 µm	124-1574
		DB-624, 75 m x 0.45 mm, 2.55 µm	124-1374
503.1	Volatile aromatic and unsaturated organic compounds in water by purge and trap gas chromatography	DB-VRX, 30 m x 0.45 mm, 2.55 µm	124-1534
		DB-624, 30 m x 0.45 mm, 2.55 µm	124-1334
504.1	1,2-Dibromoethane (EDB) and 1,2-dibromo-3-chloropropane (DB CP), GC, microextraction	VF-1ms, 30 m x 0.32 mm, 1.00 µm	CP8926
		VF-1701ms, 30 m x 0.32 mm, 1.00 µm	CP9163
		DB-VRX, 30 m x 0.45 mm, 2.55 µm	124-1534
		DB-624, 30 m x 0.45 mm, 2.55 µm	124-1334
505	Analysis of organohalide pesticides and commercial polychlorinated biphenyl (PCB) products in water by microextraction and GC	VF-1ms, 30 m x 0.32 mm, 1.00 µm	CP8926
		VF-17ms, 30 m x 0.32 mm, 0.50 µm	CP8991
506	Determination of phthalate and adipate esters in drinking water by liquid-liquid extraction or liquid-solid extraction and GC with photoionization detection	VF-5ms, 30 m x 0.32 mm, 0.25 µm	CP8955
		VF-1ms, 30 m x 0.32 mm, 0.25 µm	CP8924
		DB-5ms, 30 m x 0.25 mm, 0.25 µm	122-5532
		DB-5ms, 30 m x 0.53 mm, 1.50 µm	125-5532
		DB-608, 30 m x 0.53 mm, 0.50 µm	125-6837
507	Determination of nitrogen and phosphorus-containing pesticides in water by GC with a nitrogen-phosphorus detector	VF-5 Pesticides, 30 m x 0.25 mm, 0.25 µm	CP9074
		VF-1701 Pesticides, 30 m x 0.25 mm, 0.25 µm	CP9070
		DB-35ms, 30 m x 0.25 mm, 0.25 µm	122-3832
		DB-5ms, 30 m x 0.25 mm, 0.25 µm	122-5532
508	Determination of chlorinated pesticides in water GC with an electron capture detector	VF-5 Pesticides, 30 m x 0.25 mm, 0.25 µm	CP9074
		VF-1701 Pesticides, 30 m x 0.25 mm, 0.25 µm	CP9070
508.1	Determination of chlorinated pesticides, herbicides, and organohalides by liquid-solid extraction and electron capture GC	VF-5 Pesticides, 30 m x 0.25 mm, 0.25 µm	CP9074
		DB-35ms, 30 m x 0.32 mm, 0.25 µm	123-3832
		DB-XLB, 30 m x 0.32 mm, 0.50 µm	123-1236

(Continued)

Drinking Water

EPA Method	Application	Recommended Column	Part No.
515	Determination of chlorinated herbicides in drinking water	DB-35ms, 30 m x 0.32 mm, 0.25 µm	123-3832
515.3	Determination of chlorinated acids in drinking water by liquid-liquid extraction, derivatization and GC with electron capture detection	VF-1701ms, 30 m x 0.25 mm, 0.25 µm	CP9151
		VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
515.4	Determination of chlorinated acids in drinking water by liquid-liquid microextraction, derivatization, and fast GC with electron capture detection	VF-1701ms, 30 m x 0.25 mm, 0.25 µm	CP9151
		VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
521	Determination of nitrosamines in drinking water by solid phase extraction and capillary column gas chromatography with large volume injection and chemical ionization tandem mass spectrometry (MS/MS)	VF-5ms, 30 m x 0.25 mm, 1.00 µm	CP8946
524.2	Measurement of purgeable organic compounds in water by capillary GC/MS	VF-624ms, 30 m x 0.53 mm, 3.00 µm	CP9106
		VF-624ms, 75 m x 0.53 mm, 3.00 µm	CP9108
		VF-5ms, 30 m x 0.32 mm, 1.00 µm	CP8957
		DB-VRX, 60 m x 0.25 mm, 1.40 µm	122-1564
		DB-624, 60 m x 0.25 mm, 1.4 µm	122-1364
		HP-VOC, 60 m x 0.20 mm, 1.10 µm	19091R-306
		DB-VRX, 20 m x 0.18 mm, 1.00 µm	121-1524
		DB-624, 20 m x 0.18 mm, 1.00 µm	121-1324
525, 525.2	Determination of organic compounds in drinking water by liquid-solid extraction and capillary column GC/MS	VF-5 Pesticides, 30 m x 0.25 mm, 0.25 µm	CP9074
		HP-5ms, 30 m x 0.25 mm, 0.50 µm	19091S-133
526	Determination of selected semivolatile organic compounds in drinking water by solid phase extraction and capillary column GC/MS	VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
527	Determination of selected pesticides and flame retardants in drinking water by solid phase extraction and capillary column GC/MS	VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
528	Determination of phenols in drinking water by solid phase extraction and capillary column GC/MS	VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
		DB-5ms, 30 m x 0.25 mm, 0.25 µm	122-5532
		DB-XLB, 30 m x 0.25 mm, 0.25 µm	122-1232
		DB-5ms, 30 m x 0.53 mm, 1.50 µm	125-5532
529	Determination of explosives and related compounds in drinking water by solid phase extraction and capillary column GC/MS	VF-5ms, 15 m x 0.25 mm, 0.25 µm	CP8939

(Continued)

Drinking Water

EPA Method	Application	Recommended Column	Part No.
551	Determination of Chlorination Disinfection Byproducts and Chlorinated Solvents in Drinking Water by Liquid-Liquid Extraction and Gas Chromatography with Electron Capture Detection	VF-1301ms, 30 m x 0.25 mm, 1.00 µm	CP9054
		DB-5ms, 30 m x 0.25 mm, 1.00 µm	122-5533
		DB-1, 30 m x 0.25 mm, 1.00 µm	122-1033
551.1	Determination of chlorination disinfection byproducts, chlorinated solvents, and halogenated pesticides/herbicides in drinking water by liquid-liquid extraction and GC with electron-capture detection	VF-1ms, 30 m x 0.25 mm, 1.00 µm	CP8913
		VF-1301ms, 30 m x 0.25 mm, 1.00 µm	CP9054
		DB-5ms, 30 m x 0.25 mm, 1.00 µm	122-5533
		DB-1, 30 m x 0.25 mm, 1.00 µm	122-1033
552	Determination of Haloacetic Acids in Drinking Water by Liquid-Liquid Extraction, Derivatization, and Gas Chromatography with Electron Capture Detection	VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
		DB-35ms, 30 m x 0.32 mm, 0.25 µm	123-3832
		DB-XLB, 30 m x 0.32 mm, 0.50 µm	123-1236
552.1	Determination of Haloacetic Acids and Dalapon in Drinking Water by Ion Exchange Liquid-Solid Extraction and Gas Chromatography with an Electron Capture Detector	DB-35ms, 30 m x 0.32 mm, 0.25 µm	123-3832
		DB-XLB, 30 m x 0.32 mm, 0.50 µm	123-1236
552.2	Determination of haloacetic acids and dalapon in drinking water by liquid-liquid extraction, derivatization GC with electron capture detection	VF-1701ms, 30 m x 0.25 mm, 0.25 µm	CP9151
		VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
		DB-35ms, 30 m x 0.32 mm, 0.25 µm	123-3832
		DB-XLB, 30 m x 0.32 mm, 0.50 µm	123-1236
552.3	Determination of haloacetic acids and dalapon in drinking water by liquid-liquid microextraction, derivatization, and GC with electron capture detection	VF-1701ms, 30 m x 0.25 mm, 0.25 µm	CP9151
		VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
556	Determination of carbonyl compounds in drinking water by pentafluorobenzylhydroxylamine derivatization and capillary GC with electron capture detection	VF-1701ms, 30 m x 0.25 mm, 0.25 µm	CP9151
		VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944

