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 • Faster column exchange	• Minimized conditioning time • 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

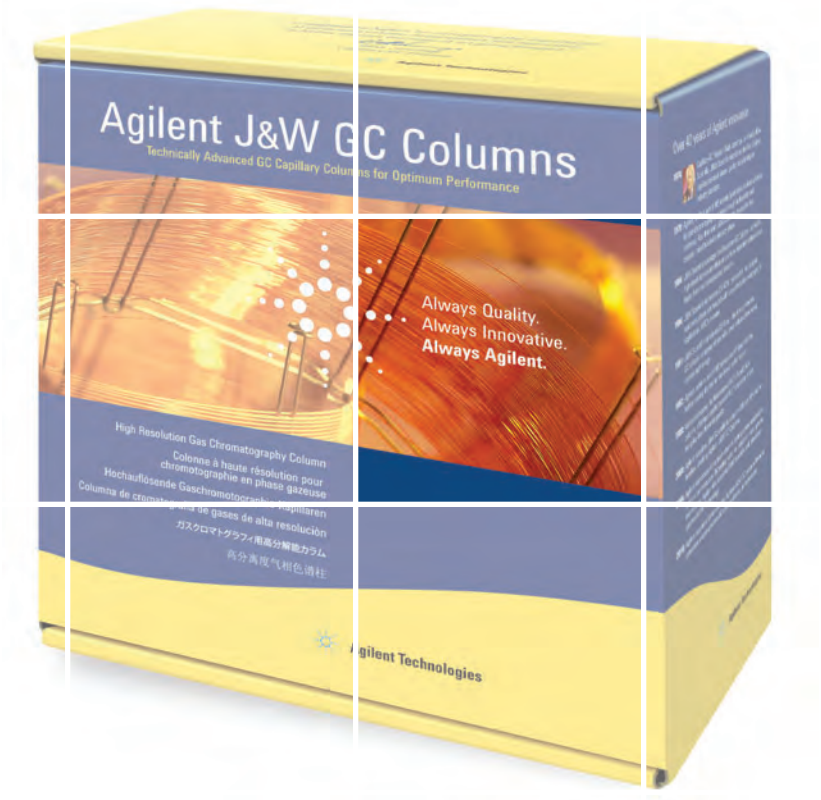
High efficiency, high throughput, and high resolution without the high costs

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.

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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
Food, Flavors and Fragrances	
Lavender Oil Characterization	Page 622

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	30	0.25	5	CP9010
			0.25	10	CP9011
VF-5ms	0.25	15	0.25	5	CP9021
		30	0.25	5	CP9012
			0.25	10	CP9013
			0.50	5	CP9014
			0.50	10	CP9015
		60	0.25	5	CP9016
	0.53	30	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

Tips & Tools

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

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Low-bleed GC/MS Columns

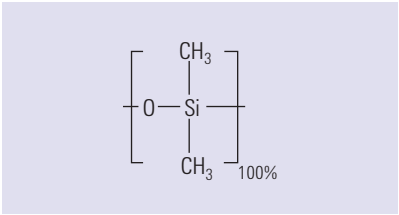
There is a rapidly increasing population of benchtop GC/MS instruments in analytical laboratories that analyze a widening range of trace level, higher temperature samples. These samples require increasingly inert, lower bleed, higher temperature columns. In response to this growing need, Agilent Technologies 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

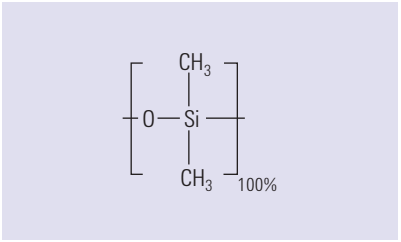
DB-1ms Chromatograms

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

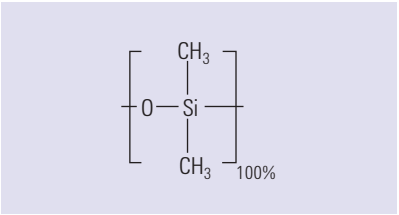
HP-1ms Chromatograms

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	
	60	0.25	-60 to 325/350	19091S-936	19091S-936E		
0.32	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

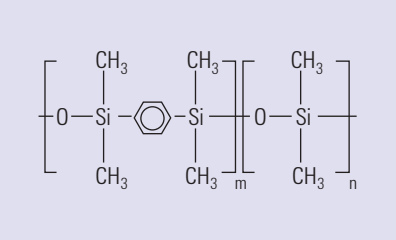
VF-1ms

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

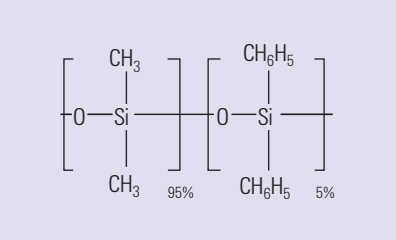
DB-5ms

- 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

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	-60 to 325/350	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

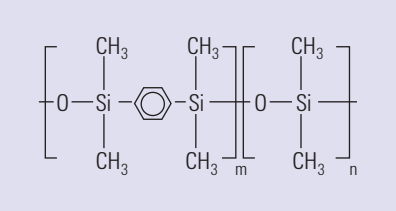
HP-5ms

- (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

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

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

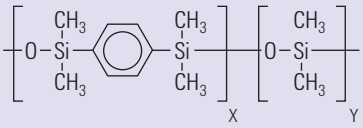
Note: "DB-XLB is designed for inhibiting column bleed at high temperatures. It also appears to have inadvertently inherited an exceptional ability for separating many PCB congeners when used with MS detection. This stellar performance was maximized after careful optimization of the column dimensions, temperature programs, and carrier gas flow conditions."

