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Agilent Technologies

Agilent J&W GC columns

The story behind Agilent J&W GC Columns

In 2000, Agilent Technologies, the inventor of fused silica GC tubing, merged with J&W Scientific, the creator of the first GC stationary phase made from cross-linked siloxane polymers. In 2010, Agilent acquired Varian adding PLOT, Select, VF, CP-Sil and packed to the existing Ultra Inert, High Efficiency, LTM, PAH, UltiMetal, and Custom GC columns. Our foundation of GC expertise, combined with these vital acquisitions, we have built Agilent J&W into the most extensive and innovative GC column offering in the world.

Put 40 years of Agilent quality and innovation behind your every separation

Agilent J&W offers the broadest portfolio of the most innovative GC columns in the world, with over 3700 part numbers. Our portfolio offers the best inertness for acids/bases/mixed functional compounds, the lowest bleed levels and the tightest column-to-column reproducibility. So when you put industry-leading Agilent J&W GC columns to work in your lab, you can have the utmost confidence in your column, and in every separation.



The most inert and lowest bleed columns for sensitivity and performance

Agilent J&W columns have the widest range of standard, GC/MS and Ultra Inert stationary phases proven to deliver consistent column inertness and exceptionally low column bleed with high upper temperature limits, ensuring accurate peak identification and quantification. Column bleed can decrease spectral integrity, reduce uptime, and shorten column life. Column activity contributes to severe peak tailing, as well as compound loss or degradation for active compounds (e.g. acids and bases), leading to inaccurate quantification.

Better precision for better results

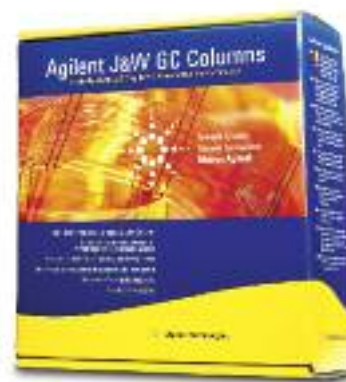
Agilent J&W columns adhere to tight retention factor (k) specifications, promoting consistent retention and separation. They also feature narrow retention indexes and a high number of theoretical plates per meter, ensuring narrow peaks and improving the resolution of closely eluting peaks.

The industry's tightest quality control specifications

Agilent's industry-leading testing ensures the most reliable qualitative and quantitative results, and unmatched column-to-column reproducibility, for your most challenging compounds. Offering the industry's only Ultra Inert testing, we test each column for peak height ratios and tailing for acids, bases, and other chromatographically demanding compounds so you can have utmost confidence in your trace-level separations.

And, with Agilent's industry-leading instruments, services, global technical support, and quick shipping, Agilent's whole solution provides you with even more confidence in your column, and in your every separation.

To learn more about Agilent J&W GC columns please visit www.agilent.com/chem/mygccolumns.



Agilent J&W LTM Column Modules

Agilent J&W LTM Column Modules for 7890 and 6890 Series 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

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.



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 an integrated 3 in 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

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. Compatible with Agilent LTM and LTM II series GC systems and retrofit upgrades.

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

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





GC Capillary Columns

More than just essential products... reliable results!

With the highest inertness, lowest bleed levels, and the tightest column-to-column reproducibility, Agilent J&W GC Capillary columns perform better than any columns on the market.

Ultra Inert Columns – allow you to perform trace level analysis – including the analysis of acids, bases, or other active compounds – with the utmost confidence. They also help ensure an inert GC flow path that is essential for sensitivity, performance, and the integrity of your analytical results.

High Efficiency Columns – are ideal for applications that require reduced analysis time, such as high throughput screening, fast process monitoring, fast QC analyses, and fast method development.

Low-bleed GC/MS Columns – are specifically designed to chromatograph a broad range of trace-level samples, and offer low bleed and high inertness even at higher temperatures.

Premium Polysiloxane Columns – are stable, robust, and versatile and are available in a wide variety of stationary phases.

Polyethylene Glycol (PEG) Columns – offer a variety of unique phase characteristics to meet the varying needs of your laboratory, thanks to Agilent's strict quality control of the cross-linking and deactivation processes.

Specialty Columns – meet Agilent's uncompromising standards for high-temperature, life science, pesticide, petroleum, semivolatile, and volatile applications.

PLOT Columns – deliver superior separation for compounds that are gases at room temperature. They are also ideal for analyzing fixed gases, low molecular weight hydrocarbon isomers, volatile polymer compounds, and reactive analytes such as gases, amines, and hydrides.

On the following pages you will find details on our complete line of innovative Agilent J&W GC columns. For more information contact your local Agilent representative or Agilent Authorized Distributor. Or you can order online at www.agilent.com/chem/store.

Table of Contents

Column Selection	195	Premium Polysiloxane Columns	269	Specialty Columns	314
GC Column Application and Method Guides	210	DB-1	269	<i>High Temperature Columns</i>	314
Ultra Inert Capillary GC Columns	237	HP-1	273	DB-1ht	314
DB-1ms Ultra Inert	240	CP-Sil 5 CB.....	275	DB-5ht	315
HP-1ms Ultra Inert.....	240	Ultra 1	279	DB-17ht.....	316
DB-5ms Ultra Inert	241	Ultra 2	280	VF-5ht and VF-5ht UltiMetal.....	317
HP-5ms Ultra Inert.....	241	DB-5.....	281	<i>Petroleum Columns</i>	318
DB-35ms Ultra Inert.....	242	HP-5	284	Lowox	318
DB-624 Ultra Inert	242	CP-Sil 8 CB.....	286	GS-OxyPLOT	318
DB-UI 8270D.....	242	CP-Sil 13 CB	288	CP-Sil 5 CB for Formaldehyde	319
Low-bleed GC/MS Columns	244	DB-35	289	HP-PONA	319
DB-1ms.....	245	HP-35	290	CP-Sil PONA CB.....	320
HP-1ms	246	DB-17.....	291	CP-Sil PONA for ASTM D 5134.....	320
VF-1ms	247	HP-50+.....	292	DB-Petro	321
DB-5ms.....	249	CP-Sil 24 CB	293	HP-1 Aluminum Clad.....	321
HP-5ms	251	DB-23.....	294	DB-2887.....	322
VF-5ms	252	DB-200.....	295	DB-HT SimDis	322
DB-XLB.....	254	DB-210.....	296	CP-SimDist.....	323
VF-Xms	255	DB-225.....	297	CP-SimDist UltiMetal	324
DB-35ms	256	CP-Sil 43 CB	298	CP-Sil 2 CB.....	325
VF-35ms	257	DB-1301.....	299	CP-TCEP for Alcohols in Gasoline.....	325
DB-17ms	258	CP-1301	300	Select Low Sulfur	326
VF-17ms	259	DB-1701.....	301	CP-Sil 5 CB for Sulfur.....	326
VF-23ms	260	CP-Sil 19 CB	302	Select Permanent Gases.....	327
VF-200ms	261	Polyethylene Glycol (PEG) Columns	304	Select Al ₂ O ₃ MAPD.....	327
DB-225ms	262	DB-WAX and DB-WaxFF	304	Biodiesel Capillary GC Columns.....	328
VF-WAXms.....	263	DB-WAXetr	306	Select Biodiesel.....	330
VF-624ms and VF-1301ms	265	HP-INNOWax	307	Select Silanes	331
VF-1701ms	267	CP-Wax 52 CB	308	CP-Volamine	331
		DB-FFAP.....	310	CP-Sil 8 CB for Amines.....	332
		HP-FFAP	311	CP-Wax for Volatile Amines and Diamines	332
		CP-Wax 58 FFAP CB.....	312	PoraPLOT Amines	332
		Carbowax 20M and HP-20M	313		

(Continued)

Table of Contents (Continued)

Specialty Columns (Continued)

<i>Pesticides Columns</i>	333
DB-CLP 1 and DB-CLP 2.....	333
VF-5 Pesticides.....	334
DB-1701P.....	334
VF-1701 Pesticides.....	335
CP-Sil 8 CB for Pesticides.....	335
CP-Sil 19 CB for Pesticides.....	336
DB-608.....	336
HP-PAS5.....	337
Rapid-MS.....	337
<i>PAH Columns</i>	338
Select PAH.....	338
DB-EUPAH.....	338
CP-Sil PAH CB UltiMetal.....	339
<i>Semivolatiles Columns</i>	340
DB-UI 8270D.....	340
CP-Sil 8 CB for PCB.....	340
DB-5.625.....	341
HP-5ms Semivolatile.....	342
CP-Sil 5/C18 CB for PCB.....	342
DB-Dioxin.....	343
CP-Sil 88 for Dioxins.....	343
<i>Volatiles Columns</i>	344
DB-624.....	344
CP-Select 624 CB.....	346
DB-VRX.....	347
HP-VOC.....	348
DB-502.2.....	349
DB-MTBE.....	349
CP-Select CB for MTBE.....	350
DB-TPH.....	350
Select Mineral Oil.....	351

Foods, Flavors

<i>and Fragrance Columns</i>	352
HP-88.....	352
CP-Sil 88.....	353
Select FAME.....	354
CP-Sil 88 for FAME.....	354
CP-Wax 57 CB.....	355
CP-Carbowax 400.....	356
CP-Wax 57 CB for Glycols and Alcohols.....	356
CP-TAP CB.....	357
CP-FFAP CB.....	358
CycloSil-B.....	358
Cyclodex-B.....	359
HP-Chiral β.....	359
CP-Chirasil Val.....	360
CP-Chirasil-Dex CB.....	360
CP-Cyclodextrin-β-2,3,6-M-19.....	361
<i>Life Sciences Columns</i>	362
DB-ALC1 and DB-ALC2.....	362
VF-DA.....	362
HP-Blood Alcohol.....	363
DB-5ms EVDX.....	363
DB-Select 624 UI <467>.....	364
HP-Fast Residual Solvent.....	364
Metal Columns	365
PLOT Columns	368
PoraBOND Q.....	368
PoraBOND U.....	369
PoraPLOT Q and PoraPLOT Q-HT.....	369
HP-PLOT Q.....	371
GS-Q.....	372
PoraPLOT U and PoraPLOT S.....	373
HP-PLOT U.....	374

PLOT Columns

HP-PLOT Al ₂ O ₃ KCl.....	374
GS-Alumina KCl.....	375
CP-Al ₂ O ₃ /KCl and CP-Al ₂ O ₃ /Na ₂ SO ₄	375
HP-PLOT Al ₂ O ₃ S.....	378
GS-Alumina.....	379
HP-PLOT Al ₂ O ₃ M.....	380
GS-GasPro.....	380
CP-SilicaPLOT.....	381
CarboBOND and CarboPLOT P7.....	382
GS-CarbonPLOT.....	383
HP-PLOT Molesieve.....	384
CP-Molsieve 5Å.....	385
Non-Bonded Stationary Phases	387
Guard Columns	391
LTM Column Modules	393
Fused Silica Tubing	397
Packed GC Columns	400
GC Column Test Standards	411
Column Installation and Troubleshooting	413

Column Selection Principles

Narrow your choices, save time, and reduce trial and error

Selecting the right capillary column for your application can be an uncertain (and sometimes difficult) task. If possible, you should begin by consulting sample applications provided by GC manufacturers and suppliers – or described in published Application Notes.

In addition, the following pages will help you:

- Choose a stationary phase – your most critical decision – based on factors such as selectivity, polarity, and phenyl content.
- Understand how column diameter influences factors like efficiency, solute retention, head pressure, and carrier gas flow rates.
- Determine which column length will affect solute retention, column head pressure, column bleed – and cost.
- Appreciate the difference between thin-film and thick-film columns with regard to capacity, inertness, bleed, and upper temperature limit.

While there are no foolproof techniques, shortcuts, tricks or secrets to column selection, there are some guidelines and concepts that simplify the process. There are four major column parameters to consider: stationary phase, diameter, length, and film thickness.





Selecting Stationary Phases

Choosing the best stationary phase is the most important decision when selecting a capillary column. Unfortunately, it is also the most difficult and ambiguous decision. The most reliable method is to consult the large collection of example applications provided by column manufacturers, GC manufacturers and in published literature. While an exact example application may not be available, enough information can usually be obtained to simplify the decision or reduce the number of potential columns. The most difficult situation is when no previous information is available. Stationary phase selection is much easier even if only one chromatogram is available for all or most of the sample compounds. The most reliable method is to consult the large collection of example applications provided by GC column & hardware manufacturers and published in literature.

The concepts of stationary phase selectivity and polarity are very useful when selecting stationary phases. For best performance, start with the general purpose Agilent J&W Ultra Inert 1ms and 5ms columns to get the lowest column bleed and column activity for a wide range of analytes, including active compounds and trace level samples.

Synonymous use of the terms polarity and selectivity is not accurate, but it is very common. Selectivity is determined by the physicochemical interactions of the solute molecules with the stationary phase. Polarity is determined by the structure of the stationary phase. Polarity does have an effect on separation; however, it is only one of the many stationary phase properties that influence peak separation (see the next section on polarity).

Selectivity can be thought of as the ability of the stationary phase to differentiate between two solute molecules by differences in their chemical or physical properties. Separation is obtained if the interactions between the stationary phase and solutes are different. For liquid or gum stationary phase (polysiloxanes and polyethylene glycols), there are three major interactions: dispersion, dipole, and hydrogen bonding. The following is a simplified and condensed explanation of the interactions for polysiloxane and polyethylene glycol stationary phases.

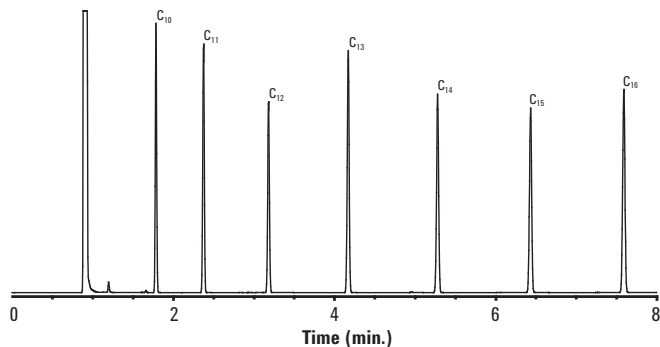
Dispersion is the dominant interaction for all polysiloxane and polyethylene glycol stationary phases. Dispersion can be simplified into the concept of volatility. Simply stated, the more volatile a solute, the faster it elutes from the column (i.e., shorter retention time). However, this order can be altered by the effect of solute and stationary phase polarities, and the other interactions. Solute boiling points are sometimes used as a measure of compound volatility. That is, compounds elute in the order of their increasing boiling points. Unfortunately, boiling points cannot be universally applied to the dispersion interactions. Boiling points are fairly valid when dealing with compounds with similar structures, functional groups or homologous series (**Figure 1**). When dealing with compounds with mixed functional groups, the boiling points simplification often fails (**Figure 2**). If compound boiling points differ by more than 30 °C, they usually can be separated by most stationary phases (there are exceptions). If compound boiling points differ by less than 10 °C, the boiling point simplification becomes less certain and more likely to be in error (except for compounds in a homologous series).

Figure 1: Boiling Point Elution Order for Homologous Series**Column:** DB-1, 15 m x 0.25 mm id, 0.25 μ m

Carrier: Helium at 30 cm/sec

Oven: 60 $^{\circ}$ C for 1 min, 60-180 $^{\circ}$ C at 20 $^{\circ}$ C/min

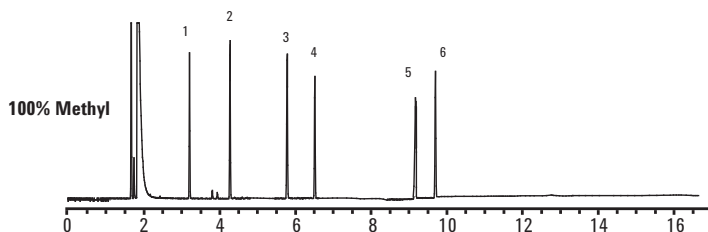
	Boiling Point ($^{\circ}$ C)
1. n-Decane (C ₁₀)	174
2. n-Undecane (C ₁₁)	196
3. n-Dodecane (C ₁₂)	216
4. n-Tridecane (C ₁₃)	234
5. n-Tetradecane (C ₁₄)	253
6. n-Pentadecane (C ₁₅)	268
7. n-Hexadecane (C ₁₆)	287



Homologous series of hydrocarbons. The solutes elute in order of their increasing boiling points; however, the peaks are not spaced in proportion to their respective boiling points.

Figure 2: Deviation from Boiling Point Order**Column:** DB-1, 30 m x 0.25 mm id, 0.25 μ m

	Boiling Point ($^{\circ}$ C)
1. Toluene	111
2. Hexanol	157
3. Phenol	182
4. Decane (C ₁₀)	174
5. Naphthalene	219
6. Dodecane (C ₁₂)	216



Solutes outside of the homologous series do not elute in the boiling point order.

If the stationary phase is capable of dipole interaction, it enhances its power to separate solutes whose dipole moments are different. Only some stationary phases are able to exploit this interaction. Polyethylene glycols, and cyanopropyl and trifluoropropyl substituted polysiloxanes readily undergo the dipole interactions; methyl or phenyl substituted groups do not undergo a dipole interaction (**Table 1**). The amount of peak separation for solutes with different dipoles often changes if a stationary phase with a different interaction is used (**Figure 3**). If the dipole difference between compounds is small, a greater amount of the appropriate group is needed (e.g., a 50% cyanopropylphenyl-methyl polysiloxane instead of a 14% cyanopropylphenyl-methyl polysiloxane). It is difficult to accurately predict the magnitude of the separation change for all of the peaks. Empirical results have shown that dipole interaction stationary phases are well suited for samples containing compounds that have base or central structures to which different groups are attached in various positions. Examples include substituted aromatics, halocarbons, pesticides and drugs.

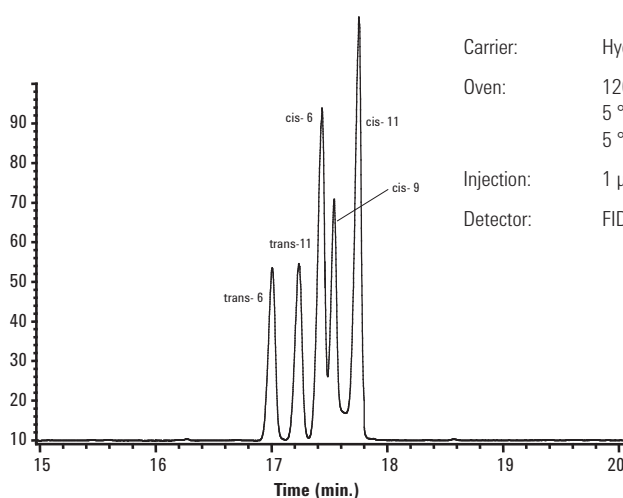
Table 1: Stationary Phase Interactions

Functional Group	Dispersion	Dipole	Hydrogen Bonding
Methyl	Strong	None	None
Phenyl	Strong	None to Weak	Weak
Cyanopropyl	Strong	Very Strong	Moderate
Trifluoropropyl	Strong	Moderate	Weak
PEG	Strong	Strong	Moderate

Figure 3: Dipole Interactions

Column: HP-88, 30 m x 0.25 mm id, 0.25 μ m

Molecular weight and boiling points are virtually identical for these fatty acid methyl ester (FAME) isomers, with only the dipole interactions due to the hydrogen isomeric positions on the molecules being different. Only strong dipole interactions in the stationary phase can provide chromatographic separation for these types of compounds.



C-18:1 cis and trans isomers on HP-88

Carrier: Hydrogen, 2 mL/min constant flow
 Oven: 120 °C, 1 min, 10 °C/min to 175 °C, 10 min
 5 °C/min to 210 °C, 5 min
 5 °C/min to 230 °C, 5 min
 Injection: 1 μ L
 Detector: FID, 250 °C

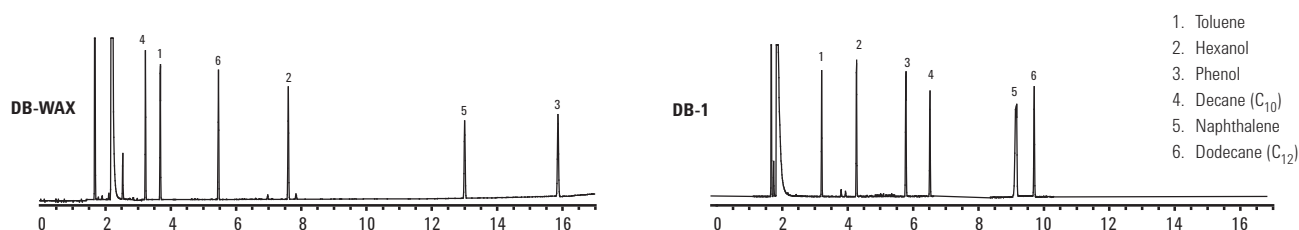
The hydrogen bonding interaction occurs if there is hydrogen bonding between the solute molecules and the stationary phase. **Table 2** lists the types of compounds that can form hydrogen bonds along with their relative bonding strengths. It is the difference in the strength of the hydrogen bonding that is critical. The same stationary phases that undergo dipole interactions also undergo hydrogen bonding interactions. The amount of peak separation for solutes whose hydrogen bonding potentials differ often changes if a stationary phase with a different amount of hydrogen bonding interaction is used (**Figure 4**). If the hydrogen bonding difference between compounds is small, a great amount of the appropriate group is needed (e.g., a polyethylene glycol instead of a 14% cyanopropylphenyl-methyl polysiloxane). It is difficult to accurately predict the magnitude of the separation change for all of the peaks. Sometimes the desired separation is obtained, but another set of peaks now co-elute with the new stationary phase.

Table 2: Relative Hydrogen Bonding Strengths

Strength	Compounds
Strong	Alcohols, carboxylic acids, amines
Moderate	Aldehydes, esters, ketones
Weak to None	Hydrocarbons, halocarbons, ethers

Figure 4: Hydrogen Bonding Interactions

Column: 15 m x 0.25 mm id, 0.25 μ m

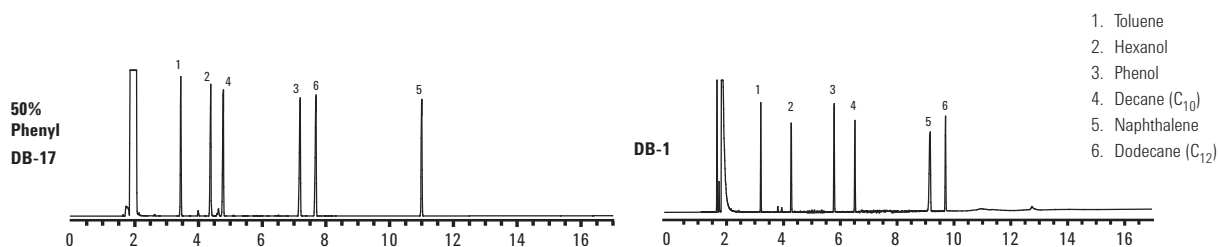


DB-1 does not undergo hydrogen bonding interactions. The change in the elution order of hexanol and phenol with DB-WAX is a combination of the dipole and hydrogen bonding interaction.

Another stationary phase characteristic that may effect retention in a predictable manner is the phenyl content. In general, the higher the phenyl content of the stationary phase, the higher the retention of aromatic solutes relative to aliphatic solutes. This does not mean that aromatic solutes are more retained (e.g., higher k) by high phenyl content stationary phases, but that aromatic solutes are more retained relative to aliphatic solutes. **Figure 5** shows an example of this retention behavior.

Figure 5: Phenyl Content Retention

Column: 15 m x 0.25 mm id, 0.25 μ m



The aromatics increase in retention relative to the hydrocarbons for the DB-17 columns. DB-17 contains 50% phenyl substitution. DB-1 contains no phenyl substitution.

Polarity

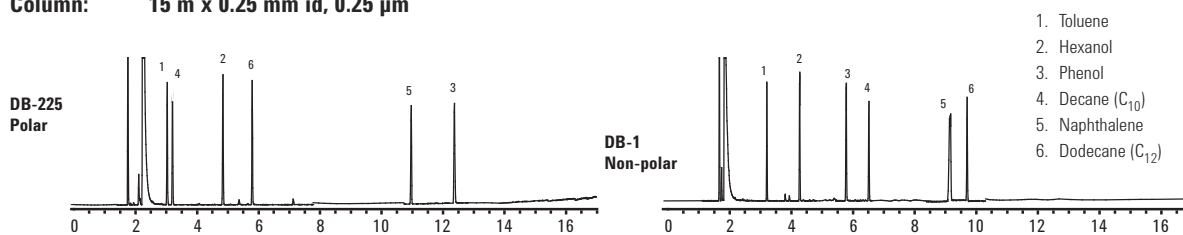
Stationary phase polarity is determined by the polarity of the substituted groups and their relative amounts. **Table 3** lists a variety of stationary phases in order of their increasing polarity. Polarity is often erroneously used to select columns or to determine separation characteristics. Stationary phase polarity is only one of many factors that affect retention and separation.

While polarity is not directly related to selectivity, it has a pronounced affect on compound retention, thus separation. For compounds of similar volatility, greater retention is obtained for solutes with polarities similar to the stationary phase. In other words, polar compounds are more strongly retained by a polar stationary phase than a less polar stationary phase, and vice versa. This effect can be seen in **Figure 6**. The changes in retention and elution order can be largely attributed to the changes in stationary phase polarity. Changes in the amount of phenyl substitution, and dipole and hydrogen bonding interactions also contribute to the changes; however, it is difficult to assess the magnitude of their individual contributions.

Separation and efficiency have to be considered together and not as separate column attributes, as each contributes to peak resolution. When the stationary phase provides adequate resolution between peaks, higher efficiency is not needed. Shorter or larger diameter columns and less than optimal GC conditions can be used in these situations. When resolution is not adequate, there is a need for higher column efficiency.

Figure 6: Polarity – Retention Relationship

Column: 15 m x 0.25 mm id, 0.25 μ m



The alcohols (polar) increase in retention relative to hydrocarbon (non-polar) for the DB-225 column. DB-225 is more polar than DB-1.

In addition to retention, stationary phase polarity influences other column characteristics. There is a general trend between stationary phase polarity and column lifetime, temperature limits, bleed and efficiency. Column life, temperature limits and efficiency tend to be higher for more non-polar stationary phases. These are general trends and not absolute certainties. Low bleed stationary phases sometimes go against this trend.

Table 3: Stationary Phase Polarity

Low Polarity			Mid Polarity			High Polarity		
CP-Sil 2	DB & HP-1ms UI	DB & HP-5ms UI	DB-XLB	DB-225ms	DB-ALC1	HP-88	DB-WAX	CP-TCEP
DB-MTBE	DB & HP-1ms	DB & HP-5ms	VF-Xms	DB-225	DB-Dioxin	CP-Sil 88	DB-WAXetr	
CP-Select CB MTBE	VF-1 ms	VF-5ms	DB-35ms UI	CP-Sil 43 CB	DB-200	DB-23	HP-INNOWax	
	DB & HP-1	DB & HP-5	DB & VF-35ms	VF-1701 ms	VF-200ms	VF-23 ms	VF-WAXms	
	CP-Sil 5 CB	CP-Sil 8 CB	DB & HP-35	DB-1701	DB-210		CP-Wax 57 CB	
	Ultra 1	Ultra 2	DB & VF-17ms	CP-Sil 19 CB	DX-4		DB & HP-FFAP	
	DB-1ht	VF-DA	DB-17	HP-Blood Alcohol			DB-WAX FF	
	DB-2887	DB-5.625	HP-50+	DB-ALC2			CP-FFAP CB	
	DB-Petro/ PONA	DB & VF-5ht	DB-17ht	DX-1			CP-WAX 58 FFAP CB	
	CP-Sil PONA CB	CP-Sil PAH CB	DB-608				CP-WAX 52 CB	
	DB-HT SimDis	Select Biodiesel	DB-TPH				CP-WAX 51	
	CP-SimDis	SE-54	DB-502.2				CP-Carbowax 400	
	CP-Volamine		HP-VOC				Carbowax 20M	
	Select Mineral Oil		DB-VRX				HP-20M	
	HP-101		DB-624				CAM	
	SE-30		VF-624ms					
			CP-Select 624 CB					
			DB-1301					
			VF-1301ms					
			CP-Sil 13 CB					

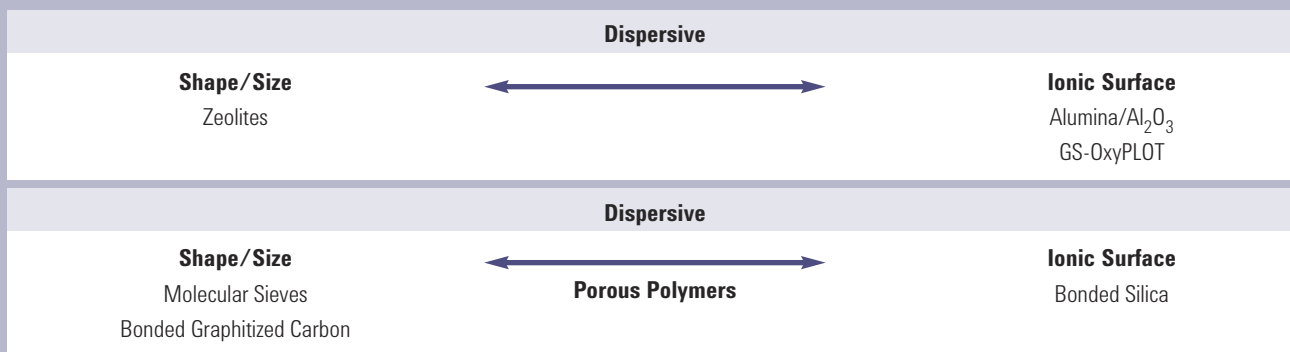
Gas-Solid or PLOT Columns

PLOT (Porous Layer Open Tubular) columns are intended for the separation of very volatile solutes (primarily gases) without the need for cryogenic or sub-ambient cooling of the oven. Separations that would require column temperatures below 35 °C, even with thick film liquid stationary phase can be obtained at temperatures above 35 °C with PLOT columns.

Gas-solid or PLOT column stationary phases are physically different than polysiloxanes and polyethylene glycols. Gas-solid stationary phase are small, porous particles. The particles are stuck to the inner wall of the capillary tubing using a binder or similar means. Solute are separated based on differences in their adsorption properties. Since the particles are porous, size and shape differentiation also occurs.

Alumina PLOT columns are well suited for the separation of C₁-C₁₀ hydrocarbons and small aromatics. The KCl version of the Alumina PLOT column changes the retention order for some of the hydrocarbons. The PLOT Q column provides slightly better separation for C₁-C₃ hydrocarbons, but C₄ and higher hydrocarbons are better separated with an Alumina PLOT column. PLOT Q exhibits extremely long retention times and very broad peaks for C₆ and higher hydrocarbons and aromatics. PLOT Q separates sulfur gases from each other and from most light hydrocarbons. Molesieve PLOT columns are used to separate many noble and permanent gases. GS-GasPro columns combine many of the features of the various other PLOT columns. Light hydrocarbons, inorganic gases and solvents are some of the samples suitable for GS-GasPro.

Primary Selectivity Interactions in PLOT Phases



PLOT Column Examples

Zeolite/Molesieve:	HP-PLOT Molesieve
Graphitized Bonded Carbon:	GS-CarbonPLOT, CarboBOND
Porous Polymers:	HP-PLOT Q, HP-PLOT U
Bonded Silica:	GS-GasPro, CP-SilicaPLOT
Alumina/Al₂O₃:	GS-Alumina, GS-Alumina KCl, HP-PLOT Al ₂ O ₃ KCl, HP-PLOT Al ₂ O ₃ "S", HP-PLOT Al ₂ O ₃ "M"
Proprietary Phase:	Lowox, GS-OxyPLOT

Stationary Phase Selection Summary

1. If no information or ideas about which stationary phase to use is available, start with a DB-1 or DB-5.
2. Low-bleed ("ms") columns are usually more inert and have higher temperature limits. Ultra Inert 1ms, 5ms and 35ms columns provide the lowest column bleed and highest column inertness for a wide range of analytes, including active compounds and trace level samples.
3. Use the least polar stationary phase that provides satisfactory resolution and analysis times. Non-polar stationary phases have superior lifetimes compared to polar phases.
4. Use a stationary phase with a polarity similar to that of the solutes. This approach works more times than not; however, the best stationary phase is not always found using this technique.
5. If poorly separated solutes possess different dipoles or hydrogen bonding strengths, change to a stationary phase with a different amount (not necessarily more) of the dipole or hydrogen bonding interaction. Other co-elutions may occur upon changing the stationary phase, thus the new stationary phase may not provide better overall resolution.
6. If possible, avoid using a stationary phase that contains a functionality that generates a large response with a selective detector. For example, cyanopropyl containing stationary phases exhibit a disproportionately large baseline rise (due to column bleed) with NPDs.
7. A DB-1 or DB-5, DB-1701, DB-17, and DB-WAX cover the widest range of selectivities with the smallest number of columns.
8. PLOT columns are used for the analysis of gaseous samples at above ambient column temperatures.

TIPS & TOOLS

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Table 4:
Column Efficiency vs. Diameter

Column ID Diameter (mm)	Theoretical Plates/Meter
0.10	12,500
0.18	6,600
0.20	5,940
0.25	4,750
0.32	3,710
0.45	2,640
0.53	2,240

Maximum efficiency for a solute with $k=5$

Column Diameter

Column diameter has an influence over five parameters of primary concern. They are efficiency, retention, pressure, carrier gas flow rate, and capacity.

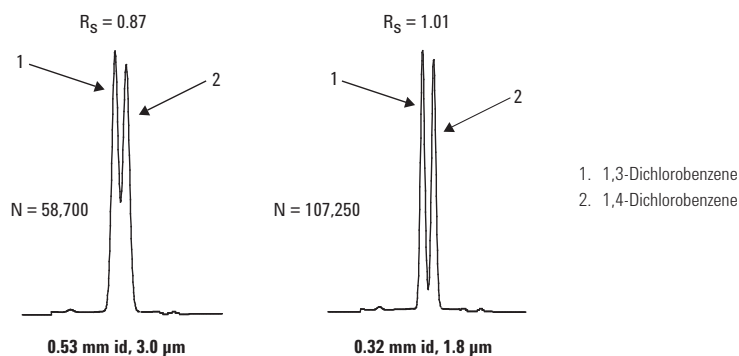
Column efficiency (N/m) is inversely proportional to column diameter. The efficiencies listed in **Table 4** show that smaller diameter columns have higher theoretical plates per meter. Resolution is a square root function of the theoretical plate number. Therefore, doubling column efficiency theoretically increases resolution only by 1.41 times (the square root of 2), but closer to 1.2-1.3 times in real practice. Smaller diameter columns are used when peak separation is small and high column efficiency (i.e., narrow peaks) is needed. **Figure 7** shows the difference in resolution for two different diameter columns.

Solute retention is inversely proportional to column diameter, for isothermal temperature conditions. For temperature program conditions, the change is 1/3-1/2 of the isothermal value. Column diameters are rarely selected based on retention. **Figure 7** shows the difference in retention for two different diameter columns.

Column head pressure is approximately an inverse squared function of the column radius. For example, a 0.25 mm id column requires about 1.7 times the head pressure of a 0.32 mm id column of the same length (also, carrier gas and temperature). Column head pressures increase or decrease dramatically with changes in column diameter. Column diameters of 0.18 mm id or larger are used for standard GC analysis due to the very high pressures needed for smaller diameter columns. Wider diameter columns, especially shorter ones (e.g., 15 m x 0.32 mm id), are impractical for use in GC/MS systems. The vacuum at the exit of the column greatly reduces the required head pressure, and it is difficult to maintain or control very low head pressures.

Figure 7: Column Diameter – Comparison of Resolution and Retention

Column: **DB-624, 30 m**



At constant pressure, **carrier gas flow rates** increase as column diameters increase. For applications or hardware requiring high flow rates, larger diameter columns are normally used. Headspace and purge & trap systems require higher carrier gas flow rates for proper operation. 0.45 or 0.53 mm id columns are used with these systems so that the higher flow rates can be used. Special considerations must be taken if small diameter columns are used in these types of systems. This includes the use of cryogenic interfaces or ovens, or interfacing through split injectors. Added complexity and/or cost, or sample loss, are involved with these techniques. For applications or hardware requiring low carrier gas flow rates, smaller diameter columns are normally used. GC/MS is the typical system requiring low carrier gas flow rates, and therefore, 0.25 mm id and smaller id columns are used in these applications.

Column capacity increases as the column diameter increases. The actual column capacity also depends on the stationary phase, solute and film thickness. **Table 5** lists typical capacity ranges for a variety of column diameters.

Table 5: Column Capacity in ng

Film Thickness (μm)	Column Inside Diameter (mm)			
	0.18-0.20	0.25	0.32	0.53
0.10	20-35	25-50	35-75	50-100
0.25	35-75	50-100	75-125	100-250
0.50	75-150	100-200	125-250	250-500
1.00	150-250	200-300	250-500	500-1000
3.00		400-600	500-800	1000-2000
5.00		1000-1500	1200-2000	2000-3000

Column Diameter Selection Summary

1. Use **0.15, 0.18 or 0.25 mm id columns** when higher column efficiencies are needed. 0.15 and 0.18 mm id columns are especially well suited for GC/MS systems with low pumping capacities. Smaller diameter columns have the lowest capacities and require the highest head pressures.
2. Use **0.32 mm id columns** when higher sample capacity is needed. They often provide better resolution of earlier eluting solutes for splitless injections or large injection volumes ($> 2 \mu\text{L}$) than 0.25 mm id columns.
3. Use **0.45 mm id columns** when only a Megabore direct injector is available and higher column efficiency is desired. Well suited for high carrier gas flow rate situations, such as with purge & trap, headspace samplers, and valve injection applications.
4. Use **0.53 mm id columns** when only a Megabore direct injector is available. Well suited for high carrier gas flow rate situations, such as with purge & trap and headspace samplers. 0.53 mm id columns have the highest sample capacities at constant d_p .