Waste Water

EPA Method	Application	Column	Part No.
601	Purgeable Halocarbons	VF-624ms, 75 m x 0.53 mm, 3.00 μ m	CP9108
		VF-624ms, 60 m x 0.32 mm, 1.80 μ m	CP9105
		VF-624ms, 30 m x 0.25 mm, 1.40 μ m	CP9102
		DB-VRX, 75 m x 0.45 mm, 2.55 μ m	124-1574
		DB-624, 75 m x 0.45 mm, 2.55 μ m	124-1374
602	Purgeable aromatics	VF-624ms, 75 m x 0.53 mm, 3.00 μ m	CP9108
		VF-624ms, 30 m x 0.25 mm, 1.40 μ m	CP9102
		VF-624ms, 30 m x 0.25 mm, 1.40 μ m	CP9102
		DB-VRX, 30 m x 0.45 mm, 2.55 μ m	124-1534
		DB-624, 30 m x 0.45 mm, 2.55 μ m	124-1334
603	Acrolein and Acrylonitrile	VF-WAXms, 30 m x 0.25 mm, 1.00 μ m	CP9206
		VF-624ms, 30 m x 0.25 mm, 1.40 μ m	CP9102
		DB-VRX, 30 m x 0.45 mm, 2.55 μ m	124-1534
		DB-624, 30 m x 0.45 mm, 2.55 μ m	124-1334
604	Phenols	VF-624ms, 60 m x 0.32 mm, 1.80 μ m	CP9105
		VF-624ms, 60 m x 0.25 mm, 1.40 μ m	CP9103
		DB-5ms, 30 m x 0.25 mm, 0.25 μ m	122-5532
		DB-XLB, 30 m x 0.25 mm, 0.25 μ m	122-1232
		DB-5ms, 30 m x 0.53 mm, 1.50 μ m	125-5532
605	Benzidines	DB-5ms, 30 m x 0.25 mm, 0.25 μ m	122-5532
		DB-5ms, 30 m x 0.53 mm, 1.50 μ m	125-5532
		DB-608, 30 m x 0.53 mm, 0.50 μ m	125-6837
606	Phthalate esters	VF-5ms, 30 m x 0.25 mm, 0.25 μ m	CP8944
		DB-5ms, 30 m x 0.25 mm, 0.25 μ m	122-5532
		DB-5ms, 30 m x 0.53 mm, 1.50 μ m	125-5532
		DB-608, 30 m x 0.53 mm, 0.50 μ m	125-6837
607	Nitrosamines	CP-Sil 8 CB for Amines, 30 m x 0.32 mm, 1.00 μ m	CP7596
		DB-5ms, 30 m x 0.25 mm, 0.25 μ m	122-5532
		DB-5ms, 30 m x 0.53 mm, 1.50 μ m	125-5532
608	Organochlorine pesticides and PCBs	VF-5 Pesticides, 30 m x 0.25 mm, 0.25 μ m	CP9074
		VF-1701 Pesticides, 30 m x 0.25 mm, 0.25 μ m	CP9070
		VF-17ms, 30 m x 0.25 mm, 0.25 μ m	CP8982
		DB-35ms, 30 m x 0.32 mm, 0.25 μ m	123-3832
		DB-XLB, 30 m x 0.32 mm, 0.50 μ m	123-1236

(Continued)

Waste Water

EPA Method	Application	Column	Part No.
609	Nitroaromatics and Isophorone	VF-5ms, 30 m x 0.53 mm, 1.50 μ m	CP8976
		VF-5ms, 30 m x 0.25 mm, 0.50 μ m	CP8945
		HP-5ms, 30 m x 0.25 mm, 0.50 μ m	19091S-133
		DB-5ms, 30 m x 0.53 mm, 1.50 μ m	125-5532
		DB-608, 30 m x 0.53 mm, 0.50 μ m	125-6837
610	Polynuclear Aromatic Hydrocarbons	VF-17ms, 30 m x 0.25 mm, 0.25 μ m	CP8982
		VF-5ms, 30 m x 0.25 mm, 0.25 μ m	CP8944
		DB-5ms, 30 m x 0.25 mm, 0.25 μ m	122-5532
		DB-5ms, 30 m x 0.32 mm, 0.25 μ m	123-5532
		DB-1ms, 30 m x 0.25 mm, 0.25 μ m	122-0132
611	Haloethers	VF-5ms, 30 m x 0.53 mm, 1.50 μ m	CP8976
		VF-5ms, 30 m x 0.25 mm, 0.50 μ m	CP8945
612	Chlorinated Hydrocarbons	VF-5ms, 30 m x 0.25 mm, 0.10 μ m	CP8943
		VF-35ms, 30 m x 0.25 mm, 0.25 μ m	CP8877
		VF-200ms, 30 m x 0.25 mm, 1.00 μ m	CP8860
		DB-5ms, 30 m x 0.32 mm, 0.50 μ m	123-5536
		HP-5ms, 30 m x 0.32 mm, 0.50 μ m	19091S-113
		DB-1, 30 m x 0.32 mm, 0.50 μ m	123-103E
613	2,3,7,8-Tetrachlorodibenzo-p-dioxin	CP-Sil 88 for Dioxins, 50 m x 0.25 mm, 0.20 μ m	CP7588
		VF-5ms, 60 m x 0.25 mm, 0.10 μ m	CP8948
614	The Determination of Organophosphorus Pesticides in Municipal and Industrial Wastewater	DB-35ms, 30 m x 0.25 mm, 0.25 μ m	122-3832
		DB-5ms, 30 m x 0.25 mm, 0.25 μ m	122-5532
615	Chlorinated herbicides	VF-1701 Pesticides, 30 m x 0.25 mm, 0.25 μ m	CP9070
		VF-5 Pesticides, 30 m x 0.25 mm, 0.25 μ m	CP9074
		DB-35ms, 30 m x 0.32 mm, 0.25 μ m	123-3832
619	Triazine pesticides	VF-17ms, 30 m x 0.25 mm, 0.50 μ m	CP8983
		VF-5ms, 30 m x 0.25 mm, 0.25 μ m	CP8944
		DB-35ms, 30 m x 0.25 mm, 0.25 μ m	122-3832
		DB-5ms, 30 m x 0.25 mm, 0.25 μ m	122-5532
622	The Determination of Organophosphorus Pesticides in Municipal and Industrial Wastewater	DB-35ms, 30 m x 0.25 mm, 0.25 μ m	122-3832
		DB-5ms, 30 m x 0.25 mm, 0.25 μ m	122-5532

(Continued)

Waste Water

EPA Method	Application	Column	Part No.
624	Purgeables	VF-624ms, 75 m x 0.53 mm, 3.00 μ m	CP9108
		VF-624ms, 60 m x 0.32 mm, 1.80 μ m	CP9105
		VF-624ms, 30 m x 0.25 mm, 1.40 μ m	CP9102
		DB-VRX, 60 m x 0.25 mm, 1.40 μ m	122-1564
		DB-624, 60 m x 0.25 mm, 1.4 μ m	122-1364
		HP-VOC, 60 m x 0.20 mm, 1.10 μ m	19091R-306
		DB-VRX, 20 m x 0.18 mm, 1.00 μ m	121-1524
		DB-624, 20 m x 0.18 mm, 1.00 μ m	121-1324
625	Base/neutrals and acids	VF-5 Pesticides, 30 m x 0.25 mm, 0.25 μ m	CP9074
		VF-1701 Pesticides, 30 m x 0.25 mm, 0.25 μ m	CP9070
		VF-200ms, 30 m x 0.25 mm, 0.25 μ m	CP8858
		HP-5ms, 30 m x 0.25 mm, 0.50 μ m	19091S-133
1613	Tetra- through octa-chlorinated dioxins and furans by isotope dilution HRGC/HRMS	VF-5ms, 60 m x 0.25 mm, 0.25 μ m	CP8960
		CP-Sil 88 for Dioxins, 50 m x 0.25 mm, 0.20 μ m	CP7588
1624	Volatile organic compounds by isotope dilution GC/MS	VF-624ms, 60 m x 0.25 mm, 1.40 μ m	CP9103
1625	Semivolatile organic compounds by isotope dilution GC/MS	VF-5ms, 30 m x 0.25 mm, 0.25 μ m	CP8944
8010	Volatile Halogenated Organic Compounds List by EPA Method 8021	DB-VRX, 75 m x 0.45 mm, 2.55 μ m	124-1574
		DB-624, 75 m x 0.45 mm, 2.55 μ m	124-1374
8021	Volatile Halogenated & Aromatic Organic Compounds	DB-VRX, 75 m x 0.45 mm, 2.55 μ m	124-1574
		DB-624, 75 m x 0.45 mm, 2.55 μ m	124-1374