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

DB-XLB Chromatograms

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.

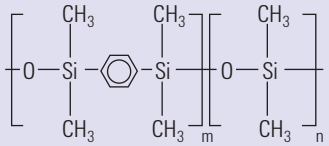
VF-Xms Chromatograms

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	CP8806I5
		0.50	30 to 340/360	CP8807	
		1.00	30 to 340/360	CP8808	
	60	0.25	30 to 340/360	CP8809	
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
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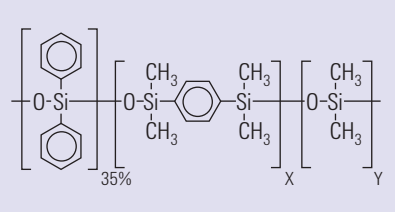
DB-35ms

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.

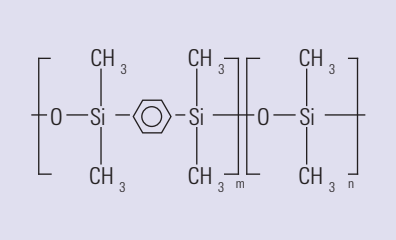
VF-35ms Chromatograms

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

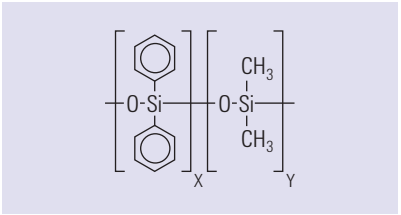
DB-17ms

- 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
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.

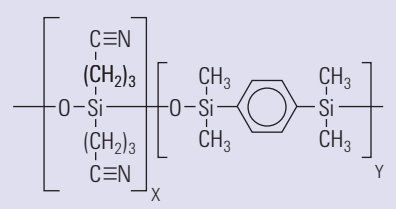
VF-17ms Chromatograms

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.

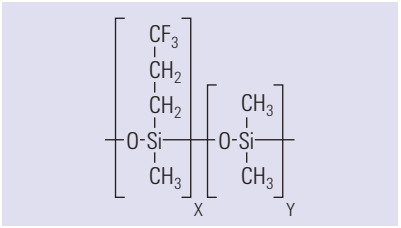
VF-23ms Chromatograms

Food, Flavors and Fragrances

Fast screening of FAME isomers in butter Page 639

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	CP8820I5
	30	0.15	40 to 260/260	CP8821	CP8821I5
		0.25	40 to 260/260	CP8822	CP8822I5
	60	0.15	40 to 260/260	CP8823	
		0.25	40 to 260/260	CP8824	CP8824I5
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	
	60	0.15	40 to 260/260	CP8828	
		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	
	20	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	
	30	0.50	0 to 300/325	CP8867	
		1.00	0 to 300/325	CP8868	CP8868I5

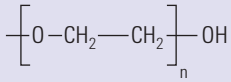
DB-225ms

- 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

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.

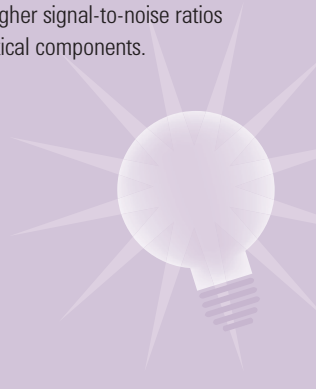
VF-WAXms Chromatograms

Food, Flavors and Fragrances

Acids Page 631

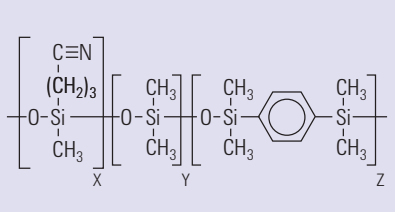
Tips & Tools

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

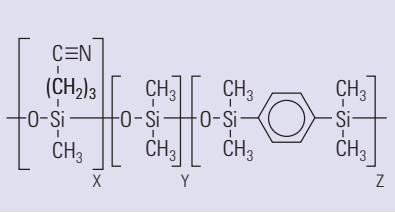
FactorFour cyano columns eliminate unstable baselines Page 610

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	
	60	0.25	-40 to 280/300	CP9055	
		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.