Column Length

Column length influences three parameters of major concern. They are efficiency, retention (analysis time) and carrier gas pressure.

Column efficiency (N) is proportional to column length. Resolution is a square root function of the theoretical plate number. For example, doubling column length (thus efficiency) theoretically increases resolution by only 1.41 times (closer to 1.2-1.3 times in practice). Longer columns are used when peak separation is small and high column efficiency (i.e., narrow peaks) is needed. **Figure 8** shows the difference in resolution for three different lengths.

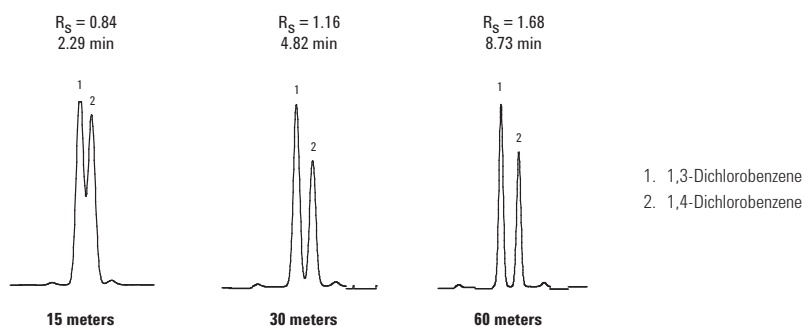
Figure 8: Column Length – Comparison of Resolution and Retention

Column: DB-624

15 m x 0.53 mm id, 0.3 μ m

30 m x 0.53 mm id, 0.3 μ m

60 m x 0.53 mm id, 0.3 μ m



Solute retention is proportional to column length for isothermal temperature conditions. For temperature program conditions, the change is 1/3-1/2 of the isothermal value. When efficiency is increased by lengthening the column, there is a significant increase in analysis time. Figure 8 shows the difference in retention for three different lengths.

Column head pressure is nearly proportional to column length. Pressure is usually not an issue unless the column has a very small or large diameter. Long, small diameter columns require extremely high head pressures, and short, wide diameter columns require very low head pressures. Neither situation is very practical and may be a limiting factor. Choice of carrier gas will also have an impact on column pressure.

Column bleed increases as column length increases. Longer columns have more stationary phase, thus more degradation products are produced. The increase in bleed with longer columns is not large and should not be a deterrent to using a longer column when one is necessary.

Column cost is directly related to column length. Doubling column length nearly doubles the price of the column. When efficiency is increased by lengthening the column, there is a significant increase in column cost. When considered in conjunction with the increase in analysis time, lengthening the column should be the last reasonable option for increasing efficiency.

Shorter columns cost more per meter than longer columns. Cutting longer columns into shorter lengths seems like a good method to save money, but it is not recommended. The quality of the smaller pieces cannot be guaranteed and may not be the same as the original, intact column. Theoretically, each piece should provide satisfactory and consistent results. In practice, this does not always occur. The probability of individual piece variation is higher when shorter pieces are cut from the original column. Greater variability between individual pieces is observed as column length, film thickness and stationary phase polarity increases, and column diameter decreases. Finally, there is the increased chance of tubing breakage when rewinding the shorter columns on other cages. Technically, cutting a column into shorter pieces voids the performance warranty.

Column Length Selection Summary

1. Start with **25-30 meter columns** when the best length is unknown.
2. **10-15 meter columns** are well suited for samples containing very well separated solutes or very few solutes. Shorter lengths are used for very small diameter columns to reduce head pressures.
3. **50-60 meter columns** should be used when resolution is not possible by other means (smaller diameter, different stationary phase, change in column temperature). Best suited for complex samples containing a large number of solutes. Long columns have long analysis times and higher cost.

Column Film Thickness

Column film thickness influences five major parameters: retention, resolution, bleed, inertness and capacity.

For isothermal conditions, solution retention is directly proportional to film thickness. For temperature program conditions, the change is 1/3-1/2 of the isothermal value. Thicker film columns are used to obtain higher retention for very volatile solutes. Volatile solutes normally requiring cryogenic (subambient) cooling with standard film thickness columns can be sufficiently retained at temperatures above 30 °C. Changing to a thicker film column has a net effect of providing equal or greater retention at a higher column temperature. Thicker film columns are typically used for volatile compounds like solvents and select gases. Thinner film columns are used to reduce the retention of highly retained solutes. Highly retained solutes can be eluted faster or at a lower temperature. Changing to a thinner film column has the net effect of providing equal or less retention at a lower column temperature. Thinner film columns are typically used for high boiling or molecular weight compounds. **Figure 9** shows the difference in retention for two different film thicknesses.

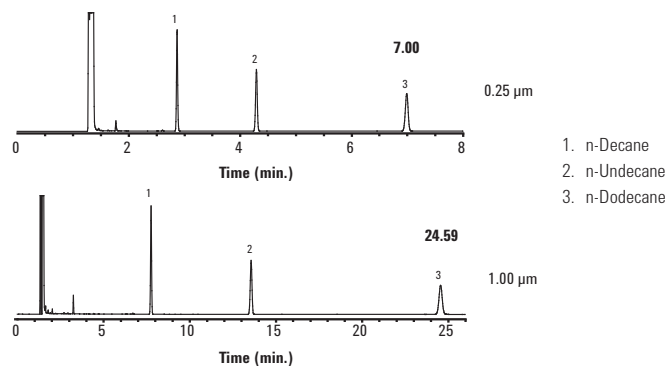
Solutes with k values less than 2 are very difficult to resolve due to insufficient retention by the column. Changing to a thicker film column results in better resolution since solute retention is increased. The resolution improvement depends on the solute k value for the original column. For solutes with k values of about 5 or less, increasing their retention results in improved resolution. For solute peaks with values of 5-10, increasing their retention provides a small to moderate increase in resolution. For peaks with k values above 10, increasing their retention often results in no resolution improvement and sometimes a loss of resolution. Increasing film thickness to improve the resolution of early eluting peaks may result in a resolution loss for later eluting peaks.

Figure 9: Column Film Thickness – Comparison of Resolution and Retention

Column: DB-1, 30 m x 0.32 mm id

Carrier: Helium at 38 cm/sec

Oven: 100 °C isothermal



For a given stationary phase, column bleed increases as film thickness increases. Since thicker film columns are more retentive, later eluting peaks may shift into a region of much higher column bleed when increasing film thickness. The upper temperature limits of thick film columns may be lower due to their higher bleed levels.

Thicker film columns are more inert. There is more stationary phase to shield the solutes from the tubing surface. Peak tailing for active compounds can often be reduced or eliminated with a thicker film column.

Thicker film columns have higher solute capacities. When one solute is present in significantly higher amounts, the resulting broad peak may interfere or co-elute with an adjacent peak. Changing to a thicker film column may reduce peak broadening, thus co-eluting. Table 5 lists typical capacity ranges for a variety of film thickness.

Column Film Thickness Selection Summary

1. For **0.18-0.32 mm id columns**, a film thickness of 0.18-0.25 μm is average or standard (i.e., not thin or thick) and used for most analyses.
2. For **0.45-0.53 mm id columns**, a film thickness of 0.8-1.5 μm is average or standard (i.e., not thin or thick) and used for most analyses.
3. **Thick film columns** are used to retain and resolve volatile solutes (e.g., light solvents, gases). Thick columns are more inert and have higher capacities. Thick film columns exhibit higher column bleed and decreased upper temperature limits.
4. **Thin film columns** are used to minimize the retention of high boiling, high molecular weight solutes (e.g., steroids, triglycerides). Thin film columns are less inert, have lower capacities and exhibit lower column bleed.



GC Column Application and Method Guides

Application	Specific Application	Agilent Phases
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 C ₂₆ , cis, trans, fast resolution FAME	Select FAME
	Best separation for cis, trans FAME analyses up to 260 °C	HP-88, 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 C ₁ -C ₂₆	DB-WAX, HP-WAX, CP-FFAP CB
	Glycols, diols, alcohols	CP-Wax 57 CB for Glycols and Alcohols, DB-WAX
Life Sciences	Blood alcohol analysis	DB-ALC1 and DB-ALC2
	Drugs of abuse confirmation	DB-5ms EVDX
	USP solvents, common solvents	DB-Select 624UI for <467>, DB-624, VF-624ms
	Drugs of abuse confirmation	DB-35ms Ultra Inert, VF-DA
Pesticides	Organochlorine pesticides and PCBs	DB-CLP1 and DB-CLP2, DB-35ms Ultra Inert, DB-17ms, DB-XLB
	Chlorinated pesticides and PCBs	DB-608
	Trace levels of pesticides in food and environmental samples	DB-35ms Ultra Inert, DB-XLB, VF-1701 Pesticides, DB-1701P
	Chlorinated, nitrogen, phosphorus pesticides	CP-Sil 8 CB for Pesticides, DB-35ms Ultra Inert, DB-5ms Ultra Inert
	Chlorinated, nitrogen, phosphorus pesticides, trace level DDT and Endrin	CP-Sil 19 CB for Pesticides, DB-35ms, DB-XLB

(Continued)

Application	Specific Application	Agilent Phases
Polycyclic Aromatic Hydrocarbons	EU regulated PAHs	DB-EUPAH
	PAHs in environmental and food samples	Select PAH
	C ₅ -C ₈₀ , 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
	C ₅ -C ₁₂₀ simulated distillation	DB-HT SimDis, CP-SimDist UltiMetal
	PONA and PIANO analysis	HP-PONA, DB-Petro, CP-Sil PONA CB
	ASTM D5134	CP-Sil PONA for ASTM D5134
	C ₁ -C ₁₀ hydrocarbons	Select Al ₂ O ₃ MAPD, Alumina PLOT family
	C ₁ -C ₆ alcohols, aromatic C ₆ -C ₁₀	CP-TCEP for Alcohols in Gasoline
	Sulfur impurities in propylene streams	Select Low 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
	C ₁ -C ₆ amines, alcohols, NH ₃ , water, solvents, ethanol amines	CP-Volamine
	C ₃ -C ₂₀ amines, alkanol amines	CP-Sil 8 CB for Amines
	C ₃ -C ₈ amines and diamines	CP-Wax for Volatile Amines and Diamines
	C ₄ -C ₁₀ amines, diamines and aromatic amines	CP-Wax 51 for Amines
	Oxygenates in C ₁ -C ₁₀ hydrocarbons	CP-Lowox, GS-OxyPLOT
	C ₁ -C ₁₀ hydrocarbons	GS-OxyPLOT
	Methanol, formaldehyde and formic acid in water	CP-Sil 5 CB for Formaldehyde
	C ₁ -C ₁₂ hydrocarbons	CP-Squalane
	Volatile oxygenates and halogenated hydrocarbons	CP-Propox
	Semivolatiles	Polychlorinated dibenzodioxins (PCDDs) and dibenzofurans (PCDFs)
Dioxins and dibenzo furan		CP-Sil 88 for Dioxins, DB-Dioxin
EPA Semivolatiles Methods 625, 1625, 8270 and CLP protocols		DB-UI 8270D, DB-5ms Ultra Inert, DB-5.625, HP-5ms Semivolatile
PCB, detailed analysis		CP-Sil 5/C18 CB for PCB
PCB		CP-Sil 8 CB for PCB, DB-XLB

(Continued)

Application	Specific Application	Agilent Phases
Volatiles	EPA Methods 502.2, 524.2 and 8260	DB-624 Ultra Inert, DB-VRX
	Volatile priority pollutants and residual solvents	DB-624 Ultra Inert, DB-624, VF-624ms
	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
	C ₅ -C ₄₀ hydrocarbons	Select Mineral Oil
Metal	High temperature analysis and process applications	UltiMetal and 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

TIPS & TOOLS



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EPA Methods

Drinking Water

EPA Methods	Application	Recommended Column	Part No.
501, 501.3	Measurement of trihalomethanes in drinking water by GC/MS and selected ion monitoring	DB-VRX, 30 m x 0.25 mm, 1.40 μ m	122-1534
		DB-624, 30 m x 0.25 mm, 1.40 μ m	122-1334
		VF-624ms, 30 m x 0.25 mm, 1.40 μ m	CP9102
		DB-624 Ultra Inert, 30 m x 0.25 mm, 1.4 μ m	122-1334UI
502.2	Volatile organic compounds in water by purge and trap capillary column GC with photoionization and electrolytic conductivity detectors in series	DB-VRX, 60 m x 0.25 mm, 1.40 μ m	122-1564
		DB-624, 60 m x 0.25 mm, 1.40 μ m	122-1364
		VF-624ms, 60 m x 0.25 mm, 1.40 μ m	CP9103
		DB-624 Ultra Inert, 60 m x 0.25 mm, 1.4 μ m	122-1364UI
503.1	Volatile aromatic and unsaturated organic compounds in water by purge and trap gas chromatography	DB-VRX, 30 m x 0.25 mm, 1.40 μ m	122-1534
		DB-624, 30 m x 0.25 mm, 1.40 μ m	122-1334
504.1	1,2-Dibromoethane (EDB) and 1,2-dibromo-3-chloropropane (DB CP), GC, microextraction	DB-CLP1, 30 m x 0.32 mm, 0.25 μ m	123-8232
		DB-CLP2, 30 m x 0.32 mm, 0.5 μ m	123-8336
		DB-VRX, 30 m x 0.25 mm, 1.40 μ m	122-1534
		DB-624, 30 m x 0.25 mm, 1.40 μ m	122-1334
		DB-624 Ultra Inert, 30 m x 0.25 mm, 1.4 μ m	122-1334UI
		VF-1ms, 30 m x 0.32 mm, 1.00 μ m	CP8926
505	Analysis of organohalide pesticides and commercial polychlorinated biphenyl (PCB) products in water by microextraction and GC	VF-1701ms, 30 m x 0.32 mm, 1.00 μ m	CP9163
		DB-CLP1, 30 m x 0.32 mm, 0.25 μ m	123-8232
		DB-CLP2, 30 m x 0.32 mm, 0.5 μ m	123-8336
		DB-XLB, 30 m x 0.25 mm, 0.50 μ m	122-1236
		VF-1ms, 30 m x 0.32 mm, 1.00 μ m	CP8926
506	Determination of phthalate and adipate esters in drinking water by liquid-liquid extraction or liquid-solid extraction and GC with photoionization detection	VF-17ms, 30 m x 0.32 mm, 0.50 μ m	CP8991
		DB-5ms, 30 m x 0.25 mm, 0.25 μ m	122-5532
		VF-5ms, 30 m x 0.32 mm, 0.25 μ m	CP8955
507	Determination of nitrogen and phosphorus-containing pesticides in water by GC with a nitrogen-phosphorus detector	VF-1ms, 30 m x 0.32 mm, 0.25 μ m	CP8924
		DB-35ms, 30 m x 0.25 mm, 0.25 μ m	122-3832
		DB-5ms, 30 m x 0.25 mm, 0.25 μ m	122-5532
		VF-5 Pesticides, 30 m x 0.25 mm, 0.25 μ m	CP9074
		VF-1701 Pesticides, 30 m x 0.25 mm, 0.25 μ m	CP9070

Drinking Water

EPA Methods	Application	Recommended Column	Part No.
508	Determination of chlorinated pesticides in water by GC with an electron capture detector	DB-CLP1, 30 m x 0.32 mm, 0.25 µm	123-8232
		DB-CLP2, 30 m x 0.32 mm, 0.5 µm	123-8336
		DB-35ms Ultra Inert, 30 m x 0.32 mm, 0.25 µm	123-3832UI
		DB-XLB, 30 m x 0.32 mm, 0.50 µm	123-1236
		DB-608, 30 m x 0.32 mm, 0.50 µm	123-1730
		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	DB-CLP1, 30 m x 0.32 mm, 0.25 µm	123-8232
		DB-CLP2, 30 m x 0.32 mm, 0.5 µm	123-8336
		DB-35ms Ultra Inert, 30 m x 0.32 mm, 0.25 µm	123-3832UI
		DB-XLB, 30 m x 0.32 mm, 0.50 µm	123-1236
		VF-5 Pesticides, 30 m x 0.25 mm, 0.25 µm	CP9074
515	Determination of chlorinated herbicides in drinking water	DB-35ms Ultra Inert, 30 m x 0.32 mm, 0.25 µm	123-3832UI
		DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm	122-5532UI
		HP-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm	19091S-433UI
		DB-1701, 30 m x 0.25 mm, 0.25 µm	122-0732
515.3	Determination of chlorinated acids in drinking water by liquid-liquid extraction, derivatization and GC with electron capture detection	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm	122-5532UI
		HP-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm	19091S-433UI
		DB-1701, 30 m x 0.25 mm, 0.25 µm	122-0732
		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	DB-5ms Ultra Inert, 20 m x 0.18 mm, 0.18 µm	121-5522UI
		HP-5ms Ultra Inert, 20 m x 0.18 mm, 0.18 µm	19091S-577UI
		DB-1701, 20 m x 0.18 mm, 0.18 µm	121-0722
		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)	DB-5ms Ultra Inert, 30 m x 0.25 mm, 1.00 µm	122-5533UI
		HP-5ms Ultra Inert, 30 m x 0.25 mm, 1.00 µm	19091S-233UI
		VF-5ms, 30 m x 0.25 mm, 1.00 µm	CP8946

(Continued)

Drinking Water

EPA Methods	Application	Recommended Column	Part No.
524.2	Measurement of purgeable organic compounds in water by capillary GC/MS	DB-VRX, 60 m x 0.25 mm, 1.40 µm	122-1564
		DB-624, 60 m x 0.25 mm, 1.40 µm	122-1364
		DB-624 Ultra Inert, 60 m x 0.25 mm, 1.4 µm	122-1364UI
		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
		DB-624 Ultra Inert, 60 m x 0.25 mm, 1.4 µm	122-1364UI
		VF-624ms, 30 m x 0.25 mm, 1.40 µm	CP9102
		VF-624ms, 60 m x 0.25 mm, 1.40 µm	CP9103
		VF-5ms, 30 m x 0.32 mm, 1.00 µm	CP8957
525, 525.2	Determination of organic compounds in drinking water by liquid-solid extraction and capillary column GC/MS	HP-5ms, 30 m x 0.25 mm, 0.50 µm	19091S-133
		VF-5 Pesticides, 30 m x 0.25 mm, 0.25 µm	CP9074
526	Determination of selected semivolatile organic compounds in drinking water by solid phase extraction and capillary column GC/MS	DB-5ms, 30 m x 0.25 mm, 0.25 µm	122-5532
		HP-5ms, 30 m x 0.25 mm, 0.25 µm	19091S-433
		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	DB-5ms, 30 m x 0.25 mm, 0.25 µm	122-5532
		HP-5ms, 30 m x 0.25 mm, 0.25 µm	19091S-433
		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	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
		VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
529	Determination of explosives and related compounds in drinking water by solid phase extraction and capillary column GC/MS	DB-5ms Ultra Inert, 15 m x 0.25 mm, 0.25 µm	122-5512UI
		HP-5ms Ultra Inert, 15 m x 0.25 mm, 0.25 µm	19091S-431UI
		VF-5ms, 15 m x 0.25 mm, 0.25 µm	CP8939
551	Determination of chlorination disinfection byproducts and chlorinated solvents in drinking water by liquid-liquid extraction and gas chromatography with electron-capture detection	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
		DB-210, 30 m x 0.25 mm, 0.50 µm	122-0233
		VF-1301ms, 30 m x 0.25 mm, 1.00 µm	CP9054
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	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
		DB-1301, 30 m x 0.25 mm, 1.00 µm	122-1333
		VF-1ms, 30 m x 0.25 mm, 1.00 µm	CP8913
		VF-1301ms, 30 m x 0.25 mm, 1.00 µm	CP9054

(Continued)

Drinking Water

EPA Methods	Application	Recommended Column	Part No.
552	Determination of haloacetic acids in drinking water by liquid-liquid extraction, derivatization, and gas chromatography with electron-capture detection	DB-35ms Ultra Inert, 30 m x 0.32 mm, 0.25 µm	123-3832UI
		DB-XLB, 30 m x 0.32 mm, 0.50 µm	123-1236
		DB-1701, 30 m x 0.25 mm, 0.25 µm	122-0732
		DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm	122-5532UI
		HP-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm	19091S-433UI
		VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
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-CLP1, 30 m x 0.32 mm, 0.25 µm	123-8232
		DB-CLP2, 30 m x 0.32 mm, 0.5 µm	123-8336
		DB-35ms Ultra Inert, 30 m x 0.32 mm, 0.25 µm	123-3832UI
		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	DB-CLP1, 30 m x 0.32 mm, 0.25 µm	123-8232
		DB-CLP2, 30 m x 0.32 mm, 0.5 µm	123-8336
		DB-35ms Ultra Inert, 30 m x 0.32 mm, 0.25 µm	123-3832UI
		DB-XLB, 30 m x 0.32 mm, 0.50 µm	123-1236
		VF-1701ms, 30 m x 0.25 mm, 0.25 µm	CP9151
		VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
552.3	Determination of haloacetic acids and dalapon in drinking water by liquid-liquid microextraction, derivatization, and GC with electron-capture detection	DB-CLP1, 30 m x 0.32 mm, 0.25 µm	123-8232
		DB-CLP2, 30 m x 0.32 mm, 0.5 µm	123-8336
		DB-5ms, 30 m x 0.25 mm, 0.25 µm	122-5532
		DB-1701, 30 m x 0.25 mm, 0.25 µm	122-0732
		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	DB-5ms, 30 m x 0.25 mm, 0.25 µm	122-5532
		DB-1701, 30 m x 0.25 mm, 0.25 µm	122-0732
		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	DB-VRX, 60 m x 0.25 mm, 1.40 μ m	122-1564
		DB-624, 75 m x 0.45 mm, 2.55 μ m	124-1374
		DB-624, 60 m x 0.25 mm, 1.40 μ m	122-1364
		VF-624ms, 75 m x 0.53 mm, 3.00 μ m	CP9108
		VF-624ms, 60 m x 0.32 mm, 1.80 μ m	CP9105
		VF-5ms, 30 m x 0.25 mm, 0.25 μ m	CP8944
602	Purgeable aromatics	DB-624, 75 m x 0.53 mm, 3.00 μ m	125-1374
		DB-624, 30 m x 0.25 mm, 1.40 μ m	122-1334
		DB-VRX, 30 m x 0.25 mm, 1.40 μ m	122-1534
		VF-624ms, 75 m x 0.53 mm, 3.00 μ m	CP9108
		VF-5ms, 30 m x 0.25 mm, 0.25 μ m	CP8944
		VF-624ms, 30 m x 0.25 mm, 1.40 μ m	CP9102
603	Acrolein and acrylonitrile	DB-624, 30 m x 0.25 mm, 1.40 μ m	122-1334
		DB-VRX, 30 m x 0.25 mm, 1.40 μ m	122-1534
		VF-WAXms, 30 m x 0.25 mm, 1.00 μ m	CP9206
		VF-624ms, 30 m x 0.25 mm, 1.40 μ m	CP9102
604	Phenols	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 μ m	122-5532UI
		DB-XLB, 30 m x 0.25 mm, 0.25 μ m	122-1232
		VF-5ms, 60 m x 0.32 mm, 1.80 μ m	CP9105
		VF-5ms, 30 m x 0.25 mm, 0.25 μ m	CP8944
605	Benzidines	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 μ m	122-5532UI
		DB-608, 30 m x 0.25 mm, 0.25 μ m	122-6832
606	Phthalate esters	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 μ m	122-5532UI
		DB-608, 30 m x 0.25 mm, 0.25 μ m	122-6832
		VF-5ms, 30 m x 0.25 mm, 0.25 μ m	CP8944
607	Nitrosamines	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 μ m	122-5532UI
		CP-Sil 8 CB for Amines, 30 m x 0.32 mm, 1.00 μ m	CP7596

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TIPS & TOOLS

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Waste Water

EPA Method	Application	Column	Part No.
608	Organochlorine pesticides and PCBs	DB-35ms Ultra Inert, 30 m x 0.32 mm, 0.25 µm	123-3832UI
		DB-XLB, 30 m x 0.32 mm, 0.50 µm	123-1236
		DB-17ms, 30 m x 0.32 mm, 0.25 µm	123-4732
		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
609	Nitroaromatics and isophorone	HP-5ms, 30 m x 0.25 mm, 0.50 µm	19091S-133
		DB-5ms, 30 m x 0.25 mm, 0.50 µm	122-5536
		DB-608, 30 m x 0.25 mm, 0.25 µm	122-6832
		VF-5ms, 30 m x 0.53 mm, 1.50 µm	CP8976
		VF-5ms, 30 m x 0.25 mm, 0.50 µm	CP8945
610	Polynuclear aromatic hydrocarbons	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm	122-5532UI
		DB-5ms, 30 m x 0.32 mm, 0.25 µm	123-5532
		DB-17ms, 30 m x 0.25 mm, 0.25 µm	122-4732
		VF-17ms, 30 m x 0.25 mm, 0.25 µm	CP8982
		VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
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	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
		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
613	2,3,7,8-Tetrachlorodibenzo-p-dioxin	DB-5ms Ultra Inert, 60 m x 0.25 mm, 0.25 µm	122-5562UI
		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 Ultra Inert, 30 m x 0.25 mm, 0.25 µm	122-5532UI
615	Chlorinated herbicides	DB-35ms Ultra Inert, 30 m x 0.32 mm, 0.25 µm	123-3832UI
		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

(Continued)

Waste Water

EPA Method	Application	Column	Part No.
619	Triazine pesticides	DB-35ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm	122-3832UI
		DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm	122-5532UI
		VF-17ms, 30 m x 0.25 mm, 0.50 µm	CP8983
		VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
622	The determination of organophosphorus pesticides in municipal and industrial wastewater	DB-35ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm	122-3832UI
		DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm	122-5532UI
624	Purgeables	DB-VRX, 60 m x 0.25 mm, 1.40 µm	122-1564
		DB-624, 60 m x 0.25 mm, 1.40 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
		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-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
625	Base/neutrals and acids	HP-5ms Ultra Inert, 30 m x 0.25 mm, 0.50 µm	19091S-133UI
		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
1613	Tetra- through octa-chlorinated dioxins and furans by isotope dilution HRGC/HRMS	DB-5ms Ultra Inert, 60 m x 0.25 mm, 0.25 µm	122-5562UI
		CP-Sil 88 for Dioxins, 50 m x 0.25 mm, 0.20 µm	CP7588
		VF-5ms, 60 m x 0.25 mm, 0.25 µm	CP8960
1624	Volatile organic compounds by isotope dilution GC/MS	DB-624, 60 m x 0.25 mm, 1.40 µm	122-1364
		VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
1625	Semivolatile organic compounds by isotope dilution GC/MS	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm	122-5532UI
		HP-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm	19091S-433UI
		VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
8021	Volatile halogenated & aromatic organic compounds	DB-VRX, 60 m x 0.25 mm, 1.40 µm	122-1564
		DB-624, 60 m x 0.25 mm, 1.40 µm	122-1364

(Continued)

Solid Waste			
EPA Method	Application	Column	Part No.
8010	Volatile halogenated organic compounds list by EPA method 8021	DB-VRX 60 m x 0.25 mm, 1.40 µm	122-1564
		DB-608 30 m x 0.53 mm, 0.50 µm	125-6837
8011	1,2-Dibromoethane and 1,2-dibromo-3-chloropropane by microextraction and GC	DB-624 30 m x 0.25 mm, 1.40 µm	122-1334
		DB-624 Ultra Inert 30 m x 0.25 mm, 1.4 µm	122-1334UI
		DB-VRX 30 m x 0.25 mm, 1.40 µm	122-1534
		VF-1ms 30 m x 0.32 mm, 0.25 µm	CP8924
8015	Nonhalogenated organics by GC	DB-624 30 m x 0.25 mm, 1.40 µm	122-1334
		DB-624 Ultra Inert 30 m x 0.25 mm, 1.4 µm	122-1334UI
		DB-VRX 30 m x 0.25 mm, 1.40 µm	122-1534
8015c	Nonhalogenated organics by GC	DB-WAX 30 m x 0.25 mm, 0.50 µm	122-7033
		DB-5 30 m x 0.25 mm, 1.00 µm	122-5033
		HP-5 30 m x 0.25 mm, 1.00 µm	19091J-233
		DB-608 30 m x 0.53 mm, 1.00 µm	CP9215
		CP-Sil 8 CB 30 m x 0.53 mm, 1.50 µm	CP8736
		DB-624 30 m x 0.25 mm, 1.40 µm	122-1334
8020	Volatile aromatic organic compounds list by EPA method 8021	DB-624 Ultra Inert 30 m x 0.25 mm, 1.4 µm	122-1334UI
		DB-VRX 30 m x 0.25 mm, 1.40 µm	122-1534
		DB-624 30 m x 0.25 mm, 1.40 µm	122-1334
8021, CLP Volamines	Volatile halogenated & aromatic organic compounds	DB-VRX 60 m x 0.25 mm, 1.40 µm	122-1564
		DB-608 30 m x 0.53 mm, 0.50 µm	125-6837

(Continued)

Solid Waste			
EPA Method	Application	Column	Part No.
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	DB-624 30 m x 0.25 mm, 1.40 µm	122-1334
		DB-624 Ultra Inert 30 m x 0.25 mm, 1.4 µm	122-1334UI
		DB-VRX 30 m x 0.25 mm, 1.40 µm	122-1534
		PoraBOND Q 25 m x 0.53 mm, 10.00 µm	CP7354
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	DB-WAX 15 m x 0.25 mm, 0.50 µm	122-7013
		HP-INNOWax 15 m x 0.25 mm, 0.50 µm	19091N-231
		VF-WAXms 15 m x 0.53 mm, 1.00 µm	CP9226
8040, 8041, 8041a	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
		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-608 30 m x 0.53 mm, 0.50 µm	125-6837
8061	Phthalate esters by GC with electron capture detection (GC/ECD)	DB-5ms 30 m x 0.25 mm, 0.25 µm	122-5532
		DB-608 30 m x 0.53 mm, 0.50 µm	125-6837
		VF-1701ms 30 m x 0.53 mm, 1.00 µm	CP9171

(Continued)

Solid Waste			
EPA Method	Application	Column	Part No.
8070, 8070a	Nitrosamines by gas chromatography	DB-5ms 30 m x 0.25 mm, 0.25 µm	122-5532
		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, 8081a	Organochlorine pesticides by gas chromatography	DB-CLP1 30 m x 0.32 mm, 0.25 µm	123-8232
		DB-CLP2 30 m x 0.32 mm, 0.5 µm	123-8336
		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
		VF-5ms 30 m x 0.25 mm, 1.00 µm	CP8946
		VF-35ms 30 m x 0.25 mm, 1.00 µm	CP8879
		8082, CLP Pesticides, 8082a	Polychlorinated biphenyls (PCBs) by gas chromatography
DB-CLP2 30 m x 0.32 mm, 0.5 µm	123-8336		
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		
VF-5ms 30 m x 0.25 mm, 1.00 µm	CP8946		
VF-35ms 30 m x 0.25 mm, 1.00 µm	CP8879		
8090	Nitroaromatics and isophorone		
		DB-608 30 m x 0.53 mm, 0.50 µm	125-6837
		HP-5ms 30 m x 0.25 mm, 0.50 µm	19091S-133
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

(Continued)



Solid Waste

EPA Method	Application	Column	Part No.
8095	Explosives by GC	DB-225 15 m x 0.53 mm, 1.00 µm	125-2212
		HP-5 15 m x 0.53 mm, 1.50 µm	19095J-321
		DB-5 15 m x 0.53 mm, 1.50 µm	125-5012
		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
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		
DB-17ms 30 m x 0.25 mm, 0.25 µm	122-4732		
VF-5ms 30 m x 0.25 mm, 0.25 µm	CP8944		
8111	Haloethers by GC		
		HP-5ms 30 m x 0.25 mm, 0.50 µm	19091S-133
		DB-1701 30 m x 0.25 mm, 1.00 µm	122-0733
		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
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		

(Continued)

Solid Waste

EPA Method	Application	Column	Part No.
8121	Chlorinated hydrocarbons by GC: capillary column technique	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
		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
		8131	Aniline and selected derivatives by GC
HP-5ms Ultra Inert 30 m x 0.25 mm, 0.50 µm	19091S-133UI		
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
		VF-5ms 30 m x 0.25 mm, 0.25 µm	CP8944
8141a, 8141b	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
		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

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Solid Waste

EPA Method	Application	Column	Part No.		
8150	Chlorinated herbicides	DB-35ms 30 m x 0.32 mm, 0.25 µm	123-3832		
8151, 8151b	Chlorinated herbicides by GC using methylation or pentafluorobenzoylation derivatization: capillary column technique	DB-CLP1 30 m x 0.32 mm, 0.25 µm	123-8232		
		DB-CLP2 30 m x 0.32 mm, 0.5 µm	123-8336		
		DB-35ms Ultra Inert 30 m x 0.32 mm, 0.25 µm	123-3832UI		
		DB-5ms Ultra Inert 30 m x 0.32 mm, 0.25 µm	123-5532UI		
		HP-5ms Ultra Inert 30 m x 0.32 mm, 0.25 µm	19091S-413UI		
		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		
		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-624 Ultra Inert 60 m x 0.25 mm, 1.4 µm	122-1364UI				
DB-VRX 60 m x 0.25 mm, 1.40 µm	122-1564				
DB-608 30 m x 0.53 mm, 0.50 µm	125-6837				
HP-VOC 60 m x 0.20 mm, 1.10 µm	19091R-306				
VF-624ms 60 m x 0.25 mm, 1.40 µm	CP9103				
DB-624 Ultra Inert 60 m x 0.25 mm, 1.4 µm	122-1364UI				
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-608 30 m x 0.53 mm, 0.50 µm	125-6837
		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		

(Continued)

Solid Waste					
EPA Method	Application	Column	Part No.		
8260b	Volatile organic compounds by GC/MS	DB-VRX 60 m x 0.25 mm, 1.40 µm	122-1564		
		DB-608 30 m x 0.53 mm, 0.50 µm	125-6837		
		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		
		VF-5ms 30 m x 0.25 mm, 1.00 µm	CP8946		
		VF-624ms 60 m x 0.32 mm, 1.80 µm	CP9105		
		DB-624 Ultra Inert 60 m x 0.32 mm, 1.8 µm	123-1364UI		
		8261	Volatile organic compounds by vacuum distillation in combination with GC/MS spectrometry (VD/GC/MS)	DB-VRX 60 m x 0.25 mm, 1.40 µm	122-1564
				DB-608 30 m x 0.53 mm, 0.50 µm	125-6837
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-624 Ultra Inert 20 m x 0.18 mm, 1 µm	121-1324UI				
VF-624ms 60 m x 0.25 mm, 1.40 µm	CP9103				
8270, 8270d	Semivolatile organic compounds by gas chromatography/mass spectrometry (GC/MS)			DB-UI 8270D 30 m x 0.25 mm, 0.25 µm	122-9732
				DB-UI 8270D 20 m x 0.18 mm, 0.36 µm	121-9723
				HP-5ms 30 m x 0.25 mm, 0.50 µm	19091S-133
		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		

(Continued)

Solid Waste

EPA Method	Application	Column	Part No.
8275a	Semivolatile organic compounds (PAHs and PCBs) in soils/sludges and solid wastes using thermal extraction/gas chromatography/mass spectrometry (TE/GC/MS)	DB-5ms 30 m x 0.25 mm, 1.00 µm	122-5533
		HP-5ms 30 m x 0.25 mm, 0.50 µm	19091S-133
		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
		DB-5ms Ultra Inert 60 m x 0.25 mm, 0.25 µm	122-5562UI
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
		DB-5ms Ultra Inert 60 m x 0.25 mm, 0.25 µm	122-5562UI
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
		DB-5ms Ultra Inert 60 m x 0.25 mm, 0.25 µm	122-5562UI
8410	Gas chromatography/Fourier transform infrared (GC/FT-IR) spectrometry for semivolatile organics: capillary column	HP-5ms 30 m x 0.32 mm, 1.00 µm	19091S-213
		DB-5ms 30 m x 0.32 mm, 1.00 µm	123-5533
		VF-5ms 30 m x 0.32 mm, 0.25 µm	CP8955
		DB-WAX 30 m x 0.25 mm, 0.50 µm	122-7033
8430	Analysis of bis(2-chloroethyl) ether and hydrolysis products by direct aqueous injection (GC/FT-IR)	HP-INNOWax 30 m x 0.25 mm, 0.50 µm	19091N-233
		VF-WAXms 30 m x 0.53 mm, 1.00 µm	CP9215
		DB-WAX 30 m x 0.25 mm, 0.50 µm	122-7033

TIPS & TOOLS

The Agilent J&W DB-624UI GC columns are optimized for fast analysis of volatile compounds. Learn more at www.agilent.com/chem/624UI