Solid Waste			
EPA Method	Application	Column	Part No.
8010	Volatile Halogenated Organic Compounds List by EPA Method 8021	DB-VRX, 75 m x 0.45 mm, 2.55 µm	124-1574
		DB-624, 75 m x 0.45 mm, 2.55 µm	124-1374
8011	1,2-Dibromoethane and 1,2-dibromo-3-chloropropane by microextraction and GC	VF-1ms, 30 m x 0.32 mm, 0.25 µm	CP8924
		DB-VRX, 30 m x 0.45 mm, 2.55 µm	124-1534
		DB-624, 30 m x 0.45 mm, 2.55 µm	124-1334
8015	Nonhalogenated organics by GC	DB-VRX, 30 m x 0.45 mm, 2.55 µm	124-1534
		DB-624, 30 m x 0.45 mm, 2.55 µm	124-1334
8015c	Nonhalogenated organics by GC	VF-WAXms, 30 m x 0.53 mm, 1.00 µm	CP9215
		CP-Sil 8 CB, 30 m x 0.53 mm, 1.50 µm	CP8736
8020	Volatile Aromatic Organic Compounds List by EPA Method 8021	DB-VRX, 30 m x 0.45 mm, 2.55 µm	124-1534
		DB-624, 30 m x 0.45 mm, 2.55 µm	124-1334
8021, CLP Volamines	Volatile Halogenated & Aromatic Organic Compounds	DB-VRX, 75 m x 0.45 mm, 2.55 µm	124-1574
		DB-624, 75 m x 0.45 mm, 2.55 µm	124-1374
8021b	Aromatic and halogenated volatiles by GC	VF-624ms, 60 m x 0.53 mm, 3.00 µm	CP9107
		VF-624ms, 60 m x 0.25 mm, 1.40 µm	CP9103
8031	Acrylonitrile by GC	CP-PoraBOND Q, 25 m x 0.53 mm, 10.00 µm	CP7354
		DB-VRX, 30 m x 0.45 mm, 2.55 µm	124-1534
		DB-624, 30 m x 0.45 mm, 2.55 µm	124-1334
8032	Acrylamide by GC	CP-Wax 58 FFAP CB, 25 m x 0.53 mm, 2.00 µm	CP7654
8033	Acetonitrile by GC with nitrogen-phosphorus detection	VF-WAXms, 15 m x 0.53 mm, 1.00 µm	CP9226
8040, 8041	Phenols by Gas Chromatography	DB-5ms, 30 m x 0.25 mm, 0.25 µm	122-5532
		DB-XLB, 30 m x 0.25 mm, 0.25 µm	122-1232
		DB-5ms, 30 m x 0.53 mm, 1.50 µm	125-5532
8041a	Phenols by GC	VF-5ms, 30 m x 0.53 mm, 1.50 µm	CP8976
		VF-1701ms, 30 m x 0.53 mm, 1.00 µm	CP9171
		VF-17ms, 30 m x 0.53 mm, 1.00 µm	CP9001
8060	Phthalate esters	DB-5ms, 30 m x 0.25 mm, 0.25 µm	122-5532
		DB-5ms, 30 m x 0.53 mm, 1.50 µm	125-5532
		DB-608, 30 m x 0.53 mm, 0.50 µm	125-6837

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EPA Method	Application	Column	Part No.
8061	Phthalate esters by GC with electron capture detection (GC/ECD)	VF-5ms, 30 m x 0.53 mm, 1.50 μ m	CP8976
		VF-1701ms, 30 m x 0.53 mm, 1.00 μ m	CP9171
		DB-5ms, 30 m x 0.25 mm, 0.25 μ m	122-5532
		DB-5ms, 30 m x 0.53 mm, 1.50 μ m	125-5532
		DB-608, 30 m x 0.53 mm, 0.50 μ m	125-6837
8070	Nitrosamines by Gas Chromatography	DB-5ms, 30 m x 0.25 mm, 0.25 μ m	122-5532
		DB-5ms, 30 m x 0.53 mm, 1.50 μ m	125-5532
8070a	Nitrosamines by GC	CP-Sil 8 CB for Amines, 30 m x 0.53 mm, 1.00 μ m	CP7597
		VF-17ms, 30 m x 0.53 mm, 1.50 μ m	CP9002
8081	Organochlorine pesticides by GC	VF-5ms, 30 m x 0.25 mm, 1.00 μ m	CP8946
		VF-35ms, 30 m x 0.25 mm, 1.00 μ m	CP8879
		VF-35ms, 30 m x 0.53 mm, 0.50 μ m	CP8887
		VF-1701ms, 30 m x 0.53 mm, 1.00 μ m	CP9171
		VF-5ms, 30 m x 0.53 mm, 1.50 μ m	CP8976
8081a	Organochlorine Pesticides by Gas Chromatography	DB-35ms, 30 m x 0.32 mm, 0.25 μ m	123-3832
		DB-XLB, 30 m x 0.32 mm, 0.50 μ m	123-1236
8082, CLP Pesticides	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	DB-35ms, 30 m x 0.32 mm, 0.25 μ m	123-3832
		DB-XLB, 30 m x 0.32 mm, 0.50 μ m	123-1236
8082a	Polychlorinated biphenyls (PCBs) by GC	VF-5ms, 30 m x 0.25 mm, 1.00 μ m	CP8946
		VF-35ms, 30 m x 0.25 mm, 1.00 μ m	CP8879
		VF-35ms, 30 m x 0.53 mm, 0.50 μ m	CP8887
		VF-1701ms, 30 m x 0.53 mm, 1.00 μ m	CP9171
		VF-5ms, 30 m x 0.53 mm, 1.50 μ m	CP8976
8090	Nitroaromatics and Isophorone	HP-5ms, 30 m x 0.25 mm, 0.50 μ m	19091S-133
		DB-5ms, 30 m x 0.53 mm, 1.50 μ m	125-5532
		DB-608, 30 m x 0.53 mm, 0.50 μ m	125-6837
8091	Nitroaromatics and cyclic ketones by GC	VF-5ms, 30 m x 0.53 mm, 1.50 μ m	CP8976
		VF-1701ms, 30 m x 0.53 mm, 1.00 μ m	CP9171
8095	Explosives by GC	VF-5ms, 15 m x 0.53 mm, 1.50 μ m	CP8973
		VF-1ms, 15 m x 0.53 mm, 1.50 μ m	CP8967
		VF-200ms, 15 m x 0.53 mm, 1.00 μ m	CP8866
8100	Polynuclear aromatic hydrocarbons	VF-5ms, 30 m x 0.25 mm, 0.25 μ m	CP8944
		DB-5ms, 30 m x 0.25 mm, 0.25 μ m	122-5532
		DB-5ms, 30 m x 0.32 mm, 0.25 μ m	123-5532
		DB-1ms, 30 m x 0.25 mm, 0.25 μ m	122-0132

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EPA Method	Application	Column	Part No.
8111	Haloethers by GC	VF-5ms, 15 m x 0.53 mm, 1.50 µm	CP8973
		VF-1701ms, 30 m x 0.53 mm, 1.00 µm	CP9171
8120	Chlorinated hydrocarbons by Gas Chromatography	DB-5ms, 30 m x 0.32 mm, 0.50 µm	123-5536
		HP-5ms, 30 m x 0.32 mm, 0.50 µm	19091S-113
		DB-1, 30 m x 0.32 mm, 0.50 µm	123-103E
8121	Chlorinated hydrocarbons by GC: capillary column technique	VF-200ms, 30 m x 0.53 mm, 1.00 µm	CP8868
		VF-WAXms, 30 m x 0.53 mm, 1.00 µm	CP9215
		VF-5ms, 30 m x 0.53 mm, 1.50 µm	CP8976
		VF-1701ms, 30 m x 0.53 mm, 1.00 µm	CP9171
		DB-5ms, 30 m x 0.32 mm, 0.50 µm	123-5536
		HP-5ms, 30 m x 0.32 mm, 0.50 µm	19091S-113
		DB-1, 30 m x 0.32 mm, 0.50 µm	123-103E
8131	Aniline and selected derivatives by GC	VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
		CP-Sil 8 CB for Amines, 30 m x 0.25 mm, 0.25 µm	CP7598
8140	Organophosphorus Pesticides by GC-NPD	DB-35ms, 30 m x 0.25 mm, 0.25 µm	122-3832
		DB-5ms, 30 m x 0.25 mm, 0.25 µm	122-5532
8141a	Organophosphorus compounds by gas chromatography: capillary column technique	DB-35ms, 30 m x 0.25 mm, 0.25 µm	122-3832
		DB-5ms, 30 m x 0.25 mm, 0.25 µm	122-5532
8141b	Organophosphorus compounds by GC	VF-200ms, 30 m x 0.53 mm, 1.00 µm	CP8868
		VF-35ms, 30 m x 0.53 mm, 1.00 µm	CP8888
		VF-5ms, 30 m x 0.53 mm, 1.00 µm	CP8975
		VF-1ms, 30 m x 0.53 mm, 1.00 µm	CP8969
8150	Chlorinated herbicides	DB-35ms, 30 m x 0.32 mm, 0.25 µm	123-3832
8151	Chlorinated herbicides by GC using methylation or pentafluorobenzoylation derivatization: capillary column technique	DB-35ms, 30 m x 0.32 mm, 0.25 µm	123-3832
8151b	Chlorinated herbicides by GC using methylation or pentafluorobenzoylation derivatization	VF-5 Pesticides, 30 m x 0.25 mm, 0.25 µm	CP9074
		VF-5ms, 30 m x 0.32 mm, 1.00 µm	CP8957
		VF-35ms, 30 m x 0.25 mm, 0.25 µm	CP8877
		VF-1701 Pesticides, 30 m x 0.25 mm, 0.25 µm	CP9070
		VF-35ms, 30 m x 0.53 mm, 1.00 µm	CP8888
		VF-1701ms, 30 m x 0.53 mm, 1.00 µm	CP9171
8240	Volatile Chlorinated and Aromatic Hydrocarbons	DB-VRX, 20 m x 0.18 mm, 1.00 µm	121-1524
		DB-624, 20 m x 0.18 mm, 1.00 µm	121-1324
		DB-VRX, 60 m x 0.25 mm, 1.40 µm	122-1564
		DB-624, 60 m x 0.25 mm, 1.4 µm	122-1364
		HP-VOC, 60 m x 0.20 mm, 1.10 µm	19091R-306