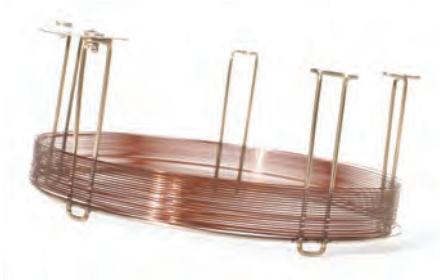
VF-1701ms Chromatograms

Environmental

Analysis of pesticides using EPA 8081 with ECD Page 576

VF-1701ms

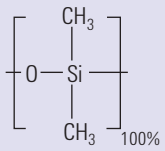
ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
0.10	10	0.20	-20 to 280/300	CP9140	
		0.40	-20 to 280/300	CP9141	
	20	0.10	-20 to 280/300	CP9142	
0.15	15	0.10	-20 to 280/300	CP9175	
		0.15	-20 to 280/300	CP9143	
		0.60	-20 to 280/300	CP9144	
	20	0.15	-20 to 280/300	CP9145	
		0.60	-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

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

(Continued)

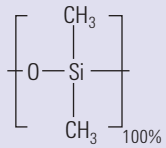
DB-1

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	0.10	-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
		5.00	-60 to 260/280	125-1015		125-1015LTM
	25	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

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

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

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		

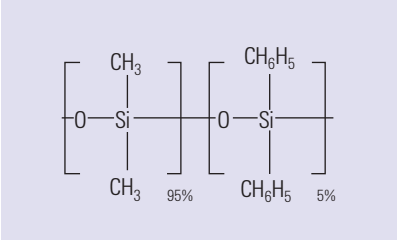
Ultra 2

- (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

Ultra 2

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	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

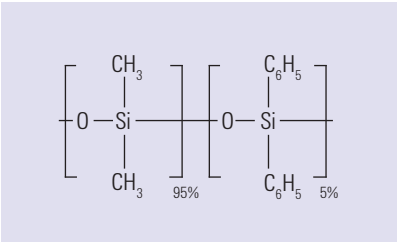
DB-5

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	0.10	-60 to 325/350	123-5011		123-5011LTM
		0.25	-60 to 325/350	123-5012	123-5012E	123-5012LTM
		1.00	-60 to 325/350	123-5013	123-5013E	123-5013LTM
	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	0.25	-60 to 300/320	125-501K		125-501KLTM
		0.50	-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 Page 596

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	CP7319I5
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	CP7451I5
		0.40	-60 to 325/350	CP7759	
		1.20	-60 to 325/350	CP7671	
	30	0.25	-60 to 330/350	CP8751	CP8751I5
		1.00	-60 to 325/350	CP8771	CP8771I5
	50	0.12	-60 to 330/350	CP7721	
		0.25	-60 to 330/350	CP7453	CP7453I5
		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

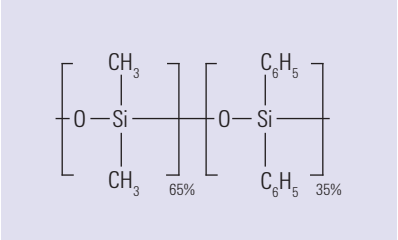
CP-Sil 13 CB

- 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
	50	0.20	-25 to 300/330	CP7907	
		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

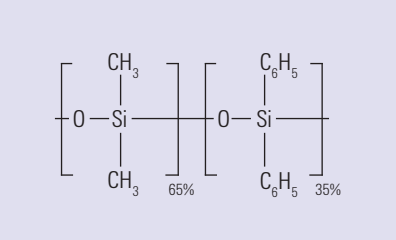
- (35%-Phenyl)-methylpolysiloxane
- Mid-polarity – slightly more polar than HP-35
- Low bleed
- Inert to active solutes
- Ideal for confirmational analyses
- Bonded and cross-linked
- Solvent rinsable
- Equivalent to USP Phase G42

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

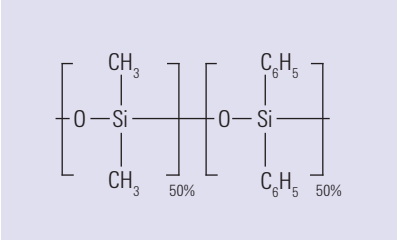
HP-35 Chromatograms

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

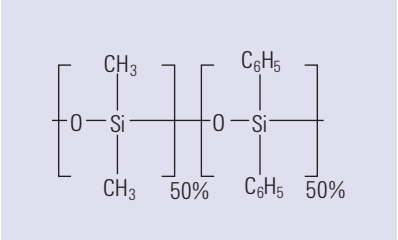
DB-17

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	0.10	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	0.25	40 to 280/300	122-1762		

(Continued)

DB-17

ID (mm)	Length (m)	Film (µm)	Temp Limits (°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 confirmational 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

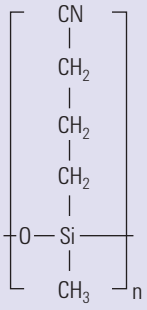
CP-Sil 24 CB is a medium polarity, 50% phenyl/50% dimethylpolysiloxane phase with no cyano groups, making it ideal for use with ECD. The CP-Sil 24 CB column produces perfect peak shapes for amines as shown by the Grob test mixture. It is especially suitable for the analysis of drugs and pesticides and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

CP-Sil 24 CB Chromatograms

Environmental

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

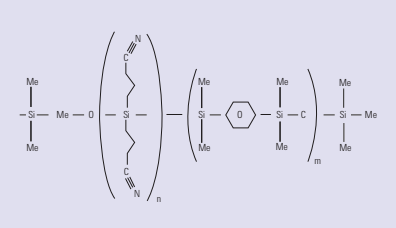
- (50%-Cyanopropyl)-methylpolysiloxane
- High polarity
- Designed for separation of fatty acid methyl esters (FAMEs)
- Excellent resolution for cis- and trans-isomers
- Bonded and cross-linked
- Solvent rinsable
- Replaces HP-23
- Close equivalent to USP Phase G5