United States Pharmacopoeia (USP) GC Phases

USP	Phase Composition	Agilent Phase Recommendation
G1	Dimethylpolysiloxane oil	HP-1*, DB-1*, HP-1ms*, DB-1ms*, VF-1ms, CP-Sil 5 CB, CP-Sil 5 CB Low Bleed/MS
G2	Dimethylpolysiloxane gum	HP-1*, DB-1*, HP-1ms*, DB-1ms*, VF-1ms, CP-Sil 5 CB, CP-Sil 5 CB Low Bleed/MS, CP-SimDist
G3	50% Phenyl 50% methylpolysiloxane	DB-17*, HP-50+*, VF-17ms, CP-Sil 24 CB, CP-Sil 24 CB Low Bleed/MS
G5	3-cyanopropyl polysiloxane	DB-23, VF-23ms, Select for FAME, CP-Sil 88
G6	Trifluoropropylmethylpolysilicone	DB-200, DB-210, VF-200ms
G7	50% 3-cyanopropyl 50% phenylmethylsilicone	DB-225, DB-225ms, CP-Sil 43 CB
G8	80% Bis(3-cyanopropyl) 20% 3-cyanopropylphenylpolysiloxane or 90% 3-cyanopropyl 10% phenylmethylsiloxane	HP-88, VF-23ms
G14	Polyethylene glycol (average molecular weight of 950-1,050)	DB-WAX, VF-WAXms, CP-Wax 52 CB
G15	Polyethylene glycol (average molecular weight of 3,000-3,700)	DB-WAX, VF-WAXms, CP-Wax 52 CB
G16	Polyethylene glycol (average molecular weight of 15,000)	DB-WAX*, VF-WAXms, CP-Wax 52 CB
G17	75% Phenyl 25% methylpolysiloxane	DB-17, HP-50+, VF-17ms, CP-Sil 24 CB, CP-Sil 24 CB Low Bleed/MS
G19	25% Phenyl 25% cyanopropylmethylsilicone	DB-225*, DB-225ms, CP-Sil 43 CB
G20	Polyethylene glycol (average molecular weight of 380-420)	DB-WAX, VF-WAXms, CP-Wax 52 CB
G25	Polyethylene glycol TPA (Carbowax 20M terephthalic acid)	DB-FFAP*, HP-FFAP*, CP-Wax 58 (FFAP) CB, CP-FFAP CB
G27	5% Phenyl 95% methylpolysiloxane	DB-5*, HP-5*, HP-5ms*, DB-5ms, VF-5ms, VF-5ht, CP-Sil 8 CB, CP-Sil 8 CB Low Bleed/MS
G28	25% Phenyl 75% methylpolysiloxane	DB-35, HP-35, DB-35ms, VF-35ms
G32	20% Phenylmethyl 80% dimethylpolysiloxane	DB-35, HP-35, DB-35ms, VF-35ms
G35	Polyethylene glycol & diepoxide esterified with nitroterephthalic acid	DB-FFAP*, HP-FFAP*, CP-Wax 58 (FFAP) CB, CP-FFAP CB
G36	1% Vinyl 5% phenylmethylpolysiloxane	DB-5, HP-5, HP-5ms, DB-5ms, VF-5ms, VF-5ht, CP-Sil 8 CB, CP-Sil 8 CB Low Bleed/MS
G38	Phase G1 plus a tailing inhibitor	DB-1, HP-1, HP-1ms, DB-1ms, VF-1ms, CP-Sil 5 CB, CP-Sil 5 CB Low Bleed/MS
G39	Polyethylene glycol (average molecular weight of 1,500)	DB-WAX, VF-WAXms, CP-Wax 52 CB
G41	Phenylmethyldimethylsilicone (10% phenyl substituted)	DB-5, HP-5, HP-5ms, DB-5ms, VF-5ms, VF-5ht, CP-Sil 8 CB, CP-Sil 8 CB Low Bleed/MS
G42	35% Phenyl 65% dimethylvinylsiloxane	DB-35*, HP-35*, DB-35ms, VF-35ms
G43	6% Cyanopropylphenyl 94% dimethylpolysiloxane	DB-624*, DB-1301, VF-624ms, VF-1301ms, CP-1301, CP-Select 624 CB
G45	Divinylbenzene-ethylene glycol-dimethacrylate	HP-PLOT U*, CP-PoraBOND U, CP-PoraPLOT U
G46	14% Cyanopropylphenyl 86% methylpolysiloxane	DB-1701*, VF-1701ms, CP-Sil 19 CB, CP-Sil 19 CB Low Bleed/MS

*Indicates an exact equivalent



TIPS & TOOLS

Gain extra confidence to meet high standards with Agilent's solution for the revised USP <467>. Visit www.agilent.com/chem/usp467

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, 50.00 µm	19095P-MS9
		HP PLOT Q, 15 m x 0.53 mm, 40.00 µm	19095P-Q03
		CP-Molsieve 5Å, 10 m x 0.53 mm, 50.00 µm	CP7537
		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, 50.00 µm	19095P-MS9
		HP PLOT Q, 15 m x 0.53 mm, 40.00 µm	19095P-Q03
		CP-Molsieve 5Å, 10 m x 0.53 mm, 50.00 µm	CP7537
		CP-Molsieve 5Å, 25 m x 0.25 mm, 30.00 µm	CP7533
D 1983	Standard Test Method for Fatty Acid Composition by Gas-Liquid Chromatography of Methyl Esters	DB-WAX, 30 m x 0.25 mm, 0.25 µm	122-7032
D 2163	Standard Test Method for the Analysis of Liquefied Petroleum (LP) Gases and Propene Concentrates by GC	HP PLOT Al2O3 "KCl", 30 m x 0.53 mm, 15.00 µm	19095P-K23
		HP PLOT Al2O3 "S", 30 m x 0.53 mm, 15.00 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 C ₂ through C ₅ 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 C ₂ and Lighter Hydrocarbon Products by GC	HP PLOT, 30 m x 0.53 mm, 50.00 µm	19095P-MS0
		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

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ASTM Methods			
Method	Title	Recommended Agilent Column	Part No.
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
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, 50 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 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, 1.00 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 C ₆₀	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	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

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ASTM Methods			
Method	Title	Recommended Agilent Column	Part No.
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
D 3447	Standard Test Method for Purity of Halogenated Organic Solvents	DB-624, 30 m x 0.53 mm, 3.00 µm	125-1334
D 3452	Standard Practice for Rubber – Identification by Pyrolysis-Gas Chromatography	CP-Sil 5 CB, 30 m x 0.53 mm, 1.50 µm	CP8735
D 3465	Standard Test Method for Purity of Monomeric Plasticizers by Gas Chromatography	CP-Sil 5 CB, 25 m x 0.32 mm, 0.52 µm	CP8430
		CP-Sil 5 CB, 30 m x 0.53 mm, 1.50 µm	CP8735
D 3524	Standard Test Method for Diesel Fuel Diluent in Used Diesel Engine Oils by Gas Chromatography	CP-SimDist UltiMetal, 10 m x 0.53 mm, 0.53 µm	CP7592
D 3545	Standard Test Method for Alcohol Content and Purity of Acetate Esters by GC	DB-624, 30 m x 0.53 mm, 3.00 µm	125-1334
D 3606	Standard Test Method for Determination of Benzene and Toluene in Finished Motor and Aviation Gasoline by Gas Chromatography	VF-1ms, 15 m x 0.25 mm, 0.10 µm	CP8906
		CP-TCEP for Alcohols in Gasoline, 50 m x 0.25 mm, 0.40 µm	CP7525
D 3687	Standard Test Method for Analysis of Organic Vapors Collected by the Activated Charcoal Tube Adsorption Method	DB-WAX, 30 m x 0.53 mm, 1.00 µm	125-7032
		DB-WAX, 30 m x 0.45 mm, 0.85 µm	124-7032
		CP-WAX 52 CB, 30 m x 0.32 mm, 0.50 µm	CP8763
		CP-WAX 52 CB, 30 m x 0.53 mm, 1.00 µm	CP8738
D 3695	Standard Test Method for Volatile Alcohols in Water by Direct Aqueous-Injection GC	DB-WAX, 30 m x 0.53 mm, 1.00 µm	125-7032
		CP-SimDist UltiMetal, 10 m x 0.53 mm, 0.53 µm	CP7592
D 3710	Standard Test Method for Boiling Range Distribution of Gasoline and Gasoline Fractions by GC	DB-2887, 10 m x 0.53 mm, 3.00 µm	125-2814
D 3749	Standard Test Method for Residual Vinyl Chloride Monomer in Poly(Vinyl Chloride) Resins by Gas Chromatographic Headspace Technique	PoraBOND Q, 10 m x 0.32 mm, 5.00 µm	CP7350
		PoraBOND Q, 10 m x 0.53 mm, 10.00 µm	CP7353

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ASTM Methods			
Method	Title	Recommended Agilent Column	Part No.
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	PoraBOND Q, 25 m x 0.32 mm, 5.00 µm	CP7351
		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
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	PoraBOND Q, 25 m x 0.53 mm, 10.00 µm	CP7354
D 4367	Standard Test Method for Benzene in Hydrocarbon Solvents by Gas Chromatography	VF-1ms, 15 m x 0.25 mm, 0.10 µm	CP8906
		CP-TCEP for Alcohols in Gasoline, 50 m x 0.25 mm, 0.40 µm	CP7525
D 4415	Standard Test Method for Determination of Dimer in Acrylic Acid	DB-FFAP, 30 m x 0.32 mm, 0.25 µm	123-3232
D 4424	Standard Test Method for Butylene Analysis by GC	HP PLOT Al ₂ O ₃ S, 50 m x 0.53 mm, 15.00 µm	19095P-S25
		CP-Al203/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

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ASTM Methods			
Method	Title	Recommended Agilent Column	Part No.
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 μ m	CP7525
D 4509	Standard Test Methods for Determining the 24-Hour Gas (AIR) Space Acetaldehyde Content of Freshly Blown PET Bottles	PoraBOND Q, 25 m x 0.32 mm, 5.00 μ m	CP7351
		PoraBOND Q, 25 m x 0.53 mm, 10.00 μ m	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 μ m	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 μ m	124-3232
		CP-Wax 58 FFAP CB, 25 m x 0.53 mm, 1.00 μ m	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 μ m	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 μ m	124-7032
D 4947	Standard Test Method for Chlordane and Heptachlor Residues in Indoor Air	DB-5, 30 m x 0.53 mm, 1.50 μ m	125-5032
		DB-608, 30 m x 0.53 mm, 0.83 μ m	125-1730
D 4961	Standard Test Method for GC Analysis of Major Organic Impurities in Phenol Produced by the Cumene Process	DB-FFAP, 30 m x 0.45 mm, 0.85 μ m	124-3232
		HP PLOT Q, 15 m x 0.53 mm, 40.00 μ m	19095P-003
D 4983	Standard Test Method for Cyclohexylamine Morpholine and Diethylaminoethanol in Water and Condensed Steam by Direct Aqueous Injection GC	HP-5ms, 30 m x 0.32 mm, 1.00 μ m	19091S-213
		CAM, 30 m x 0.53 mm, 1.00 μ m	115-2132
D 5008	Standard Test Method for Ethyl Methyl Pentonal Content and Purity Value of 2-Ethylhexanol by GC	HP-1, 15 m x 0.53 mm, 5.00 μ m	19095Z-621
		HP-INNOWax, 30 m x 0.32 mm, 0.25 μ m	19091N-113
D 5060	Standard Test Method for Determining Impurities in High-Purity Ethylbenzene by GC	HP-INNOWax, 60 m x 0.32 mm, 0.50 μ m	19091N-216
		CP-WAX 52 CB, 60 m x 0.32 mm, 0.50 μ m	CP8773
D 5075	Standard Test Method for Nicotine in Indoor Air	DB-5, 30 m x 0.53 mm, 1.50 μ m	125-5032
		DB-5, 30 m x 0.32 mm, 1.00 μ m	123-5033
D 5134	Standard Test Method for Detailed Analysis of Petroleum Naphthas Through n-Nonane by Capillary GC	HP-PONA, 50 m x 0.20 mm, 0.50 μ m	19091S-001
		CP-Sil PONA para ASTM D 5134, 50 m x 0.21 mm, 0.50 μ m	CP7531
D 5135	Standard Test Method for Analysis of Styrene by Capillary GC	HP-INNOWax, 60 m x 0.32 mm, 0.50 μ m	19091N-216
		CP-WAX 52 CB, 60 m x 0.32 mm, 0.50 μ m	CP8773
D 5175	Standard Test Method for Organohalide Pesticides and Polychlorinated Biphenyls in Water by Microextraction and GC	DB-1, 30 m x 0.32 mm, 1.00 μ m	123-1033
		DB-608, 30 m x 0.32 mm, 0.50 μ m	123-1730
		DB-XLB, 30 m x 0.25 mm, 0.25 μ m	122-1232

(Continued)

ASTM Methods			
Method	Title	Recommended Agilent Column	Part No.
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, 40.00 µm	19095P-004
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
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	122-10A6E
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

(Continued)

ASTM Methods			
Method	Title	Recommended Agilent Column	Part No.
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, 40.00 µm	19095P-Q03
		HP PLOT U, 30 m x 0.53 mm, 20.00 µm	19095P-U04
D 5508	Standard Test Method for Determination of Residual Acrylonitrile Monomer in Styrene-Acrylonitrile Co-polymer Resins and Nitrile-Butadiene Rubber by Headspace Capillary GC	HP PLOT Q, 30 m x 0.53 mm, 40.00 µm	19095P-Q04
D 5580	Standard Test Method for Determination of Benzene, Toluene, Ethylbenzene, p/m-Xylene, C ₉ 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
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, 0.50 µm	128-1056
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, 1.40 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

(Continued)

ASTM Methods			
Method	Title	Recommended Agilent Column	Part No.
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, C ₈ -C ₁₂ 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, 15.00 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 °C by GC	DB-HT SimDis, 5 m x 0.53 mm, 0.15 µm	145-1001
D 6387	Standard Test Methods for Composition of Turpentine and Related Terpene Products by Capillary Gas Chromatography	CP-WAX 52 CB, 30 m x 0.32 mm, 0.50 µm	CP8763
		CP-WAX 52 CB, 30 m x 0.53 mm, 1.00 µm	CP8738
D 6417	Standard Test Method for Estimation of Engine Oil Volatility by Capillary GC	DB-HT SimDis, 5 m x 0.53 mm, 0.15 µm	145-1001
D 6584	Standard Test Method for Determination of Total Monoglyceride, Total Diglyceride, Total Triglyceride, and Free and Total Glycerin in B-100 Biodiesel Methyl Esters by Gas Chromatography	Select Biodiesel, 15 m x 0.32 mm, 0.10 µm	CP9078
D 6806	Standard Practice for Analysis of Halogenated Organic Solvents and Their Admixtures by Gas Chromatography	CP-Sil 5 CB, 50 m x 0.53 mm, 5.00 µm	CP7685
E 1616	Standard Test Method for Analysis of Acetic Anhydride Using GC	HP-1, 50 m x 0.32 mm, 0.52 µm	19091Z-115
E 1863	Standard Test Method for Analysis of Acrylonitrile by GC	DB-WAXetr, 60 m x 0.32 mm, 1.00 µm	123-7364
E 0202	Standard Test Method for Analysis of Ethylene Glycols and Propylene Glycols	DB-624, 30 m x 0.53 mm, 3.00 µm	125-1334
		CP-Wax 57 CB for Glycols and Alcohols, 25 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

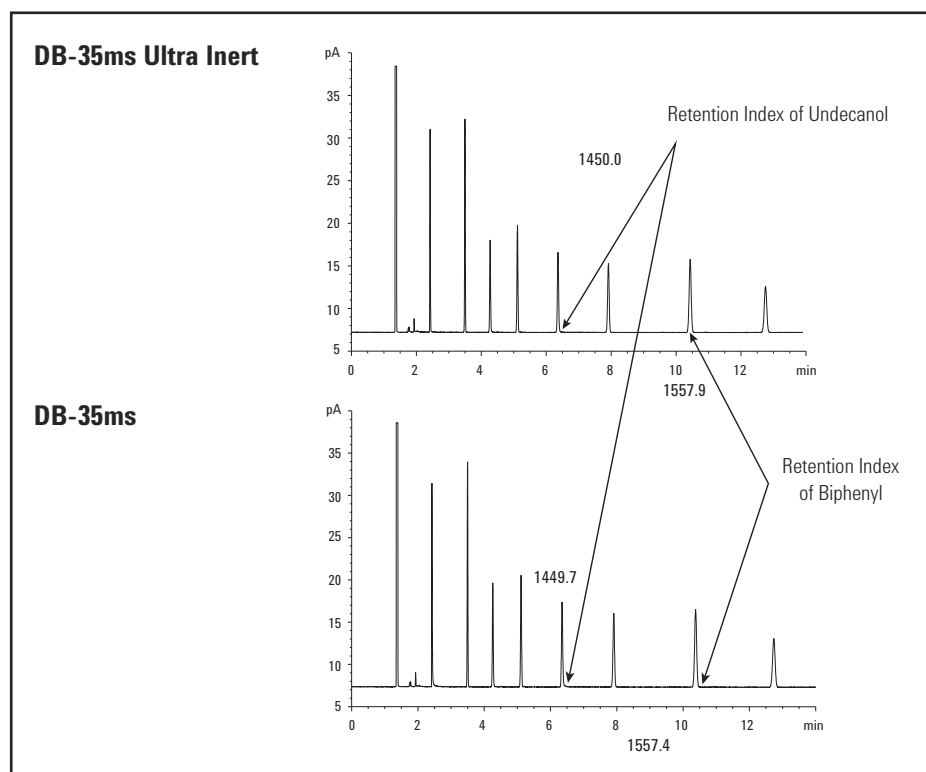
GC Capillary Columns

Agilent J&W Ultra Inert GC Columns

Perform trace-level analysis with the utmost confidence

As the GC industry's premier measurement company, Agilent is uniquely positioned to ensure the inertness of the surfaces your sample touches, so you can achieve the parts-per-billion – or parts-per-trillion – detection levels for your most demanding analyses. Agilent Ultra Inert components work together to deliver industry-leading results: the Agilent GC instrument, Ultra Inert liner and Agilent J&W Ultra Inert GC column family.

The Agilent J&W Ultra Inert GC column family pushes industry standards for consistent column inertness and exceptionally low column bleed, resulting in lower detection limits and more accurate data for difficult analytes. Each Ultra Inert column is tested with the industry's most demanding test probe mixture and we prove it with a performance summary sheet shipped with each column.



With Agilent J&W Ultra Inert GC columns, selectivity remains the same, allowing you to confidently integrate Ultra Inert columns into your current methods.

The industry's most rigorous test probe mixture ensures consistent column inertness – and results

A strong test probe mixture can highlight deficiencies in column activity, while a weak mixture can actually mask such deficiencies.

The test probes in Agilent's Ultra Inert test probe mixture have low molecular weights, low boiling points and no steric shielding of their active groups. These characteristics allow the probative portion of the test molecules to penetrate – and fully interact with – the stationary phase and column surface.

Commonly used, less demanding test probes

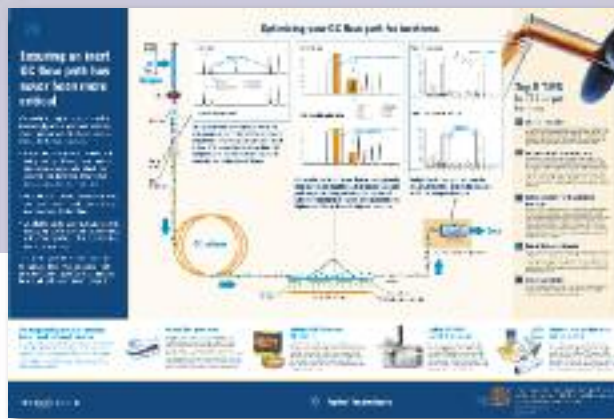
1. 1-Octanol	4. 2,6-Dimethylaniline	7. 1-Decanol
2. n-Undecane	5. n-Dodecane	8. n-Tridecane
3. 2,6-Dimethylphenol	6. Napthalene	9. Methyldecanoate

TIPS & TOOLS



Clearly Better Inertness

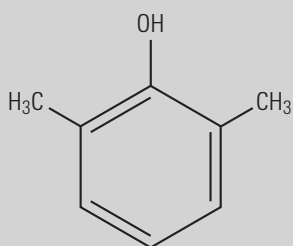
To learn more and order your free poster, visit www.agilent.com/chem/ultraintert



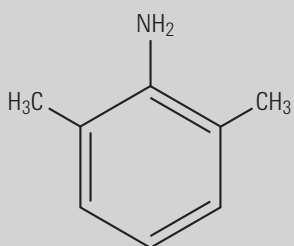
Agilent's more demanding Ultra Inert test probe mixture for 5ms, 1ms, and 35ms Ultra Inert columns

Ultra Inert 5ms Columns			Ultra Inert 1ms Columns			Ultra Inert 35ms Columns		
Elution Order	Test Probe	Functional Test	Elution Order	Test Probe	Functional Test	Elution Order	Test Probe	Functional Test
1.	1-Propionic acid	Basicity	1.	1-Propionic acid	Basicity	1.	1-Octene	Polarity
2.	1-Octene	Polarity	2.	1-Octene	Polarity	2.	1-Butyric acid	Basicity
3.	n-Octane	Hydrocarbon marker	3.	n-Octane	Hydrocarbon marker	3.	n-Nonane	Hydrocarbon marker
4.	4-Picoline	Acidity	4.	1,2-Butanediol	Silanol	4.	4-Picoline	Acidity
5.	n-Nonane	Hydrocarbon marker	5.	4-Picoline	Acidity	5.	n-Propylbenzene	Polarity
6.	Trimethyl phosphate	Acidity	6.	Trimethyl phosphate	Acidity	6.	1-Heptanol	Silanol, Polarity
7.	1,2-Pentanediol	Silanol	7.	n-Propylbenzene	Hydrocarbon marker	7.	1,2-Pentanediol	Silanol
8.	n-Propylbenzene	Hydrocarbon marker	8.	1-Heptanol	Silanol	8.	3-Octanone	Polarity
9.	1-Heptanol	Silanol	9.	3-Octanone	Polarity	9.	Trimethyl phosphate	Acidity
10.	3-Octanone	Polarity	10.	tert-Butylbenzene	Hydrocarbon marker	10.	tert-Butylbenzene	Hydrocarbon marker
11.	n-Decane	Efficiency	11.	n-Decane	Efficiency	11.	n-Undecane	Efficiency

Chemical Structures

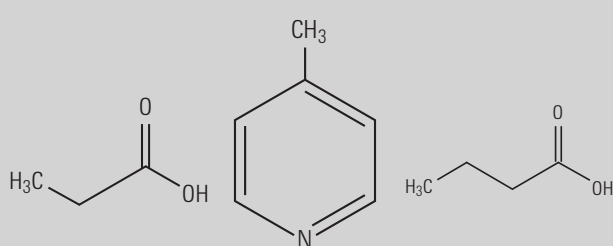


2,6-Dimethylphenol



2,6-Dimethylaniline

Weak probe molecules: The acidic and basic portions of these molecules are shielded by the two methyl groups on their phenyl rings, making them less probative.



1-Propionic acid

4-Picoline

1-Butyric acid

Strong probe molecules: The probes in Agilent's Ultra Inert test probe mixture are highly probative of the stationary phase and surface. Note, too, that the active end of each compound is available to interact with any active sites on the column.

DB-1ms Ultra Inert

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
<i>0.18</i>	<i>20</i>	<i>0.18</i>	<i>-60 to 325/350</i>	<i>121-0122UI</i>	
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	

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

HP-1ms Ultra Inert

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
<i>0.18</i>	<i>20</i>	<i>0.18</i>	<i>-60 to 325/350</i>	<i>19091S-677UI</i>	<i>19091S-677UIE</i>
0.25	15	0.25	-60 to 325/350	19091S-931UI	19091S-931UIE
		0.25	-60 to 325/350	19091S-933UI	19091S-933UIE
	30	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	

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

Similar Phases: SPB-1, Rtx-1, BP-1, OV-1, OV-101, 007-1(MS), SP-2100, SE-30, ZB-1, AT-1, MDN-1, ZB-1, ZB-1ms

TIPS & TOOLS



Learn how to ensure an inert GC flow path with the Agilent Ultra Inert Solutions Brochure. Order yours at www.agilent.com/chem/Ulorder

DB-5ms Ultra Inert

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM Module
<i>0.18</i>	<i>20</i>	<i>0.18</i>	<i>-60 to 325/350</i>	<i>121-5522UI</i>		<i>121-5522UILTM</i>
		<i>0.36</i>	<i>-60 to 325/350</i>	<i>121-5523UI</i>		<i>121-5523UILTM</i>
0.25	15	0.25	-60 to 325/350	122-5512UI		122-5512UILTM
		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
		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		

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

Similar Phases: Rtx-5ms, Rxi-5ms, Rxi-5Sil MS, VF-5ms, PTE-5, BPX-5, AT-5ms, ZB-5ms, ZB-5MSi, SLB-5ms, Equity-5

HP-5ms Ultra Inert

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM Module
HP-5ms Ultra Inert						
<i>0.18</i>	<i>20</i>	<i>0.18</i>	<i>-60 to 325/350</i>	<i>19091S-577UI</i>		<i>19091S-577UILTM</i>
0.25	15	0.25	-60 to 325/350	19091S-431UI		19091S-431UILTM
	30	0.25	-60 to 325/350	19091S-433UI	19091S-433UIE	19091S-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

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

Similar Phases: Rtx-5ms, Rxi-5ms, Rxi-5Sil MS, PTE-5, BPX-5, AT-5ms, ZB-5ms, SLB-5ms, Equity-7

DB-35ms Ultra Inert

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
<i>0.18</i>	<i>20</i>	<i>0.18</i>	<i>50 to 340/360</i>	<i>121-3822UI</i>
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

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

Similar Phases: Rtx-35, Rtx-35ms, Rxi-35Sil MS, SPB-35, AT-35, Sup-Herb, MDN-35, BPX-34, ZB-35, ZB-35 ht

DB-624 Ultra Inert

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
<i>0.18</i>	<i>20</i>	<i>1</i>	<i>-20 to 260</i>	<i>121-1324UI</i>
0.25	30	1.4	-20 to 260	122-1334UI
	60	1.4	-20 to 260	122-1364UI
0.32	30	1.8	-20 to 260	123-1334UI
	60	1.8	-20 to 260	123-1364UI
0.53	30	3	-20 to 260	125-1334UI
	75	3	-20 to 260	125-1374UI

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

DB-UI 8270D

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
<i>0.18</i>	<i>20</i>	<i>0.36</i>	<i>-60 to 325/350</i>	<i>121-9723</i>
				<i>621-9723, 6/pk*</i>
0.25	30	0.25	-60 to 325/350	122-9732
				622-9732, 6/pk*
				122-9736
		0.50	-60 to 325/350	

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

*Only available in the U.S.

TIPS & TOOLS



Complete your ultra inert flow path with the industry leading Agilent Ultra Inert Inlet Liner, www.agilent.com/chem/uiliner



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 GC columns can reduce your sample run time by 50% or more without compromising resolution.

Unlike other manufacturers' 0.1 mm id columns, Agilent's 0.15 and 0.18 mm id 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.

The Agilent J&W High Efficiency GC columns throughout this section are displayed using italicized descriptions and part numbers in the ordering tables.

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 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.

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 indicated by 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.

TIPS & TOOLS



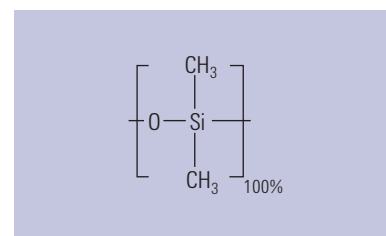
Check out Agilent's complete line of sample preparation products for any type of GC and GC/MS analysis at www.agilent.com/chem/sampleprep



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

Similar Phases: SPB-1, Rtx-1, BP-1, OV-1, OV-101, 007-1(MS), SP-2100, SE-30, ZB-1, AT-1, MDN-1, ZB-1, ZB-1ms



Structure of DB-1ms

DB-1ms

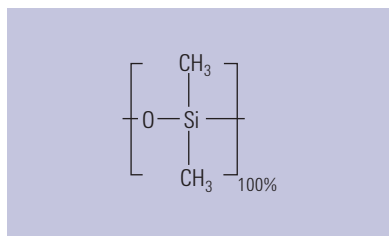
ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM Module	5975T LTM Toroid
0.10	10	0.10	-60 to 340/360	127-0112		127-0112LTM	
		0.40	-60 to 340/360	127-0113			
	20	0.10	-60 to 340/360	127-0122			
		0.40	-60 to 340/360	127-0123			127-0123LTM
<i>0.18</i>	<i>20</i>	<i>0.18</i>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

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

TIPS & TOOLS

Learn how the Agilent 5975T LTM GC/MSD can deliver the rapid, reliable results you need in the field or in the lab, www.agilent.com/chem/5975T





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

Similar Phases: Rtx-1ms, Rxi-1ms, MDN-1, AT-1, ZB-1ms, Equity-1

HP-1ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM Module	5975T LTM Toroid
<i>0.18</i>	<i>20</i>	<i>0.18</i>	<i>-60 to 325/350</i>	<i>19091S-677</i>	<i>19091S-677E</i>	<i>19091S-677LTM</i>	<i>29091S-677LTM</i>
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	
	60	1.00	-60 to 325/350	19091S-733	19091S-733E	19091S-733LTM	
0.32	60	0.25	-60 to 325/350	19091S-936	19091S-936E		
	15	0.25	-60 to 325/350	19091S-911		19091S-911LTM	
	25	0.52	-60 to 325/350	19091S-612		19091S-612LTM	
	30	0.25	-60 to 325/350	19091S-913	19091S-913E	19091S-913LTM	
		1.00	-60 to 325/350	19091S-713		19091S-713LTM	
60	0.25	-60 to 325/350	19091S-916				

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

VF-1ms

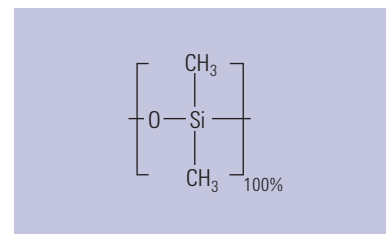
- Highly inert, non-polar 100% dimethylpolysiloxane phase, low-bleed GC column providing increased sensitivity over a broad array of applications
- Ultra low bleed specification of 1 pA @ 325 °C (30 m, 0.25 mm, 0.25 µm) for trace analysis with MS
- QC test results for retention index, efficiency, selectivity and bleed is reported with every column
- 0.15 mm id columns available for high efficiency GC and GC/MS analyses
- Supplied with EZ-GRIP to simplify column installation, coupling and operation

Similar Phases: Rtx-1ms, Rxi-1ms, MDN-1, AT-1, ZB-1ms, Equity-1

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	
<i>0.15</i>	<i>10</i>	<i>0.15</i>	<i>-60 to 325/350</i>	<i>CP9030</i>	
	<i>15</i>	<i>0.15</i>	<i>-60 to 325/350</i>	<i>CP5881</i>	
	<i>20</i>	<i>0.15</i>	<i>-60 to 325/350</i>	<i>CP9031</i>	
		<i>0.60</i>	<i>-60 to 325/350</i>	<i>CP9032</i>	<i>CP903215</i>
0.20	12	0.33	-60 to 325/350	CP8904	
	25	0.33	-60 to 325/350	CP8905	

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers



Structure of VF-1ms

(Continued)



Column shown with EZ-GRIP

VF-1ms

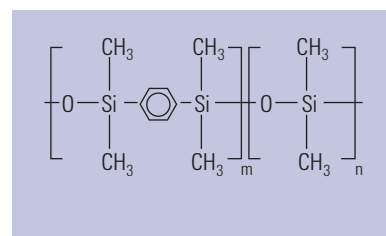
ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
0.25	15	0.10	-60 to 325/350	CP8906	CP8906I5
		0.25	-60 to 325/350	CP8907	CP8907I5
		1.00	-60 to 325/350	CP8908	CP8908I5
	25	0.25	-60 to 325/350	CP8909	
		0.40	-60 to 325/350	CP8910	
	30	0.10	-60 to 325/350	CP8911	CP8911I5
		0.25	-60 to 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	

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

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
- Exact replacement of HP-5TA
- Close equivalent to USP Phase G27
- Test mix available

Similar Phases: Rtx-5ms, Rxi-5ms, Rxi-5Sil MS, PTE-5, BPX-5, AT-5ms, ZB-5ms, ZB-5MSi, SLB-5ms, Equity-5



Structure of DB-5ms

TIPS & TOOLS

Learn more about the Agilent 7890A GC System at www.agilent.com/chem/7890A



DB-5ms

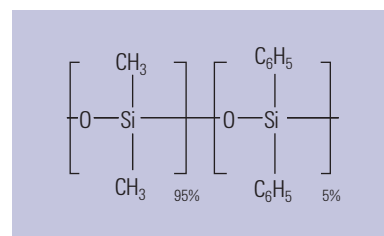
ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM Module	5975T LTM Toroid
<i>0.18</i>	<i>20</i>	<i>0.18</i>	<i>-60 to 325/350</i>	<i>121-5522</i>	<i>121-5522E</i>	<i>121-5522LTM</i>	<i>221-5522LTM</i>
		<i>0.36</i>	<i>-60 to 325/350</i>	<i>121-5523</i>		<i>121-5523LTM</i>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

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

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

Similar Phases: Rtx-5ms, Rxi-5ms, Rxi-5Sil MS, PTE-5, BPX-5, AT-5ms, ZB-5ms, SLB-5ms, Equity-5

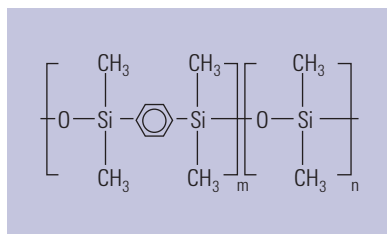


Structure of HP-5ms

HP-5ms

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM Module	5975T LTM Toroid
<i>0.18</i>	<i>20</i>	<i>0.18</i>	<i>-60 to 325/350</i>	<i>19091S-577</i>		<i>19091S-577LTM</i>	
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			

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers



Structure of VF-5ms

VF-5ms

- Highly inert 5% phenylmethyl column for increased sensitivity, accuracy and instrument uptime
- Minimal column bleed improves sensitivity – ultra low bleed specification of 1 pA @ 325 °C (30 m x 0.25 mm, 0.25 μm)
- Slightly higher polarity than VF-1ms, results in improved selectivity for aromatic compounds; selectivity and excellent inertness make these columns applicable for a wide range of semi-polar and even polar compounds
- 0.15 mm id columns available for high efficiency GC and GC/MS analyses
- QC test results for retention index, efficiency, selectivity and bleed is reported with every column
- Supplied with EZ-GRIP to simplify column installation, coupling and operation

Similar Phases: Rtx-5ms, Rxi-5ms, Rxi-5Sil MS, PTE-5, BPX-5, AT-5ms, ZB-5ms, ZB-5MSi, SLB-5ms, Equity-5

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	<i>10</i>	<i>0.15</i>	<i>-60 to 325/350</i>	<i>CP9034</i>	<i>CP903415</i>
	<i>15</i>	<i>0.15</i>	<i>-60 to 325/350</i>	<i>CP9035</i>	
	<i>20</i>	<i>0.15</i>	<i>-60 to 325/350</i>	<i>CP9036</i>	<i>CP903615</i>
		<i>0.30</i>	<i>-60 to 325/350</i>	<i>CP9037</i>	
		<i>0.60</i>	<i>-60 to 325/350</i>	<i>CP9038</i>	
	<i>40</i>	<i>0.15</i>	<i>-60 to 325/350</i>	<i>CP9039</i>	<i>CP903915</i>
<i>0.60</i>		<i>-60 to 325/350</i>	<i>CP9040</i>		
0.20	12	0.33	-60 to 325/350	CP8935	CP893515
	25	0.33	-60 to 325/350	CP8936	CP893615
	50	0.33	-60 to 325/350	CP8937	

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

(Continued)

TIPS & TOOLS



As part of Agilent's ongoing commitment to be your partner in chromatography, we have created a series of GC Troubleshooting videos, featuring Daron Decker, GC Applications Specialist, and Herb Brooks, Agilent Service Engineer. To view the videos, visit www.agilent.com/chem/gctroubleshooting



VF-5ms

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	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
- 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)

Similar Phases: Rtx-XLB, MDN-12, ZB-XLB, ZB-XLB HT

DB-XLB

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

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

VF-Xms

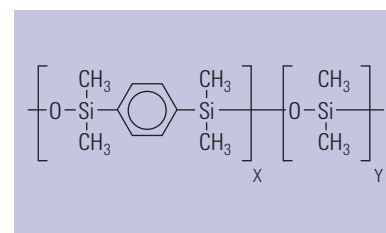
- High arylene modified phase for accurate results
- Isothermal applications up to 340 °C for a broad application range
- Ideal for confirmational analyses – more polar alternative to 5% phenyl columns
- Ultra low bleed delivers ultimate sensitivity and signal-to-noise ratio
- Provides exceptionally high selectivity for semivolatle compounds such as pesticides and delivers high resolution with short analysis time
- Very unique selectivity for chlorinated compounds
- QC test results for retention index, efficiency, selectivity and bleed is reported with every column
- 0.15 mm id columns available for high efficiency GC and GC/MS analyses
- Supplied with an EZ-GRIP to simplify column installation, coupling and operation

Similar Phases: Rtx-XLB, MDN-12, ZB-XLB, ZB-XLB HT

VF-Xms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
<i>0.15</i>	<i>20</i>	<i>0.15</i>	<i>30 to 340/360</i>	<i>CP9041</i>	
0.20	12	0.33	30 to 340/360	CP8800	
	25	0.33	30 to 340/360	CP8801	
0.25	15	0.10	30 to 340/360	CP8802	
		0.25	30 to 340/360	CP8803	
	30	0.10	30 to 340/360	CP8805	
		0.25	30 to 340/360	CP8806	CP880615
		0.50	30 to 340/360	CP8807	
	60	1.00	30 to 340/360	CP8808	
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	