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EPA Method	Application	Column	Part No.
8260/CLP-VOCs	Volatile Organic Compounds by Gas Chromatography/Mass Spectroscopy (GC/MS): Capillary Column Technique Method	DB-VRX, 60 m x 0.25 mm, 1.40 µm	122-1564
		DB-624, 60 m x 0.25 mm, 1.4 µm	122-1364
		HP-VOC, 60 m x 0.20 mm, 1.10 µm	19091R-306
		DB-VRX, 20 m x 0.18 mm, 1.00 µm	121-1524
		DB-624, 20 m x 0.18 mm, 1.00 µm	121-1324
8260b	Volatile organic compounds by GC/MS	VF-624ms, 75 m x 0.53 mm, 3.00 µm	CP9108
		VF-5ms, 30 m x 0.25 mm, 1.00 µm	CP8946
		VF-624ms, 60 m x 0.32 mm, 1.80 µm	CP9105
8261	Volatile organic compounds by vacuum distillation in combination with GC/MS spectrometry (VD/GC/MS)	VF-624ms, 60 m x 0.53 mm, 3.00 µm	CP9107
		VF-624ms, 60 m x 0.25 mm, 1.40 µm	CP9103
8270	Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	HP-5ms, 30 m x 0.25 mm, 0.50 µm	19091S-133
8270d	Semivolatile organic compounds by GC/MS	VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
		VF-5ms, 30 m x 0.25 mm, 0.50 µm	CP8945
		VF-5ms, 30 m x 0.25 mm, 1.00 µm	CP8946
8275a	Semivolatile organic compounds (PAHs and PCBs) in soils/sludges and solid wastes using thermal extraction/gas chromatography/mass spectrometry (TE/GC/MS)	VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
		VF-5ms, 30 m x 0.25 mm, 0.50 µm	CP8945
		VF-5ms, 30 m x 0.25 mm, 1.00 µm	CP8946
8280b	Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) by high resolution gas chromatography/low resolution mass spectrometry (HRGC/LRMS)	CP-Sil 8 CB, 30 m x 0.25 mm, 0.25 µm	CP8751
8290b	Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) by high resolution gas chromatography/high resolution mass spectrometry (HRGC/HRMS)	CP-Sil 8 CB, 30 m x 0.25 mm, 0.25 µm	CP8751
		CP-Sil 88 for Dioxins, 50 m x 0.25 mm, 0.20 µm	CP7588
8410	Gas chromatography/Fourier transform infrared (GC/FT-IR) spectrometry for semivolatile organics: capillary column	VF-5ms, 30 m x 0.32 mm, 0.25 µm	CP8955
8430	Analysis of bis(2-chloroethyl) ether and hydrolysis products by direct aqueous injection (GC/FT-IR)	VF-WAXms, 30 m x 0.53 mm, 1.00 µm	CP9215

United States Pharmacopoeia (USP) GC Phases

USP	Phase Composition	Agilent Phase Recommendation
G1	Dimethylpolysiloxane oil	HP-1*, DB-1*, HP-1ms*, DB-1ms*, VF-1ms, CP-Sil 5 CB, CP-Sil 5 CB Low Bleed/MS
G2	Dimethylpolysiloxane gum	HP-1*, DB-1*, HP-1ms*, DB-1ms*, VF-1ms, CP-Sil 5 CB, CP-Sil 5 CB Low Bleed/MS, CP-SimDist
G3	50% Phenyl 50% methylpolysiloxane	DB-17*, HP-50+*, VF-17ms, CP-Sil 24 CB, CP-Sil 24 CB Low Bleed/MS
G5	3-cyanopropyl polysiloxane	DB-23, VF-23ms, Select for FAME, CP-Sil 88
G6	Trifluoropropylmethylpolysilicone	DB-200, DB-210, VF-200ms
G7	50% 3-cyanopropyl 50% phenylmethylsilicone	DB-225, DB-225ms, CP-Sil 43 CB
G8	80% Bis(3-cyanopropyl) 20% 3-cyanopropylphenylpolysiloxane or 90% 3-cyanopropyl 10% phenylmethylsiloxane	HP-88, VF-23ms
G14	Polyethylene glycol (average molecular weight of 950-1,050)	DB-WAX, VF-WAXms, CP-Wax 52 CB
G15	Polyethylene glycol (average molecular weight of 3,000-3,700)	DB-WAX, VF-WAXms, CP-Wax 52 CB
G16	Polyethylene glycol (average molecular weight of 15,000)	DB-WAX*, VF-WAXms, CP-Wax 52 CB
G17	75% Phenyl 25% methylpolysiloxane	DB-17, HP-50+, VF-17ms, CP-Sil 24 CB, CP-Sil 24 CB Low Bleed/MS
G19	25% Phenyl 25% cyanopropylmethylsilicone	DB-225*, DB-225ms, CP-Sil 43 CB
G20	Polyethylene glycol (average molecular weight of 380-420)	DB-WAX, VF-WAXms, CP-Wax 52 CB
G25	Polyethylene glycol TPA (Carbowax 20M terephthalic acid)	DB-FFAP*, HP-FFAP*, CP-Wax 58 (FFAP) CB, CP-FFAP CB
G27	5% Phenyl 95% methylpolysiloxane	DB-5*, HP-5*, HP-5ms*, DB-5ms, VF-5ms, VF-5ht, CP-Sil 8 CB, CP-Sil 8 CB Low Bleed/MS
G28	25% Phenyl 75% methylpolysiloxane	DB-35, HP-35, DB-35ms, VF-35ms
G32	20% Phenylmethyl 80% dimethylpolysiloxane	DB-35, HP-35, DB-35ms, VF-35ms
G35	Polyethylene glycol & diepoxide esterified with nitroterephthalic acid	DB-FFAP*, HP-FFAP*, CP-Wax 58 (FFAP) CB, CP-FFAP CB
G36	1% Vinyl 5% phenylmethylpolysiloxane	DB-5, HP-5, HP-5ms, DB-5ms, VF-5ms, VF-5ht, CP-Sil 8 CB, CP-Sil 8 CB Low Bleed/MS
G38	Phase G1 plus a tailing inhibitor	DB-1, HP-1, HP-1ms, DB-1ms, VF-1ms, CP-Sil 5 CB, CP-Sil 5 CB Low Bleed/MS
G39	Polyethylene glycol (average molecular weight of 1,500)	DB-WAX, VF-WAXms, CP-Wax 52 CB
G41	Phenylmethyldimethylsilicone (10% phenyl substituted)	DB-5, HP-5, HP-5ms, DB-5ms, VF-5ms, VF-5ht, CP-Sil 8 CB, CP-Sil 8 CB Low Bleed/MS
G42	35% Phenyl 65% dimethylvinylsiloxane	DB-35*, HP-35*, DB-35ms, VF-35ms
G43	6% Cyanopropylphenyl 94% dimethylpolysiloxane	DB-624*, DB-1301, VF-624ms, VF-1301ms, CP-1301, CP-Select 624 CB
G45	Divinylbenzene-ethylene glycol-dimethacrylate	HP-PLOT U*, CP-PoraBOND U, CP-PoraPLOT U
G46	14% Cyanopropylphenyl 86% methylpolysiloxane	DB-1701*, VF-1701ms, CP-Sil 19 CB, CP-Sil 19 CB Low Bleed/MS