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
	30	0.15	40 to 250/260	122-2331		122-2331LTM
		0.25	40 to 250/260	122-2332	122-2332E	122-2332LTM
	60	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

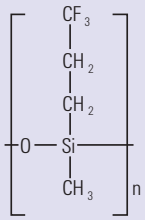
CP-Sil 88

- 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

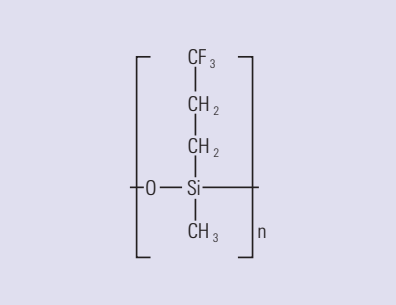
- (35% Trifluoropropyl)-methylpolysiloxane
- 300/320°C temperature limit
- Mid-polarity – more polar than DB-1701 or DB-17
- Ideal for difficult-to-separate positional isomers
- Unique interactions with compounds containing nitro, halogen and carbonyl groups
- Low ECD bleed
- Unique selectivity
- Close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

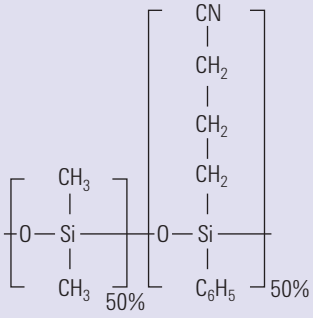
DB-210 Chromatograms

Environmental

Herbicides II Page 586

DB-210

ID (mm)	Length (m)	Film (µm)	Temp Limits (°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

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
	30	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	15	1.00	40 to 200/220	125-2212		125-2212LTM
	30	0.50	40 to 200/220	125-2237		125-2237LTM
		1.00	40 to 200/220	125-2232		125-2232LTM

Tips & Tools

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

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
0.53	30	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

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.

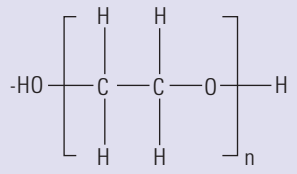
CP-Sil 19 CB

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
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Formaldehyde Underivatized	Page 649
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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		
		1.00	30 to 250/260	123-7364		
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
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Free Organic Acids/C4-C5 Isomers	Page 644
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Impurities in Ethylbenzene	Page 652
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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

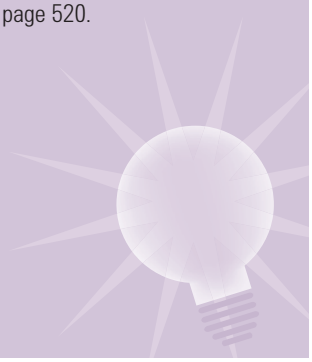
ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage	7890/6890 LTM Module	5975T LTM Toroid
0.10	10	0.10	40 to 250	127-3212		127-3212LTM	
	15	0.10	40 to 250	127-32H2		127-32H2LTM	
0.25	15	0.25	40 to 250	122-3212		122-3212LTM	222-3212LTM
	30	0.25	40 to 250	122-3232	122-3232E	122-3232LTM	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
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	
	25	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	Page 662

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 C_1 to C_3 isomers and alkanes to C_{12}, CO_2, 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

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-QO3		19091P-QO3LTM
	30	20.00	-60 to 270/290	19091P-QO4	19091P-QO4E	19091P-QO4LTM
0.53	15	40.00	-60 to 270/290	19095P-QO3	19095P-QO3E	19095P-QO3LTM
	30	40.00	-60 to 270/290	19095P-QO4	19095P-QO4E	19095P-QO4LTM

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 C_1 to C_7 hydrocarbons, CO_2, 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-UO4	19091P-UO4E	19091P-UO4LTM
0.53	15	20	-60 to 190	19095P-UO3		19095P-UO3LTM
	30	20	-60 to 190	19095P-UO4	19095P-UO4E	19095P-UO4LTM

HP-PLOT Al_2O_3 KCl

- Least "polar" Alumina phase
- Aluminum oxide deactivated with KCl
- Standard column choice for light hydrocarbon analysis – C_1 to C_8 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 Al_2O_3 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-Al_2O_3/KCl and CP-Al_2O_3/Na_2SO_4

- 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 C_1 to C_5 hydrocarbons in a main stream of C_1 to C_5 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-Al_2O_3 PLOT column offers increased selectivity and allows all C_1 to C_5 hydrocarbon isomers to be separated. CP-Al_2O_3 operates without the need for sub-ambient cooling and is available in two unique selectivities.

Selectivity Through KCl or Na_2SO_4 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-Al_2O_3 PLOT column will show a particular selectivity. The KCl salt results in a relatively apolar Al_2O_3 surface, while Na_2SO_4 deactivation provides a polar surface. Unsaturated compounds such as ethylene and acetylene (ethyne) are retained longer.