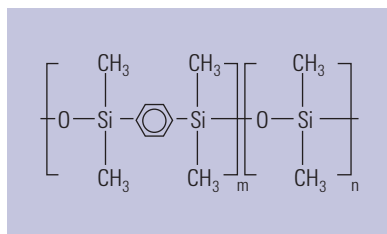
Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers



Structure of VF-Xms



Column shown with EZ-GRIP



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

Similar Phases: Rtx-35, Rtx-35ms, Rxi-35Sil MS, SPB-35, AT-35, Sup-Herb, MDN-35, BPX-34, ZB-35, ZB-35 ht

DB-35ms

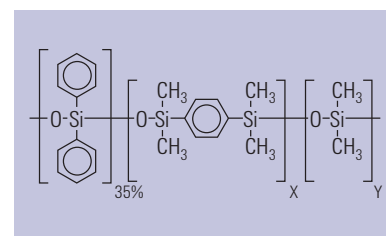
ID (mm)	Length (m)		Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890	5975T
							LTM Module	LTM Toroid
<i>0.18</i>	<i>20</i>	<i>0.18</i>	<i>50 to 340/360</i>	<i>121-3822</i>	<i>121-3822E</i>	<i>121-3822LTM</i>	<i>221-3822LTM</i>	
0.20	15	0.33	50 to 340/360	128-3812				
	25	0.33	50 to 340/360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

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

VF-35ms

- Stabilized arylene-modified equivalent of a 35% phenylmethyl phase
- Ideal for dual column confirmational analyses
- Ultra low bleed, highly stable column with a programmable maximum temperature of 360 °C
- Medium polarity column ideal for trace environmental and chemical analyses
- 0.15 mm id columns available for high efficiency GC and GC/MS analyses
- Supplied with an EZ-GRIP to simplify column installation, coupling and operation

Similar Phases: Rtx-35, Rtx-35ms, Rxi-35Sil MS, SPB-35, AT-35, Sup-Herb, MDN-35, BPX-34, ZB-35, ZB-35 ht

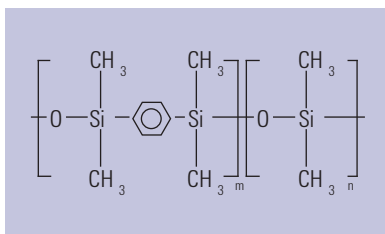


Structure of VF-35ms

VF-35ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
<i>0.15</i>	<i>10</i>	<i>0.15</i>	<i>40 to 340/360</i>	<i>CP5887</i>	
	<i>15</i>	<i>0.15</i>	<i>40 to 340/360</i>	<i>CP5888</i>	
	<i>20</i>	<i>0.15</i>	<i>40 to 340/360</i>	<i>CP5889</i>	
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	
		0.10	40 to 340/360	CP8875	
	30	0.15	40 to 340/360	CP8876	
		0.25	40 to 340/360	CP8877	CP887715
		0.50	40 to 340/360	CP8878	CP887815
	60	1.00	40 to 340/360	CP8879	
		0.25	40 to 340/360	CP8880	
0.32	15	0.25	40 to 340/360	CP8881	
		0.25	40 to 340/360	CP8882	
	30	0.50	40 to 340/360	CP8883	CP888315
		1.00	40 to 340/360	CP8884	
		0.25	40 to 340/360	CP8885	
0.53	15	1.00	40 to 325/350	CP8886	
		0.50	40 to 325/350	CP8887	
	30	1.00	40 to 325/350	CP8888	

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers



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
- Excellent choice for CLP pesticides

Similar Phases: Rxi-17Sil MS, Rtx-50, 007-17, SP-2250, SPB-50, BPX-50, SPB-17, AT-50

DB-17ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM Module	5975T LTM Toroid
<i>0.18</i>	<i>20</i>	<i>0.18</i>	<i>40 to 320/340</i>	<i>121-4722</i>	<i>121-4722E</i>	<i>121-4722LTM</i>	<i>221-4722LTM</i>
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
0.32	15	0.25	40 to 320/340	123-4712		123-4712LTM	
	30	0.25	40 to 320/340	123-4732		123-4732LTM	

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers



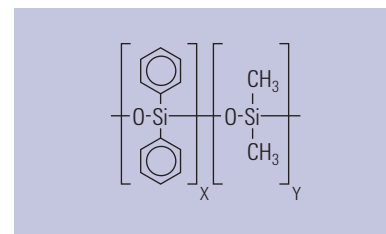
TIPS & TOOLS

View the latest GC column focused applications, products and educational resources at www.agilent.com/chem/myGCcolumns

VF-17ms

- 50% phenyl/50% dimethylpolysiloxane, medium polarity phase
- Ultra low bleed
- Proprietary deactivation technology and manufacturing process improves column stability, resulting in improved column-to-column repeatability and column lifetimes
- Ideal for environmental and clinical methods
- Ultra low bleed specification at 2 pA @ 325 °C (0.25 mm x 30 m, 0.25 µm)
- Ideal EPA confirmation column for ultimate confidence
- Bonded and cross-linked
- Solvent rinsable
- 0.15 mm id columns available for high efficiency GC and GC/MS analyses
- Supplied with an EZ-GRIP to simplify column installation, coupling and operation

Similar Phases: Rxi-17Sil MS, Rtx-50, 007-17, SP-2250, SPB-50, BPX-50, SPB-17, AT-50

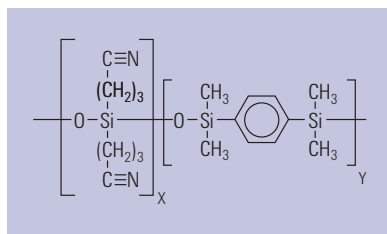


Structure of VF-17ms

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	
<i>0.15</i>	<i>10</i>	<i>0.15</i>	<i>40 to 330/360</i>	<i>CP5882</i>	
	<i>15</i>	<i>0.15</i>	<i>40 to 330/360</i>	<i>CP5883</i>	
	<i>20</i>	<i>0.15</i>	<i>40 to 330/360</i>	<i>CP5884</i>	
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	
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		

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers



Structure of VF-23ms

VF-23ms

- High polarity and highly substituted cyanopropyl low bleed phase
- Engineered for accurate analysis of very polar analytes
- 100% bonded phase permits column rinsing to enhance column lifetime
- Operating temperature up to 260 °C
- Expands application ranges to higher molecular weight compounds
- 0.15 mm id columns available for high efficiency GC and GC/MS analyses
- Supplied with an EZ-GRIP to simplify column installation, coupling and operation

Similar Phases: SP-2330, Rtx-2330, 007-23, AT-Silar, BPX-70, SP-2340

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	
<i>0.15</i>	<i>15</i>	<i>0.15</i>	<i>40 to 260/260</i>	<i>CP5886</i>	
	<i>20</i>	<i>0.15</i>	<i>40 to 260/260</i>	<i>CP9042</i>	
	<i>40</i>	<i>0.15</i>	<i>40 to 260/260</i>	<i>CP5885</i>	
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	
		0.15	40 to 260/260	CP8828	
	60	0.25	40 to 260/260	CP8829	
0.53	15	0.50	40 to 245/245	CP8830	
	30	0.50	40 to 245/245	CP8831	

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VF-200ms

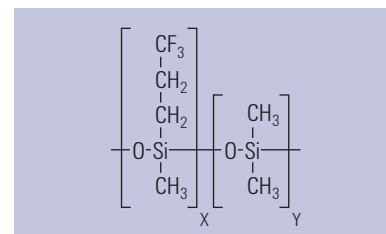
- Trifluoropropyl phase has very high temperature stability and can be used routinely up to 350 °C
- Ideally suited for analyses of ketones, aldehydes, nitro- or chloro-containing compounds, PAHs, unsaturated compounds, silanes, and CFCs
- Optimized deactivation for symmetrical peak shape
- Ultra-low bleed for trace analysis
- 0.15 mm id columns available for high efficiency GC and GC/MS analyses
- Supplied with an EZ-GRIP to simplify column installation, coupling and operation

Similar Phases: Rtx-200

VF-200ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
<i>0.15</i>	<i>10</i>	<i>0.15</i>	<i>0 to 325/350</i>	<i>CP5893</i>	
		<i>0.15</i>	<i>0 to 325/350</i>	<i>CP5891</i>	
		<i>0.60</i>	<i>0 to 325/350</i>	<i>CP5892</i>	
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
0.32	15	0.25	0 to 325/350	CP8862	
		0.25	0 to 325/350	CP8863	
	30	0.50	0 to 325/350	CP8864	
		1.00	0 to 325/350	CP8865	CP8865I5
0.53	15	1.00	0 to 300/325	CP8866	
		0.50	0 to 300/325	CP8867	
	30	1.00	0 to 300/325	CP8868	CP8868I5

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers



Structure of VF-200ms

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

Similar Phases: SP-2330, Rtx-225, BP-225, OV-225, 007-225, AT-225

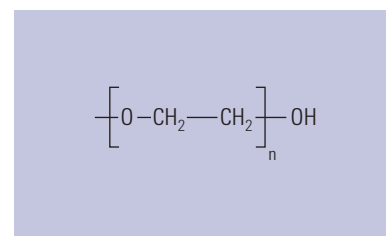
DB-225ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890	5975T
						LTM Module	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	

VF-WAXms

- Specially designed WAX phase designed for accurate MS results with polar compounds
- Operating temperature range of 20 °C to 250 °C
- Improves signal-to-noise ratio for trace analyses
- Ideal for GC/MS food, flavor and fragrance applications, especially where trace analyses are required
- Ultra low bleed provides increased sensitivity and extended column lifetime at higher temperatures
- Improved performance with no change in the typical selectivity of PEG
- 0.15 mm id columns available for high efficiency GC and GC/MS analyses
- Supplied with an EZ-GRIP to simplify column installation, coupling and operation

Similar Phases: SUPELCOWAX 10, SUPEROX II, CB-WAX, Stabilwax, BP-20, 007-CW, Carbowax, Rtx-WAX, ZB-WAX, ZB-WAX plus



Structure of VF-WAXms

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	
<i>0.15</i>	<i>10</i>	<i>0.15</i>	<i>20 to 250/260</i>	<i>CP9200</i>		
	<i>15</i>	<i>0.15</i>	<i>20 to 250/260</i>	<i>CP9201</i>		
	<i>20</i>	<i>0.15</i>	<i>20 to 250/260</i>	<i>CP9220</i>		
	<i>30</i>	<i>0.15</i>	<i>20 to 250/260</i>	<i>CP9202</i>		
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	
	60	1.00	20 to 240	CP9206		
			0.25	20 to 250/260	CP9207	
		0.50	20 to 240	CP9223		

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(Continued)

VF-WAXms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
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	



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-624ms and VF-1301ms

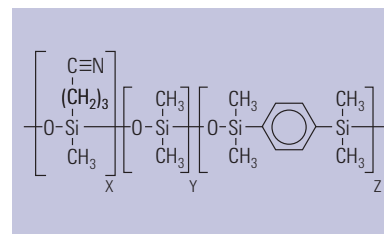
- VF-624ms is designed for analyzing solvents according to EPA Methods 524, 624 and 8260, as well as USP 467
- VF-1301ms ultra-low-bleed thin-film has a similar selectivity to 624 and is suitable for semivolatile organic solvents, as well as PCBs and pesticides
- Enhanced selectivity for USP 467 eliminates coelution of benzene and 1,2-dichloroethane
- Mid polarity
- Low bleed
- 0.15 mm id columns available for high efficiency GC and GC/MS analyses
- Supplied with an EZ-GRIP to simplify column installation, coupling and operation

Similar Phases: AT-624, Rxi-624 Sil MS, Rtx-624, PE-624, 007-624, 007-502, ZB-624

VF-624ms

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in Cage	5 in Cage
<i>0.15</i>	<i>15</i>	<i>0.84</i>	<i>-40 to 280/300</i>	<i>CP9101</i>	<i>CP910115</i>
	<i>20</i>	<i>0.84</i>	<i>-40 to 280/300</i>	<i>CP9100</i>	
	<i>30</i>	<i>0.84</i>	<i>-40 to 280/300</i>	<i>CP9109</i>	
	<i>40</i>	<i>0.84</i>	<i>-40 to 280/300</i>	<i>CP9110</i>	
0.25	30	1.40	-40 to 280/300	CP9102	CP910215
	60	1.40	-40 to 280/300	CP9103	CP910315
0.32	30	1.80	-40 to 280/300	CP9104	CP910415
	60	1.80	-40 to 280/300	CP9105	CP910515
0.53	30	3.00	-40 to 280/300	CP9106	CP910615
	60	3.00	-40 to 265/280	CP9107	
	75	3.00	-40 to 265/280	CP9108	

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Structure of VF-624ms and VF-1301ms

Similar Phases: Rtx-1301, PE-1301

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	
<i>0.15</i>	<i>15</i>	<i>0.15</i>	<i>-40 to 280/300</i>	<i>CP9050</i>	
	<i>20</i>	<i>0.15</i>	<i>-40 to 280/300</i>	<i>CP9051</i>	
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	CP906015
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	

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TIPS & TOOLS



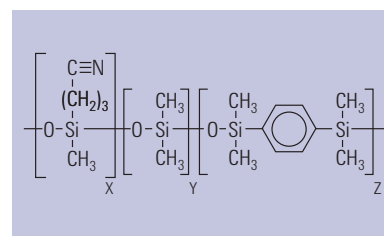
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VF-1701ms

- Ultra-low bleed 14% cyanopropyl/phenyl/86% polydimethylsiloxane phase
- Mid polarity
- Ideal for pesticides, PCBs and semi-volatile organic compounds
- Highly inert for difficult analytes such as p,p'-DDT
- Deactivated for accurate trace analysis
- Engineered for reduced bleed, (bleed specification is 2 pA @ 280 °C for a 0.25 mm x 60 m, 0.25 µm id column)
- 0.15 mm id columns available for high efficiency GC and GC/MS analyses
- Supplied with an EZ-GRIP to simplify column installation, coupling and operation

Similar Phases: SPB-1701, Rtx-1701, BP-10, OV-1701, 007-1701, ZB-1701



Structure of VF-1701ms

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	
<i>0.15</i>	<i>15</i>	<i>0.10</i>	<i>-20 to 280/300</i>	<i>CP9175</i>	
		<i>0.15</i>	<i>-20 to 280/300</i>	<i>CP9143</i>	
		<i>0.60</i>	<i>-20 to 280/300</i>	<i>CP9144</i>	
	<i>20</i>	<i>0.15</i>	<i>-20 to 280/300</i>	<i>CP9145</i>	
		<i>0.60</i>	<i>-20 to 280/300</i>	<i>CP9146</i>	
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	

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

(Continued)

VF-1701ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
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	
	60	1.00	-20 to 280/300	CP9163	
		0.15	-20 to 280/300	CP9164	
		0.25	-20 to 280/300	CP9165	
0.53	15	1.00	-20 to 280/300	CP9167	
		30	0.10	-20 to 280/300	CP9168
	30	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
	60	1.50	-20 to 265/280	CP9174	



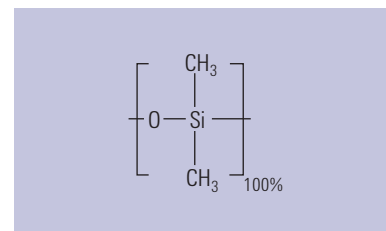
Premium Polysiloxane Columns

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 percent level of substitution of the groups distinguish each stationary phase and its properties.

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

Similar Phases: SPB-1, Rtx-1, BP-1, OV-1, OV-101, 007-1(MS), SP-2100, SE-30, ZB-1, AT-1, MDN-1, ZB-1



Structure of DB-1

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
		0.20	-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	127-1012	127-1012E
	0.40		-60 to 325/350	127-1013	127-1013E	127-1013LTM
	20	0.10	-60 to 325/350	127-1022	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			

(Continued)

DB-1

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM Module
<i>0.15</i>	<i>10</i>	<i>1.20</i>	<i>-60 to 325/350</i>	<i>12A-1015</i>		<i>12A-1015LTM</i>
<i>0.18</i>	<i>10</i>	<i>0.18</i>	<i>-60 to 325/350</i>	<i>121-1012</i>	<i>121-1012E</i>	<i>121-1012LTM</i>
		<i>0.20</i>	<i>-60 to 325/350</i>	<i>121-101A</i>		<i>121-101ALTM</i>
		<i>0.40</i>	<i>-60 to 325/350</i>	<i>121-1013</i>	<i>121-1013E</i>	<i>121-1013LTM</i>
	<i>20</i>	<i>0.18</i>	<i>-60 to 325/350</i>	<i>121-1022</i>	<i>121-1022E</i>	<i>121-1022LTM</i>
		<i>0.40</i>	<i>-60 to 325/350</i>	<i>121-1023</i>		<i>121-1023LTM</i>
<i>0.20</i>	<i>40</i>	<i>0.40</i>	<i>-60 to 325/350</i>	<i>121-1043</i>	<i>121-1043E</i>	
	<i>12</i>	<i>0.33</i>	<i>-60 to 325/350</i>	<i>128-1012</i>		<i>128-1012LTM</i>
	<i>25</i>	<i>0.33</i>	<i>-60 to 325/350</i>	<i>128-1022</i>		<i>128-1022LTM</i>
	<i>30</i>	<i>0.80</i>	<i>-60 to 325/350</i>	<i>128-1034</i>		<i>128-1034LTM</i>
<i>0.25</i>	<i>15</i>	<i>0.33</i>	<i>-60 to 325/350</i>	<i>128-1052</i>		
		<i>0.10</i>	<i>-60 to 325/350</i>	<i>122-1011</i>		<i>122-1011LTM</i>
		<i>0.25</i>	<i>-60 to 325/350</i>	<i>122-1012</i>		<i>122-1012LTM</i>
	<i>25</i>	<i>1.00</i>	<i>-60 to 325/350</i>	<i>122-1013</i>		<i>122-1013LTM</i>
		<i>0.25</i>	<i>-60 to 325/350</i>	<i>122-1022</i>		<i>122-1022LTM</i>
		<i>0.10</i>	<i>-60 to 325/350</i>	<i>122-1031</i>		<i>122-1031LTM</i>
		<i>0.25</i>	<i>-60 to 325/350</i>	<i>122-1032</i>	<i>122-1032E</i>	<i>122-1032LTM*</i>
		<i>0.50</i>	<i>-60 to 325/350</i>	<i>122-103E</i>		<i>122-103ELTM</i>
		<i>1.00</i>	<i>-60 to 325/350</i>	<i>122-1033</i>	<i>122-1033E</i>	<i>122-1033LTM</i>
		<i>0.25</i>	<i>-60 to 325/350</i>	<i>122-1052</i>		
	<i>60</i>	<i>0.10</i>	<i>-60 to 325/350</i>	<i>122-1061</i>		
		<i>0.25</i>	<i>-60 to 325/350</i>	<i>122-1062</i>		
		<i>0.50</i>	<i>-60 to 325/350</i>	<i>122-106E</i>		
<i>1.00</i>		<i>-60 to 325/350</i>	<i>122-1063</i>			
<i>100</i>	<i>0.50</i>	<i>-60 to 325/350</i>	<i>122-10AE</i>			
<i>150</i>	<i>1.00</i>	<i>-60 to 325/350</i>	<i>122-10G3</i>			

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

(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	0.50	-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		
0.45	30	1.27	-60 to 325/350	124-1032		124-1032LTM	
		2.55	-60 to 260/280	124-1034		124-1034LTM	

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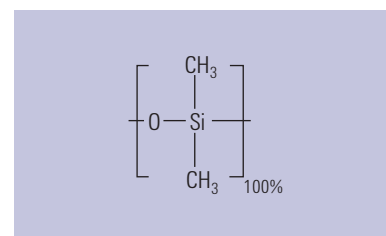
DB-1

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage	5 in Cage	7890/6890 LTM Module
0.53	5	0.88	-60 to 325/350	125-100A		125-100ALTM
		2.65	-60 to 325/350	125-100B		125-100BLTM
		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	
		-60 to 260/280	125-10H5		125-10H5LTM	
15	0.15	-60 to 340/360	125-1011	125-1011E	125-1011LTM	
		-60 to 320/340	125-101K		125-101KLTM	
		-60 to 300/320	125-1017		125-1017LTM	
		-60 to 300/320	125-101J		125-101JLTM	
		-60 to 300/320	125-1012	125-1012E	125-1012LTM	
		-60 to 260/280	125-1014		125-1014LTM	
		-60 to 260/280	125-1015		125-1015LTM	
25	1.00	-60 to 300/320	125-102J		125-102JLTM	
		-60 to 260/280	125-1025		125-1025LTM	
30	0.10	-60 to 340/360	125-1039			
		-60 to 320/340	125-103K	125-103KE	125-103KLTM	
		-60 to 300/320	125-1037		125-1037LTM	
		-60 to 300/320	125-103J		125-103JLTM	
		-60 to 300/320	125-1032		125-1032LTM	
		-60 to 260/280	125-103B		125-103BLTM	
		-60 to 260/280	125-1034	125-1034E	125-1034LTM	
		-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		
		-60 to 300/320	125-1062	125-1062E		
		-60 to 260/280	125-1064			
		-60 to 260/280	125-1065	125-1065E		
105	5.00	-60 to 260/280	125-10B5			

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

Similar Phases: SPB-1, Rtx-1, BP-1, OV-1, OV-101, 007-1(MS), SP-2100, SE-30, ZB-1, AT-1, MDN-1, ZB-1



Structure of HP-1

HP-1

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM Module
<i>0.18</i>	<i>20</i>	<i>0.18</i>	<i>-60 to 325/350</i>	<i>19091Z-577</i>	<i>19091Z-577E</i>	<i>19091Z-577LTM</i>
0.20	12	0.33	-60 to 325/350	19091-60312		
		17	0.11	-60 to 325/350	19091Z-008	
	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			
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	

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

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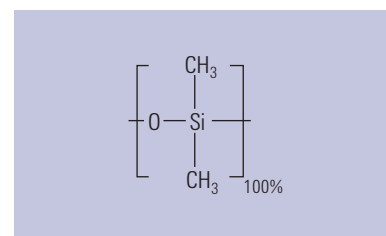
HP-1

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	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		
			-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

- 100% dimethylpolysiloxane
- Non-polar
- General purpose phase
- Bonded and cross-linked
- Solvent rinsable
- Available in Fused Silica or UltiMetal
- Separation almost entirely based on boiling points, making this column suitable for a wide range of applications with a broad temperature range
- High temperature limit
- Supplied with an EZ-GRIP to simplify column installation, coupling and operation

Similar Phases: SPB-1, Rtx-1, BP-1, OV-1, OV-101, 007-1(MS), SP-2100, SE-30, ZB-1, AT-1, MDN-1, ZB-1



Structure of CP-Sil 5 CB

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	CP731015
		0.40	-60 to 325/350	CP7312	
	20	0.10	-60 to 330/350	CP7313	
0.15	10	<i>0.12</i>	<i>-60 to 330/350</i>	<i>CP7684</i>	<i>CP768415</i>
		<i>2.00</i>	<i>-60 to 325/350</i>	<i>CP7682</i>	<i>CP768215</i>
	25	<i>0.12</i>	<i>-60 to 330/350</i>	<i>CP7694</i>	
		<i>1.20</i>	<i>-60 to 325/350</i>	<i>CP7693</i>	
		<i>2.00</i>	<i>-60 to 325/350</i>	<i>CP7692</i>	<i>CP769215</i>
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	CP764315
		0.50	-60 to 325/350	CP7644	CP764415

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

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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	
	30	1.20	-60 to 325/350	CP7670	CP7670I5
		0.10	-60 to 330/350	CP8710	
		0.25	-60 to 330/350	CP8741	CP8741I5
	50	1.00	-60 to 325/350	CP8770	
		0.12	-60 to 330/350	CP7720	
		0.25	-60 to 330/350	CP7443	CP7443I5
	60	0.40	-60 to 325/350	CP7719	CP7719I5
		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 ($^{\circ}\text{C}$)	7 in Cage	5 in Cage
0.53	10	1.00	-60 to 315/340	CP7625	
		2.00	-60 to 305/330	CP7620	CP762015
		5.00	-60 to 290/325	CP7645	
15	15	0.15	-60 to 330/350	CP8673	CP867315
		1.50	-60 to 305/330	CP8674	CP867415
		3.00	-60 to 300/325	CP8675	
		5.00	-60 to 290/325	CP8676	
20	5.00	-60 to 290/325	CP8774		
25	25	1.00	-60 to 315/340	CP7635	CP763515
		2.00	-60 to 305/330	CP7630	
		5.00	-60 to 290/325	CP7675	CP767515
30	30	1.50	-60 to 305/330	CP8735	CP873515
		2.00	-60 to 305/330	CP8730	CP873015
		3.00	-60 to 300/325	CP8677	CP867715
		5.00	-60 to 290/325	CP8775	CP877515
50	50	1.00	-60 to 315/340	CP7695	
		2.00	-60 to 305/330	CP7640	
		5.00	-60 to 290/325	CP7685	CP768515
60	60	1.50	-60 to 305/330	CP8799	
		5.00	-60 to 290/325	CP8685	
100	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		

TIPS & TOOLS



Agilent CrossLab GC supplies, including CrossLab Ultra Inert liners, perform seamlessly with a variety of instruments regardless of make or model, including Varian (now Bruker), PerkinElmer, Shimadzu, and Thermo Scientific GC systems. Learn more at www.agilent.com/chem/CrossLab



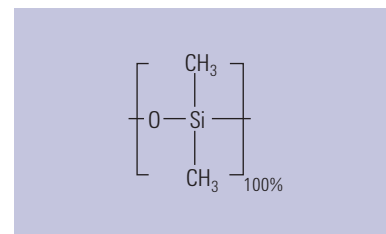
Ultra 1

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

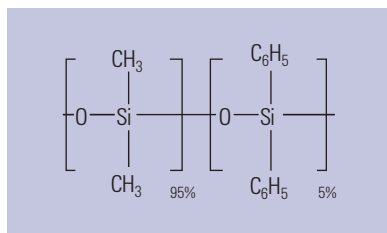
Similar Phases: SPB-1, Rtx-1, BP-1, 007-1(MS)

Ultra 1

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



Structure of Ultra 1



Structure of Ultra 2

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

Similar Phases: SPB-5, Rtx-5, BP-5, CB-5, 007-5, 2B-5

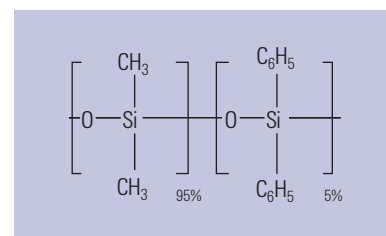
Ultra 2

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
		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	19091B-105E	
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	

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

Similar Phases: SPB-5, Rtx-5, BP-5, OV-5, 007-2(MPS-5), SE-52, SE-54, XTI-5, PTE-5, ZB-5, AT-5, MDN-5, ZB-5



Structure of DB-5

DB-5

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7890/6890		
				7 in Cage	5 in Cage	LTM Module
0.10	10	0.10	-60 to 325/350	127-5012	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	10	0.10	-60 to 325/350	127-5022	127-5022E	127-5022LTM
		0.40	-60 to 325/350	127-5023		127-5023LTM
<i>0.15</i>	<i>10</i>	<i>1.20</i>	<i>-60 to 300/320</i>	<i>12A-5015</i>		<i>12A-5015LTM</i>
<i>0.18</i>	<i>10</i>	<i>0.18</i>	<i>-60 to 325/350</i>	<i>121-5012</i>	<i>121-5012E</i>	<i>121-5012LTM</i>
		<i>0.40</i>	<i>-60 to 325/350</i>	<i>121-5013</i>		<i>121-5013LTM</i>
	<i>20</i>	<i>0.18</i>	<i>-60 to 325/350</i>	<i>121-5022</i>	<i>121-5022E</i>	<i>121-5022LTM</i>
		<i>0.40</i>	<i>-60 to 325/350</i>	<i>121-5023</i>	<i>121-5023E</i>	<i>121-5023LTM</i>
<i>40</i>	<i>10</i>	<i>0.18</i>	<i>-60 to 325/350</i>	<i>121-5042</i>		

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

(Continued)

DB-5

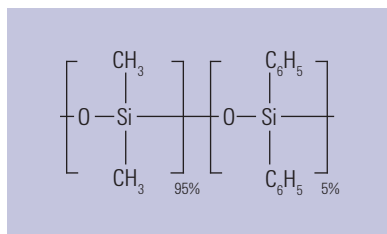
ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890	
						LTM Module	
0.20	12	0.33	-60 to 325/350	128-5012		128-5012LTM	
	15	0.20	-60 to 325/350	128-50H7		128-50H7LTM	
	25	0.33	-60 to 325/350	128-5022		128-5022LTM	
	50	0.33	-60 to 325/350	128-5052			
0.25	15	0.10	-60 to 325/350	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			
	0.32	10	0.50	-60 to 325/350	123-500E		123-500ELTM
			1.00	-60 to 325/350	123-5003		123-5003LTM
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			

(Continued)



DB-5

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage	5 in Cage	7890/6890
						LTM Module
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
			-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

Similar Phases: SPB-5, Rtx-5, BP-5, OV-5, 007-2(MPS-5), SE-52, SE-54, XTI-5, PTE-5, ZB-5, AT-5, MDN-5, ZB-5

HP-5

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM Module
<i>0.18</i>	<i>20</i>	<i>0.18</i>	<i>-60 to 325/350</i>	<i>19091J-577</i>	<i>19091J-577E</i>	<i>19091J-577LTM</i>
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	

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

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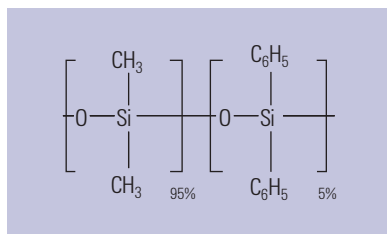
HP-5

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)			7890/6890
				7 in Cage	5 in Cage	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	19091J-115	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

TIPS & TOOLS

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Structure of CP-Sil 8 CB

CP-Sil 8 CB

- (5% phenyl) methylpolysiloxane
- Non-polar
- General purpose phase
- Cross-linked and bonded
- Solvent rinsable
- Low bleed
- High column-to-column reproducibility
- Wide choice of dimensions available
- Available in Fused Silica and UltiMetal
- Supplied with an EZ-GRIP to simplify column installation, coupling and operation

Similar Phases: SPB-5, Rtx-5, BP-5, OV-5, 007-2(MPS-5), SE-52, SE-54, XTI-5, PTE-5, ZB-5, AT-5, MDN-5, ZB-5

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
<i>0.15</i>	<i>10</i>	<i>0.12</i>	<i>-60 to 330/350</i>	<i>CP7884</i>	
		<i>1.20</i>	<i>-60 to 325/350</i>	<i>CP7885</i>	
		<i>25</i>	<i>0.12</i>	<i>-60 to 330/350</i>	<i>CP7894</i>
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	
	30	1.20	-60 to 325/350	CP7671	
			0.25	-60 to 330/350	CP8751
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		

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

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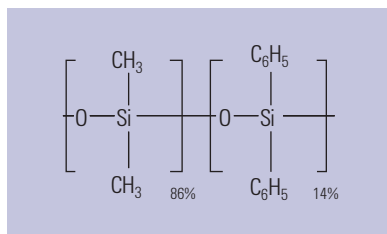
CP-Sil 8 CB

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





Structure of CP-Sil 13 CB
(with 14% phenyl substitution)

CP-Sil 13 CB

- 14% phenyl/86% dimethylpolysiloxane
- Mid polarity phase
- Specially developed for the analysis of medium polarity compounds
- Ideal for confirmational analyses using ECD
- Bonded and cross-linked
- Solvent rinsable
- Supplied with an EZ-GRIP to simplify column installation, coupling and operation

Similar Phases: Rtx-20

CP-Sil 13 CB

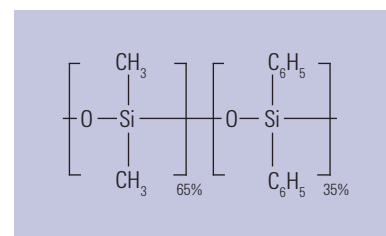
ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
<i>0.15</i>	<i>25</i>	<i>0.40</i>	<i>-25 to 300/330</i>	<i>CP7813</i>	
0.25	25	0.20	-25 to 300/330	CP7906	
		0.40	-25 to 300/330	CP7916	
		1.20	-25 to 300/330	CP7977	CP7977I5
	50	0.20	-25 to 300/330	CP7907	
		0.40	-25 to 300/330	CP7917	
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	
		2.00	-25 to 300/330	CP7649	
	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		

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

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

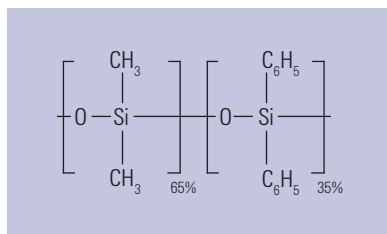
Similar Phases: Rtx-35, Rtx-35ms, Rxi-35Sil MS, SPB-35, AT-35, Sup-Herb, MDN-35, BPX-34, ZB-35, ZB-35 ht



Structure of DB-35

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

Similar Phases: Rtx-35ms, Rxi-35Sil MS, SPB-35, AT-35, Sup-Herb, MDN-35, BPX-34, ZB-35, ZB-35 ht

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

TIPS & TOOLS



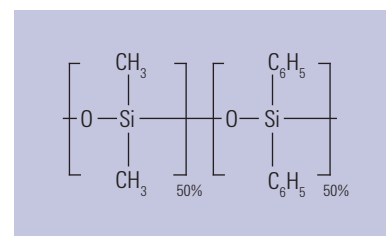
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DB-17

- (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

Similar Phases: Rtx-50, 007-17(MPS-50), SP-2250, SPB-50, ZB-50, AT-50

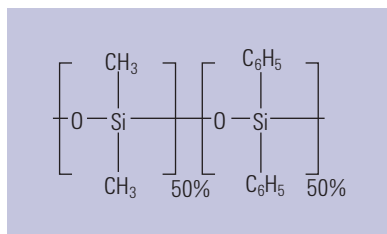


Structure of DB-17

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	
		0.10	40 to 280/300	127-1722		127-1722LTM	
<i>0.18</i>	<i>20</i>	<i>0.18</i>	<i>40 to 280/300</i>	<i>121-1722</i>		<i>121-1722LTM</i>	
		<i>0.30</i>	<i>40 to 280/300</i>	<i>121-1723</i>		<i>121-1723LTM</i>	
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				
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	
		0.50	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		

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers



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

Similar Phases: Rtx-50, 007-17(MPS-50), SP-2250, SPB-50, ZB-50, AT-50

HP-50+

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

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

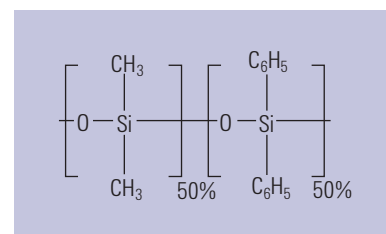
CP-Sil 24 CB

- 50% phenyl/50% dimethylpolysiloxane
- Mid polarity phase
- Specially suitable for analysis of amines, drugs and pesticides
- Ideal for analysis using ECD
- Excellent confirmation column in combination with CP-Sil 5 CB or CP-Sil 8 CB
- Bonded and cross-linked
- Solvent rinsable
- Supplied with an EZ-GRIP to simplify column installation, coupling and operation

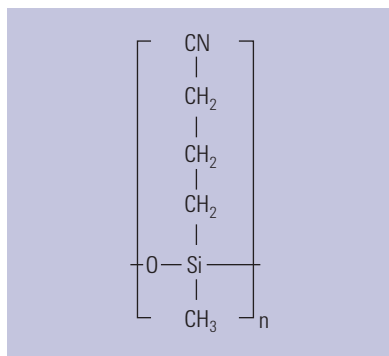
Similar Phases: Rtx-50, 007-17(MPS-50), SP-2250, SPB-50, ZB-50, AT-50

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



Structure of CP-Sil 24 CB



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

Similar Phases: SP-2330, Rtx-2330, 007-23, AT-Silar, BPX-70, SP-2340

DB-23

ID (mm)	Length		Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM Module
	(m)	Film (µm)				
<i>0.18</i>	<i>20</i>	<i>0.20</i>	<i>40 to 250/260</i>	<i>121-2323</i>		<i>121-2323LTM</i>
0.25	15	0.25	40 to 250/260	122-2312		122-2312LTM
		30	0.15	40 to 250/260	122-2331	
			0.25	40 to 250/260	122-2332	122-2332E
		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

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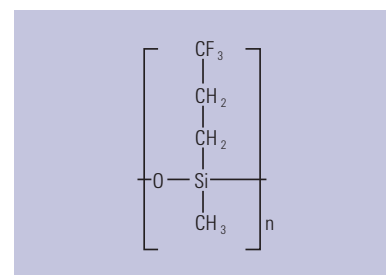
DB-200

- (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

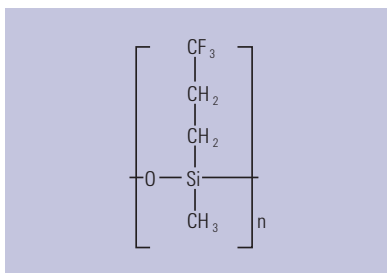
Similar Phases: Rtx-200

DB-200

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7890/6890	
				7 in Cage	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-200



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

Similar Phases: SP-2401

DB-210

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)			7890/6890
				7 in Cage	5 in Cage	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	1.00	45 to 220/240	125-0212		125-0212LTM
	30	1.00	45 to 220/240	125-0232		125-0232LTM