*Indicates an exact equivalent

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ASTM Methods

Method	Title	Recommended Agilent Column	Part No.
D 1945	Standard Test Method for the Analysis of Natural Gas by GC	HP PLOT, 15 m x 0.53 mm, 50 µm	19095P-MS9
		HP PLOT Q, 15 m x 0.53 mm, 40 µm	19095P-Q03
		CP-Molsieve 5Å, 10 m x 0.53 mm, 50.00 µm	CP7537
		CP-PoraPLOT Q-HT, 10 m x 0.53 mm, 20.00 µm	CP7558
D 1946	Standard Test Method for the Analysis of Reformed Gas by GC	HP PLOT, 15 m x 0.53 mm, 50 µm	19095P-MS9
		HP PLOT Q, 15 m x 0.53 mm, 40 µm	19095P-Q03
		CP-Molsieve 5Å, 10 m x 0.53 mm, 50.00 µm	CP7537
		CP-Molsieve 5Å, 25 m x 0.25 mm, 30.00 µm	CP7533
D 1983	Standard Test Method for Fatty Acid Composition by Gas-Liquid Chromatography of Methyl Esters	DB-WAX, 30 m x 0.25 mm, 0.25 µm	122-7032
D 2163	Standard Test Method for the Analysis of Liquified Petroleum (LP) Gases and Propene Concentrates by GC	HP PLOT Al2O3 "KCl", 30 m x 0.53 mm, 15 µm	19095P-K23
		HP PLOT Al2O3 "S", 30 m x 0.53 mm, 15 µm	19095P-S23
D 2195	Standard Test Methods for Pentaerythritol	CP-Sil 5 CB, 30 m x 0.53 mm, 1.50 µm	CP8735
D 2268	Standard Test Method for Analysis of High-Purity n-Heptane and Isooctane by Capillary GC	DB-1, 60 m x 0.25 mm, 0.50 µm	122-106E
D 2306	Standard Test Method for C8 Aromatic Hydrocarbons by GC	HP-INNOWax, 60 m x 0.25 mm, 0.25 µm	19091N-136
D 2360	Standard Test Method for Trace Impurities in Monocyclic Aromatic Hydrocarbons by GC	HP-INNOWax, 60 m x 0.32 mm, 0.25 µm	19091N-116
D 2426	Standard Test Method for Butadiene Dimer and Styrene in Butadiene Concentrates by GC	DB-1, 30 m x 0.53 mm, 5.00 µm	125-1035
		CP-Sil 5 CB, 30 m x 0.53 mm, 1.50 µm	CP8735
D 2427	Standard Test Method for Determination of C2 through C5 Hydrocarbons in Gasoline by GC	DB-1, 30 m x 0.53 mm, 5.00 µm	125-1035
		GS-Alumina, 30 m x 0.53 mm,	115-3532
		CP-Al2O3/KCl, 50 m x 0.53 mm, 10.00 µm	CP7518
D 2245	Standard Test Method for Identification of Oils and Oil Acids in Solvent-Reducible Paints	CP-Sil 88 for FAME, 50 m x 0.25 mm, 0.20 µm	CP7488
D 2504	Standard Test Method for Noncondensable Gases in C2 and Lighter Hydrocarbon Products by GC	HP PLOT, 30 m x 0.53 mm, 50 µm	19095P-MS0
		CP-CarboBOND, 25 m x 0.53 mm, 10.00 µm	CP7374
D 2505	Standard Test Method for Ethylene, Other Hydrocarbons, and Carbon Dioxide in High-Purity Ethylene by GC	GS-GasPro, 60 m x 0.32 mm,	113-4362
D 2580	Standard Test Method for Phenols in Water by Gas-Liquid Chromatography	CP-Sil 8 CB, 25 m x 0.32 mm, 0.40 µm	CP5850
		CP-FFAP CB, 25 m x 0.53 mm, 1.00 µm	CP7486

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ASTM Methods

Method	Title	Recommended Agilent Column	Part No.
D 2593	Standard Test Method for Butadiene Purity and Hydrocarbon Impurities by GC	GS-Alumina, 30 m x 0.53 mm	115-3532
		CP-AI203/KCl, 25 m x 0.32 mm, 5.00 µm	CP7515
		CP-AI203/KCl, 50 m x 0.53 mm, 10.00 µm	CP7518
D 2712	Standard Test Method for Hydrocarbon Traces in Propylene Concentrates by GC	GS-Alumina, 50 m x 0.53 mm	115-3552
D 2743	Standard Practices for Uniformity of Traffic Paint Vehicle Solids by Spectroscopy and Gas Chromatography	CP-Sil 88 for FAME, 50 m x 0.25 mm, 0.20 µm	CP7488
D 2804	Standard Test Method for Purity of Methyl Ethyl Ketone by GC	DB-WAX, 30 m x 0.53 mm, 1.00 µm	125-7032
		DB-210, 15 m x 0.53 mm, 1 µm	125-0212
		CP-WAX 52 CB, 30 m x 0.32 mm, 0.50 µm	CP8763
		CP-WAX 52 CB, 30 m x 0.53 mm, 1.00 µm	CP8738
D 2887	Standard Test Method for Boiling Range Distribution of Petroleum Fractions by GC	DB-2887, 10 m x 0.53 mm, 3.00 µm	125-2814
		CP-SimDist UltiMetal, 5 m x 0.53 mm, 0.88 µm	CP7570
		CP-SimDist UltiMetal, 10 m x 0.53 mm, 2.65 µm	CP7582
		CP-SimDist UltiMetal, 5 m x 0.53 mm, 0.17 µm	CP7532
Extended D 2887	Standard Test Method for Boiling Range Distribution of Petroleum Fractions by GC, to C60	HP-1, 10 m x 0.53 mm, 0.88 µm	19095Z-021
		HP-1, 5 m x 0.53 mm, 0.88 µm	19095Z-020
D 2908	Standard Practice for Measuring Volatile Organic Matter in Water by Aqueous-Injection GC	CP-Select 624 CB, 30 m x 0.32 mm, 1.80 µm	CP7414
		CP-Select 624 CB, 75 m x 0.53 mm, 3.00 µm	CP7417
		CP-WAX 52 CB, 30 m x 0.32 mm, 0.50 µm	CP8763
		CP-WAX 52 CB, 30 m x 0.53 mm, 1.00 µm	CP8738
D 3054	Standard Test Method for Analysis of Cyclohexane by GC	DB-1, 60 m x 0.32 mm, 0.50 µm	123-106E
D 3168	Standard Practice for Qualitative Identification of Polymers in Emulsion Paints	CP-Sil 5 CB, 30 m x 0.32 mm, 1.00 µm	CP8760
		CP-Sil 5 CB, 30 m x 0.53 mm, 1.50 µm	CP8735
D 3257	Standard Test Method for Aromatics in Mineral Spirits by GC	DB-624, 30 m x 0.53 mm, 3.00 µm	125-1334
D 3271	Standard Practice for Direct Injection of Solvent-Reducible Paints into a Gas Chromatograph for Solvent Analysis	CP-PoraPLOT Q, 25 m x 0.53 mm, 20.00 µm	CP7554
		CP-WAX 52 CB, 30 m x 0.53 mm, 1.00 µm	CP8738
D 3328	Standard Test Methods for Comparison of Waterborne Petroleum Oils by Gas Chromatography	CP-Sil 5 CB, 30 m x 0.32 mm, 3.00 µm	CP8687
		CP-Sil 5 CB, 30 m x 0.53 mm, 3.00 µm	CP8677
D 3329	Standard Test Method for Purity of Methyl Isobutyl Ketone by GC	DB-WAX, 30 m x 0.53 mm, 1.00 µm	125-7032
		DB-624, 30 m x 0.45 mm, 2.55 µm	124-1334
		CP-WAX 52 CB, 60 m x 0.53 mm, 1.00 µm	CP8798
D 3432	Standard Test Method for Unreacted Toluene Diisocyanates in Urethane Prepolymers and Coating Solutions by GC	HP-1ms, 30 m x 0.32 mm, 1.00 µm	19091S-713