CP-Al_2O_3/Na_2SO_4

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	CP7565I5
0.53	25	10.00	-100 to 200/200	CP7567	
	50	10.00	-100 to 200/200	CP7568	

CP-Al_2O_3/Na_2SO_4 UltiMetal

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

CP-Al_2O_3/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-Al_2O_3/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 Al_2O_3 S

- Middle range of "polarity" for Alumina phases
- Aluminum oxide deactivated with sodium sulfate
- Excellent general use column for light hydrocarbon analysis – C_1 to C_8 hydrocarbon isomers
- Best for resolving acetylene from butane and propylene from isobutane

HP-PLOT Al_2O_3 S Chromatograms

Petroleum	
Ethylene	Page 688
Natural Gas	Page 687

HP-PLOT Al_2O_3 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 – C_1 to C_8 hydrocarbon isomers
- Separates C_1 to C_4 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 CO_2 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 200ºC.

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 Al_2O_3 M

- Most "polar" Alumina phase (similar to GS-Alumina)
- Aluminum oxide deactivated with proprietary deactivation
- Good general use column for light hydrocarbon analysis – C_1 to C_8 hydrocarbon isomers
- Good for resolving acetylene from butane and propylene from isobutane

HP-PLOT Al_2O_3 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 CO_2 on a single column
- Ideal PLOT column for GC/MS – no particles

GS-GasPro Chromatograms	
Environmental	
C1 and C2 Halocarbons (Freons)	Page 614
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 CO_2 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 C_1 to C_4 isomers in the presence of water, with water having no influence on retention times. CP-SilicaPLOT elutes CO_2 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 CO_2 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, CH_4, CO_2, O_2/Ar, N_2, Kr, and hydrocarbons C_2 and C_3 (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 N_2, O_2, CO, CO_2, He, Xe, Ne, CH_4, O_2/Ar, Kr and C_1 to C_2 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 CO_2, 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
- O_2, N_2, CO and CH_4 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/O_2 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 200ºC.

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/O_2 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 Molesieve column Page 616

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/pk 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

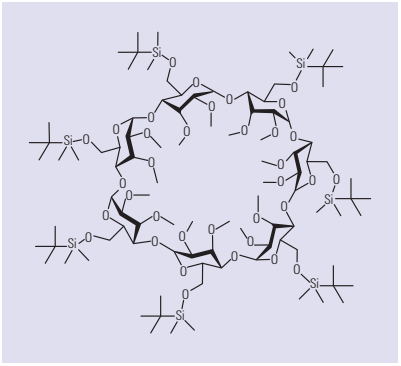
Description	ID (mm)	Length (m)	Film (µm)	7 in. Cage
For gylcerides, UltiMetal, with retention gap	0.32	15	0.10	CP9078
For gylcerides, UltiMetal	0.32	15	0.10	CP9079
For gylcerides, UltiMetal, with retention gap	0.32	10	0.10	CP9076
For gylcerides, UltiMetal	0.32	10	0.10	CP9077
For FAME, fused silica	0.32	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 (µm)	Temp Limits (°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 Page 624

Cyclodex-B

ID (mm)	Length (m)	Film (µm)	Temp Limits (°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

HP-Chiral β

ID (mm)	Length (m)	Film (µm)	Temp Limits (°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 Page 668

CP-Chirasil-Dex CB

ID (mm)	Length (m)	Film (µm)	Temp Limits (°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 C_6 to C_{26} 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	CP7527I5

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 C_2 to C_{24} 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 C_1 to C_{26}.

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

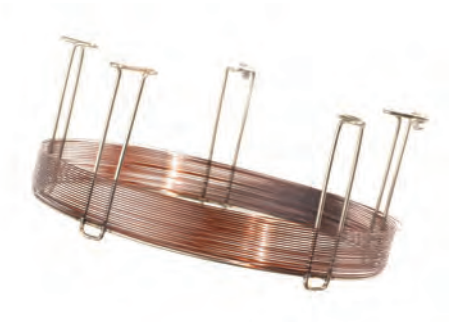
CP-Wax 57 CB for Glycols and Alcohols

- 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 Page 638

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	CP9092I5
		0.10	-60 to 430/450	CP9093*	
0.32	15	0.10	-60 to 430/450	CP9094	CP9094I5
		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 Page 638

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

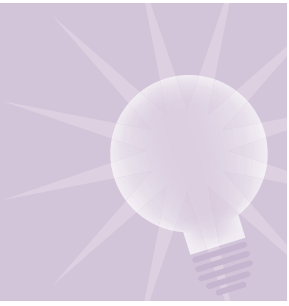
Analysis of drugs of abuse in urine via GC/MS Page 674

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 (°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 (°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.

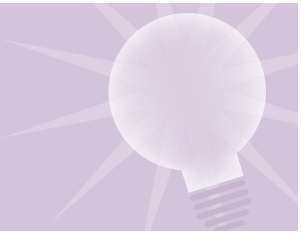
Its one-shot technology saves money on capital investment and cost per analysis, and increases productivity. In addition, the low column bleed of Select PAH reduces the requirement for MS maintenance and enhances sensitivity.

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 Distallation
- 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
- 430ºC upper temperature limit
- Distillation range of C_6 to C_{110+}
- Low bleed, even at 430ºC
- 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 C_{100}. 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 (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	5 in. Cage
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 Al_2O_3 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 Al_2O_3 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 C_{10}. With Select Al_2O_3 MAPD, the adsorption and non-stable response for reactive (polar) hydrocarbons is greatly improved. Select Al_2O_3 MAPD delivers up to a two-fold higher response for MAPD, especially important when running an impurity analysis.