DB-225

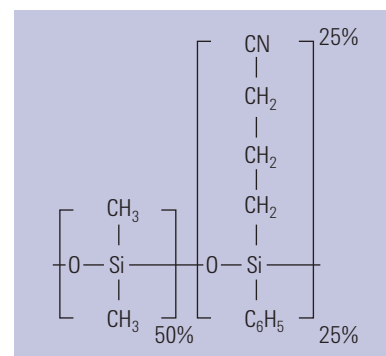
- (50%-Cyanopropylphenyl)-dimethylpolysiloxane
- Mid/high polarity
- Excellent for separations of cis- and trans-fatty acid methyl esters (FAMES)
- Bonded and cross-linked
- Solvent rinsable
- Exact replacement of HP-225
- Close equivalent to USP Phase G7

Similar Phases: SP-2330, Rtx-225, BP-225, OV-225, 007-225, AT-225

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
<i>0.18</i>	<i>20</i>	<i>0.20</i>	<i>40 to 220/240</i>	<i>121-2223</i>		<i>121-2223LTM</i>
0.25	15	0.25	40 to 220/240	122-2212		122-2212LTM
		0.15	40 to 220/240	122-2231		122-2231LTM
		0.25	40 to 220/240	122-2232		122-2232LTM
0.32	30	0.25	40 to 220/240	123-2232	123-2232E	123-2232LTM
0.53	15	1.00	40 to 200/220	125-2212		125-2212LTM
		0.50	40 to 200/220	125-2237		125-2237LTM
		1.00	40 to 200/220	125-2232		125-2232LTM

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

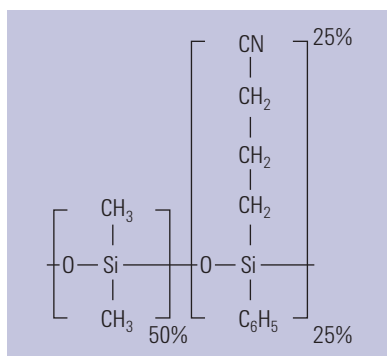


Structure of DB-225

TIPS & TOOLS

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





Structure of CP-Sil 43 CB

CP-Sil 43 CB

- 25% cyanopropyl/25% phenyl/50% dimethylpolysiloxane phase
- Mid polarity
- Separates aromatic from aliphatic hydrocarbons with selectivity equivalent to OV-255
- Bonded and cross-linked
- Solvent rinsable
- Supplied with an EZ-GRIP to simplify column installation, coupling and operation

Similar Phases: SP-2330, Rtx-225, BP-225, OV-225, 007-225, AT-225

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

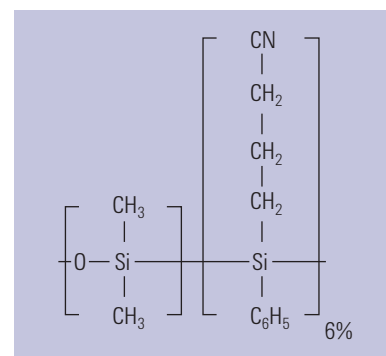
- (6%-Cyanopropyl-phenyl) methylpolysiloxane
- Equivalent to USP Phase G43
- Low/mid polarity
- Bonded and cross-linked
- Exact replacement of HP-1301 and HP-1701
- Solvent rinsable

Similar Phases: Rtx-1301, PE-1301

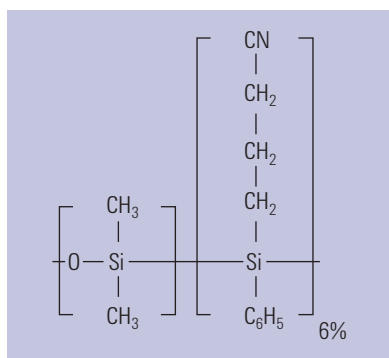
DB-1301

ID (mm)	Length (m)	Film (μm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM Module
<i>0.18</i>	<i>10</i>	<i>0.40</i>	<i>-20 to 280/300</i>	<i>121-1313</i>		<i>121-1313LTM</i>
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		123-1333LTM
	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

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers



Structure of DB-1301



Structure of CP-1301

CP-1301

- 6% cyanopropyl-phenyl/94% dimethylpolysiloxane
- Mid polarity
- Ideal for analysis of herbicides, pesticides and many pharmaceutical products
- High column-to-column reproducibility
- Good inertness for better quality of data, even with thick films
- Supplied with an EZ-GRIP to simplify column installation, coupling and operation
- Bonded and cross-linked
- Solvent rinsable

Similar Phases: Rtx-1301, PE-1301

CP-1301

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.25	30	1.00	-25 to 265/280	CP8604
		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

DB-1701

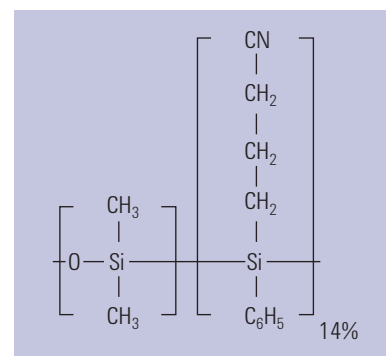
- (14% Cyanopropyl-phenyl)-methylpolysiloxane
- Low/mid polarity
- Bonded and cross-linked
- Exact replacement of HP-1301 and HP-1701
- Solvent rinsable

Similar Phases: SPB-1701, Rtx-1701, BP-10, OV-1701, 007-1701, ZB-1701

DB-1701

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)			7890/6890
				7 in Cage	5 in Cage	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
<i>0.18</i>	<i>10</i>	<i>0.40</i>	<i>-20 to 280/300</i>	<i>121-0713</i>		<i>121-0713LTM</i>
	<i>20</i>	<i>0.18</i>	<i>-20 to 280/300</i>	<i>121-0722</i>		<i>121-0722LTM</i>
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		
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	

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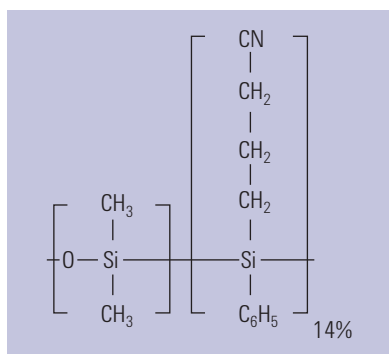


Structure of DB-1701

TIPS & TOOLS

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





Structure of CP-Sil 19 CB

CP-Sil 19 CB

- 14% cyanopropyl-phenyl/86% dimethylpolysiloxane
- Mid polarity
- Ideal for many environmental, food and beverage, and pharmaceutical applications
- Useful as confirmation column
- Bonded and cross-linked
- Solvent rinsable
- Broad range of configurations available
- Supplied with an EZ-GRIP to simplify column installation, coupling and operation

Similar Phases: SPB-1701, Rtx-1701, BP-10, OV-1701, 007-1701, ZB-1701

CP-Sil 19 CB

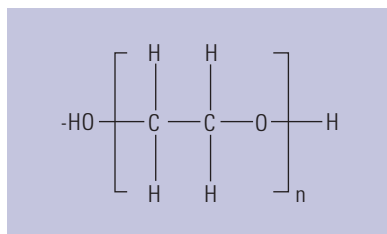
ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
0.10	10	0.20	-25 to 275/300	CP7331	
<i>0.15</i>	<i>25</i>	<i>0.50</i>	<i>-25 to 275/300</i>	<i>CP7340</i>	
0.20	25	0.20	-25 to 275/300	CP7360	
0.25	10	0.20	-25 to 275/300	CP7702	
		0.15	-25 to 275/300	CP8502	
	25	0.25	-25 to 275/300	CP8512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

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

(Continued)

CP-Sil 19 CB

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage	5 in Cage
0.32	10	0.20	-25 to 275/300	CP7732	
	15	0.25	-25 to 275/300	CP8542	CP854215
	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	CP877215
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)
This structure is applicable for all
WAX and FFAP phases.

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

Similar Phases: SUPELCOWAX 10, SUPEROX II, CB-WAX, Stabilwax, BP-20, 007-CW, Carbowax, Rtx-WAX, ZB-WAX, ZB-WAX plus

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	

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

(Continued)

DB-WAX and DB-WaxFF

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage	5 in Cage	7890/6890 LTM Module	5975T LTM Toroid
DB-WAX							
<i>0.18</i>	<i>10</i>	<i>0.18</i>	<i>20 to 250/260</i>	<i>121-7012</i>		<i>121-7012LTM</i>	
	<i>20</i>	<i>0.18</i>	<i>20 to 250/260</i>	<i>121-7022</i>	<i>121-7022E</i>	<i>121-7022LTM</i>	
		<i>0.30</i>	<i>20 to 240/250</i>	<i>121-7023</i>	<i>121-7023E</i>	<i>121-7023LTM</i>	
	<i>40</i>	<i>0.18</i>	<i>20 to 250/260</i>	<i>121-7042</i>	<i>121-7042E</i>		
		<i>0.30</i>	<i>20 to 240/250</i>	<i>121-7043</i>			
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			

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

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

Similar Phases: SUPELCOWAX 10, SUPEROX II, CB-WAX, Stabilwax, BP-20, 007-CW, Carbowax, Rtx-WAX, ZB-WAX, ZB-WAX plus

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

Similar Phases: SUPELCOWAX 10, SUPEROX II, CB-WAX, Stabilwax, BP-20, 007-CW, Carbowax, ZB-WAX, ZB-WAX+

HP-INNOWax

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM Module	5975T LTM Toroid
<i>0.18</i>	<i>20</i>	<i>0.18</i>	<i>40 to 260/270</i>	<i>19091N-577</i>	<i>19091N-577E</i>	<i>19091N-577LTM</i>	<i>29091N-577LTM</i>
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	
		0.10	40 to 260/270	19091N-330			
	15	0.15	40 to 260/270	19091N-030		19091N-030LTM	
		0.10	40 to 260/270	19091N-331			
		0.25	40 to 260/270	19091N-131	19091N-131E	19091N-131LTM	
	30	0.50	40 to 260/270	19091N-231		19091N-231LTM	
		0.15	40 to 260/270	19091N-033		19091N-033LTM	
		0.25	40 to 260/270	19091N-133	19091N-133E	19091N-133LTM	29091N-133LTM
	60	0.50	40 to 260/270	19091N-233	19091N-233E	19091N-233LTM	
		0.15	40 to 260/270	19091N-036			
0.25		40 to 260/270	19091N-136	19091N-136E			
0.32	15	0.50	40 to 260/270	19091N-236			
		0.25	40 to 260/270	19091N-111		19091N-111LTM	
		0.15	40 to 260/270	19091N-013		19091N-013LTM	
	30	0.25	40 to 260/270	19091N-113	19091N-113E	19091N-113LTM	
		0.50	40 to 260/270	19091N-213	19091N-213E	19091N-213LTM	
		0.25	40 to 260/270	19091N-116			
60	0.50	40 to 260/270	19091N-216	19091N-216E			
	1.00	40 to 240/250	19095N-121	19095N-121E	19095N-121LTM		
0.53	30	1.00	40 to 240/250	19095N-123	19095N-123E	19095N-123LTM	
	60	1.00	40 to 240/250	19095N-126			

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers



CP-Wax 52 CB

- Polyethylene glycol phase
- High polarity
- Wider temperature range than non-bonded polyethylene glycols
- Bonded and cross-linked
- Solvent rinsable
- High resolution of low boiling point analytes
- High polarity provides separations for a broad range of applications
- Excellent reproducibility and temperature stability for a variety of EPA and ASTM methods
- Supplied with an EZ-GRIP to simplify column installation, coupling and operation

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

Similar Phases: SUPELCOWAX 10, SUPEROX II, CB-WAX, Stabilwax, BP-20, 007-CW, Carbowax, HP-INNOWax, Rtx-WAX, ZB-WAX, ZB-WAX+

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			
<i>0.15</i>	<i>15</i>	<i>0.15</i>	<i>20 to 250/265</i>	<i>CP7791</i>	<i>CP7791I5</i>		
	<i>25</i>	<i>0.25</i>	<i>20 to 250/265</i>	<i>CP7792</i>	<i>CP7792I5</i>		
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		

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

(Continued)

CP-Wax 52 CB

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage	5 in Cage
0.32	10	0.20	20 to 250/265	CP7733	CP773315
		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	CP776315
	30	0.25	20 to 250/265	CP8843	CP884315
		0.50	20 to 250/265	CP8763	CP876315
	50	0.20	20 to 250/265	CP7753	CP775315
		0.40	20 to 250/265	CP7889	
		1.20	20 to 250/265	CP7773	CP777315
	60	0.25	20 to 250/265	CP8853	
		0.50	20 to 250/265	CP8773	
1.20		20 to 250/265	CP8073	CP807315	
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	CP765815
	30	1.00	20 to 250/265	CP8738	CP873815
	50	1.00	20 to 250/265	CP7698	CP769815
		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 ($^{\circ}\text{C}$)	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

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

Similar Phases: Stabilwax-DA, Nukol, 007-FFAP, BP21, AT-1000, OV-351

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				
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			

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

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

Similar Phases: Stabilwax-DA, Nukol, 007-FFAP, BP21, AT-1000, OV-351

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

TIPS & TOOLS

Agilent also offers CAM columns for amine analysis.



CP-Wax 58 FFAP CB

- Nitroterephthalic acid-modified polyethylene glycol phase
- High polarity
- Ideal for analysis of acidic compounds, such as phenols, underivatized and derivatized free fatty acids
- Highest polarity bonded wax column for analyzing polar compounds
- Chemically-bonded
- Solvent rinsable
- High inertness provides excellent peak shape
- Supplied with an EZ-GRIP to simplify column installation, coupling and operation

Similar Phases: SUPELCOWAX 10, SUPEROX II, CB-WAX, Stabilwax, BP-20, 007-CW, Carbowax, Rtx-WAX, ZB-WAX

CP-Wax 58 FFAP CB

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage	5 in Cage
0.20	25	0.30	20 to 250/275	CP7787	CP778715
	50	0.30	20 to 250/275	CP7797	
0.25	25	0.20	20 to 250/275	CP7717	CP771715
	50	0.20	20 to 250/275	CP7727	
0.32	25	0.20	20 to 250/275	CP7747	CP774715
		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	CP761415
		2.00	20 to 250/275	CP7654	
	50	1.00	20 to 250/275	CP7624	
		2.00	20 to 250/275	CP7664	



TIPS & TOOLS

View the latest GC column focused applications, products and educational resources at www.agilent.com/chem/myGCCcolumns

Carbowax 20M and HP-20M

- Polyethylene glycol, MW 20,000
- Equivalent to USP Phase G16

Similar Phases: Rt-CW20M F&F

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)	7890/6890	
				7 in Cage	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



Specialty 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 or "select" columns for a variety of applications to enhance the standard phase portfolio. With columns for volatiles, pesticides, petrochemicals 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.

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

Similar Phases: Rxi-1HT, Stx-1ht, ZB-1ht

DB-1ht

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

Similar Phases: HT5, Stx-5ht, ZB-5ht



DB-5ht

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890	5975T
						LTM Module	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		
	30	0.10	-60 to 400	123-5731	123-5731E	123-5731LTM	

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

Similar Phases: Rtx-65TG, BPX50

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		
	30	0.15	40 to 340/365	122-1831		122-1831LTM
0.32	15	0.15	40 to 340/365	123-1811		
	30	0.15	40 to 340/365	123-1831	123-1831E	
	60	0.15	40 to 340/365	123-1861		



TIPS & TOOLS

Learn more about the Agilent 7890A GC System at www.agilent.com/chem/7890A

VF-5ht and VF-5ht UltiMetal

- Enhanced selectivity improves column longevity and reduces downtime
- Superior detector performance provides improved detection limits
- For analyses of high boiling compounds by exhibiting ultra low bleed at high temperatures
- Optimized sensitivity and accuracy for analysis of high molecular weight compounds
- Identical selectivity as VF-5ms (bleed spec of 30 m x 0.25 mm column is < 5 pA at 400 °C)
- UltiMetal technology renders the stainless steel inert and enhances bonding of the stationary phase for improved column lifetime and excellent peak shape

Similar Phases: ZB-5ht, Rxi-5ht

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

Similar Phases: ZB-5ht, Rxi-5ht

VF-5ht UltiMetal

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

*These configurations include a 2 m x 0.53 mm id UltiMetal retention gap which are pre-connected to the VF-5ht UltiMetal column with a high-temperature column connector.

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.

Lowox

- Unique selectivity for a wide range of oxygenates
- Minimal particle loss preserves detector performance
- Industry proven for process and portable GC applications (ASTM D 7059)
- Analyze trace level oxygenate impurities in gas and liquid hydrocarbon streams
- High polarity
- Ideal for monitoring catalyst contamination by oxygenates

Lowox

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
0.53	10	10.00	0 to 350/350	CP8587	CP8587I5

GS-OxyPLOT

- Accurate analysis of ppm/ppb level oxygenates in C₁ to C₁₀ hydrocarbons
- Strong selectivity for a wide range of oxygenates (ethers, alcohols, aldehydes, and ketones) in complex matrices such as gaseous hydrocarbons, motor fuels, and crude oil
- Suitable for ASTM methods for oxygenates
- Very high column stability (upper temperature limit of 350 °C) with no column bleed
- Stable phase coating virtually eliminates particle generation and detector spiking
- Excellent for low concentration, quantitative GC analysis
- Ideal for selective heart-cutting applications

GS-OxyPLOT

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

- Optimized for analysis of formaldehyde, water and methanol
- Trace analysis of sulfur compounds possible
- Partial permanent gas analysis possible (especially in switching systems)
- Non-polar phase provides accurate separations based on volatility
- High inertness, elutes sulfur components without absorption for high quality data and low detection limits
- Highest efficiency for this apolar column with the thickest film

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

HP-PONA

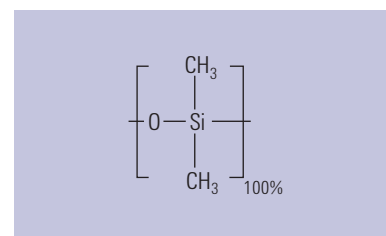
- 100% Dimethylpolysiloxane
- Configured for the analysis of petroleum process products
- Tested to ensure the resolution of m-xylene from p-xylene and of cyclopentane from 2,3-dimethylbutane
- PONA, PIANO
- High resolution
- Bonded and cross-linked
- Solvent rinsable

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

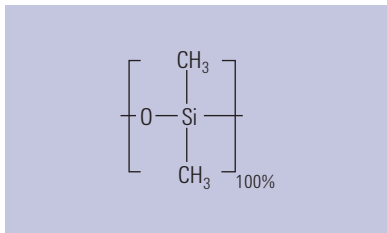
Similar Phases: Petrocol DH, SPB-1, 007-1, Rtx-1, MXT-1, Rtx-1PONA, Rtx-DHA

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



Structure of HP-PONA



Structure of CP-Sil PONA CB

CP-Sil PONA CB

- High resolution analysis of paraffins, olefins, naphthalenes and aromatics in complex hydrocarbon mixtures
- Engineered for hydrocarbon analysis according to ASTM (DHA method)
- Inert to polar compounds for highly accurate data
- Excellent column-to-column reproducibility

Similar Phases: Petrocol DH, SPB-1, 007-1, Rtx-1, MXT-1

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
0.25	150	1.00	250/275	CP7945	

CP-Sil PONA for ASTM D 5134

- Optimized PONA analysis for ASTM D 5134
- Exact dimensions as specified in the ASTM method for full compliance
- Inert to polar additives

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

Similar Phases: Petrocol DH, SPB-1, 007-1, Rtx-1, MXT-1

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	128-1056	
0.25	100	0.50	-60 to 325/350	122-10A6	122-10A6E

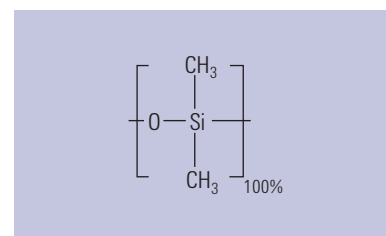
HP-1 Aluminum Clad

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

Similar Phases: MXT-1

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



Structure of DB-Petro



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

Similar Phases: Petrocol EX2887, MXT-2887, MXT-1, Rtx-2887

DB-2887

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



DB-HT SimDis

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

Similar Phases: Petrocol EX2887, MXT-2887, Rtx-2887, AC Controls High Temp Sim Dist, AT-2887, ZB-1XT SimDist

DB-HT SimDis

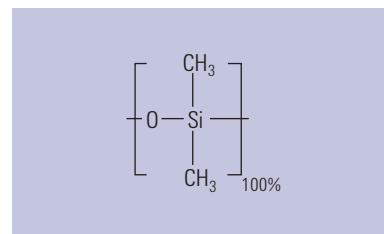
ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.53	5	0.10	-60 to 400/430	145-1009
		0.15	-60 to 400/430	145-1001

CP-SimDist

- For simulated distillation analysis up to C₁₀₀
- High temperature non-polar stationary phase
- Low bleed improves quantitation
- High temperature polyimide coating extends lifetime

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

Similar Phases: Petrocol EX2887, MXT-2887, Rtx-2887, AC Controls High Temp Sim Dist, AT-2887, ZB-1XT SimDist



Structure of CP-SimDist

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	

TIPS & TOOLS

For optimum performance, ferrules should be replaced every time the column is replaced and during column maintenance.
See pages 33-34



CP-SimDist UltiMetal

- Designed for ASTM D2887 and the extended D2887 method compliance
- Low bleed
- Extended analysis to C₁₂₀ with maximum temperature of 450 °C
- UltiMetal tubing for excellent durability (same id as 0.53 mm id fused silica)
- Excellent retention time repeatability and column lifetime due to special deactivation of UltiMetal surface

Similar Phases: Petrocol EX2887, MXT-2887, Rtx-2887, AC Controls High Temp Sim Dist, AT-2887, ZB-1XT SimDist

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
		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	

CP-Sil 2 CB

- Lowest polarity bonded stationary phase available
- Superior replacement to squalane
- Unique selectivity toward cyclic hydrocarbons
- Separation almost entirely based on boiling point
- Stable at temperatures up to 200 °C

CP-Sil 2 CB

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
0.25	25	0.25	25 to 200/200	CP7714	CP771415
	50	0.25	25 to 200/200	CP7724	
0.32	50	0.25	25 to 200/200	CP7754	CP775415
	25	1.20	25 to 200/200	CP7764	
	50	1.20	25 to 200/200	CP7774	
0.53	25	2.00	25 to 200/200	CP7653	

CP-TCEP for Alcohols in Gasoline

- Engineered for analysis of alcohols in gasoline
- Excellent peak shape for accurate separations of alcohols
- Temperature stability to 135 °C for high productivity
- Unique selectivity separates benzene after n-dodecane

Similar Phases: Rt-TCEP

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	CP752515

Select Low Sulfur

- Highest degree of column inertness provides excellent peak shape for active compounds
- Low detection limits for sulfur compounds
- Unique selectivity prevents co-elution and matrix interferences in propylene streams
- Highly permeable PLOT stationary phase provides high retention of volatile compounds
- Unique QC testing results in consistent column inertness performance
- Mechanical stability results in no particle loss

Select Low Sulfur

ID (mm)	Length (m)	Temp Limits (°C)	7 in Cage
0.32	60	185	CP8575

CP-Sil 5 CB for Sulfur

- Optimized for analysis of Volatile Sulfur Compounds
- Trace analysis of sulfur compounds to C₇ mercaptan for high productivity
- Non-polar phase provides accurate separations based on volatility
- High inertness, elutes SO₂ for high quality data and low detection limits

CP-Sil 5 CB for Sulfur

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
0.32	30	4.00	-60 to 300/325	CP7529	CP752915

Select for Permanent Gases – Dual Column

- Set of two parallel columns: CP-Molsieve 5Å for permanent gases and PoraBOND Q for CO₂ analysis
- Isothermal separation at temperatures > 40 °C eliminates the need for cryogenics
- Temperature stability up to 300 °C allows short regeneration times and improves efficiency
- One injector, one detector simplifies operation
- Engineered for fast separation, low level analysis and quantification of argon/oxygen
- Separates permanent gases and CO₂ in a single run
- Coupled, tested and securely mounted on EZ-GRIP column mount
- For resolution of the difficult-to-separate argon/oxygen and helium/neon pairs, use CP7530 Select Permanent Gases/HR (High Resolution) column

Select for Permanent Gases – Dual Column

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

Select Al₂O₃ MAPD

- Aluminum oxide PLOT column for the analysis of reactive hydrocarbons such as methyl acetylene and propadiene (MAPD)
- Optimized to improve sensitivity and response
- Faster run improves operating efficiency
- Two-fold higher response for MAPD, especially important when running impurity analyses

Similar Phases: Rt-Alumina BOND/MAPD, MXT-Alumina BOND/MAPD

Select Al₂O₃ MAPD

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



Agilent J&W 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 ($^{\circ}\text{C}$)	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/ μg 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
- Pre-tested for complete confidence in results
- Good column lifetime when operating at temperatures up to 400 °C
- UltiMetal column with ultra stable stationary phase
- Convenient pre-coupled retention gap that is leak tested

Technical Specifications

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

Select Biodiesel

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

Select Silanes

- Stabilized trifluoropropyl-methyl polysiloxane phase for optimized ppm level analysis of silanes
- High capacity and retention
- Low bleed
- Reduced surface activity provides excellent peak shape
- Thick film offers high sample loading capacity and retention
- Typical applications include alkylated chlorosilanes at % levels as well as impurity analysis
- Valved, 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

CP-Volamine

- Non polar stationary phase
- 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
- Produces symmetrical peaks due to MPD (Multi-Purpose Deactivation) technology
- Excellent performance even when the sample contains high percentages of water
- Ideal for analyzing volatile amines like MMA, DMA and TMA (monomethyl, dimethyl and trimethyl amine)

Similar Phases: Rtx-Volatile Amines

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	CP744715
	60	265/275	CP7448	CP744815

CP-Sil 8 CB for Amines

- Base deactivated 5% phenyl polydimethylpolysiloxane
- Optimized inertness performance for a broad range of Amine compounds
- Thermal stability up to 350 °C enable separations of Amines up to C₂₀ as well as alkanolamines
- Base deactivated columns also available as CP-Wax for Amines

Similar Phases: Rtx-5 Amine

CP-Sil 8 CB for Amines

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
<i>0.15</i>	<i>25</i>	<i>2.00</i>	<i>325/350</i>	<i>CP7599</i>	
0.25	30	0.25	325/350	CP7598	CP759815
	30	0.50	325/350	CP7595	CP759515
0.32	30	1.00	325/350	CP7596	CP759615
0.53	30	1.00	325/350	CP7597	CP759715

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

CP-Wax for Volatile Amines and Diamines

Similar Phases: Stabilwax DB

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	CP742215
0.53	25	2.00	220/220	CP7424	

PoraPLOT Amines

- Unique PLOT columns specially designed for high retention of very volatile amines
- High efficiency at temperatures above ambient eliminates the need for cryogenics
- High sensitivity for amines and ammonia

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	CP759115
0.53	25	20.00	-100 to 220/220	CP7594	

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.

Note: For CLP pesticides and other methods using electron capture detectors, see DB-35ms, DB-17ms and DB-XLB.

DB-CLP 1 and DB-CLP 2

- Universal column pair designed for pesticides analyses
- EPA Methods: CLP (Contract Lab Program) pesticides, 504.1, 505, 508.1, 551, 552.3, 8081B, 8082A, 8154A
- Ideal for dual column, dual ECD GC analyses
- Mid polarity stabilized phases provide fast and low bleed reliable analyses
- Special testing includes pesticides for proof of performance and column to column reproducibility
- DB-CLP1 primary, DB-CLP2 confirmation

DB-CLP 1 and DB-CLP 2

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage
0.32	30	0.25	50 to 340/360	123-8232
	30	0.5	50 to 340/360	123-8336

TIPS & TOOLS

Check out Agilent's complete line of sample preparation products for any type of GC and GC/MS analysis at www.agilent.com/chem/sampleprep



VF-5 Pesticides

- Specially designed for the determination of trace levels of pesticide residue
- Highly inert for enhanced ECD and MS detection
- Tested with key pesticides including endrin and aldrin for optimal performance and consistency of results
- Low bleed

VF-5 Pesticides

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	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

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

Similar Phases: SPB-1701, Rtx-1701, BP-10, CB-1701, OV-1701, 007-1701, ZB-1701P

DB-1701P

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	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

VF-1701 Pesticides

- Specially designed for the determination of trace levels of pesticide residues
- Columns individually tested with key pesticides, including endrin and aldrin
- Highly inert for improved detection limits for trace pesticide determination
- Proven performance with ECD or MS detection
- Ultra low bleed to improve sensitivity

VF-1701 Pesticides

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	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

CP-Sil 8 CB for Pesticides

- Linear column response down to femtogram level for improved productivity
- Excellent inertness – tested with DDTs to provide very reliable data
- Can be used with on-column injection techniques
- Integrated retention gap helps avoid problems with solvent condensation allowing repeated splitless injections without phase deterioration

CP-Sil 8 CB for Pesticides

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	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 ($^{\circ}\text{C}$)	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	

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

Similar Phases: SPB-608, NON-PAKD Pesticide, 007-608

DB-608

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage	7890/6890 LTM Module	5975T LTM Toroid
<i>0.18</i>	<i>20</i>	<i>0.18</i>	<i>40 to 280/300</i>	<i>121-6822</i>	<i>121-6822LTM</i>	<i>221-6822LTM</i>
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	

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

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

Similar Phases: SPB-5, RSL-200, Rtx-5, BP-5, CB-5, OV-5, 007-2 (MPS-5), SE-52, SE-54, XTI-5, PTE-5, CC-5, ZB-5

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

Rapid-MS

- Equivalent to 5% phenyl, 95% dimethylpolysiloxane
- Fast analysis time improves productivity
- Reduce analysis time by 3-5x for temperature programmed, and up to a 10x for isothermal runs
- The film thickness from 0.1 to 1 µm ensures high loadability and higher sensitivity
- Low bleed

Note: Rapid-MS columns utilize the high optimal carrier gas velocity obtained when a separation is performed under reduced pressure for fast analysis times

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
		1.00	-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

PAH Columns

Select PAH

- Full separation for all PAH isomers avoids false positives and inaccurate results
- Full separation of EPA PAHs in less than 7 minutes and EU PAHs in less than 30 minutes including separation of chrysene, triphenylene and benzo[fluoranthene (type b, j, and k)
- Fast results with no need for further analysis
- Low bleed enhances sensitivity

Select PAH

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

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

DB-EUPAH

- 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

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

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

CP-Sil PAH CB UltiMetal

- Separates all 16 PAHs according to EPA Method 610
- High temperature, low bleed phase
- Virtually unbreakable UltiMetal capillary column
- Maximum temperature of 400/425 °C

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

Semivolatiles Columns

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-UI 8270D for Semivolatiles

- Designed for EPA Method 8270D and other regulated GC/MS semivolatiles analysis
- Special semivolatiles testing ensures proof of column to column performance for trace level analysis
- Excellent 2,4-dinitrophenol response
- Ultra Inertness and Low bleed
- Available in convenient and economical 6 packs (6 for the price of 5)

DB-UI 8270D for Semivolatiles

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
<i>0.18</i>	<i>20</i>	<i>0.36</i>	<i>-60 to 325/350</i>	<i>121-9723</i>
			<i>-60 to 325/350</i>	<i>621-9723, 6/pk*</i>
0.25	30	0.25	-60 to 325/350	122-9732
			-60 to 325/350	622-9732, 6/pk*
		0.50	-60 to 325/350	122-9736

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

*Only available in the U.S.

CP-Sil 8 CB for PCB

- Engineered for the analysis of PCBs according to DIN method 51527
- Ideal for trace level ECD detection of PCBs
- High temperature stability provides low bleed and extended lifetime

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

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.

Similar Phases: XTI-5, Rtx-5, PTE-5, BPX-5

DB-5.625

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	7890/6890
					LTM Module
<i>0.18</i>	<i>20</i>	<i>0.18</i>	<i>-60 to 325/350</i>	<i>121-5621</i>	<i>121-5621LTM</i>
		<i>0.36</i>	<i>-60 to 325/350</i>	<i>121-5622</i>	<i>121-5622LTM</i>
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

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers



HP-5ms Semivolatiles

- (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

Similar Phases: Rtx-5ms, Rxi-5ms, Rxi-5Sil MS, PTE-5, BPX-5, AT-5ms, ZB-5ms, SLB-5ms, Equity-6

HP-5ms Semivolatiles

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

- Engineered for high resolution PCB analysis
- Lower polarity than 100% polydimethylpolysiloxane due to its C₁₈ substitution
- Provides high signal-to-noise ratios for ECD detectors
- Optimized column length for separation of 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

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

Similar Phases: SP-2331, 007-23, Rtx-2332, Rtx-Dioxin

DB-Dioxin

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	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

- High polarity stationary phase with specific selectivity for dioxins and dibenzofuran separations
- Integrated retention gap eliminates leaks and extends column lifetime with splitless injections
- 2,3,7,8-TCDD can be determined at low concentrations
- For fast runtimes, thin film configurations are available with maximum temperature program limit of 270 $^{\circ}\text{C}$

Similar Phases: SP-2560, SP-2340, SP-2330, BPX-70, BPX-90

CP-Sil 88 for Dioxins

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage
0.25	30	0.10	50 to 250/270	CP7497
		0.20	50 to 225/240	CP7588
		0.10	50 to 250/270	CP7498
0.32	60	0.13	50 to 250/270	CP7499

Volatiles Columns

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

Don't forget, we have special offers throughout the year.



To learn more, visit

www.agilent.com/chem/specialoffers

DB-624 Ultra Inert

- Environmental volatile organic compounds (VOCs) methods
- Excellent for U.S. EPA Methods: 501.3, 502.2, 503.1, 524.2, 601, 602, 8010, 8015, 8020, 8240, 8260,
- Industrial chemical analyses – solvents, petrochemicals, specialty chemicals
- Food and beverage – alcohols, fusel oils
- Pharmaceutical residual solvents per USP <467>
- Ultra inertness processing expands application range with excellent peakshape for low molecular weight acidic compounds
- UI testing ensure premium performance column to column
- Identical selectivity to the industry standard DB-624 – upgrade with no change in method required
- Optimized by the inventors of DB-624

DB-624 Ultra Inert

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
<i>0.18</i>	<i>20</i>	<i>1</i>	<i>-20 to 260</i>	<i>121-1324UI</i>
0.25	30	1.4	-20 to 260	122-1334UI
	60	1.4	-20 to 260	122-1364UI
0.32	30	1.8	-20 to 260	123-1334UI
	60	1.8	-20 to 260	123-1364UI
0.53	30	3	-20 to 260	125-1334UI
	75	3	-20 to 260	125-1374UI

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

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

Similar Phases: AT-624, Rxi-624 Sil MS, Rtx-624, PE-624, 007-624, 007-502, ZB-624

DB-624

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage	5 in Cage	7890/6890 LTM Module	5975T LTM Toroid
<i>0.18</i>	<i>20</i>	<i>1.00</i>	<i>-20 to 280</i>	<i>121-1324</i>	<i>121-1324E</i>	<i>121-1324LTM</i>	<i>221-1324LTM</i>
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		

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

CP-Select 624 CB

- 6% cyanopropyl, 94% dimethylpolysiloxane
- EPA volatiles methods 524.2, 624 and 8015
- Specified by Pharmacopoeia V.3.3.9 for residual solvents
- Excellent column-to-column reproducibility
- Low bleed

Similar Phases: AT-624, Rtx-624, PE-624, 007-624, 007-502, ZB-624

CP-Select 624 CB

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
<i>0.15</i>	<i>25</i>	<i>0.84</i>	<i>265/280</i>	<i>CP7411</i>	<i>CP741115</i>
0.25	30	1.40	265/280	CP7412	
	60	1.40	265/280	CP7413	CP741315
0.32	30	1.80	265/280	CP7414	CP741415
	60	1.80	265/280	CP7415	CP741515
0.53	30	3.00	265/280	CP7416	CP741615
	75	3.00	265/280	CP7417	
	105	3.00	265/280	CP7418	

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

TIPS & TOOLS



As part of Agilent's ongoing commitment to be your partner in chromatography, we have created a series of GC Troubleshooting videos, featuring Daron Decker, GC Applications Specialist, and Herb Brooks, Agilent Service Engineer. To view the videos, visit www.agilent.com/chem/gctroubleshooting



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.

Similar Phases: VOCOL, NON-PAKD, Rtx-Volatiles, PE-Volatiles, 007-624, Rtx-VRX, Rtx-VGC

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	<i>20</i>	<i>1.00</i>	<i>-10 to 260</i>	<i>121-1524</i>		<i>121-1524LTM</i>	<i>221-1524LTM</i>
	<i>40</i>	<i>1.00</i>	<i>-10 to 260</i>	<i>121-1544</i>	<i>121-1544E</i>	<i>121-1544LTM</i>	
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			

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

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

Similar Phases: NON-PAKD, Rtx-Volatiles, PE-Volatiles, 007-624, Rtx-VRX, Rtx-VGC

HP-VOC

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	7890/6890	5975T
					LTM Module	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 ($^{\circ}\text{C}$)	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	125-14A4

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

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage	5 in Cage	7890/6890
						LTM Module
0.45	30	2.55	35 to 260/280	124-0034		124-0034LTM
0.53	30	3.00	35 to 260/280	125-0034	125-0034E	125-0034LTM

CP-Select CB for MTBE

- Engineered for analysis of MTBE in reformulated gasoline
- Unique selectivity for MTBE
- Broad dynamic range for quantification of MTBE
- Ideal as primary or confirmation column

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

- Stabilized non-polar bonded phase engineered for fast mineral oil analysis
- Optimized selectivity for reliable Total Petroleum Hydrocarbon (TPH) results per DIN H53 N-ISO 9377-2 methods
- C₄ to C₄₀ hydrocarbons can be analyzed in less than ten minutes
- Low bleed
- Available in Fused Silica or UltiMetal
- Fast run time
- High temperature stability up to 375/400 °C
- Available in economical 3 and 6 packs

Note: For optimal injection performance, use the 4 m x 0.53 mm id retention gap

Similar Phases: Rtx-Mineral Oil

Select Mineral Oil

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	Unit	7 in Cage	5 in Cage
0.32	15	0.10	-60 to 390/400	1/pk	CP7491	CP749115
	15	0.10	-60 to 390/400	3/pk	CP749103	
	15	0.10	-60 to 390/400	6/pk	CP749106	
Retention gap						
0.53	4		-60 to 325/350	3/pk	CP8015	

Select Mineral Oil UltiMetal

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.32	15	0.10	-60 to 390/400	CP7493

TIPS & TOOLS

Ensure highest quality gas while keeping gas lines clean and leak-free with Agilent's high-capacity gas filter. Learn more at www.agilent.com/chem/gasclean





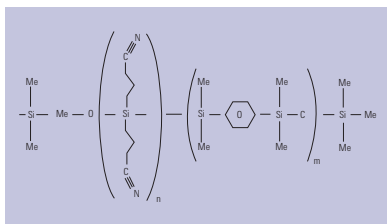
Food, Flavors and Fragrances Columns

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.