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ASTM Methods

Method	Title	Recommended Agilent Column	Part No.
D 3447	Standard Test Method for Purity of Halogenated Organic Solvents	DB-624, 30 m x 0.53 mm, 3.00 µm	125-1334
D 3452	Standard Practice for Rubber – Identification by Pyrolysis-Gas Chromatography	CP-Sil 5 CB, 30 m x 0.53 mm, 1.50 µm	CP8735
D 3465	Standard Test Method for Purity of Monomeric Plasticizers by Gas Chromatography	CP-Sil 5 CB, 25 m x 0.32 mm, 0.52 µm	CP8430
		CP-Sil 5 CB, 30 m x 0.53 mm, 1.50 µm	CP8735
D 3524	Standard Test Method for Diesel Fuel Diluent in Used Diesel Engine Oils by Gas Chromatography	CP-SimDist UltiMetal, 10 m x 0.53 mm, 0.53 µm	CP7592
D 3545	Standard Test Method for Alcohol Content and Purity of Acetate Esters by GC	DB-624, 30 m x 0.53 mm, 3.00 µm	125-1334
D 3606	Standard Test Method for Determination of Benzene and Toluene in Finished Motor and Aviation Gasoline by Gas Chromatography	VF-1ms, 15 m x 0.25 mm, 0.10 µm	CP8906
		CP-TCEP for Alcohols in Gasoline, 50 m x 0.25 mm, 0.40 µm	CP7525
D 3687	Standard Test Method for Analysis of Organic Vapors Collected by the Activated Charcoal Tube Adsorption Method	DB-WAX, 30 m x 0.53 mm, 1.00 µm	125-7032
		DB-WAX, 30 m x 0.45 mm, 0.85 µm	124-7032
		CP-WAX 52 CB, 30 m x 0.32 mm, 0.50 µm	CP8763
		CP-WAX 52 CB, 30 m x 0.53 mm, 1.00 µm	CP8738
D 3695	Standard Test Method for Volatile Alcohols in Water by Direct Aqueous-Injection GC	DB-WAX, 30 m x 0.53 mm, 1.00 µm	125-7032
		CP-SimDist UltiMetal, 10 m x 0.53 mm, 0.53 µm	CP7592
D 3710	Standard Test Method for Boiling Range Distribution of Gasoline and Gasoline Fractions by GC	DB-2887, 10 m x 0.53 mm, 3.00 µm	125-2814
D 3749	Standard Test Method for Residual Vinyl Chloride Monomer in Poly(Vinyl Chloride) Resins by Gas Chromatographic Headspace Technique	CP-PoraBOND Q, 10 m x 0.32 mm, 5.00 µm	CP7350
		CP-PoraBOND Q, 10 m x 0.53 mm, 10.00 µm	CP7353
D 3760	Standard Test Method for Analysis of Isopropylbenzene (Cumene) by GC	DB-WAX, 60 m x 0.32 mm, 0.25 µm	123-7062
		HP-1, 50 m x 0.32 mm, 0.52 µm	19091Z-115
		CP-Xylenes, 50 m x 0.53 mm,	CP7428
D 3792	Standard Test Method for Water Content of Coatings by Direct Injection Into a Gas Chromatograph	CP-PoraBOND Q, 25 m x 0.32 mm, 5.00 µm	CP7351
		CP-PoraBOND Q, 25 m x 0.53 mm, 10.00 µm	CP7354
D 3797	Standard Test Method for Analysis of o-Xylene by GC	HP-INNOWax, 60 m x 0.32 mm, 0.50 µm	19091N-216
		CP-Xylenes, 50 m x 0.53 mm	CP7428
D 3798	Standard Test Method for Analysis of p-Xylene by GC	HP-INNOWax, 60 m x 0.32 mm, 0.50 µm	19091N-216
		CP-Xylenes, 50 m x 0.53 mm	CP7428
D 3871	Standard Test Method for Purgeable Organic Compounds in Water Using Headspace Sampling	DB-VRX, 75 m x 0.45 mm, 2.55 µm	124-1574
D 3876	Standard Test Method for Methoxyl and Hydroxypropyl Substitution in Cellulose Ether Products by Gas Chromatography	CP-Sil 5 CB, 30 m x 0.32 mm, 1.00 µm	CP8760
		CP-Sil 5 CB, 30 m x 0.53 mm, 1.50 µm	CP8735

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ASTM Methods

Method	Title	Recommended Agilent Column	Part No.
D 3893	Standard Test Method for Purity of Methyl Amyl Ketone and Methyl Isoamyl Ketone by GC	DB-VRX, 30 m x 0.45 mm, 2.55 µm	124-1534
D 3973	Standard Test Method for Low-Molecular Weight Halogenated Hydrocarbons in Water	DB-VRX, 30 m x 0.45 mm, 2.55 µm	124-1534
D 4059	Standard Test Method for Analysis of Polychlorinated Biphenyls in Insulating Liquids by Gas Chromatography	CP-Sil 8 CB for PCB, 50 m x 0.25 mm, 0.25 µm	CP7482
D 4275	Standard Test Method for Determination of Butylated Hydroxy Toluene (BHT) in Polymers of Ethylene and Ethylene – Vinyl Acetate (EVA) Copolymers By Gas Chromatography	CP-Sil 5 CB, 30 m x 0.32 mm, 3.00 µm	CP8687
		CP-Sil 5 CB, 30 m x 0.53 mm, 3.00 µm	CP8677
D 4322	Standard Test Method for Residual Acrylonitrile Monomer Styrene-Acrylonitrile Copolymers and Nitrile Rubber by Headspace Gas Chromatography	CP-PoraBOND Q, 25 m x 0.53 mm, 10.00 µm	CP7354
D 4367	Standard Test Method for Benzene in Hydrocarbon Solvents by Gas Chromatography	VF-1ms, 15 m x 0.25 mm, 0.10 µm	CP8906
		CP-TCEP for Alcohols in Gasoline, 50 m x 0.25 mm, 0.40 µm	CP7525
D 4415	Standard Test Method for Determination of Dimer in Acrylic Acid	DB-FFAP, 30 m x 0.32 mm, 0.25 µm	123-3232
D 4424	Standard Test Method for Butylene Analysis by GC	HP PLOT Al ₂ O ₃ S, 50 m x 0.53 mm, 15 µm	19095P-S25
		CP-Al2O3/Na2SO4, 25 m x 0.53 mm, 10.00 µm	CP7567
D 4443	Standard Test Method for Residual Vinyl Chloride Monomer Content in PPB Range in Vinyl Chloride Homo- and Co-Polymers by Headspace GC	DB-VRX, 30 m x 0.45 mm, 2.55 µm	124-1534
D 4492	Standard Test Method for Analysis of Benzene by Gas Chromatography	CP-TCEP for Alcohols in Gasoline, 50 m x 0.25 mm, 0.40 µm	CP7525
D 4509	Standard Test Methods for Determining the 24-Hour Gas (AIR) Space Acetaldehyde Content of Freshly Blown PET Bottles	CP-PoraBOND Q, 25 m x 0.32 mm, 5.00 µm	CP7351
		CP-PoraBOND Q, 25 m x 0.53 mm, 10.00 µm	CP7354
D 4534	Test Method for Benzene Content of Cyclic Products by Gas Chromatography	CP-TCEP for Alcohols in Gasoline, 50 m x 0.25 mm, 0.40 µm	CP7525
D 4735	Standard Test Method for Determination of Trace Thiophene in Refined Benzene by GC	DB-FFAP, 30 m x 0.45 mm, 0.85 µm	124-3232
		CP-Wax 58 FFAP CB, 25 m x 0.53 mm, 1.00 µm	CP7614
D 4768	Standard Test Method for Analysis of 2,6-Ditertiary-Butyl Para-Cresol and 2,6-Ditertiary- Butyl Phenol in Insulating Liquids by Gas Chromatography	CP-Wax 58 FFAP CB, 25 m x 0.53 mm, 1.00 µm	CP7614
D 4864	Standard Test Method for Determination of Traces of Methanol in Propylene Concentrates by GC	DB-WAX, 30 m x 0.45 mm, 0.85 µm	124-7032

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ASTM Methods

Method	Title	Recommended Agilent Column	Part No.
D 4947	Standard Test Method for Chlordane and Heptachlor Residues in Indoor Air	DB-5, 30 m x 0.53 mm, 1.50 μ m	125-5032
		DB-608, 30 m x 0.53 mm, 0.83 μ m	125-1730
D 4961	Standard Test Method for GC Analysis of Major Organic Impurities in Phenol Produced by the Cumene Process	DB-FFAP, 30 m x 0.45 mm, 0.85 μ m	124-3232
		HP PLOT Q, 15 m x 0.53 mm, 40 μ m	19095P-Q03
D 4983	Standard Test Method for Cyclohexylamine Morpholine and Diethylaminoethanol in Water and Condensed Steam by Direct Aqueous Injection GC	HP-5ms, 30 m x 0.32 mm, 1.00 μ m	19091S-213
		CAM, 30 m x 0.53 mm, 1 μ m	115-2132
D 5008	Standard Test Method for Ethyl Methyl Pentonal Content and Purity Value of 2-Ethylhexanol by GC	HP-1, 15 m x 0.53 mm, 5.00 μ m	19095Z-621
		HP-INNOWax, 30 m x 0.32 mm, 0.25 μ m	19091N-113
D 5060	Standard Test Method for Determining Impurities in High-Purity Ethylbenzene by GC	HP-INNOWax, 60 m x 0.32 mm, 0.50 μ m	19091N-216
		CP-WAX 52 CB, 60 m x 0.32 mm, 0.50 μ m	CP8773
D 5075	Standard Test Method for Nicotine in Indoor Air	DB-5, 30 m x 0.53 mm, 1.50 μ m	125-5032
		DB-5, 30 m x 0.32 mm, 1.00 μ m	123-5033
D 5134	Standard Test Method for Detailed Analysis of Petroleum Naphthas Through n-Nonane by Capillary GC	HP-PONA, 50 m x 0.20 mm, 0.50 μ m	19091S-001
		CP-Sil PONA for ASTM D 5134, 50 m x 0.21 mm, 0.50 μ m	CP7531
D 5135	Standard Test Method for Analysis of Styrene by Capillary GC	HP-INNOWax, 60 m x 0.32 mm, 0.50 μ m	19091N-216
		CP-WAX 52 CB, 60 m x 0.32 mm, 0.50 μ m	CP8773
D 5175	Standard Test Method for Organohalide Pesticides and Polychlorinated Biphenyls in Water by Microextraction and GC	DB-1, 30 m x 0.32 mm, 1.00 μ m	123-1033
		DB-608, 30 m x 0.32 mm, 0.5 μ m	123-1730
		DB-XLB, 30 m x 0.25 mm, 0.25 μ m	122-1232
D 5303	Standard Test Method for Trace Carbonyl Sulfide in Propylene by GC	GS-GasPro, 30 m x 0.32 mm	113-4332
		HP PLOT Q, 30 m x 0.53 mm, 40 μ m	19095P-Q04
D 5307	Standard Test Method for Determination of Boiling Range Distribution of Crude Petroleum by GC	HP-1, 7.5 m x 0.53 mm, 5.00 μ m	19095Z-627
D 5310	Standard Test Method for Tar Acid Composition by Capillary GC	HP-5ms, 30 m x 0.25 mm, 0.25 μ m	19091S-433
		DB-225ms, 30 m x 0.25 mm, 0.25 μ m	122-2932
D 5316	Standard Test Method for 1, 2-Dibromoethane and 1, 2-Dibromo-3-Chloropropane in Water by Microextraction and GC	HP-1ms, 30 m x 0.32 mm, 1.00 μ m	19091S-713
		DB-624, 30 m x 0.45 mm, 2.55 μ m	124-1334
D 5317	Standard Test Method for Determination of Chlorinated Organic Acid Compounds in Water by GC with Electron Capture Detector	HP-5ms, 30 m x 0.25 mm, 0.25 μ m	19091S-433
		DB-1701P, 30 m x 0.25 mm, 0.25 μ m	122-7732
		DB-XLB, 30 m x 0.25 mm, 0.25 μ m	122-1232
		DB-35ms, 30 m x 0.25 mm, 0.25 μ m	122-3832