Select Al_2O_3 MAPD Chromatograms

Industrial Chemicals	
Analysis of acetylenes mixture	Page 670

Select Al_2O_3 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 C_7 mercaptan for higher productivity
- Non-polar phase providing accurate results based on volatility
- High inertness, elutes SO_2 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/CO_2 is a set of two parallel columns that combine CP-Molsieve 5Å for permanent gas analysis and CP-PoraBOND Q for CO_2 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 CO_2 in a single run, and columns are coupled, tested, and securely mounted on the EZ-GRIP column mounting system.

The CP7429 Select Permanent Gases/CO_2 column is designed for fast analysis of permanent gases and CO_2. 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 CO_2	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 C_{20}, 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 C_1 to C_{10} 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 Page 571

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

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in. Cage	7890/6890 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

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 compliancy

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 C_4 to C_{40} hydrocarbons can be analyzed in less then 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	CP7491I5
	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-AL_2O_3/KCL UltiMetal
- CP-AL_2O_3/NA_2SO_4 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
		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.

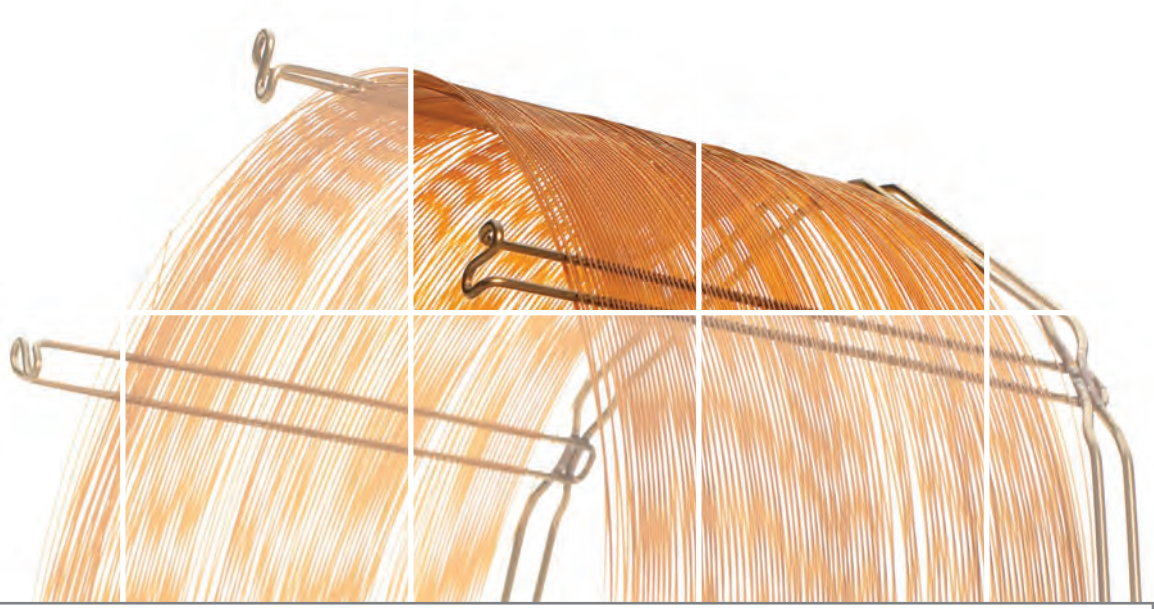
HP-101

- 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

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-butoxyetylphthalate)	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-butoxybenziline)-α,α-bi-p-toluidine N,N-	Di isodecyl-phthalate, DIDP
Bis(p-methoxybenzilidine)-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, DEGSe
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 phosphoramide, 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_3PO_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
Pentanediolsuccinate; 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-phenoxylene, 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
SP-2250
SP-2300
SP-2310
SP-2330
SP-2340
SP-2401
SP-300
Span-80
Squalane
Squalene
Sucrose acetate isobutyrate
Sucrose-octa acetate
Supelco SP-216 PS
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

U
UC-L-45
UCON 50 HB 2000
UCON 50 HB 280X
UCON 50 HB 5100
UCON 75 H 90000
UCON LB 1200X
UCON LB 1715
UCON LB 1800X
UCON LB 550X
UCW-98
UC W-982

V
Versamid 900 (polyamide resin)