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

Similar Phases: SP-2560, SP-2340, SP-2330, BPX-70, BPX-90



Structure of HP-88

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	0.20	0 to 250/260	112-8867	112-8867E	
	30	0.20	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

Similar Phases: SP-2560, SP-2340, SP-2330, BPX-70, BPX-90

CP-Sil 88

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage	5 in Cage
0.25	25	0.20	50 to 225/240	CP6172	CP617215
	50	0.20	50 to 225/240	CP6173	CP617315
0.32	25	0.20	50 to 225/240	CP6174	CP617415
	50	0.20	50 to 225/240	CP6175	

TIPS & TOOLS

Order your free GC troubleshooting and GC column installation posters at www.agilent.com/chem/GCposteroffer



Select FAME

- Tuned for optimal cis-trans separation of FAMEs, especially C₁₈ isomers
- Excellent peak shape and separation for FAME isomers – especially if one component is present at a higher concentration
- Bonded and cross-linked
- Low bleed
- High efficiency and column loadability
- Column length up to 200 m available for detailed analysis of the C₁₈:1 isomer cluster

Select FAME

ID (mm)	Length (m)	Temp Limits (°C)	7 in Cage	5 in Cage
0.25	50	275/290	CP7419	CP741915
	100	275/290	CP7420	CP742015
	200	275/290	CP7421	

CP-Sil 88 for FAME

- Optimized for analysis of FAME cis/trans isomers
- High polarity stationary phase provides improved efficiency and higher productivity
- Use for FAME separations in the C₆ to C₂₆ range

CP-Sil 88 for FAME

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

CP-Wax 57 CB

- Unique high polarity bonded wax column
- Industry proven for the analysis of alcohols in the brewing and wine/spirits industry
- Excellent inertness for optimum peak shape of alcohols and glycols
- Offered in 0.15 mm id for significantly high speed throughput

Similar Phases: SUPELCOWAX 10, SUPEROX II, CB-WAX, Stabilwax, BP-20, 007-CW, Carbowax, Rtx-WAX, ZB-WAX

CP-Wax 57 CB

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage	5 in Cage
<i>0.15</i>	<i>15</i>	<i>0.12</i>	<i>20 to 200/225</i>	<i>CP97711</i>	<i>CP9771115</i>
	<i>30</i>	<i>0.12</i>	<i>20 to 200/225</i>	<i>CP97721</i>	
0.25	25	0.20	20 to 200/225	CP97713	
	50	0.20	20 to 200/225	CP97723	CP9772315
	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	CP9776315
	50	0.20	20 to 200/225	CP97753	CP9775315
		1.20	20 to 200/225	CP97773	CP9777315
0.53	25	1.00	20 to 200/225	CP97638	CP9763815
	25	2.00	20 to 200/225	CP97658	CP9765815

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

CP-Carbowax 400 for Volatiles in Alcohol

- Designed for the analysis of volatiles in alcoholic beverages
- High resolution for amyl alcohols for accurate quality control
- High efficiency
- Special testing ensure performance and column-to-column reproducibility

CP-Carbowax 400 for Volatiles in Alcohol

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage	5 in Cage
0.32	50	0.20	60/80	CP7527	CP752715

CP-Wax 57 CB for Glycols and Alcohols

- Optimized for the analysis of glycols, diols and alcohols
- Unique, high polarity wax phase
- Symmetrical peaks providing the most accurate results
- Cross-linked and bonded phase delivers robustness and enhanced column lifetime

CP-Wax 57 CB for Glycols and Alcohols

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage	5 in Cage
0.25	25	0.25	200/200	CP7615	CP761515
0.53	25	0.50	225/250	CP7617	CP761715

CP-TAP CB for Triglycerides

- Engineered phase for detailed analysis of triglycerides
- Separates complete triglyceride pattern in less than 16 minutes
- Separation based on carbon number and degree of unsaturation
- Stabilized phase for low bleed and enhanced column lifetime
- Available in Fused Silica and UltiMetal

CP-TAP CB for Triglycerides

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage
0.25	25	0.10	350/360	CP7483

CP-TAP CB UltiMetal

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage
0.25	25	0.10	355/370	CP7463

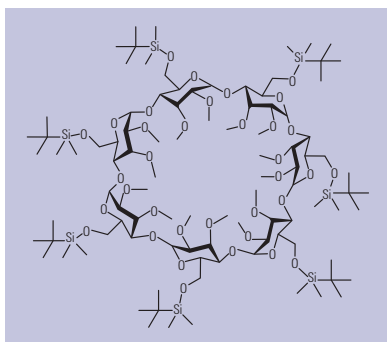
CP-FFAP CB for Free Fatty Acids in Dairy Products

- Ideal for flavors, aromas and free fatty acids C₁ to C₂₆
- Separates C₂-C₂₄ acids in one run without derivatization
- Chemically-bonded for excellent longevity
- Water and solvent resistant

CP-FFAP CB

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

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers



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

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

Similar Phases: LIPODEX C, Rt-β DEXm, β-DEX 110, β-DEX 120

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

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

Similar Phases: LIPODEX C, Rt- β DEXm, β -DEX 110, β -DEX 120

Cyclodex-B

ID (mm)	Length (m)	Film (μ m)	Temp Limits ($^{\circ}$ C)	7890/6890		
				7 in Cage	5 in Cage	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

Similar Phases: LIPODEX C, Rt- β DEXm, β -DEX 110, β -DEX 120

HP-Chiral β

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

CP-Chirasil Val

- Designed for separations of optically active compounds including amino acids
- Both antipode phases are available (D and L) for maximum versatility
- Stabilized chiral phase, over 50% cross-linked for longevity
- Tested for separation of amino acid enantiomers
- Low bleed

Note: 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 these compounds. Selecting the column from which the minor compound elutes before the major enantiomers results in the lowest detection levels.

CP-Chirasil Val

Description	ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage	5 in Cage
Antipode D	0.25	25	0.08	200/200	CP7494	CP7494I5
Antipode L	0.25	25	0.12	200/200	CP7495	CP7495I5

CP-Chirasil-Dex CB

- Cyclodextrin bonded to dimethylpolysiloxane for homogeneous enantioselectivity throughout the column
- High resolution factor between isomers across a broad application range
- Chemically bonded phase for excellent longevity
- No need for derivatization improved productivity
- Low elution temperature of polar compounds
- Suitable for all injection techniques

Similar Phases: LIPODEX C, Rt- β DEXm, β -DEX 110, β -DEX 120

CP-Chirasil-Dex CB

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

CP-Cyclodextrin- β -2,3,6-M-19

- Unique selectivity for optical and positional isomer separations
- High efficiency enables wide range of applications
- Separates o-, m-, and p-xylenes
- Excellent peak shape for underivatized polar compounds

CP-Cyclodextrin- β -2,3,6-M-19

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage	5 in Cage
0.25	25	0.25	225/250	CP7500	CP7500I5
0.32	50	0.25	225/250	CP7501	

TIPS & TOOLS

Agilent CrossLab GC supplies, including CrossLab Ultra Inert liners, perform seamlessly with a variety of instruments regardless of make or model, including Varian (now Bruker), PerkinElmer, Shimadzu, and Thermo Scientific GC systems. Learn more at www.agilent.com/chem/CrossLab



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.

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

Similar Phases: Rtx-BAC1, Rtx-BAC2, ZB-BAC-1, ZB-BAC-2

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

VF-DA

- Engineered for drugs of abuse confirmation testing
- High recovery for trace level analysis and excellent resistance to direct methanol injections
- Ultra low bleed

VF-DA

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

HP-Blood Alcohol

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

Similar Phases: Aucune

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

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

DB-Select 624 UI for <467>

- Engineered to optimize pharmaceutical residual solvents analysis per USP Method <467>
- Ultra Inertness and low bleed
- Resolution of USP regulated critical pairs, also separates benzene and 1,2-dichloroethane
- Identical selectivity to the popular VF-624 ms – upgrade with no changes in method.
- UI testing ensures premium performance column to column

DB-Select 624 UI for <467>

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.25	30	1.4	40 to 260/260	122-0334UI
	60	1.4	40 to 260/260	122-0364UI
0.32	30	1.8	40 to 260/260	123-0334UI
	60	1.8	40 to 260/260	123-0364UI
0.53	30	1.8	40 to 260/260	125-0334UI

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

Similar Phases: PE-624, 007-624, 007-502, ZB-624

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

Metal Columns

DB-ProSteel and UltiMetal columns are engineered to combine the robustness of stainless steel with advanced surface deactivation for excellent peak shape.

- Configured for high temperature analyses such as simulated distillation
- Wide variety of stationary phases and configurations available
- Ideal for portable and process GC applications
- Superior replacement for MXT/Silco-steel columns

Metal Columns

Phase	ID (mm)	Length (m)	Film (µm)	7 in Cage	5 in Cage	
Simulated distillation/high temperature						
DB-HT SimDis	0.53	5	0.10	145-1009		
			0.15	145-1001		
DB-PS2887	0.53	10	3.00	145-2814		
CP-SimDist UltiMetal	0.53	5	0.09	CP7569	CP756915	
			0.17	CP7532	CP753215	
			0.88	CP7570		
			2.65	CP7571		
	10		0.06	CP6540		
			0.17	CP7542	CP754215	
			0.53	CP7592		
			0.88	CP7512		
			1.20	CP7562		
			2.65	CP7582		
			5.00	CP7572		
			20	0.11	CP7593	
			25	0.06	CP6550	
VF-5ht UltiMetal	0.25	15	0.10	CP9090		
			0.32	CP9094	CP909415	
	0.25	30	0.10	CP9092		
			0.32	CP9096		

(Continued)

Metal Columns

Phase	ID (mm)	Length (m)	Film (µm)	7 in Cage	5 in Cage	
Simulated distillation/high temperature						
VF-5ht UltiMetal with Retention Gap UltiMetal	0.25	15	0.10	CP9091		
	0.32	15	0.10	CP9095		
	0.25	30	0.10	CP9093		
	0.32	30	0.10	CP9097		
Standard phases and PEG						
DB-PS1	0.53	15	0.15	145-1011		
		30	1.50	145-1032		
CP-Sil 5 CB	0.53	10	0.50	CP7125		
			1.00	CP7120		
			2.00	CP7150		
			5.00	CP6666	CP6666I5	
	25		0.50	CP7135	CP7135I5	
			1.00	CP7130		
			2.00	CP7160		
			5.00	CP6670		
	50		0.50	CP7195		
			1.00	CP7140		
			2.00	CP7170		
			5.00	CP6671		
	DB-HT SimDis	0.53	5	0.10	145-1009	
				0.15	145-1001	
DB-PS2887	0.53	10	3.00	145-2814		
CP-SimDist UltiMetal, 6/pk	0.53	5	0.09	CP67569		
CP-SimDist UltiMetal	0.53	5	0.09	CP7569		
			0.17	CP7532		
			0.88	CP7570		
			2.65	CP7571		
	10		0.06	CP6540		
			0.17	CP7542		
			0.53	CP7592		
			0.88	CP7512		
			1.20	CP7562		
			2.65	CP7582		
			5.00	CP7572		
			20	0.11	CP7593	
	25	0.06	CP6550			

(Continued)



Metal Columns

Phase	ID (mm)	Length (m)	Film (μm)	7 in Cage	5 in Cage
Standard phases and PEG					
CP-Sil 8 CB UltiMetal	0.53	10	1.00	CP7121	
		25	5.00	CP6680	
		50	5.00	CP7196	
					CP6681
CP-Sil 13 CB UltiMetal	0.53	25	1.00	CP7141	
		50	0.50	CP7129	
DB-PSWAX	0.53	30	1.00	145-7032	
CP-WAX 52 CB UltiMetal	0.53	10	1.00	CP7148	
			2.00	CP7177	
			0.50	CP7138	
			1.00	CP7158	
		25	2.00	CP7178	
			0.50	CP7198	
			1.00	CP7168	
			2.00	CP7179	
PLOT columns					
PoraPLOT Q UltiMetal	0.53	10	20.00	CP6953	CP695315
		25	20.00	CP6954	CP695415
		50	20.00	CP6955	
CP-Al ₂ O ₃ /KCl UltiMetal	0.53	50	10.00	CP6918	
CP-Al ₂ O ₃ /Na ₂ SO ₄ UltiMetal	0.53	50	10.00	CP6968	
CP-Molsieve 5Å UltiMetal	0.53	10	50.00	CP6937	
		25	50.00	CP6938	CP693815
		50	50		CP693715
Select application columns					
DB-PS624	0.53	30	3.00	145-1334	
CP-Sil PAH CB UltiMetal	0.25	25	0.12	CP7440	
CP-TAP CB	0.25	25	0.10	CP7463	
Select Biodiesel	0.32	10	0.10	CP9076	
With retention gap		15	0.10	CP9078	
Select Biodiesel	0.32	10	0.10	CP9077	
		15	0.10	CP9079	



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.

PoraBOND Q

- Bonded PLOT column for more reliable results for analysis of volatile solvents and hydrocarbons
- Extended analysis offers broad application range
- 300/320 °C temperature limits
- Engineered for high stability, withstands repeated water injections
- Proprietary manufacturing technique results in very pure porous polymer with virtually no catalytic activity, allowing operation to 320 °C without decomposition
- Bonding technology results in greatly reduced particle shedding, reduces the needs for particle traps

Similar Phases: Rt-Q BOND, Rt-QPLOT, SupelQ PLOT

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	

PoraBOND U

- Highly stable polar-bonded porous polymer with maximum operating temperature of 300 °C
- Reduced bleed for low detection limits and fast stabilization time
- Bonded PLOT column for excellent longevity
- Ideal for use with method that pressure programs or valve switching

Similar Phases: Rt-U-BOND



PoraBOND U

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

PoraPLOT Q and PoraPLOT Q-HT

- Recommended for column switching systems that analyze a broad range of polar and apolar volatile compounds
- Water elutes as a sharp peak enabling quantitation
- Retention of target compounds is not influenced by water in the sample
- Long term stability provides repeatable retention times
- Available in Fused Silica and UltiMetal

Similar Phases: Rt-Q BOND, Rt-QPLOT, SupelQ PLOT

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	

PoraPLOT Q UltiMetal

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	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	

PoraPLOT Q-HT

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage	5 in Cage
0.32	10	10.00	-100 to 290/290	CP7556	
	25	10.00	-100 to 290/290	CP7557	CP7557I5
0.53	10	20.00	-100 to 290/290	CP7558	CP7558I5
	25	20.00	-100 to 290/290	CP7559	CP7559I5

HP-PLOT Q

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

Similar Phases: Rt-QPLOT, SupelQ PLOT

HP-PLOT Q

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

GS-Q

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

Similar Phases: Rt-QPLOT, SupelQ PLOT

GS-Q

ID (mm)	Length (m)	Temp Limits (°C)	7890/6890		
			7 in Cage	5 in Cage	LTM Module
0.32	30	-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



TIPS & TOOLS

View the latest GC column focused applications, products and educational resources at www.agilent.com/chem/myGCcolumns

PoraPLOT U and PoraPLOT S

- The most polar porous polymer PLOT column ideal for halogenated compounds, C₁-C₆ hydrocarbons, ketones and solvents
- Excellent peak shape of polar and non-polar volatiles
- Water has no effect on retention times and elutes as a sharp quantifiable peak
- Reliable retention time repeatability

PoraPLOT U

Similar Phases: Rt-U-BOND

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

PoraPLOT S

- Divinylbenzene/vinylpyridine polymer for hydrocarbons and ketones
- Ideal for the analysis of medium polarity volatile including hydrocarbons and ketones
- Higher temperature limit than PoraPLOT U

Similar Phases: Rt-S-BOND, MXT-SBOND

PoraPLOT S

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

HP-PLOT U

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

Similar Phases: RTU PLOT

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	10.00	-60 to 190	19091P-U04	19091P-U04E	19091P-U04LTM
0.53	15	20.00	-60 to 190	19095P-U03		19095P-U03LTM
	30	20.00	-60 to 190	19095P-U04	19095P-U04E	19095P-U04LTM

HP-PLOT Al₂O₃ KCl

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

Similar Phases: Rt-Alumina PLOT, Alumina PLOT, Al₂O₃/KCl, AB-PLOT Al₂O₃ KCl, AT-Alumina

HP-PLOT Al₂O₃ KCl

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM Module
0.25	30	5.00	-60 to 200	19091P-K33	19091P-K33E	19091P-K33LTM
0.32	50	8.00	-60 to 200	19091P-K15	19091P-K15E	
0.53	30	15.00	-60 to 200	19095P-K23		19095P-K23LTM
	50	15.00	-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

Similar Phases: Al₂O₃/KCl, Al₂O₃/Na₂SO₄, Rt-Alumina PLOT, Alumina PLOT, AB-PLOT Al₂O₃ KCl, AT-Alumina

GS-Alumina KCl

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

CP-Al₂O₃/KCl and CP-Al₂O₃/Na₂SO₄

- Aluminum oxide PLOT columns offer high selectivity for separating ppm levels of C₁-C₅ hydrocarbons in process streams
- High capacity thick films
- No need for sub-ambient cooling
- Choice of two selectivities covers a broad range of applications
- Available in Fused Silica and UltiMetal

Note: The KCl deactivation salt results in a relatively apolar Al₂O₃ surface while the Na₂SO₄ deactivation provides a polar surface. Unsaturated compounds such as ethylene and acetylene (ethyne) are retained longer.

Selectivity Through KCl or Na₂SO₄ Deactivation

Note: Aluminum oxide PLOT columns are deactivated using KCl or Na₂SO₄ treatments which provides a reproducible and stable deactivation up to 200 °C. The KCl salt deactivation results in a relatively apolar Al₂O₃ surface, while the Na₂SO₄ deactivation provides a polar surface. Unsaturated compounds such as ethylene and acetylene (ethyne) are retained longer.

Similar Phases: Al₂O₃/KCl, Rt-Alumina PLOT, Alumina PLOT, RT-Alumina BOND/KCl, Alumina chloride PLOT, AB-PLOT Al₂O₃ KCl

CP-Al₂O₃/KCl

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

CP-Al₂O₃/KCl UltiMetal

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

Similar Phases: $\text{Al}_2\text{O}_3/\text{Na}_2\text{SO}_4$, Rt-Alumina PLOT, Alumina PLOT, Rt-Alumina BOND/ Na_2SO_4 , MXT-AluminaBOND/ Na_2SO_4 , Alumina sulfate PLOT

CP- $\text{Al}_2\text{O}_3/\text{Na}_2\text{SO}_4$

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	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- $\text{Al}_2\text{O}_3/\text{Na}_2\text{SO}_4$ UltiMetal

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	7 in Cage
0.53	50	10.00	-100 to 200/200	CP6968



HP-PLOT Al₂O₃ S

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

Similar Phases: Al₂O₃/Na₂SO₄, Rt-Alumina PLOT, Alumina PLOT, Rt-Alumina BOND/Na₂SO₄, MXT-AluminaBOND/Na₂SO₄, Alumina sulfate PLOT, AT-Alumina

HP-PLOT Al₂O₃ S

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

GS-Alumina

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

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

Similar Phases: Al₂O₃/KCl, Al₂O₃/Na₂SO₄, Rt-Alumina PLOT, Alumina PLOT, AB-PLOT Al₂O₃ KCl, AT-Alumina



GS-Alumina

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

HP-PLOT Al₂O₃ M

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

Similar Phases: AB-PLOT Al₂O₃ M, BGB-PLOT Al₂O₃ M, AT-Alumina

HP-PLOT Al₂O₃ M

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

GS-GasPro

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

Similar Phases: CP-Silica PLOT

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
- Elution of CO₂ and sulfur gases at ppm levels
- Separates cyclopropane from propylene
- Ideal for a wide range of applications such as COS in ethylene, freons, hydrocarbons, propylene and sulfur compounds
- High selectivity for C₁-C₄ isomers in the presence of water
- No negative influence on retention or peak shape when water is present in the sample
- Inert surface preparation results in no decomposition pentadienes or freons

Similar Phases: GS-GasPro

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	

TIPS & TOOLS

Ensure a lifetime of peak performance and maximum productivity with Agilent's comprehensive GC supplies portfolio, learn more at www.agilent.com/chem/GCsupplies



CarboBOND and 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

CarboBOND

CarboBOND

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	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

CarboPLOT P7

CarboPLOT P7

ID (mm)	Length (m)	Film (μm)	Temp Limits ($^{\circ}\text{C}$)	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

Similar Phases: Carbopack, CLOT, Carboxen-1006 PLOT

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	
	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	
	30	3.00	0 to 360	115-3133	115-3133LTM

HP-PLOT Molesieve

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

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

Similar Phases: Rt-Msieve 5A, MXT-Msieve 5A

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

Similar Phases: Rt-Msieve 5A, MXT-Msieve 5A, Mol Sieve 5A PLOT

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	CP753515
	25	30.00	-200 to 350/350	CP7536	CP753615
	30	10.00	-200 to 350/350	CP7534	CP753415
	50	30.00	-200 to 350/350	CP7540	CP754015
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	CP753815
	30	15.00	-200 to 350/350	CP7544	CP754415
	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	CP693715
	25	50.00	-200 to 350/350	CP6938	CP693815

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*

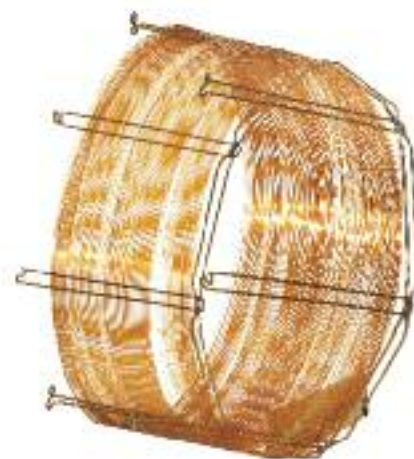
*Includes CP-UltiMetal connector

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

Columns with 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 ($^{\circ}\text{C}$)	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 ($^{\circ}\text{C}$)	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

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)			7890/6890
				7 in Cage	5 in Cage	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

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)	7890/6890	
				7 in Cage	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)	7890/6890	
				7 in Cage	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

Guard Columns

- DuraGuard and EZ-Guard 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

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
	0.32	60	0.25	10	122-5562G
		30	1.00	10	123-5533G
		30	0.50	10	125-5537G
<i>DB-5.625</i>	<i>0.18</i>	<i>20</i>	<i>0.36</i>	<i>5</i>	<i>121-5622G5</i>
	<i>0.25</i>	<i>30</i>	<i>0.25</i>	<i>5</i>	<i>122-5631G5</i>
DB-1701	0.53	30	1.00	10	125-0732G
DB-624	0.53	30	3.00	5	125-1334G5

Agilent J&W High Efficiency GC columns are displayed using italicized descriptions and part numbers

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.



EZ-Guard



A special tab clearly distinguishes the EZ-Guard guard column section from the analytical column

EZ-Guard

Phase	ID (mm)	Length (m)	Film (μm)	Guard Length (m)	Part No.
VF-1ms	0.20	12	0.33	5	CP9023
			0.25	5	CP9010
			0.25	10	CP9011
VF-5ms	0.25	15	0.25	5	CP9021
			0.25	5	CP9012
			0.25	10	CP9013
			0.50	5	CP9014
			0.50	10	CP9015
			0.25	5	CP9016
			0.53	30	0.25
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

Agilent J&W LTM Column Modules

Agilent J&W LTM Column Modules for 7890 and 6890 Series 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

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.



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 an integrated 3 in 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:

- 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



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.





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. Compatible with Agilent LTM and LTM II series GC systems and retrofit upgrades.

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

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

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.

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
		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
		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
		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
		30	0.10	29091S-833LTM	G3900-63041
			0.25	29091S-931LTM	G3900-63042
DB-5ms	0.18	20	0.18	221-5522LTM	G3900-63013
		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



(Continued)



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

Phase	ID (mm)	Length (m)	Film (µm)	Toroid Assembly	Column Module
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

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

(Continued)

Deactivated Fused Silica

ID (mm)	OD (mm)	Length (m)	Part No.
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

Agilent J&W Packed GC Columns

Agilent J&W Packed GC Columns are designed and manufactured to offer excellent and reproducible performance for all sample types associated with packed column separations, most important in the hydrocarbon processing industry.

The highly efficient and rigorous packing technology used in Agilent J&W Packed GC Columns assures column-to-column reproducibility and ultimate efficiency, while the UltiMetal treated stainless steel tubing allows for improved inertness and peak shape performance.

You can choose from a wide range of tubing materials – including stainless steel, UltiMetal, nickel, glass, copper and PTFE – plus hundreds of stationary phases, packings, and supports.



And, you can create your custom configurations by visiting www.agilent.com/chem/packedcolumnsordering

Agilent J&W Packed GC Columns for Agilent 7820, 7890, and 6890 Instruments

Carbosieve S

Length	OD (in)	ID (mm)	Mesh	Stainless Steel	UltiMetal	Nickel
20 in (0.51 m)	1/8	2	80/100	G3591-80105	G3591-81105	G3591-82105

15% Carbowax 1540

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
15 ft (4.57 m)	1/8	2	Chromosorb WHP	60/80	G3591-80095	G3591-81095	G3591-82095

5% Carbowax 20M (G16, G\$1)

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
7.22 ft (2.2 m)	1/8	2	Chromosorb WHP	100/120	G3591-80084	G3591-81084	G3591-82084

20% Carbowax 20M (G16, G\$1)

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
9.84 ft (3 m)	1/8	2	Chromosorb WHP	100/120	G3591-80099	G3591-81099	G3591-82099

7% Carbowax M + 3% Polyphenoether 6 ring + 2% KOH

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
4 ft (1.22 m)	1/8	2	Chromosorb W AW	80/100	G3591-80050	G3591-81050	G3591-82050

Carboxen-1000

Length	OD (in)	ID (mm)	Mesh	Stainless Steel	UltiMetal	Nickel
1.5 ft (0.46 m)	1/8	2	80/100	G3591-80125	G3591-81125	G3591-82125
10 ft (3.05 m)	1/8	2	60/80	G3591-80055	G3591-81055	G3591-82055

Chromosorb 101

Length	OD (in)	ID (mm)	Mesh	Stainless Steel	UltiMetal	Nickel
6 ft (1.83 m)	1/8	2	80/100	G3591-80021	G3591-81021	G3591-82021

Chromosorb 102

Length	OD (in)	ID (mm)	Mesh	Stainless Steel	UltiMetal	Nickel
2 ft (0.61 m)	1/8	2	80/100	G3591-80139	G3591-81139	G3591-82139

25% DC-200

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
15 ft (4.57 m)	1/8	2	Chromosorb PAW	80/100	G3591-80001	G3591-81001	G3591-82001

30% DC-200

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
20 ft (6.1 m)	1/8	2	Chromosorb PAW	100/120	G3591-80140	G3591-81140	G3591-82140
30 ft (9.14 m)	1/8	2	Chromosorb PAW	80/100	G3591-80082	G3591-81082	G3591-82082

35% DC-200

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
10 ft (3.05 m)	1/8	2	Chromosorb PAW	80/100	G3591-80030	G3591-81140	G3591-82030
30 ft (9.14 m)	1/8	2	Chromosorb PAW	80/100	G3591-80032	G3591-81032	G3591-82032
3 ft (0.91 m)	1/8	2	Chromosorb PAW	80/100	G3591-80039	G3591-81039	G3591-82039
5 ft (1.52 m)	1/8	2	Chromosorb PAW	80/100	G3591-80027	G3591-81027	G3591-82027

15% Hallcomid m-18

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
9.84 ft (3 m)	1/8	2	Chromosorb WHP	100/120	G3591-80067	G3591-81067	G3591-82067

30% DC 200/500

Length	OD (in)	ID (mm)	Support	Mesh	UltiMetal	Nickel	Stainless Steel
30 ft (9.14 m)	1/8	2	Chromosorb PAW	68/80			G3591-80161
2 ft (0.61 m)	1/8	2	Chromosorb PAW	60/80			G3591-80160
30 ft (9.14 m)	1/8	2	Chromosorb PAW	60/80		G3591-82161	
2 ft (0.61 m)	1/8	2	Chromosorb PAW	60/80		G3591-82160	
2 ft (0.61 m)	1/8	2	Chromosorb PAW	60/80	G3591-81160		
30 ft (9.14 m)	1/8	2	Chromosorb PAW	60/80	G3591-81161		

HayeSep D

Length	OD (in)	ID (mm)	Mesh	Stainless Steel
6.56 ft (2 m)	1/8	2	80/100	G3591-80158

HayeSep DB

Length	OD (in)	ID (mm)	Mesh	Stainless Steel	UltiMetal	Nickel
30 ft (9.14 m)	1/8	2	100/120	G3591-80088	G3591-81088	G3591-82088

HayeSep N

Length	OD (in)	ID (mm)	Mesh	Stainless Steel	UltiMetal	Nickel
6 ft (1.83 m)	1/8	2	80/100	G3591-80037	G3591-81037	G3591-82037
7 ft (2.13 m)	1/8	2	60/80	G3591-80060	G3591-81060	G3591-82060
8 ft (2.44 m)	1/8	2	80/100	G3591-80011	G3591-81011	G3591-82011
20 ft (6.1 m)	1/8	2	80/100	G3591-80045	G3591-81045	G3591-82045

HayeSep N + HayeSep R 1:1

Length	OD (in)	ID (mm)	Mesh	Stainless Steel	UltiMetal	Nickel
8 ft (2.44 m)	1/8	2	45/60	G3591-80091	G3591-81091	G3591-82091



HayeSep Q

Length	OD (in)	ID (mm)	Mesh	Stainless Steel	UltiMetal	Nickel
1.64 ft (0.5 m)	1/8	2	80/100	G3591-80023	G3591-81023	G3591-82023
3 ft (0.91 m)	1/8	2	80/100	G3591-80020	G3591-81020	G3591-82020
3.3 ft (1 m)	1/8	2	80/100		G3591-81148	
3.9 ft (1.2 m)	1/8	2	80/100			G3591-82159
4 ft (1.22 m)	1/8	2	80/100	G3591-80019	G3591-81019	G3591-82019
6 ft (1.83 m)	1/8	2	80/100	G3591-80004	G3591-81004	G3591-82004
8 ft (2.44 m)	1/8	2	80/100	G3591-80047	G3591-81047	G3591-82047
9 ft (2.74 m)	1/8	2	80/100	G3591-80033	G3591-81033	G3591-82033
10 ft (3.05 m)	1/8	2	80/100	G3591-80002	G3591-81002	G3591-82002
12 ft (3.66 m)	1/8	2	80/100	G3591-80121	G3591-81121	G3591-82121
5.91 ft (1.8 m)	1/8	2	80/100	G3591-70011		
3.28 ft (1 m)	1/8	2	80/100	G3591-70007		
6.56 ft (2 m)	1/8	2	80/100	G3591-70005		
9.84 ft (3 m)	1/8	2	80/100	G3591-70006		

HayeSep R

Length	OD (in)	ID (mm)	Mesh	Stainless Steel	UltiMetal	Nickel
6 ft (1.83 m)	1/8	2	80/100	G3591-80102	G3591-81102	G3591-82102
12 ft (3.66 m)	1/8	2	80/100	G3591-80100	G3591-81100	G3591-82100

HayeSep T

Length	OD (in)	ID (mm)	Mesh	UltiMetal	PTFE
1.64 ft (0.5 m)	1/8	2	80/100	G3591-81150	
1.64 ft (0.5 m)	1/8	2	60/80		G3591-74001

TIPS & TOOLS

To learn more about Agilent J&W Packed GC Columns please visit www.agilent.com/chem/packedcolumns.