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ASTM Methods

Method	Title	Recommended Agilent Column	Part No.
D 5320	Standard Test Method for Determination of 1, 1-Trichloroethane and Methylene Chloride in Stabilized Trichloroethylene and Tetrachloroethylene	DB-1, 30 m x 0.53 mm, 3.00 µm	125-1034
		DB-VRX, 30 m x 0.32 mm, 1.80 µm	123-1534
D 5399	Standard Test Method for Boiling Point Distribution of Hydrocarbon Solvents by GC	DB-2887, 10 m x 0.53 mm, 3.00 µm	125-2814
D 5441	Standard Test Method for Analysis of Methyl Tert-Butyl Ether (MTBD) by GC	HP-PONA, 50 m x 0.20 mm, 0.50 µm	19091S-001
		DB-Petro, 100 m x 0.25 mm, 0.50 µm	122-10A6
D 5442	Standard Test Method for Analysis of Petroleum Waxes by GC	DB-1, 25 m x 0.32 mm, 0.25 µm	123-1022
		DB-5, 15 m x 0.25 mm, 0.25 µm	122-5012
D 5475	Standard Test Method for Nitrogen- and Phosphorus-Containing Pesticides in Water by GC with a Nitrogen Phosphorus Detector	HP-5ms, 30 m x 0.25 mm, 0.25 µm	19091S-433
		DB-1701P, 30 m x 0.25 mm, 0.25 µm	122-7732
		DB-XLB, 30 m x 0.25 mm, 0.25 µm	122-1232
		DB-35ms, 30 m x 0.25 mm, 0.25 µm	122-3832
D 5480	Standard Test Method for Engine Oil Volatility by GC	DB-PS1, 15 m x 0.53 mm, 0.15 µm	145-1011
D 5501	Standard Test Method for Determination of Ethanol Content of Denatured Fuel Ethanol by GC	HP-1, 100 m x 0.25 mm, 0.50 µm	19091Z-530
D 5504	Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence	CP-Sil 5 CB for Sulfur, 30 m x 0.32 mm, 4.00 µm	CP7529
D 5507	Standard Test Method for Determination of Trace Organic Impurities in Monomer Grade Vinyl Chloride by Capillary Column/Multi-dimensional GC	HP PLOT Q, 15 m x 0.53 mm, 40 µm	19095P-Q03
		HP PLOT U, 30 m x 0.53 mm, 20 µm	19095P-U04
D 5508	Standard Test Method for Determination of Residual Acrylonitrile Monomer in Styrene-Acrylonitrile Co-polymer Resins and Nitrile-Butadiene Rubber by Headspace Capillary GC	HP PLOT Q, 30 m x 0.53 mm, 40 µm	19095P-Q04
D 5580	Standard Test Method for Determination of Benzene, Toluene, Ethylbenzene, p/m-Xylene, C9 and Heavier Aromatics, and Total Aromatics in Finished Gasoline by GC	DB-1, 30 m x 0.53 mm, 5.00 µm	125-1035
		CP-TCEP for Alcohols in Gasoline, 50 m x 0.25 mm, 0.40 µm	CP7525
		CP-Sil 5 CB, 30 m x 0.53 mm, 5.00 µm	CP8775
		VF-1ms, 15 m x 0.25 mm, 0.10 µm	CP8906
D 5599	Standard Test Method for Determination of Oxygenates in Gasoline by GC and Oxygen Selective Flame Ionization Detection	DB-5, 30 m x 0.25 mm, 0.25 µm	122-5032

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ASTM Methods

Method	Title	Recommended Agilent Column	Part No.
D 5623	Standard Test Method for Sulfur Compounds in Light Petroleum Liquids by GC and Sulfur Selective Detection	HP-1, 30 m x 0.32 mm, 4.00 μ m	19091Z-613
D 5713	Standard Test Method for Analysis of High Purity Benzene for Cyclohexane Feedstock by Capillary GC	DB-Petro, 50 m x 0.20 mm, 0.5 μ m	122-10A6E
D 5739	Standard Practice for Oil Spill Source Identification by GC and Positive Ion Electron Impact Low Resolution Mass Spectrometry	DB-5, 30 m x 0.25 mm, 0.25 μ m	122-5032
		DB-TPH, 30 m x 0.32 mm, 0.25 μ m	123-1632
D 5769	Standard Test Method for Determination of Benzene, Toluene, and Total Aromatics in Finished Gasoline by GC/MS	HP-1, 60 m x 0.25 mm, 1.00 μ m	19091Z-236
D 5790	Standard Test Method for Measurement of Purgeable Organic Compounds in Water by Capillary Column GC/MS	DB-VRX, 60 m x 0.25 mm, 1.40 μ m	122-1564
		DB-VRX, 20 m x 0.18 mm, 1.00 μ m	121-1524
		DB-624, 60 m x 0.25 mm, 1.4 μ m	122-1364
		DB-624, 20 m x 0.18 mm, 1.00 μ m	121-1324
D 5812	Standard Test Method for Determination of Organochlorine Pesticides in Water by Capillary Column GC	HP-5MS, 30 m x 0.25 mm, 0.25 μ m	19091S-433
		DB-1701P, 30 m x 0.25 mm, 0.25 μ m	122-7732
		DB-XLB, 30 m x 0.25 mm, 0.25 μ m	122-1232
		DB-35ms, 30 m x 0.25 mm, 0.25 μ m	122-3832
D 5917	Standard Test Method for Trace Impurities in Monocyclic Aromatic Hydrocarbons by GC and External Calibration	HP-INNOWax, 60 m x 0.32 mm, 0.25 μ m	19091N-116
D 5974	Standard Test Method for Fatty and Rosin Acids in Tall Oil Fraction Products by Capillary GC	DB-23, 60 m x 0.25 mm, 0.25 μ m	122-2362
D 5986	Standard Test Method for Determination of Oxygenates, Benzene, Toluene, C8-C12 Aromatics and Total Aromatics in Finished Gasoline by GC/FTIR	HP-1, 60 m x 0.53 mm, 5.00 μ m	19095Z-626
D 6144	Standard Test Method for Trace Impurities in Alpha-Methylstyrene by Capillary GC	HP-1, 60 m x 0.25 mm, 1.00 μ m	19091Z-236
D 6159	Standard Test Method for Determination of Hydrocarbon Impurities in Ethylene by GC	HP PLOT Al2O3 "KCl", 50 m x 0.53 mm, 15 μ m	19095P-K25
		GS-Alumina, 50 m x 0.53 mm	115-3552
		DB-1, 30 m x 0.53 mm, 5.00 μ m	125-1035
D 6160	Standard Test Method for Determination of PCBs in Waste Materials by GC	HP-5MS, 30 m x 0.32 mm, 0.25 μ m	19091S-413
		DB-XLB, 30 m x 0.25 mm, 0.25 μ m	122-1232
D 6352	Standard Test Method for Boiling Range Distribution of Petroleum Distillates in Boiling Range from 174 to 700 by GC	DB-HT SimDis, 5 m x 0.53 mm, 0.15 μ m	145-1001

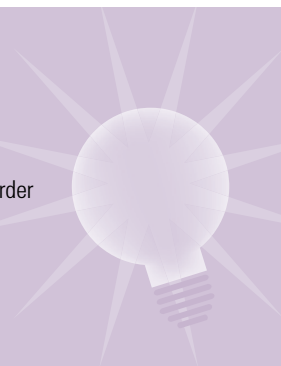
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ASTM Methods