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 distallation	CP-SimDist
	C5-C120 simulated distallation	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 distallation	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	50% Phenyl 50% dimethylpolysiloxane	Antidepressants, herbicides and pesticides
VF-17ms		
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	100% Dimethylpolysiloxane	Amines, hydrocarbons, pesticides, PCBs, phenols, sulfur compounds, flavors and fragrances
HP-1		
CP-Sil 5 CB		
Ultra 1	100% Dimethylpolysiloxane	
Ultra 2	100% Dimethylpolysiloxane	
DB-5	5% Phenyl 95% dimethylpolysiloxane	Semivolatiles, alkaloids, drugs, FAMEs, halogenated compounds, pesticides, herbicides
HP-5		
CP-Sil 8 CB		
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	35% Phenyl 65% dimethylpolysiloxane	CLP-pesticides, aroclors, pharmaceuticals, drugs of abuse
HP-35		
DB-17	50% Phenyl 50% dimethylpolysiloxane	Drugs, glycols, pesticides, steroids
HP-50+		
CP-Sil 24 CB		Antidepressants, herbicides and pesticides
DB-23	50% Cyanopropyl 50% methylpolysiloxane	FAMEs
HP-88	88% Vyanopropyl 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_2O_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_2O_3/KCl	Aluminium oxide	Hydrocarbons C1-C10 and impurities in hydrocarbon mainstreams, benzene and toluene
CP-Al_2O_3/Na_2SO_4	Aluminium oxide	Hydrocarbons C1-C10 and impurities in hydrocarbon mainstreams, benzene and toluene
HP-PLOT Al_2O_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_2O_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, SF6, 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_2H_6, N_2, C_2H_4, Kr, and C_2H_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

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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 µm	CP9108
		VF-624ms, 60 m x 0.32 mm, 1.80 µm	CP9105
		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
602	Purgeable aromatics	VF-624ms, 75 m x 0.53 mm, 3.00 µm	CP9108
		VF-624ms, 30 m x 0.25 mm, 1.40 µm	CP9102
		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
603	Acrolein and Acrylonitrile	VF-WAXms, 30 m x 0.25 mm, 1.00 µm	CP9206
		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
604	Phenols	VF-624ms, 60 m x 0.32 mm, 1.80 µm	CP9105
		VF-624ms, 60 m x 0.25 mm, 1.40 µm	CP9103
		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
605	Benzidines	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
606	Phthalate esters	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-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
607	Nitrosamines	CP-Sil 8 CB for Amines, 30 m x 0.32 mm, 1.00 µm	CP7596
		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
608	Organochlorine pesticides and PCBs	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
		VF-17ms, 30 m x 0.25 mm, 0.25 µm	CP8982
		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

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Waste Water

EPA Method	Application	Column	Part No.
609	Nitroaromatics and Isophorone	VF-5ms, 30 m x 0.53 mm, 1.50 µm	CP8976
		VF-5ms, 30 m x 0.25 mm, 0.50 µm	CP8945
		HP-5ms, 30 m x 0.25 mm, 0.50 µm	19091S-133
		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
610	Polynuclear Aromatic Hydrocarbons	VF-17ms, 30 m x 0.25 mm, 0.25 µm	CP8982
		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-5ms, 30 m x 0.32 mm, 0.25 µm	123-5532
		DB-1ms, 30 m x 0.25 mm, 0.25 µm	122-0132
611	Haloethers	VF-5ms, 30 m x 0.53 mm, 1.50 µm	CP8976
		VF-5ms, 30 m x 0.25 mm, 0.50 µm	CP8945
612	Chlorinated Hydrocarbons	VF-5ms, 30 m x 0.25 mm, 0.10 µm	CP8943
		VF-35ms, 30 m x 0.25 mm, 0.25 µm	CP8877
		VF-200ms, 30 m x 0.25 mm, 1.00 µm	CP8860
		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
613	2,3,7,8-Tetrachlorodibenzo-p-dioxin	CP-Sil 88 for Dioxins, 50 m x 0.25 mm, 0.20 µm	CP7588
		VF-5ms, 60 m x 0.25 mm, 0.10 µm	CP8948
614	The Determination of Organophosphorus Pesticides in Municipal and Industrial Wastewater	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
615	Chlorinated herbicides	VF-1701 Pesticides, 30 m x 0.25 mm, 0.25 µm	CP9070
		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
619	Triazine pesticides	VF-17ms, 30 m x 0.25 mm, 0.50 µm	CP8983
		VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
		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
622	The Determination of Organophosphorus Pesticides in Municipal and Industrial Wastewater	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

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Waste Water

EPA Method	Application	Column	Part No.
624	Purgeables	VF-624ms, 75 m x 0.53 mm, 3.00 µm	CP9108
		VF-624ms, 60 m x 0.32 mm, 1.80 µm	CP9105
		VF-624ms, 30 m x 0.25 mm, 1.40 µm	CP9102
		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
625	Base/neutrals and acids	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
		VF-200ms, 30 m x 0.25 mm, 0.25 µm	CP8858
		HP-5ms, 30 m x 0.25 mm, 0.50 µm	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 µm	CP8960
		CP-Sil 88 for Dioxins, 50 m x 0.25 mm, 0.20 µm	CP7588
1624	Volatile organic compounds by isotope dilution GC/MS	VF-624ms, 60 m x 0.25 mm, 1.40 µm	CP9103
1625	Semivolatile organic compounds by isotope dilution GC/MS	VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
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
8021	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