MolSieve 5Å

Length	OD (in)	ID (mm)	Mesh	Stainless Steel	UltiMetal	Nickel
1 ft (0.30 m)	1/8	2	60/80	G3591-80077	G3591-81077	G3591-82077
3 ft (0.91 m)	1/8	2	60/80	G3591-80103	G3591-81103	G3591-82103
3 ft (0.91 m)	1/8	2	80/100	G3591-80074	G3591-81074	G3591-82074
3 ft (0.91 m)	1/8	2	100/120	G3591-80075	G3591-81075	G3591-82075
3.3 ft (1 m)	1/8	2	60/80		G3591-81149	
4 ft (1.22 m)	1/8	2	45/60	G3591-80090	G3591-81090	G3591-82090
6 ft (1.83 m)	1/8	2	60/80	G3591-80035	G3591-81035	G3591-82035
4 ft (1.22 m)	1/8	2	60/80	G3591-80104	G3591-81104	G3591-82104
6 ft (1.83 m)	1/8	2	60/80	G3591-80017	G3591-81017	G3591-82017
7 ft (2.13 m)	1/8	2	45/60	G3591-80062	G3591-81062	G3591-82062
8 ft (2.44 m)	1/8	2	60/80	G3591-80022	G3591-81022	G3591-82022
9 ft (2.74 m)	1/8	2	60/80	G3591-80046	G3591-81046	G3591-82046
9 ft (2.74 m)	1/8	2	80/100	G3591-80064	G3591-81064	G3591-82064
15 ft (4.57 m)	1/8	2	45/60	G3591-80061	G3591-81061	G3591-82061
20 ft (6.1 m)	1/8	2	45/60	G3591-80107		
20 ft (6.1 m)	1/8	2	60/80	G3591-80056	G3591-81056	G3591-82056
25 ft (7.62 m)	1/8	2	60/80	G3591-80065	G3591-81065	G3591-82065
6.56 ft (2 m)	1/8	2	45/60	G3591-70013		
3.28 ft (1 m)	1/8	2	80/100	G3591-70008		
1.97 ft (0.6 m)	1/4	2	80/100	G3591-70004		
6.56 ft (2 m)	1/8	2	80/100	G3591-70003		
6.56 ft (2 m)	1/8	2	60/80	G3591-70002		

MolSieve 13X

Length	OD (in)	ID (mm)	Mesh	Stainless Steel	UltiMetal	Nickel
2 ft (0.61 m)	1/8	2	45/60	G3591-80031	G3591-81031	G3591-82031
3 ft (0.91 m)	1/8	2	45/60	G3591-80028	G3591-81028	G3591-82028
4 ft (1.22 m)	1/8	2	45/60	G3591-80012	G3591-81012	G3591-82012
4.9 ft (1.5 m)	1/8	2	80/100	G3591-80085	G3591-81085	G3591-82085
6 ft (1.83 m)	1/8	2	60/80	G3591-80035	G3591-81035	G3591-82035
9 ft (2.74 m)	1/8	2	45/60	G3591-80054	G3591-81054	G3591-82054
10 ft (3.05 m)	1/8	2	46/60	G3591-80003	G3591-81003	G3591-82003
10 ft (3.05 m)	1/16	1	60/80	G3591-80097	G3591-81097	G3591-82097
10 ft (3.05 m)	1/8	2	60/80	G3591-80101	G3591-81101	G3591-82101
10 ft (3.05 m)	1/8	2	80/100	G3591-80043	G3591-81043	G3591-82043
12 ft (3.66 m)	1/8	2	60/80	G3591-80058	G3591-81058	G3591-82058
15 ft (4.57 m)	1/8	2	45/60	G3591-80098	G3591-81098	G3591-82098
9.84 ft (3 m)	1/8	2	45/60	G3591-70017		
9.84 ft (3 m)	1/8	2	80/100	G3591-70015		

1.5% OV-101

Length	OD (in)	ID (mm)	Support	Mesh	UltiMetal	Nickel	Stainless Steel
2 ft (0.61 m)	1/8	2	Chromosorb GHP	100/120			G3591-80162
2 ft (0.61 m)	1/8	2	Chromosorb GHP	100/120		G3591-82162	
2 ft (0.61 m)	1/8	2	Chromosorb GHP	100/120	G3591-81162		

10% OV-101

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
2.6 ft (0.79 m)	1/8	2	Chromosorb WHP	60/80	G3591-80048	G3591-81048	G3591-82048
5 ft (1.52 m)	1/8	2	Chromosorb PAW	80/100	G3591-80093	G3591-81093	G3591-82093

20% OV-101

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
4 ft (1.22 m)	1/8	2	Chromosorb WHP	80/100	G3591-80025	G3591-81025	G3591-82025

10% PEG-20M

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
6.56 ft (2 m)	1/8	2	Chromosorb W	80/100	G3591-80119	G3591-81119	G3591-82119

20% PEG-20M

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
6.56 ft (2 m)	1/8	2	Chromosorb W	80/100	G3591-80122	G3591-81122	G3591-82122
13.1 ft (4 m)	1/8	2	Chromosorb W	80/100	G3591-80123	G3591-81123	G3591-82123

Porapak N

Length	OD (in)	ID (mm)	Mesh	Stainless Steel	UltiMetal	Nickel
3 ft (0.91 m)	1/8	2	80/100	G3591-80072	G3591-81072	G3591-82072
3.9 ft (1.2 m)	1/8	2	60/80	G3591-80087	G3591-81087	G3591-82087
6 ft (1.83 m)	1/8	2	80/100	G3591-80036	G3591-81036	G3591-82036
8.2 ft (2.5 m)	1/8	2	50/80	G3591-80086	G3591-81086	G3591-82086
9 ft (2.74 m)	1/8	2	80/100	G3591-80044	G3591-81044	G3591-82044
12 ft (3.66 m)	1/8	2	60/80	G3591-80059	G3591-81059	G3591-82059

Porapak N + Porapak R 1:1

Length	OD (in)	ID (mm)	Mesh	Stainless Steel
12 ft (3.66 m)	1/8	2	50/80	G3591-80110

Porapak Q

Length	OD (in)	ID (mm)	Mesh	Stainless Steel	UltiMetal	Nickel
3 ft (0.91 m)	1/8	2	80/100	G3591-80135	G3591-81135	G3591-82135
6 ft (1.83 m)	1/8	2	60/80	G3591-80136	G3591-81136	G3591-82136
6 ft (1.83 m)	1/8	2	80/100	G3591-80005	G3591-81005	G3591-82005
6 ft (1.83 m)	1/8	2	80/100	G3591-80013	G3591-81013	G3591-82013
8 ft (2.44 m)	1/8	2	60/80	G3591-80137	G3591-81137	G3591-82137
8.2 ft (2.5 m)	1/8	2	80/100	G3591-80083	G3591-81083	G3591-82083
9 ft (2.74 m)	1/8	2	80/100	G3591-80016	G3591-81016	G3591-82016
13 ft (3.96 m)	1/8	2	80/100	G3591-80053	G3591-81053	G3591-82053
15 ft (4.57 m)	1/8	2	80/100	G3591-80066	G3591-81066	G3591-82066
25 ft (7.62 m)	1/8	2	100/120	G3591-80052	G3591-81052	G3591-82052
30 ft (9.14 m)	1/16	1	80/100	G3591-80096	G3591-81096	G3591-82096
3.28 ft (1 m)	1/8	2	80/100	G3591-70014		
5.91 ft (1.8 m)	1/8	2	80/100	G3591-70010		
9.84 ft (3 m)	1/8	2	80/100	G3591-70009		
6.56 ft (2 m)	1/8	2	80/100	G3591-70001		
4.92 ft (1.5 m)	1/8	2	50/80	G3591-70018		

Porapak QS

Length	OD (in)	ID (mm)	Mesh	Stainless Steel	UltiMetal	Nickel
6.56 ft (2 m)	1/8	2	80/100	G3591-80157		
8 ft (2.44 m)	1/8	2	80/100	G3591-80051	G3591-81051	G3591-82051
5.91 ft (1.8 m)	1/8	2	80/100	G3591-70010		
9.84 ft (3 m)	1/8	2	80/100	G3591-70009		

Porapak R

Length	OD (in)	ID (mm)	Mesh	Stainless Steel	UltiMetal	Nickel
6 ft (1.83 m)	1/8	2	60/80	G3591-80106	G3591-81106	G3591-82106

Porapak T

Length	OD (in)	ID (mm)	Mesh	Stainless Steel	UltiMetal	Nickel
1.5 ft (0.46 m)	1/8	2	80/100	G3591-80138	G3591-81138	G3591-82138
6.56 ft (2 m)	1/8	2	80/100	G3591-80120	G3591-81120	G3591-82120

20% Sebaconitrile

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
2 ft (0.61 m)	1/8	2	Chromosorb PAW	80/100	G3591-80029	G3591-81029	G3591-82029
19.7 ft (6 m)	1/8	2	Chromosorb PAW	80/100	G3591-80071	G3591-81071	G3591-82071
30 ft (9.14 m)	1/8	2	Chromosorb PAW	80/100	G3591-80026	G3591-81026	G3591-82026

20% Sebaconitrile/2% H₃PO₄

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
2 ft (0.61 m)	1/8	2	Chromosorb PAW	80/100	G3591-80015	G3591-81015	G3591-82015
30 ft (9.14 m)	1/8	2	Chromosorb PAW	80/100	G3591-80014	G3591-81014	G3591-82014

Silica Gel

Length	OD (in)	ID (mm)	Mesh	Stainless Steel	UltiMetal	Nickel
2 ft (0.61 m)	1/8	2	60/80	G3591-80141	G3591-81141	G3591-82141
4 ft (1.22 m)	1/8	2	60/80	G3591-80142	G3591-81142	G3591-82142
6 ft (1.83 m)	1/8	2	60/80	G3591-80108		

0.1% SP-1000

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
7 ft (2.13 m)	1/8	2	Carbopak C	80/100	G3591-80063	G3591-81063	G3591-82063

25% SP-2100

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
1.64 ft (0.5 m)	1/16	1	Chromosorb PAW	80/100	G3591-80007	G3591-81007	G3591-82007
5.7 ft (1.75 m)	1/16	1	Chromosorb PAW	80/100	G3591-80008	G3591-81008	G3591-82008
15 ft (4.57 m)	1/8	2	Chromosorb PAW	80/100	G3591-80068	G3591-81068	G3591-82068

20% TCEP

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
1.84 ft (0.56 m)	1/16	1	Chromosorb PAW	80/100	G3591-80006	G3591-81006	G3591-82006
5 ft (1.52 m)	1/8	2	Chromosorb PAW	80/100	G3591-80094	G3591-81094	G3591-82094
15 ft (4.57 m)	1/8	2	Chromosorb PAW	80/100	G3591-80049	G3591-81049	G3591-82049

10% UC W982

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
1.5 ft (0.46 m)	1/8	2	Chromosorb PAW	80/100	G3591-80034	G3591-81034	G3591-82034
2 ft (0.61 m)	1/8	2	Chromosorb PAW	80/100	G3591-80040	G3591-81040	G3591-82040

12% UC W982

Length	OD (in)	ID (mm)	Support	Mesh	Stainless Steel	UltiMetal	Nickel
2 ft (0.61 m)	1/8	2	Chromosorb PAW	80/100	G3591-80000	G3591-81000	G3591-82000

Agilent J&W Packed GC Columns for All Instruments

30% DC 200/500

Length	OD (in)	ID (mm)	Support	Mesh	UltiMetal
2 ft (0.61 m)	1/8	2	Chromosorb PAW	60/80	CP2057
30 ft (9.14 m)	1/8	2	Chromosorb PAW	60/80	CP2058*

*Preconditioned and pretested

HayeSep D

Length	OD (in)	ID (mm)	Mesh	UltiMetal
6.56 ft (2 m)	1/8	2	80/100	CP1482

HayeSep DB

Length	OD (in)	ID (mm)	Mesh	UltiMetal
40 ft (12.2 m)	1/8	2	80/100	CP2047

HayeSep N

Length	OD (in)	ID (mm)	Mesh	UltiMetal
1.64 ft (0.5 m)	1/16	1	80/100	CP1307*
1.64 ft (0.5 m)	1/8	2	80/100	CP1480
6 ft (1.83 m)	1/8	2	80/100	CP2068*

*Preconditioned and pretested

HayeSep P

Length	OD (in)	ID (mm)	Mesh	UltiMetal
6 ft (1.83 m)	1/8	2	80/100	CP2062

HayeSep Q

Length	OD (in)	ID (mm)	Mesh	UltiMetal
0.82 ft (0.25 m)	1/16	1	80/100	CP1308*
1.64 ft (0.5 m)	1/8	2	80/100	CP81073*
3.28 ft (1 m)	1/8	2	80/100	CP81069*
4.92 ft (1.5 m)	1/16	1	80/100	CP1305*

*Preconditioned and pretested

HayeSep R

Length	OD (in)	ID (mm)	Mesh	UltiMetal
3.28 ft (1 m)	1/8	2	80/100	CP86678*
8.53 ft (2.6 m)	1/8	2	80/100	CP86677*
12 ft (3.66 m)	1/8	2	80/100	CP2055*

*Preconditioned and pretested

MolSieve 5Å

Length	OD (in)	ID (mm)	Mesh	UltiMetal
3.28 ft (1 m)	1/8	2	60/80	CP81025*
4.92 ft (1.5 m)	1/16	1	80/100	CP1306*
5 ft (1.52 m)	1/8	2	80/100	CP2046
6 ft (1.83 m)	1/8	2	45/60	CP2065
10 ft (3.05 m)	1/8	2	80/100	CP2045
13.1 ft (4 m)	1/8	2	80/100	CP1483*

*Preconditioned and pretested

MolSieve 13X

Length	OD (in)	ID (mm)	Mesh	UltiMetal
3 ft (0.91 m)	1/8	2	45/60	CP2059*
3.94 ft (1.2 m)	1/16	1	80/100	CP1309*
4 ft (1.22 m)	1/8	2	45/60	CP2060
4.92 ft (1.5 m)	1/8	2	80/100	CP81071*

*Preconditioned and pretested

1.5% OV-101

Length	OD (in)	ID (mm)	Support	Mesh	UltiMetal
2 ft (0.61 m)	1/8	2	Chromosorb G HP	100/120	CP2056

Porapak QS

Length	OD (in)	ID (mm)	Mesh	UltiMetal
6.56 ft (2 m)	1/8	2	80/100	CP1481

10% SE-30

Length	OD (in)	ID (mm)	Mesh	UltiMetal
2.5 ft (0.76 m)	1/8	2	80/100	CP2073

Silica Gel

Length	OD (in)	ID (mm)	Mesh	UltiMetal
10 ft (3.05 m)	1/8	2	60/80	CP2050

20% TCEP

Length	OD (in)	ID (mm)	Mesh	UltiMetal
1.84 ft (0.56 m)	1/16	0.75	80/100	CP2071
15 ft (4.57 m)	1/8	2	80/100	CP2072



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 specific performance requirements.
- We can create DuraGuard or EZ-Guard columns with an integrated guard column (retention gap). Most phases can be manufactured with a built-in guard column, which means you get the advantages of a guard column without the union. Available in DB, CP and VF phases.

Custom columns are ordered using the P/Ns below. Be sure to provide the details of your desired custom service or column including phase, length, id, and film thickness.

- 100-2000 Custom Capillary DB & HP columns
- 100-6000 Custom Capillary CP & VF columns
- 100-9000 UltiMetal treated tubing and parts
- 100-2000 LTM – Custom Low Thermal Mass column configurations
- 100-5000 Custom packed columns or bulk phases/supports

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 Agilent's Essential Chromatography Catalog.

Customers in the United States, Canada, and Puerto Rico can request a custom column quote online at www.agilent.com/chem/CustomColumn

Agilent J&W GC Column Test Standards

Compare your column's performance to the test chromatogram shipped with your Agilent J&W column. 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

Test Standards for Agilent J&W CP and VF Columns

Test Mix 31 Hazardous, 1/pk	Part No.
VF-1ms	CP0031
VF-5ms	CP0031
VF-17ms	CP0031
VF-35ms	CP0031
VF-Xms	CP0031
VF-1301ms	CP0031
VF-200ms	CP0031
VF Rapid-MS	CP0031
CP-Sil 5 CB	CP0031
CP-Sil 8 CB	CP0031
CP-Sil 24 CB	CP0031
CP-1301	CP0031
Test Mix 5, 1/pk	Part No.
CP-Sil 43 CB	CP0005

TIPS & TOOLS



Ensure highest quality gas while keeping gas lines clean and leak-free with Agilent's high-capacity gas filter. Learn more at www.agilent.com/chem/gasclean



Column Installation and Troubleshooting

Quick reference guides and tips to ensure peak performance

Agilent J&W GC columns are backed by decades of chromatography experience, so you can count on superior quality and dependability. And you can help ensure maximum performance, efficiency, and column life by implementing the most current installation and troubleshooting procedures.

In this section, you'll discover tips, techniques, and easy-reference guides that will help you:

- Confidently install any capillary column
- Condition and test new columns
- Alleviate and avoid column performance degradation due to thermal damage, oxygen damage, and other factors
- Pinpoint and fix the most common column problems

So you'll expand your hours of continuous operation, decrease downtime, and get the reproducible results that your lab demands.



Capillary Column Installation

Quick Reference Guide

For more detailed installation information, refer to the GC Column Installation Guide which is provided with your column, or visit www.agilent.com/chem/columninstall

Precolumn Installation Check List

1. Replace oxygen, moisture, and hydrocarbon traps as needed.
2. Clean the injection port, replace critical injection port seals, replace injection port liners, and change septa as needed.
3. Check detector seals, and replace as necessary. Clean or replace detector jets as necessary.
4. Carefully inspect the column for damage or breakage.
5. Check your GC manufacturer's gas pressure requirements and verify gas cylinder delivery pressures to ensure that an adequate supply of carrier, makeup, and fuel gases are available. Minimum recommended carrier gas purity percentages are: Helium 99.995% and Hydrogen 99.995%, with H₂O < 1 ppm and O₂ < 0.5 ppm.
6. Gather the necessary installation tools: You will need a column cutter, column nuts, column nut wrench, ferrules, a magnifying loupe, and typewriter correction fluid.

Table 6:

Ferrule Sizes

Column ID	Ferrule ID (mm)
0.10	0.4
0.18	0.4
0.20	0.4
0.25	0.4
0.32	0.5
0.45	0.8
0.53	0.8

Installing the Column

1. Uncoil approximately 0.5 m of tubing (1 coil ~ 0.5 m) from the column basket at both ends of the column for injector and detector installation. Avoid using sharp bends in the tubing.
2. Mount the column in the oven. Use a handling bracket if available.
3. Install the column nut and Graphite/Vespel or Graphite ferrule at each column end; pull the nut and ferrule down the tubing approximately 15 cm. (**Table 6**)
4. Score (scratch) the column. Use a light touch to score the column about 4 to 5 cm from each end.

Installing the Column

5. Make a clean break. Grasp the column between the thumb and forefinger as close to the score point as possible. Gently pull and bend the column. The column should part easily. If the column does not break easily, do not force it. Score the column again in a different place (farther from the end than before) and try again for a clean break.
6. Use a magnifying loupe to inspect the cut. Make sure the cut is square across the tubing with no polyimide or "glass" fragments at the end of the tube.
7. Install the column in the inlet. Check the GC manufacturer's instrument manual for the correct insertion distance in the injection port type being used. Slide the column nut and ferrule to the proper distance and then mark the correct distance on the column with typewriter correction fluid just behind the column nut. Allow the fluid to dry. Insert the column into the injector. Finger tighten the column nut until it starts to grab the column, and then tighten the nut an additional 1/4 to 1/2 turn, so that the column cannot be pulled from the fitting when gentle pressure is applied. Verify that the correct column insertion distance has been maintained by looking at the typewriter correction fluid mark.
8. Turn on the carrier gas and establish the proper flow rate. Set head pressure, split flow, and septum purge flow to appropriate levels. See **Table 7** for nominal head pressures. If using a split/splitless inlet, check that the purge (split) valve is "on" (open).
9. Confirm carrier gas flow through the column. Immerse the end of the column in a vial of solvent and check for bubbles.
10. Install the column into the detector. Check the instrument manufacturer's manual for the proper insertion distance.
11. Check for leaks. **This is very important.** Do not heat the column without thoroughly checking for leaks.
12. Establish proper injector and detector temperatures.
13. Establish proper makeup and detector gas flows. Ignite or turn "on" the detector.
14. Purge the column for a minimum of 10 min at ambient temperature. Add the appropriate additional purge time following inlet or trap maintenance.
15. Inject non-retained substance to check for proper injector installation. Examples: butane or methane (FID), headspace vapors from Acetonitrile (NPD), headspace vapors from methylene chloride (ECD), air (TCD), argon (mass spectrometer). Proper installation is indicated by a symmetrical non-retained peak. If tailing is observed, reinstall the column into the inlet.



TIPS & TOOLS

Learn more about Agilent's top-ranked service and support at www.agilent.com/chem/services



Conditioning and Testing the Column

1. Set oven temperature 20 °C above the maximum temperature of the analysis or at the maximum temperature of the column (whichever is lower) for 2 hours. If after 10 min at the upper temperature the background does not begin to fall, immediately cool the column and check for leaks.
2. If you are using Vespel or Graphite/Vespel ferrules, recheck column nut tightness after the conditioning process.
3. Confirm final proper average linear velocity by injecting a non-retained substance again.

Table 7:

Approximate Head Pressures (psig)						
Column Length (m)	Column ID (mm)					
	0.18	0.2	0.25	0.32	0.45	0.53
10	5-10					
12		10-15				
15			8-12	5-10		1-2
20	10-20					
25		20-30				
30			15-25	10-20	3-5	2-4
40	20-40					
50		40-60				
60			30-45	20-30	6-10	4-8
75					8-14	5-10
105						7-15

Causes of Column Performance Degradation

Column Breakage

Fused silica columns break wherever there is a weak point in the polyimide coating. The polyimide coating protects the fragile but flexible fused silica tubing. The continuous heating and cooling of the oven, vibrations caused by the oven fan, and being wound on a circular cage all place stress on the tubing. Eventually breakage occurs at a weak point. Weak spots are created where the polyimide coating is scratched or abraded. This usually occurs when a sharp point or edge is dragged over the tubing. Column hangers and tags, metal edges in the GC oven, column cutters, and miscellaneous items on the lab bench are just some of the common sources of sharp edges or points.

It is rare for a column to spontaneously break. Column manufacturing practices tend to expose any weak tubing and eliminate it from use in finished columns. Larger diameter columns are more prone to breakage. This means that greater care and prevention against breakage must be taken with 0.45-0.53 mm id tubing than with 0.18-0.32 mm id tubing.

A broken column is not always fatal. If a broken column was maintained at a high temperature either continuously or with multiple temperature program runs, damage to the column is very likely. The back half of the broken column has been exposed to oxygen at elevated temperatures which rapidly damages the stationary phase. The front half is fine since carrier gas flowed through this length of column. If a broken column has not been heated or only exposed to high temperatures or oxygen for a very short time, the back half has probably not suffered any significant damage.

A union can be installed to repair a broken column. Any suitable union will work to rejoin the column. Problems with dead volume (peak tailing) may occur with improperly installed unions.



Thermal Damage

Exceeding a column's upper temperature limit results in accelerated degradation of the stationary phase and tubing surface. This results in the premature onset of excessive column bleed, peak tailing for active compounds and/or loss of efficiency (resolution). Fortunately, thermal damage is a slower process, thus prolonged times above the temperature limit are required before significant damage occurs. Thermal damage is greatly accelerated in the presence of oxygen. Overheating a column with a leak or high oxygen levels in the carrier gas results in rapid and permanent column damage.

Setting the GC's maximum oven temperature at or only a few degrees above the column's temperature limit is the best method to prevent thermal damage. This prevents the accidental overheating of the column. If a column is thermally damaged, it may still be functional. Remove the column from the detector. Heat the column for 8-16 hours at its isothermal temperature limit. Remove 10-15 cm from the detector end of the column. Reinstall the column and condition as usual. The column usually does not return to its original performance; however, it is often still functional. The life of the column will be reduced after thermal damage.

Oxygen Damage

Oxygen is an enemy to most capillary GC columns. While no column damage occurs at or near ambient temperatures, severe damage occurs as the column temperature increases. In general, the temperature and oxygen concentration at which significant damage occurs is lower for polar stationary phases. It is constant exposure to oxygen that is the problem. Momentary exposure such as an injection of air or a very short duration septum nut removal is not a problem.

A leak in the carrier gas flow path (e.g., gas lines, fittings, injector) is the most common source of oxygen exposure. As the column is heated, very rapid degradation of the stationary phase occurs. This results in the premature onset of excessive column bleed, peak tailing for active compounds and/or loss of efficiency (resolution). These are the same symptoms as for thermal damage. Unfortunately, by the time oxygen damage is discovered, significant column damage has already occurred. In less severe cases, the column may still be functional but at a reduced performance level. In more severe cases, the column is irreversibly damaged.

Maintaining an oxygen and leak-free system is the best prevention against oxygen damage. Good GC system maintenance includes periodic leak checks of the gas lines and regulators, regular septa changes, using high quality carrier gases, installing and changing oxygen traps, and changing gas cylinders before they are completely empty.

Chemical Damage

There are relatively few compounds that damage stationary phases. Introducing nonvolatile compounds (e.g., salts) in a column often degrades performance, but damage to the stationary phase does not occur. These residues can often be removed and performance returned by solvent rinsing the column.

Inorganic or mineral bases and acids are the primary compounds to avoid introducing into a column. The acids include hydrochloric (HCl), sulfuric (H_2SO_4), nitric (HNO_3), phosphoric (H_3PO_4), and chromic (CrO_3). The bases include potassium hydroxide (KOH), sodium hydroxide (NaOH), and ammonium hydroxide (NH_4OH). Most of these acids and bases are not very volatile and accumulate at the front of the column. If allowed to remain, the acids or bases damage the stationary phase. This results in the premature onset of excessive column bleed, peak tailing for active compounds and/or loss of efficiency (resolution). The symptoms are very similar to thermal and oxygen damage. Hydrochloric acid and ammonium hydroxide are the least harmful of the group. Both tend to follow any water that is present in the sample. If the water is not or only poorly retained by the column, the residence time of the HCl and NH_4OH in the column is short. This tends to eliminate or minimize any damage by these compounds. Thus, if HCl or NH_4OH are present in a sample, using conditions or a column with no water retention will render these compounds relatively harmless to the column.

The only organic compounds that have been reported to damage stationary phases are perfluoroacids. Examples include trifluoroacetic, pentafluoropropanoic, and heptafluorobutyric acid. They need to be present at high levels (e.g., 1% or higher). Most of the problems are experienced with splitless or Megabore direct injections where large volumes of the sample are deposited at the front of the column.

Since chemical damage is usually limited to the front of the column, trimming or cutting 0.5-1 meter from the front of the column often eliminates any chromatographic problems. In more severe cases, five or more meters may need to be removed. The use of a guard column or retention gap will minimize the amount of column damage; however, frequent trimming of the guard column may be necessary. The acid or base often damages the surface of the deactivated fused silica tubing which leads to peak shape problems for active compounds.



Column Contamination

Column contamination is one of the most common problems encountered in capillary GC. Unfortunately, it mimics a very wide variety of problems and is often misdiagnosed as another problem. A contaminated column is usually not damaged, but it may be rendered useless.

There are two basic types of contaminants: nonvolatile and semivolatile. Nonvolatile contaminants or residues do not elute and accumulate in the column. The column becomes coated with these residues which interfere with the proper partitioning of solutes in and out of the stationary phase. Also, the residues may interact with active solutes resulting in peak adsorption problems (evident as peak tailing or loss of peak size). Active solutes are those containing a hydroxyl (-OH) or amine (-NH) group, and some thiols (-SH) and aldehydes. Semivolatile contaminants or residues accumulate in the column, but eventually elute. Hours to days may elapse before they completely leave the column. Like nonvolatile residues, they may cause peak shape and size problems, and, in addition, are usually responsible for many baseline problems (instability, wander, drift, ghost peaks, etc.).

Contaminants originate from a number of sources, with injected samples being the most common. Extracted samples are among the worst types. Biological fluids and tissues, soils, waste and ground water, and similar types of matrices contain high amounts of semivolatile and nonvolatile materials. Even with careful and thorough extraction procedures, small amounts of these materials are present in the injected sample. Several to hundreds of injections may be necessary before the accumulated residues cause problems. Injection techniques such as on-column, splitless, and Megabore direct place a large amount of sample into the column, thus column contamination is more common with these injection techniques.

Occasionally, contaminants originate from materials in gas lines and traps, ferrule and septa particles, or anything coming in contact with the sample (vials, solvents, syringes, pipettes, etc.). These types of contaminants are probably responsible when a contamination problem suddenly develops and similar samples in previous months or years did not cause any problems.

Minimizing the amount of semivolatile and nonvolatile sample residues is the best method to reduce contamination problems. Unfortunately, the presence and identity of potential contaminants are often unknown. Rigorous and thorough sample cleanup is the best protection against contamination problems. The use of a guard column or retention gap often reduces the severity or delays the onset of column contamination induced problems. If a column becomes contaminated, it is best to solvent rinse the column to remove the contaminants.

Maintaining a contaminated column at high temperatures for long periods of time (often called baking-out a column) is not recommended. Baking-out a column may convert some of the contaminating residues into insoluble materials that cannot be solvent rinsed from the column. If this occurs, the column cannot be salvaged in most cases. Sometimes the column can be cut in half and the back half may still be useable. Baking-out a column should be limited to 1-2 hours at the isothermal temperature limit of the column.

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.

Solvent Rinsing Columns

Solvent rinsing columns involves removing the column from the GC and passing milliliters of solvent through the column. Any residues soluble in the rinse solvents are washed from the column. Injecting large volumes of solvent while the column is still installed is not rinsing and doing so will not remove any contaminants from the column. **A capillary GC column must have a bonded and cross-linked stationary phase before it can be solvent rinsed.** Solvent rinsing a non-bonded stationary phase results in severe damage to the column.

A column rinse kit is used to force solvent through the column (see picture). The rinse kit is attached to a pressurized gas source (N₂ or He), and the column is inserted into the rinse kit. Solvent is added to the vial, and the vial is pressurized using the gas source. The pressure forces solvent to flow through the column. Residues dissolve into the solvent and are backflushed out of the column with the solvent. The solvent is then purged from the column, and the column is properly conditioned.

Before rinsing a column, cut about 0.5 meter from the front (i.e., injector end) of the column. Insert the detector end of the column into the rinse kit. Multiple solvents are normally used to rinse columns. Each successive solvent must be miscible with the previous one. High boiling point solvents should be avoided especially as the last solvent. The sample matrix solvent(s) is often a good choice.

Methanol, methylene chloride and hexane are recommended and work very well for the majority of cases. Acetone can be substituted for methylene chloride to avoid using halogenated solvents; however, methylene chloride is one of the best rinsing solvents. If aqueous based samples (e.g., biological fluids and tissues) were injected, use water before the methanol. Some residues originating from aqueous based samples are only soluble in water and not organic solvents. Water and alcohols (e.g., methanol, ethanol, isopropanol) should be used to rinse bonded polyethylene glycol based stationary phases (e.g., DB-WAX, DB-WAXetr, DB-FFAP, HP-Innowax) **only as a last resort**.

Table 8 lists the suggested solvent volumes for different diameter columns. Using larger solvent volumes is not harmful, but rarely better and merely wasteful. After adding the first solvent, pressurize the rinse kit, but stay below 20 psi. Use the highest pressure that keeps the solvent flow rate below 1 mL/min. Except for most 0.53 mm id columns, the rinse kit pressure will reach 20 psi before the flow rate reaches 1 mL/min. Longer rinse times are required when using heavy or viscous solvents, and for longer or smaller diameter columns. When all or most of the first solvent has entered the column, add the next solvent. The previous solvent does not have to vacate the column before the next solvent is started through the column.

After the last solvent has left the column, allow the pressurizing gas to flow through the column for 5-10 min. Install the column in the injector and turn on the carrier gas. Allow the carrier gas to flow through the column for 5-10 min. Attach the column to the detector (or leave it unattached if preferred). Using a temperature program starting at 40-50 °C, heat the column at 2-3 °/min until the upper temperature limit is reached. Maintain this temperature for 1-4 hours until the column is fully conditioned.



Column rinse kit, 430-3000

Table 8:

Solvent Volumes for Rinsing Columns

Column ID (mm)	Solvent Volume (mL)
0.18-0.2	3-4
0.25	4-5
0.32	6-7
0.45	7-8
0.53	10-12

Using larger volumes will not damage the column



Column Storage

Capillary columns should be stored in their original box when removed from the GC. Place a GC septa over the ends to prevent debris from entering the tubing. Upon reinstallation of the column, the column ends need to be trimmed by 2-4 cm to ensure that a small piece of septa is not lodged in the column.

If a column is left in a heated GC, there should always be carrier gas flow. The carrier gas flow can be turned off only if the oven, injector, detector and transfer lines are turned off (i.e., not heated). Without carrier gas flow, damage to the heated portion of the column occurs.

Evaluating the Problem

The first step in any troubleshooting effort is to step back and evaluate the situation. Rushing to solve the problem often results in a critical piece of important information being overlooked or neglected. In addition to the problem, look for any other changes or differences in the chromatogram. Many problems are accompanied by other symptoms. Retention time shifts, altered baseline noise or drift, or peak shape changes are only a few of the other clues that often point to or narrow the list of possible causes. Finally, make note of any changes or differences involving the sample. Solvents, vials, pipettes, storage conditions, sample age, extraction, preparation techniques, or any other factor influencing the sample environment can be responsible.

Checking the Obvious

A surprising number of problems involve fairly simple and often overlooked components of the GC system or analysis. Many of these items are transparent in the daily operation of the GC and are often taken for granted ("set it and forget it"). The areas and items to check include:

- Gases: pressures, carrier gas average linear velocity, and flow rates (detector, split vent, septum purge)
- Temperatures: column, injector, detector, and transfer lines
- System parameters: purge activation times, detector attenuation and range, mass ranges, etc.
- Gas lines and traps: cleanliness, leaks, and expiration
- Injector consumables: septa, liners, O-rings, and ferrules
- Sample integrity: concentration, degradation, solvent, and storage
- Syringes: handling technique, leaks, needle sharpness, and cleanliness
- Data system: settings and connections

The Most Common Problems

Ghost Peaks or Carryover

System contamination is responsible for most ghost peaks or carryover problems. If the extra ghost peaks are similar in width to the sample peaks (with similar retention times), the contaminants were likely introduced into the column at the same time as the sample. The extra compounds may be present in the injector (i.e., contamination) or in the sample itself. Impurities in solvents, vials, caps and syringes are only some of the possible sources. Injecting sample and solvent blanks may help to find possible sources of the contaminants. If the ghost peaks are much broader than the sample peaks, the contaminants were most likely already in the column when the injection was made. These compounds were still in the column when a previous GC run was terminated. They elute during a later run and are often very broad. Sometimes numerous ghost peaks from multiple injections overlap and elute as a hump or blob. This often takes on the appearance of baseline drift or wander.

Increasing the final temperature or time in the temperature program is one method to minimize or eliminate a ghost peak problem. Alternatively, a short bake-out after each run or series of runs may remove the highly retained compounds from the column before they cause a problem.



Condensation Test

Use this test whenever injector or carrier gas contamination problems are suspected (e.g., ghost peaks or erratic baseline).

1. Leave the GC at 40-50 °C for 8 or more hours.
2. Run a blank analysis (i.e., start the GC, but with no injection) using the normal temperature conditions and instrument settings.
3. Collect the chromatogram for this blank run.
4. Immediately repeat the blank run as soon as the first one is completed. Do not allow more than 5 min to elapse before starting the second blank run.
5. Collect the chromatogram for the second blank run and compare it to the first chromatogram.
6. If the second chromatogram contains a substantially larger amount of peaks and baseline instability, the incoming carrier gas line or the carrier gas is contaminated.
7. If the second chromatogram contains few peaks or very little baseline drift, the carrier gas and incoming carrier gas lines are relatively clean.

Troubleshooting Guides

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
Column contamination	Bake-out the column	Limit a bake-out to 1-2 hours
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

Tailing Peaks

Possible Cause	Solution	Comments
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

Product Index

Agilent J&W GC Columns

Application and Method Guides

ASTM Methods	229-236
Application Cross Reference Guide	210-212
EPA Methods	
Drinking Water	213-216
Solid Waste	220-227
Waste Water	217-220
United States Pharmacopoeia (USP) GC Phases	228

Capillary Columns

By Group

Foods, Flavors and Fragrances	352
High Temperature	314
Life Sciences	362
Low-bleed GC/MS	244
Non-Bonded	387
PAH	338
PLOT	368
Pesticides	315
Petroleum	318
Polyethylene Glycol (PEG)	304
Premium Polysiloxane	269
Semivolatiles	340
Ultra Inert	237
Volatiles	344

By Stationary Phase

Biodiesel	328
CAM	388
CP Wax 58 FFAP CB	312
CP-1301	300
CP-Al2O3/KCl	375-377
CP-Al2O3/Na2SO4	375-377
CP-Carbowax 400 for Volatiles in Alcohol	356
CP-Chirasil Val	360
CP-Chirasil-Dex CB	360
CP-Cyclodextrin-B-2,3,6-M-19	361
CP-FFAP CB for Free Fatty Acids in Dairy Products	358
CP-Molsieve 5Å	385
CP-Select 624 CB	346
CP-Select CB for MTBE	350
CP-Sil 13 CB	288
CP-Sil 19 CB	302-303
CP-Sil 19 CB for Pesticides	336
CP-Sil 2 CB	325
CP-Sil 24 CB	293
CP-Sil 43 CB	298
CP-Sil 5 CB	275-278
CP-Sil 5 CB for Formaldehyde	319
CP-Sil 5 CB for Sulfur	326
CP-Sil 5/C18 CB for PCB	342
CP-Sil 8 CB	286-287
CP-Sil 8 CB for Amines	332
CP-Sil 8 CB for PCB	340
CP-Sil 8 CB for Pesticides	335
CP-Sil 88	353
CP-Sil 88 for Dioxins	343
CP-Sil 88 for FAME	354
CP-Sil PAH CB UltiMetal	339
CP-Sil PONA CB	320
CP-Sil PONA for ASTM D 5134	320

CP-SilicaPLOT	381
CP-SimDist	323
CP-TAP CB for Triglycerides	357
CP-TCEP for Alcohols in Gasoline	325
CP-Volamine	331
CP-Wax 52 CB	308-309
CP-Wax 57 CB	355
CP-Wax 57 CB for Glycols and Alcohols	356
CP-Wax for Volatile Amines and Diamines	332
CarboBOND	382
CarboPLOT P7	382
Carbowax 20M	313
CycloSil-B	358
Cyclodex-B	359
DB-1	269-272
DB-1301	299
DB-17	291
DB-1701	301
DB-1701P	334
DB-17ht	316
DB-17ms	258
DB-1ht	314
DB-1ms	245
DB-1ms Ultra Inert	240
DB-200	295
DB-210	296
DB-225	297
DB-225ms	262
DB-23	294
DB-2887	322
DB-35	289
DB-35ms	256
DB-35ms Ultra Inert	242
DB-5	281-283
DB-5.625	341
DB-502.2	349
DB-5ht	315
DB-5ms	249-250
DB-5ms EVDX	363
DB-5ms Ultra Inert	241
DB-608	336
DB-624	344-345
DB-624 Ultra Inert	242, 344
DB-ALC 1	362
DB-ALC 2	362
DB-CLP 1	333
DB-CLP 2	333
DB-Dioxin	343
DB-EUPAH	338
DB-FFAP	310
DB-HT Sim Dis	322
DB-MTBE	349
DB-Petro	321
DB-Select 624 UI for <467>	364
DB-TPH	350
DB-UI 8270D	242
DB-UI 8270D for Semivolatiles	340
DB-VRX	347
DB-WAX	304-305
DB-WAX FF	304-305
DB-WAXetr	306
DB-XLB	254
DX-1	389

DX-4	389
GS-Alumina	379
GS-Alumina KCl	375
GS-CarbonPLOT	383
GS-GasPro	380
GS-OxyPLOT	318
GS-Q	372
HP-1	273-274
HP-1 Aluminum Clad	321
HP-101	387
HP-17	387
HP-1ms	246
HP-1ms Ultra Inert	240
HP-20M	313
HP-35	290
HP-5	284-285
HP-50+	292
HP-5ms	251
HP-5ms Semivolatile	342
HP-5ms Ultra Inert	241
HP-88	352
HP-Blood Alcohol	363
HP-Chiral B	359
HP-FFAP	311
HP-Fast Residual Solvent	364
HP-INNOWax	307
HP-PAS5	336-337
HP-PLOT Al2O3 KCl	374
HP-PLOT Al2O3 M	380
HP-PLOT Al2O3 S	378
HP-PLOT Molesieve	384
HP-PLOT Q	371
HP-PLOT U	374
HP-PONA	319
HP-VOC	346-348
Lowox	318
PoraBOND Q	368
PoraBOND U	369
PoraPLOT Amines	332
PoraPLOT Q	369-370
PoraPLOT Q-HT	369-370
PoraPLOT S	372-373
PoraPLOT U	372-373
Rapid-MS	337
SE-30	390
SE-54	390
Select Al2O3 MAPD	327
Select Biodiesel	330
Select FAME	353-354
Select Low Sulfur	326
Select Mineral Oil	351
Select PAH	338
Select Silanes	331
Select for Permanent Gases	327
Ultra 1	278-279
Ultra 2	280
VF-1301ms	266
VF-1701 Pesticides	335
VF-1701ms	267-268
VF-17ms	259
VF-1ms	247-248
VF-200ms	261
VF-23ms	260