Method	Title	Recommended Agilent Column	Part No.
D 6387	Standard Test Methods for Composition of Turpentine and Related Terpene Products by Capillary Gas Chromatography	CP-WAX 52 CB, 30 m x 0.32 mm, 0.50 µm	CP8763
		CP-WAX 52 CB, 30 m x 0.53 mm, 1.00 µm	CP8738
D 6417	Standard Test Method for Estimation of Engine Oil Volatility by Capillary GC	DB-HT SimDis, 5 m x 0.53 mm, 0.15 µm	145-1001
D 6584	Standard Test Method for Determination of Total Monoglyceride, Total Diglyceride, Total Triglyceride, and Free and Total Glycerin in B-100 Biodiesel Methyl Esters by Gas Chromatography	Select Biodiesel, 15 m x 0.32 mm, 0.10 µm	CP9078
D 6806	Standard Practice for Analysis of Halogenated Organic Solvents and Their Admixtures by Gas Chromatography	CP-Sil 5 CB, 50 m x 0.53 mm, 5.00 µm	CP7685
E 1616	Standard Test Method for Analysis of Acetic Anhydride Using GC	HP-1, 50 m x 0.32 mm, 0.52 µm	19091Z-115
E 1863	Standard Test Method for Analysis of Acrylonitrile by GC	DB-WAXetr, 60 m x 0.32 mm, 1.00 µm	123-7364
E 0202	Standard Test Method for Analysis of Ethylene Glycols and Propylene Glycols	DB-624, 30 m x 0.53 mm, 3.00 µm	125-1334
		CP-Wax 57 CB for Glycols and Alcohols, 50 m x 0.25 mm, 0.25 µm	CP7615
E 0475	Standard Test Method for Assay of Di-tert-Butyl Peroxide Using GC	HP-5, 30 m x 0.53 mm, 5.00 µm	19095J-623

Tips & Tools

GC Method Translation Software allows you to port a current GC method to another while ensuring that relative retention order is maintained so peaks elute in the same order. Download at www.agilent.com/chem/gcmethodtranslation





GC Column Troubleshooting and Maintenance

These at-a-glance troubleshooting tables will help you pinpoint and fix the most common GC column problems.

Please consult *Agilent's J&W GC Column Installation Guide* (publication number 830-0120) and the *Agilent J&W GC Column Selection Guide* (publication number 5989-6159EN) for more in-depth information, including:

- Comprehensive column selection principles
- Maintenance procedures, including column installation, conditioning, testing, and storage
- Strategies for increasing your productivity
- The most current method development procedures



To request your copy of the *Agilent J&W GC Column Selection Guide*, visit **www.agilent.com/chem/guides**

The Agilent J&W GC Column Installation Guide comes standard with every Agilent J&W GC column. You can also request a copy by contacting your local Agilent Representative or Agilent Authorized Distributor.

Excessive Baseline Noise

Possible Cause	Solution	Comments
Injector contamination	Clean the injector; replace liner, gold seal	Try a condensation test; gas lines may also need cleaning
Column contamination	Bake-out the column	Limit the bake-out to 1-2 hours
	Solvent rinse the column	Only for bonded and cross-linked phases
		Check for inlet contamination
Detector contamination	Clean the detector	Usually the noise increases over time and not suddenly
Contaminated or low quality gases	Use better grade gases; also check for expired gas traps or leaks	Usually occurs after changing a gas cylinder
Column inserted too far into the detector	Reinstall the column	Consult GC manual for proper insertion distance
Incorrect detector gas flow rates	Adjust the flow rates to the recommended values	Consult GC manual for proper flow rates
Leak when using an MS, ECD, or TCD	Find and eliminate the leak	Usually at the column fittings or injector
Old detector filament, lamp or electron multiplier	Replace appropriate part	
Septum degradation	Replace septum	For high temperature applications use an appropriate septum

Baseline Instability or Disturbances

Possible Cause	Solution	Comments
Injector contamination	Clean the injector	Try a condensation test; gas lines may also need cleaning
Unequilibrated detector	Allow the detector to stabilize	Some detectors may require up to 24 hours to fully stabilize
Incompletely conditioned column	Fully condition the column	More critical for trace level analyses
Change in carrier gas flow rate during the temperature program	Normal in many cases	MS, TCD and ECD respond to changes in carrier gas flow rate
Column contamination	Trim the column	Remove 0.5-1 m from the front of the column
	Solvent rinse the column	Only for bonded and cross-linked phases Check for inlet contamination
Column activity	Irreversible. Replace the column	Only affects active compounds
Solvent-phase polarity mismatch	Change sample solvent to a single solvent	More tailing for the early eluting peaks or those closest to the solvent front
	Use a retention gap	3-5 m retention gap is sufficient
Solvent effect violation for splitless or on-column injections	Decrease the initial column temperature	Peak tailing decreases with retention
Too low of a split ratio	Increase the split ratio	Flow from split vent should be 20 mL/min or higher
Poor column installation	Reinstall the column	More tailing for early eluting peaks
Some active compounds always tail	None	Most common for amines and carboxylic acids

Split Peaks

Possible Cause	Solution	Comments
Injection technique	Change technique	Usually related to erratic plunger depression or having sample in the syringe needle. Use an auto injector.
Mixed sample solvent	Change sample solvent to a single solvent	Worse for solvents with large differences in polarity or boiling points
Poor column installation	Reinstall the column	Usually a large error in the insertion distance
Sample degradation in the injector	Reduce the injector temperature	Peak broadening or tailing may occur if the temperature is too low
	Change to an on-column injection	Requires an on-column injector
Poor sample focusing	Use a retention gap	For splitless and on-column injection

Retention Time Shift

Possible Cause	Solution	Comments
Change in carrier gas velocity	Check the carrier gas velocity	All peaks will shift in the same direction by approximately the same amount
Change in column temperature	Check the column temperature	Not all peaks will shift by the same amount
Change in column dimension	Verify column identity	
Large change in compound concentration	Try a different sample concentration	May also affect adjacent peaks. Sample overloading is corrected with an increase in split ratio or sample dilution.
Leak in the injector	Leak check the injector	A change in peak size usually occurs
Blockage in a gas line	Clean or replace the plugged line	More common for the split line; also check flow controllers and solenoids
Septum leak	Replace septum	Check for needle barb
Sample solvent incompatibility	Change sample solvent to a single solvent Use a retention gap	For splitless injection

Change in Peak Size

Possible Cause	Solution	Comments
Change in detector response	Check gas flows, temperatures and settings	All peaks may not be equally affected
	Check background level or noise	May be caused by system contamination and not the detector
Change in the split ratio	Check split ratio	All peaks may not be equally affected
Change in the purge activation time	Check the purge activation line	For splitless injection
Change in injection volume	Check the injection technique	Injection volumes are not linear
Change in sample concentration	Check and verify sample concentration	Changes may also be caused by degradation, evaporation, or variances in sample temperature or pH
Leak in the syringe	Use a different syringe	Sample leaks past the plunger or around the needle; leaks are not often readily visible
Column contamination	Trim the column	Remove 0.5-1 m from the front of the column
	Solvent rinse the column	Only for bonded and cross-linked phases
Column activity	Irreversible	Only affects active compounds
Coelution	Change column temperature or stationary phase	Decrease column temperature and check for the appearance of a peak shoulder or tail
Change in injector discrimination	Maintain the same injector parameters	Most severe for split injections
Sample flashback	Inject less, use a larger liner, reduce the inlet temperature	Less solvent and higher flow rates are most helpful
Decomposition from inlet contamination	Clean the injector; replace liner, gold seal	Only use deactivated liners and glass wool in the inlet

Loss of Resolution

Possible Cause	Solution	Comments
Decrease in separation		
Different column temperature	Check the column temperature	Differences in other peaks will be visible
Different column dimensions or phase	Verify column identity	Differences in other peaks will be visible
Coelution with another peak	Change column temperature	Decrease column temperature and check for the appearance of a peak shoulder or tail
Increase in peak width		
Change in carrier gas velocity	Check the carrier gas velocity	A change in the retention time also occurs
Column contamination	Trim the column	Remove 0.5-1 m from the front of the column
	Solvent rinse the column	Only for bonded and cross-linked phases
Change in the injector	Check the injector settings	Typical areas: split ratio, liner, temperature, injection volume
Change in sample concentration	Try a different sample concentration	Peak widths increase at higher concentrations
Improper solvent effect, lack of focusing	Lower oven temperature, better solvent, sample phase polarity match, use a retention gap	For splitless injection

Tips & Tools

Watch Agilent's in-depth video series cover common chromatographic problems, causes, and corresponding solutions presented by two of Agilent's seasoned GC experts at www.agilent.com/chem/gctroubleshooting