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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 µm	CP8976
		VF-1701ms, 30 m x 0.53 mm, 1.00 µm	CP9171
		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
8070	Nitrosamines by Gas Chromatography	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
8070a	Nitrosamines by GC	CP-Sil 8 CB for Amines, 30 m x 0.53 mm, 1.00 µm	CP7597
		VF-17ms, 30 m x 0.53 mm, 1.50 µm	CP9002
8081	Organochlorine pesticides by GC	VF-5ms, 30 m x 0.25 mm, 1.00 µm	CP8946
		VF-35ms, 30 m x 0.25 mm, 1.00 µm	CP8879
		VF-35ms, 30 m x 0.53 mm, 0.50 µm	CP8887
		VF-1701ms, 30 m x 0.53 mm, 1.00 µm	CP9171
		VF-5ms, 30 m x 0.53 mm, 1.50 µm	CP8976
8081a	Organochlorine Pesticides by Gas Chromatography	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
8082, CLP Pesticides	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	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
8082a	Polychlorinated biphenyls (PCBs) by GC	VF-5ms, 30 m x 0.25 mm, 1.00 µm	CP8946
		VF-35ms, 30 m x 0.25 mm, 1.00 µm	CP8879
		VF-35ms, 30 m x 0.53 mm, 0.50 µm	CP8887
		VF-1701ms, 30 m x 0.53 mm, 1.00 µm	CP9171
		VF-5ms, 30 m x 0.53 mm, 1.50 µm	CP8976
8090	Nitroaromatics and Isophorone	HP-5ms, 30 m x 0.25 mm, 0.50 µm	19091S-133
		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
8091	Nitroaromatics and cyclic ketones 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
8095	Explosives by GC	VF-5ms, 15 m x 0.53 mm, 1.50 µm	CP8973
		VF-1ms, 15 m x 0.53 mm, 1.50 µm	CP8967
		VF-200ms, 15 m x 0.53 mm, 1.00 µm	CP8866
8100	Polynuclear aromatic hydrocarbons	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-5ms, 30 m x 0.32 mm, 0.25 µm	123-5532
		DB-1ms, 30 m x 0.25 mm, 0.25 µm	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 pentafluorobenzylation 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 pentafluorobenzylation 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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Solid Waste

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 nitroterepthalic 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-QO3
		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-QO3
		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-Al2O3/KCl, 25 m x 0.32 mm, 5.00 µm	CP7515
		CP-Al2O3/KCl, 50 m x 0.53 mm, 10.00 µm	CP7518
D 2712	Standard Test Method for 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 Halogentated 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_2O_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 µm	125-5032
		DB-608, 30 m x 0.53 mm, 0.83 µm	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 µm	124-3232
		HP PLOT Q, 15 m x 0.53 mm, 40 µm	19095P-QO3
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 µm	19091S-213
		CAM, 30 m x 0.53 mm, 1 µm	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 µm	19095Z-621
		HP-INNOWax, 30 m x 0.32 mm, 0.25 µm	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 µm	19091N-216
		CP-WAX 52 CB, 60 m x 0.32 mm, 0.50 µm	CP8773
D 5075	Standard Test Method for Nicotine in Indoor Air	DB-5, 30 m x 0.53 mm, 1.50 µm	125-5032
		DB-5, 30 m x 0.32 mm, 1.00 µm	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 µm	19091S-001
		CP-Sil PONA for ASTM D 5134, 50 m x 0.21 mm, 0.50 µm	CP7531
D 5135	Standard Test Method for Analysis of Styrene by Capillary GC	HP-INNOWax, 60 m x 0.32 mm, 0.50 µm	19091N-216
		CP-WAX 52 CB, 60 m x 0.32 mm, 0.50 µm	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 µm	123-1033
		DB-608, 30 m x 0.32 mm, 0.5 µm	123-1730
		DB-XLB, 30 m x 0.25 mm, 0.25 µm	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 µm	19095P-QO4
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 µm	19095Z-627
D 5310	Standard Test Method for Tar Acid Composition by Capillary GC	HP-5ms, 30 m x 0.25 mm, 0.25 µm	19091S-433
		DB-225ms, 30 m x 0.25 mm, 0.25 µm	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 µm	19091S-713
		DB-624, 30 m x 0.45 mm, 2.55 µm	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 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

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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-QO3
		HP PLOT U, 30 m x 0.53 mm, 20 µm	19095P-UO4
D 5508	Standard Test Method for Determination of Residual Acrylonitrile Monomer in Styrene-Acyrlonitrile Co-polymer Resins and Nitrile-Butadiene Rubber by Headspace Capillary GC	HP PLOT Q, 30 m x 0.53 mm, 40 µm	19095P-QO4
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 µm	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 µm	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 µm	122-5032
		DB-TPH, 30 m x 0.32 mm, 0.25 µm	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 µm	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 µm	122-1564
		DB-VRX, 20 m x 0.18 mm, 1.00 µm	121-1524
		DB-624, 60 m x 0.25 mm, 1.4 µm	122-1364
		DB-624, 20 m x 0.18 mm, 1.00 µm	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 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 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 µm	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 µm	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 µm	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 µm	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 µm	19095P-K25
		GS-Alumina, 50 m x 0.53 mm	115-3552
		DB-1, 30 m x 0.53 mm, 5.00 µm	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 µm	19091S-413
		DB-XLB, 30 m x 0.25 mm, 0.25 µm	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 µm	145-1001

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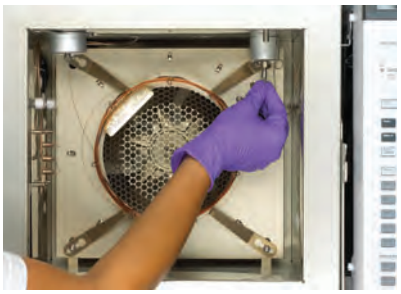
ASTM Methods

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 Gycols 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**