VF-35ms.....	257	HayeSep N + HayeSep R 1:1	402	Ion Source	
VF-5 Pesticides	333-334	HayeSep Q	403	Chemical Ionization (CI) Ion Source.....	121
VF-5ht.....	317	HayeSep R	403	Electron Impact (EI) Ion Source	119-120
VF-5ms.....	252-253	HayeSep T	403	MSD Contamination	110-111
VF-624ms	265	MolSieve 13X.....	404	MSD Filaments	125
VF-DA.....	362	MolSieve 5A.....	404	Maintenance Schedule.....	109
VF-WAXms	263-264	Porapak N	405	Mass Spectrometer Symptoms	114-116
VF-Xms.....	255	Porapak N + Porapak R 1:1	405	Quadrupole Mass Filter	126
Metal Columns.....	365	Porapak Q	406	QuickSwap MS Interface	124
Column Selection		Porapak QS	406	Standards	
Column Diameter	204-205	Porapak R.....	406	Analyzer Kit Standards	137
Column Film Thickness.....	208-209	Porapak T	406	Test and Performance Samples.....	137-138
Column Length.....	206-207	Silica Gel	407	Vacuum Systems and Pumps	
Polarity.....	200-201	For All Instruments		Diffusion Pump.....	130
Selecting Stationary Phases.....	196-199	1.5% OV-101	409	Foreline Pump.....	131
Custom Ordering.....	410	10% SE-30.....	409	Pressure Symptoms	128-129
Fused Silica Tubing		20% TCEP.....	409	Inlet Liners	
Deactivated	397-398	30% DC 200/500	408	Specialty Injection	
Undeactivated	399	HayeSep D	408	Direct Connect	28
Guard Columns		HayeSep DB	408	MultiMode Inlet Heavy Matrix.....	27
DuraGuard	391	HayeSep N.....	408	PTV	28
EZ-Guard.....	392	HayeSep P	408	Split, Original Deactivation	25
Installation and Troubleshooting		HayeSep Q	408	Splitless, Original Deactivation	26
Causes of Column Performance		HayeSep R	408	Ultra Inert	24
Degradation	417-419	MolSieve 13X.....	409	Inlet Septa	
Quick Reference Guide	414-416	MolSieve 5A.....	409	Advanced Green	17
Troubleshooting Guides		Porapak QS	409	Bleed and Temperature Optimized (BTO).....	16
Baseline Instability or Disturbances	424	Silica Gel	409	General Purpose	19
Change in Peak Size.....	426	Test Standards.....	411-412	Long-Life	17
Excessive Baseline Noise.....	424	Agilent Supplies		Inlet Systems	
Loss of Resolution.....	427	Bulk GC Supplies	14	Cool On-Column.....	66
Retention Time Shift	426	Capillary Column Ferrules		Flip Top Inlet Sealing System	57
Split Peaks	425	Column Nuts.....	33-34	Inlet Convenience Kits	55
Tailing Peaks	425	Ferrule Selection Recommendations.....	30-31	Multimode	64
LTM Column Modules.....	393-394	For LTM Rapid Heating/Cooling System	35	Programmable Temperature Vaporizer	
Packed Columns		For NCD and SCD	35	(PTV)	69-70
For Agilent 7820, 7890, and 6890 Instruments		Reducing	35	Purged Packed	74-75
0.1% SP-1000	407	Specialty.....	33-34	Split/Splitless Inlet Seals	56, 58-59
1.5% OV-101	405	Straight.....	35	Liner O-rings.....	29
10% OV-101	405	Capillary Flow Technology		Maintenance Schedule.....	12-13
10% PEG-20M.....	405	Column/Retention Gap Installation.....	37	Markes Thermal Desorption	53-54
10% UC W982.....	407	Ferrules	37	Merlin Microseal.....	20-21
12% UC W982.....	407	Fittings.....	37	Oven Exhaust Deflector	107
15% Carbowax 1540.....	400	Ultimate Union.....	36-37	Purge and Trap Systems	
15% Hallcomid m-18.....	402	Column Connectors and Splitters		Archon.....	52
20% Carbowax 20M	400	Graphpak.....	39	Teledyne Tekmar	50-51
20% OV-101	405	Press-fit.....	38	Sample Introduction Systems	
20% PEG-20M.....	405	Column Nuts	33-34	7693A Automatic Liquid Sampler	43-44
20% Sebaconitrile	406	Detector Systems		7697A Headspace Sampler	45-47
20% Sebaconitrile/2% H3PO4.....	407	Electron Capture Detector (ECD).....	86-87	Automatic Liquid Sampler.....	44
20% TCEP.....	407	Flame Ionization Detector (FID)	78	G1883A Network Headspace Sampler.....	49
25% DC-200	401	Flame Photometric Detector (FPD).....	94	G1888A Network Headspace Sampler.....	48
25% SP-2100	407	Nitrogen Chemiluminescence Detector		G3520A XLSI Accessory.....	46
30% DC 200/500	402	(NCD).....	106	Standards.....	108
30% DC-200.....	401	Nitrogen Phosphorus Detector (NPD)	101	Valves and Loops.....	40
35% DC-200.....	401	Sulfur Chemiluminescence Detector (SCD).....	107		
5% Carbowax 20M	400	Thermal Conductivity Detector (TCD).....	89-91	Applications	
7% Carbowax M + 3% Polyphenolether		GC/MS		Energy and Fuels	552
6 ring + 2% KOH	401	220-MS	136	Environmental	
Carbosieve S	400	240-MS Ion Trap	134-135	Air Analysis.....	473
Carboxen-1000	401	7000A Triple Quadrupole GC/MS.....	132-133	Hydrocarbons	429
Chromosorb 101	401	Cleaning and Maintenance	116-117	Pesticides and Herbicides.....	434
Chromosorb 102.....	401	Electron Multipliers.....	127	Semivolatiles	458
HayeSep D	402	GC/MSD Interface.....	122-123	Volatiles	468
HayeSep DB	402			Food, Flavor and Fragrance.....	478
HayeSep N.....	402				

Industrial Chemical487
 Life Science.....521

CrossLab Supplies

Bruker, Varian GC Systems
 Autosampler Syringes158
 Capillary Column Ferrules157
 Column Nuts158
Detector Replacement
 Flame Ionization Detector (FID).....166
 Pulsed Flame Photometric Detector (PFPD)167-168
 Thermal Conductivity Detector (TCD).....166
 Thermionic Specific Detector (TSD).....168
Injector Replacement
 1041 Packed/Wide Bore On-Column (PWOC) injector165
 1061 Packed/530 µm Capillary Column Injector.....164
 1079 Large Volume Injector (LVI).....162
 1093 Cool On-Column (COC) Injector163
 1177 Split/Splitless Injector.....161-168
Inlet Liners
 1060/1061 Injector156
 1075/1077 Injector156
 1078/1079 Injector155-156
 1093/1094 Injector155-156
 1177 Injector154-160
 Inlet Septa.....159-160
 Liner O-rings156
 Packed Column Ferrules.....158
CTC GC Autosamplers
 Autosampler Syringes.....187
 Column Ferrules.....143
 Inlet Liners140-141
Inlet Septa
 Advanced Green151
 Bleed and Temperature Optimized (BTO)150
 General Purpose153
 Long-Life.....152
 Liner O-rings142
Perkin Elmer GC Systems
 Autosampler Syringes.....173
 Capillary Column Ferrules171
 Column Nuts172
Inlet Liners
 AutoSystem.....169-174
 AutoSystem XL.....169-174
 Clarus.....169-174
 Inlet Septa.....174
 Liner O-rings170
 Packed Column Ferrules.....172
Shimadzu GC Systems
 Autosampler Syringes.....180
 Capillary Column Ferrules179
 Column Nuts180
Inlet Liners
 14 Systems178
 17A Systems177
 2010 and 2010 Plus Systems.....176
 2014 Systems.....175-180
 Inlet Septa.....181
 Liner O-rings178
 Packed Column Ferrules.....179
 Syringes145-146

Thermo Scientific GC Systems
 Autosampler Syringes.....184
 Capillary Column Ferrules183
 Column Nuts184
Inlet Liners
 Focus Systems.....182-186
 Trace Systems.....182-186
 Inlet Septa.....185-186
 Liner O-rings.....183

Part Number Index

0100-1104.....	35	112-2032.....	313	115-3412LTM.....	372	121-4722.....	258
0100-1324.....	35	112-2032LTM.....	313	115-3422.....	372	121-4722E.....	258
0100-1325.....	35	112-2112.....	388	115-3422LTM.....	372	121-4722LTM.....	258
0100-1326.....	35	112-2112LTM.....	388	115-3432.....	372	121-5012.....	281
0100-1331.....	35	112-2132.....	388	115-3432E.....	372	121-5012E.....	281
0100-1332.....	35, 77, 91	112-2132LTM.....	388	115-3432LTM.....	372	121-5012LTM.....	281
0100-1342.....	35	112-2133.....	388	115-34H2.....	372	121-5013.....	281
0100-1344.....	35	112-2133LTM.....	388	115-34H2LTM.....	372	121-5013LTM.....	281
0100-1365.....	35	112-2162.....	388	115-3532.....	229, 230, 379	121-5022.....	281
0100-1375.....	35, 72	112-2532.....	359	115-3532E.....	379	121-5022E.....	281
0100-1378.....	35	112-2532E.....	359	115-3532LTM.....	379	121-5022LTM.....	281
0100-1379.....	35	112-2532LTM.....	359	115-3552.....	230, 236, 379	121-5023.....	281
0100-1381.....	35	112-2562.....	359	115-4912.....	318	121-5023E.....	281
0100-2594.....	46	112-5432.....	390	115-4912E.....	318	121-5023LTM.....	281
0101-0282.....	42	112-5432LTM.....	390	121-0122.....	245	121-5042.....	281
0101-0299.....	42	112-5462.....	390	121-0122E.....	245	121-5522.....	250
0101-0300.....	42	112-6632.....	358	121-0122LTM.....	245	121-5522E.....	250
0101-0301.....	42	112-6632LTM.....	358	121-0122UI.....	240	121-5522LTM.....	250
0101-0302.....	42	112-8837.....	352	121-0713.....	301	121-5522UI.....	214, 241
0101-0303.....	42	112-8837E.....	352	121-0713LTM.....	301	121-5522UILTM.....	241
0101-0355.....	41	112-8837LTM.....	352	121-0722.....	214, 301	121-5523.....	250
0101-0403.....	41	112-8867.....	352	121-0722LTM.....	301	121-5523LTM.....	250
0101-0532.....	41	112-8867E.....	352	121-1012.....	270	121-5523UI.....	241
0101-0584.....	40	112-88A7.....	352	121-1012E.....	270	121-5523UILTM.....	241
0101-0585.....	40	112-88A7E.....	352	121-1012LTM.....	270	121-5542.....	250
0101-0633.....	41	113-2032.....	313	121-1013.....	270	121-5621.....	341
0101-0636.....	40	113-2032LTM.....	313	121-1013E.....	270	121-5621LTM.....	341
0101-0637.....	40	113-2062.....	313	121-1013LTM.....	270	121-5622.....	341
0101-0638.....	40	113-2132.....	388	121-101A.....	270	121-5622G5.....	391
0101-0639.....	40	113-2132E.....	388	121-101ALTM.....	270	121-5622LTM.....	341
0410105017.....	48	113-2132LTM.....	388	121-1022.....	270	121-6822.....	336
0510-1306.....	62	113-2133.....	388	121-1022E.....	270	121-6822LTM.....	336
0515-0655.....	105	113-2133E.....	388	121-1022LTM.....	270	121-7012.....	305
0515-0680.....	99	113-2133LTM.....	388	121-1023.....	270	121-7012LTM.....	305
0515-0683.....	100	113-2532.....	359	121-1023LTM.....	270	121-7022.....	305
0515-1084.....	99	113-2532E.....	359	121-1043.....	270	121-7022E.....	305
0515-1799.....	76	113-2532LTM.....	359	121-1043E.....	270	121-7022LTM.....	305
0515-2495.....	105	113-3032.....	390	121-1222.....	254	121-7023.....	305
0515-2711.....	76	113-3032LTM.....	390	121-1222E.....	254	121-7023E.....	305
0515-2712.....	84	113-3112.....	383	121-1222LTM.....	254	121-7023LTM.....	305
05890-61525.....	43	113-3132.....	383	121-1232.....	254	121-7042.....	305
05890-80660.....	41	113-3132LTM.....	383	121-1313.....	299	121-7042E.....	305
05921-21170.....	34, 117	113-3133.....	383	121-1313LTM.....	299	121-7043.....	305
05970-60045.....	138	113-3133LTM.....	383	121-1324.....	215, 219, 225-226, 235, 345	121-9627.....	338
05971-20134.....	120	113-3162.....	383	121-1324E.....	345	121-9723.....	212, 226, 242, 340
05971-20143.....	120	113-3432.....	372	121-1324LTM.....	345	122-0112.....	245
05971-60140.....	125	113-3432E.....	372	121-1324UI.....	226, 242, 344	122-0112E.....	245
05971-60561.....	116	113-3432LTM.....	372	121-1524.....	215, 219, 225-226, 235, 347	122-0112LTM.....	245
05971-80102.....	127	113-4302.....	380	121-1524LTM.....	347	122-0112UI.....	240
05971-80103.....	127, 133	113-4312.....	380	121-1544.....	347	122-0131.....	245
05980-20018.....	116	113-4332.....	234, 380	121-1544E.....	347	122-0132.....	223, 245
05980-60051.....	116, 133	113-4362.....	229, 380	121-1544LTM.....	347	122-0132E.....	245
05988-20066.....	34, 117	113-5432.....	390	121-1722.....	291	122-0132UI.....	240
05990-60075.....	138	113-5432LTM.....	390	121-1722LTM.....	291	122-0132UIE.....	240
07673-20570.....	44	113-6632.....	358	121-1723.....	291	122-0162.....	245
07673-40180.....	43	113-6632LTM.....	358	121-1723LTM.....	291	122-0162UI.....	240
07673-60840.....	44	115-2132.....	233, 388	121-1723LTM.....	291	122-0212.....	296
07675-80050.....	42	115-2132LTM.....	388	121-2223.....	297	122-0212LTM.....	296
0854-0141.....	99	115-3113.....	383	121-2223LTM.....	297	122-0232.....	296
0905-1284.....	105	115-3133.....	383	121-2323.....	294	122-0232E.....	296
0905-1463.....	132	115-3133LTM.....	383	121-2323LTM.....	294	122-0232LTM.....	296
0905-1610.....	99	115-3332.....	375	121-3822.....	256	122-0233.....	215, 296
0905-2580.....	105	115-3332LTM.....	375	121-3822E.....	256	122-0233LTM.....	296
0960-0897.....	125	115-3352.....	375	121-3822LTM.....	256	122-0334UI.....	364
1000-1437.....	100	115-3352E.....	375	121-3822UI.....	242	122-0364UI.....	364
1000-1438.....	100	115-3412.....	372				

122-0712	301	122-1363	299	122-3232LTM	310	122-5532	213, 215-216, 221-224, 250
122-0712LTM	301	122-1363E	299	122-3233	310	122-5532E	250
122-0713	301	122-1364	213, 215, 217, 219, 235, 345	122-3233LTM	310	122-5532G	391
122-0713LTM	301	122-1364E	345	122-3262	310	122-5532LTM	250
122-0731	301	122-1364UI	213, 215, 225, 242, 344	122-3262E	310	122-5532UI	214, 216-219, 241
122-0731LTM	301	122-1464	349	122-3263	310	122-5532UIE	241
122-0732	214, 216, 301	122-1534	213, 217, 220-221, 347	122-3812	256	122-5532UILTM	241
122-0732E	301	122-1534LTM	347	122-3812UI	242	122-5533	215, 222-223, 227, 250
122-0732LTM	301	122-1564	213, 215, 217, 219-220, 225-226, 235, 347	122-3831	256	122-5533E	250
122-0733	223, 301	122-1564E	347	122-3832	213, 218, 224, 234-235, 256	122-5533G	391
122-0733E	301	122-1711	291	122-3832E	256	122-5533LTM	250
122-0733LTM	301	122-1711LTM	291	122-3832LTM	256	122-5533UI	214, 224, 241
122-0761	301	122-1712	291	122-3832UI	219, 242	122-5533UIE	241
122-0762	301	122-1712LTM	291	122-3862	256	122-5533UILTM	241
122-0763	301	122-1713	291	122-4711	258	122-5536	218, 250
122-0763E	301	122-1713LTM	291	122-4711LTM	258	122-5536E	250
122-0766	301	122-1713E	291	122-4712	258	122-5536G	391
122-1011	270	122-1713LTM	291	122-4712LTM	258	122-5536LTM	250
122-1011LTM	270	122-1731	291	122-4731	258	122-5536UI	241
122-1012	270	122-1731E	291	122-4731LTM	258	122-5536UILTM	241
122-1012LTM	270	122-1731LTM	291	122-4732	218, 223, 258	122-5552	250
122-1013	270	122-1732	291	122-4732E	258	122-5552UI	241
122-1013LTM	270	122-1732E	291	122-4732LTM	258	122-5561	250
122-1022	270	122-1732LTM	291	122-4762	258	122-5562	250
122-1022LTM	270	122-1733	291	122-5011	282	122-5562E	250
122-1031	270	122-1733LTM	291	122-5011LTM	282	122-5562G	391
122-1031LTM	270	122-1762	291	122-5012	234, 282	122-5562UI	218-219, 227, 241
122-1032	270	122-1801	316	122-5012LTM	282	122-5563	250
122-1032E	270	122-1801LTM	316	122-5013	282	122-5563UI	241
122-1032G	391	122-1811	316	122-5013LTM	282	122-5631	341
122-1032LTM	270	122-1831	316	122-501E	282	122-5631G5	391
122-1033	215, 270	122-1831LTM	316	122-501ELTM	282	122-5631LTM	341
122-1033E	270	122-1932	289	122-5022	282	122-5632	341
122-1033LTM	270	122-1932LTM	289	122-5022LTM	282	122-5632LTM	341
122-103E	270	122-1962	289	122-5031	282	122-5633	341
122-103ELTM	270	122-2032	295	122-5031LTM	282	122-5633LTM	341
122-1052	270	122-2032LTM	295	122-5032	235, 282	122-5661	341
122-1061	270	122-2033	295	122-5032E	282	122-5711	315
122-1062	270	122-2033LTM	295	122-5032LTM	282	122-5711E	315
122-1063	270	122-2212	297	122-5033	220, 282	122-5711LTM	315
122-106E	229, 270	122-2212LTM	297	122-5033E	282	122-5731	315
122-10A6	321	122-2231	297	122-5033LTM	282	122-5731LTM	315
122-10A6E	234, 321	122-2231LTM	297	122-503E	282	122-6133	389
122-10AE	270	122-2232	297	122-503ELTM	282	122-6432	389
122-10G3	270	122-2232LTM	297	122-5052	282	122-6432LTM	389
122-1111	314	122-2312	294	122-5061	282	122-6462	389
122-1111E	314	122-2312LTM	294	122-5062	282	122-6832	217-218, 336
122-1131	314	122-2331	294	122-5063	282	122-6832LTM	336
122-1211	254	122-2331LTM	294	122-506E	282	122-7012	305
122-1211LTM	254	122-2332	294	122-5511	250	122-7012E	305
122-1212	254	122-2332E	294	122-5511LTM	250	122-7012LTM	305
122-1231	254	122-2332LTM	294	122-5512	250	122-7013	221, 305
122-1232	215, 217, 221, 233-236, 254	122-2361	294	122-5512LTM	250	122-7013LTM	305
122-1232G	391	122-2361E	294	122-5512UI	215, 241	122-7031	305
122-1232LTM	254	122-2362	236, 294	122-5512UILTM	241	122-7031LTM	305
122-1233	254	122-2362E	294	122-5513	250	122-7032	229, 305
122-1236	213, 254	122-2461	343	122-5513LTM	250	122-7032E	305
122-1262	254	122-2461E	343	122-5513UI	241	122-7032LTM	305
122-1262E	254	122-2462	343	122-5513UILTM	241	122-7033	220, 227, 305
122-1332	299	122-2912	262	122-5516	250	122-7033E	305
122-1332E	299	122-2912LTM	262	122-5516LTM	250	122-7033LTM	305
122-1332LTM	299	122-2932	234, 262	122-5522	250	122-7061	305
122-1333	215, 299	122-2932E	262	122-5522LTM	250	122-7062	305
122-1333LTM	299	122-2932LTM	262	122-5522UI	241	122-7062E	305
122-1334	213, 217, 220-221, 345	122-2962	262	122-5522UILTM	241	122-7063	305
122-1334E	345	122-3212	310	122-552A	250	122-7063E	305
122-1334LTM	345	122-3212LTM	310	122-552ALTM	250	122-7332	306
122-1334UI	213, 220-221, 242, 344	122-3232	310	122-5531	250	122-7332E	306
122-1362	299	122-3232E	310	122-5531LTM	250	122-7332LTM	306

PART NUMBER INDEX

122-7333.....	306	123-1035LTM.....	271	123-1831E.....	316	123-5033E.....	282
122-7333LTM.....	306	123-103B.....	271	123-1861.....	316	123-5033LTM.....	282
122-7362.....	306	123-103BLTM.....	271	123-1932.....	289	123-503B.....	282
122-7363.....	306	123-103E.....	218, 223-224, 271	123-1932LTM.....	289	123-503BLTM.....	282
122-7732.....	234-235, 334	123-103ELTM.....	271	123-1933.....	289	123-503E.....	282
122-7732LTM.....	334	123-1052.....	271	123-1933E.....	289	123-503ELTM.....	282
122-96L2.....	338	123-1055.....	271	123-1933LTM.....	289	123-5052.....	282
122-9732.....	226, 242, 340	123-1056.....	271	123-2032.....	295	123-5053.....	282
122-9736.....	242, 340	123-105C.....	271	123-2032LTM.....	295	123-5056.....	282
123-0112.....	245	123-105F.....	271	123-2033.....	295	123-5062.....	282
123-0112UI.....	240	123-1061.....	271	123-2033LTM.....	295	123-5063.....	282
123-0131.....	245	123-1062.....	271	123-2232.....	297	123-5063E.....	282
123-0132.....	245	123-1062E.....	271	123-2232E.....	297	123-5511.....	250
123-0132LTM.....	245	123-1063.....	271	123-2232LTM.....	297	123-5511LTM.....	250
123-0132UI.....	240	123-1063E.....	271	123-2332.....	294	123-5512.....	250
123-0162.....	245	123-1064.....	271	123-2332E.....	294	123-5512LTM.....	250
123-0213.....	296	123-1064E.....	271	123-2332LTM.....	294	123-5513.....	250
123-0213LTM.....	296	123-1065.....	271	123-2362.....	294	123-5513E.....	250
123-0232.....	296	123-1065E.....	271	123-2461.....	343	123-5513LTM.....	250
123-0232LTM.....	296	123-106B.....	271	123-2462.....	343	123-5526.....	250
123-0233.....	296	123-106BE.....	271	123-2932.....	262	123-5526LTM.....	250
123-0233LTM.....	296	123-106E.....	230, 271	123-2932LTM.....	262	123-5531.....	250
123-0334UI.....	364	123-106G.....	271	123-3212.....	310	123-5531LTM.....	250
123-0364UI.....	364	123-1111.....	314	123-3212LTM.....	310	123-5532.....	218, 223, 250
123-0712.....	301	123-1111LTM.....	314	123-3223.....	310	123-5532E.....	250
123-0712LTM.....	301	123-1131.....	314	123-3223LTM.....	310	123-5532LTM.....	250
123-0713.....	301	123-1131E.....	314	123-3232.....	232, 310	123-5532UI.....	225, 241
123-0713LTM.....	301	123-1131LTM.....	314	123-3232E.....	310	123-5532UIE.....	241
123-0731.....	301	123-1232.....	254	123-3232LTM.....	310	123-5532UILTM.....	241
123-0731LTM.....	301	123-1236.....	214, 216, 218, 222, 254	123-3233.....	310	123-5533.....	227, 250
123-0732.....	301	123-1262.....	254	123-3233LTM.....	310	123-5533G.....	391
123-0732E.....	301	123-1332.....	299	123-3234.....	310	123-5533LTM.....	250
123-0732LTM.....	301	123-1332LTM.....	299	123-3234LTM.....	310	123-5533UI.....	241
123-0733.....	301	123-1333.....	299	123-3253.....	310	123-5533UILTM.....	241
123-0733E.....	301	123-1333LTM.....	299	123-3262.....	310	123-5536.....	218, 223-224, 250
123-0733LTM.....	301	123-1334.....	345	123-3263.....	310	123-5536LTM.....	250
123-0753.....	301	123-1334E.....	345	123-3264.....	310	123-5536UI.....	241
123-0762.....	301	123-1334LTM.....	345	123-3812.....	256	123-5536UILTM.....	241
123-0763.....	301	123-1334UI.....	242, 344	123-3812UI.....	242	123-5561.....	250
123-0763E.....	301	123-1363.....	299	123-3832.....	222, 225, 256	123-5562.....	250
123-100E.....	271	123-1363E.....	299	123-3832E.....	256	123-5563.....	250
123-100ELTM.....	271	123-1364.....	345	123-3832UI.....	214, 216, 218, 225, 242	123-5563UI.....	241
123-1011.....	271	123-1364E.....	345	123-4712.....	258	123-5566.....	250
123-1011LTM.....	271	123-1364UI.....	226, 242, 344	123-4712LTM.....	258	123-5631.....	341
123-1012.....	271	123-1464.....	349	123-4732.....	218, 258	123-5631LTM.....	341
123-1012LTM.....	271	123-1534.....	234, 347	123-4732LTM.....	258	123-5632.....	341
123-1013.....	271	123-1534LTM.....	347	123-500E.....	282	123-5632LTM.....	341
123-1013LTM.....	271	123-1564.....	347	123-500ELTM.....	282	123-5701.....	315
123-1014.....	271	123-1564E.....	347	123-5011.....	282	123-5701LTM.....	315
123-1014LTM.....	271	123-1632.....	235, 350	123-5011LTM.....	282	123-5711.....	315
123-1015.....	271	123-1632LTM.....	350	123-5012.....	282	123-5711E.....	315
123-1015LTM.....	271	123-1711.....	291	123-5012E.....	282	123-5731.....	315
123-1022.....	234, 271	123-1711LTM.....	291	123-5012LTM.....	282	123-5731E.....	315
123-1022LTM.....	271	123-1712.....	291	123-5013.....	282	123-5731LTM.....	315
123-1026.....	271	123-1712LTM.....	291	123-5013E.....	282	123-6133.....	389
123-1026LTM.....	271	123-1713.....	291	123-5013LTM.....	282	123-6133LTM.....	389
123-1027.....	271	123-1713LTM.....	291	123-5022.....	282	123-6412.....	389
123-1027LTM.....	271	123-1730.....	214, 233, 336	123-5022LTM.....	282	123-6412LTM.....	389
123-102F.....	271	123-1730LTM.....	336	123-5026.....	282	123-6432.....	389
123-102FLTM.....	271	123-1731.....	291	123-5026LTM.....	282	123-6432LTM.....	389
123-1031.....	271	123-1731LTM.....	291	123-502D.....	282	123-6462.....	389
123-1031LTM.....	271	123-1732.....	291	123-502DLTM.....	282	123-7012.....	305
123-1032.....	271	123-1732E.....	291	123-502F.....	282	123-7012LTM.....	305
123-1032LTM.....	271	123-1732LTM.....	291	123-502FLTM.....	282	123-7013.....	305
123-1033.....	233, 271	123-1733.....	291	123-5031.....	282	123-7013LTM.....	305
123-1033E.....	271	123-1733E.....	291	123-5031LTM.....	282	123-7031.....	305
123-1033LTM.....	271	123-1733LTM.....	291	123-5032.....	282	123-7031LTM.....	305
123-1034.....	271	123-1762.....	291	123-5032E.....	282	123-7032.....	305
123-1034LTM.....	271	123-1811.....	316	123-5032LTM.....	282	123-7032E.....	305
123-1035.....	271	123-1831.....	316	123-5033.....	233, 282	123-7032LTM.....	305

123-7033	305	125-0212LTM	296	125-1065E	272	125-2312	294
123-7033E	305	125-0232	296	125-106J	272	125-2312LTM	294
123-7033LTM	305	125-0232LTM	296	125-106JE	272	125-2332	294
123-7062	232, 305	125-0334UI	364	125-10B5	272	125-2332LTM	294
123-7063	305	125-0712	301	125-10H5	272	125-2814	230-231, 234, 322
123-7063E	305	125-0712E	301	125-10H5LTM	272	125-2814E	322
123-7312	306	125-0712LTM	301	125-10HB	272	125-2814LTM	322
123-7312LTM	306	125-0731	301	125-10HBE	272	125-3212	310
123-7314	306	125-0731LTM	301	125-10HBLTM	272	125-3212LTM	310
123-7314LTM	306	125-0732	301	125-1131	314	125-3217	310
123-7332	306	125-0732E	301	125-1212	254	125-3217LTM	310
123-7332LTM	306	125-0732G	391	125-1212LTM	254	125-3231	310
123-7333	306	125-0732LTM	301	125-1232	254	125-3231LTM	310
123-7333LTM	306	125-0733	301	125-1232LTM	254	125-3232	310
123-7334	306	125-0733LTM	301	125-1312	299	125-3232E	310
123-7334LTM	306	125-0737	301	125-1312LTM	299	125-3232LTM	310
123-7354	306	125-0737LTM	301	125-1314	345	125-3233	310
123-7354E	306	125-0762	301	125-1332	299	125-3233LTM	310
123-7362	306	125-0762E	301	125-1332LTM	299	125-3237	310
123-7363	306	125-1002	272	125-1333	299	125-3237LTM	310
123-7364	236, 306	125-1002LTM	272	125-1333LTM	299	125-3262	310
123-7722	334	125-1005	272	125-1334	230-231, 236, 345	125-32H2	310
123-7722LTM	334	125-1005LTM	272	125-1334E	345	125-32H2LTM	310
123-7732	334	125-100A	272, 274	125-1334G5	391	125-3832	256
123-7732E	334	125-100ALTM	272	125-1334LTM	345	125-3832LTM	256
123-7732LTM	334	125-100B	272	125-1334UI	242, 344	125-3837	256
123-8232	213-214, 216, 222, 225, 333	125-100BLTM	272	125-1364	345	125-3837LTM	256
123-8336	213-214, 216, 222, 225, 333	125-1011	272	125-1364E	345	125-5012	223, 283
123-9134	362	125-1011E	272	125-1374	217, 345	125-5012E	283
123-9134LTM	362	125-1011LTM	272	125-1374E	345	125-5012LTM	283
123-9234	362	125-1012	272	125-1374UI	242, 344	125-5017	283
123-9234E	362	125-1012E	272	125-14A4	349	125-5017LTM	283
123-9234LTM	362	125-1012LTM	272	125-1704	291	125-501J	283
123-9612	338	125-1014	272	125-1704LTM	291	125-501JLTM	283
123-BD01	329	125-1014LTM	272	125-1710	336	125-501K	283
123-BD11	329	125-1015	272	125-1710LTM	336	125-501KLTM	283
123-BD34	329	125-1015LTM	272	125-1711	291	125-5025	283
124-0034	349	125-1017	272	125-1711LTM	291	125-5025LTM	283
124-0034LTM	349	125-1017LTM	272	125-1712	291	125-5032	233, 283
124-1032	271	125-101J	272	125-1712LTM	291	125-5032E	283
124-1032LTM	271	125-101JLTM	272	125-1713	291	125-5032LTM	283
124-1034	271	125-101K	272	125-1713LTM	291	125-5034	283
124-1034LTM	271	125-101KLTM	272	125-1717	291	125-5034E	283
124-1334	231, 234, 345	125-1025	272	125-1717LTM	291	125-5034LTM	283
124-1334LTM	345	125-1025LTM	272	125-1730	233, 336	125-5035	283
124-1374	217, 345	125-102J	272	125-1730LTM	336	125-5035E	283
124-1474	349	125-102JLTM	272	125-1731	291	125-5035LTM	283
124-14A4	349	125-1032	272	125-1731LTM	291	125-5037	283
124-1534	232, 347	125-1032LTM	272	125-1732	291	125-5037LTM	283
124-1534LTM	347	125-1034	234, 272	125-1732E	291	125-503B	283
124-1574	232, 347	125-1034E	272	125-1732LTM	291	125-503BLTM	283
124-1632	350	125-1034LTM	272	125-1733	291	125-503D	283
124-1730	336	125-1035	229, 235-236, 272	125-1733LTM	291	125-503DLTM	283
124-1730LTM	336	125-1035E	272	125-1737	291	125-503J	283
124-3232	233, 310	125-1035LTM	272	125-1737LTM	291	125-503JLTM	283
124-3232LTM	310	125-1037	272	125-1762	291	125-503K	283
124-5012	283	125-1037LTM	272	125-1912	289	125-503KLTM	283
124-5012LTM	283	125-1039	272	125-1912LTM	289	125-5062	283
124-5032	283	125-103B	272	125-1932	289	125-5062E	283
124-5032LTM	283	125-103BLTM	272	125-1932LTM	289	125-5065	283
124-5037	283	125-103J	272	125-1937	289	125-5065E	283
124-5037LTM	283	125-103JLTM	272	125-1937LTM	289	125-50HB	283
124-7032	231, 233, 305	125-103K	272	125-2032	295	125-50HBLTM	283
124-7032LTM	305	125-103KE	272	125-2032LTM	295	125-5512	250
125-0034	349	125-103KLTM	272	125-2212	223, 297	125-5512LTM	250
125-0034E	349	125-1055	272	125-2212LTM	297	125-5532	250
125-0034LTM	349	125-1062	272	125-2232	297	125-5532LTM	250
125-0212	230, 296	125-1062E	272	125-2232LTM	297	125-5537	250
		125-1064	272	125-2237	297	125-5537G	391
		125-1065	272	125-2237LTM	297	125-5537LTM	250

PART NUMBER INDEX

125-553J.....	250	127-1023E.....	269	128-50H7LTM.....	282	160-2625-1.....	37, 397
125-553JLTM.....	250	127-1023LTM.....	269	128-5512.....	250	160-2625-10.....	37, 397
125-6837.....	220-222, 225-226, 336	127-1043.....	269	128-5512LTM.....	250	160-2625-5.....	37, 397
125-6837LTM.....	336	127-1046.....	269	128-5522.....	250	160-2634-10.....	399
125-7012.....	305	127-1046E.....	269	128-5522LTM.....	250	160-2634-5.....	399
125-7012E.....	305	127-1712.....	291	128-5552.....	250	160-2635-1.....	397
125-7012LTM.....	305	127-1712LTM.....	291	128-7022.....	305	160-2635-10.....	397
125-7017.....	305	127-1713.....	291	128-7022LTM.....	305	160-2635-5.....	397
125-7017LTM.....	305	127-1713LTM.....	291	128-7032.....	305	160-2644-10.....	399
125-7031.....	305	127-1722.....	291	128-7032LTM.....	305	160-2644-5.....	399
125-7031LTM.....	305	127-1722LTM.....	291	128-7052.....	305	160-2644-10.....	399
125-7032.....	230-231, 305	127-2222.....	297	128-7323.....	306	160-2650-5.....	399
125-7032E.....	305	127-2222LTM.....	297	128-7323LTM.....	306	160-2655-1.....	397
125-7032LTM.....	305	127-3212.....	310	128-8522.....	363	160-2655-10.....	397
125-7037.....	305	127-3212LTM.....	310	12A-1015.....	270	160-2655-5.....	397
125-7037LTM.....	305	127-32H2.....	310	12A-1015LTM.....	270	160-2660-5.....	399
125-7062.....	305	127-32H2LTM.....	310	12A-5015.....	281	160-2815-5.....	398
125-7062E.....	305	127-5012.....	281	12A-5015LTM.....	281	160-2825-5.....	398
125-7312.....	306	127-5012E.....	281	1300502506.....	48	160-2845-10.....	398
125-7312LTM.....	306	127-5012LTM.....	281	1390-1023.....	76	160-2845-5.....	398
125-7314.....	306	127-5013.....	281	14-8911-003.....	51	160-2855-10.....	398
125-7314LTM.....	306	127-5013LTM.....	281	1400-0015.....	105	160-2855-5.....	398
125-7332.....	306	127-501E.....	281	145-1001.....	236, 322, 365-366	160-2865-10.....	398
125-7332E.....	306	127-501EE.....	281	145-1009.....	322, 365-366	160-2865-5.....	398
125-7332LTM.....	306	127-501ELTM.....	281	145-1011.....	234, 366	160-4535-5.....	46, 398
125-7333.....	306	127-501N.....	281	145-1032.....	366	18596-40015.....	44
125-7333LTM.....	306	127-501NLTM.....	281	145-1334.....	367	18710-20119.....	81, 85, 104-105
125-7334.....	306	127-5022.....	281	145-2814.....	365-366	18710-60170.....	85, 91
125-7334E.....	306	127-5022E.....	281	145-7032.....	367	18711-60060.....	91
125-7334LTM.....	306	127-5022LTM.....	281	1500334701.....	166, 168	18713-60040.....	88
125-7362.....	306	127-5023.....	281	1530-2163.....	42	18713-60050.....	88
125-7732.....	334	127-5023LTM.....	281	1530-2167.....	42	18740-20800.....	63
125-7732LTM.....	334	127-7012.....	304	1535-4952.....	40, 46	18740-20880.....	56, 63
125-9134.....	362	127-7012E.....	304	1535-4954.....	40	18740-60830.....	62
125-9134E.....	362	127-7012LTM.....	304	160-1010-1.....	397	18740-60835.....	62, 64, 71-72, 76-77
125-9134LTM.....	362	127-7013.....	304	160-1010-10.....	397	18740-60840.....	27
125-9234.....	362	127-7013LTM.....	304	160-1010-5.....	397	18740-80190.....	27
125-9234LTM.....	362	127-7022.....	304	160-2200-10.....	399	18740-80200.....	26
126-1012.....	269	127-7022LTM.....	304	160-2200-5.....	399	18740-80220.....	26
126-1012LTM.....	269	127-7023.....	304	160-2205-1.....	397	18789-60060.....	105
126-1013.....	269	127-7023E.....	304	160-2205-10.....	397	18789-80070.....	81
126-1013LTM.....	269	127-7023FF.....	305	160-2205-5.....	397	18900-20250.....	42
126-1713.....	291	127-7023LTM.....	304	160-2250-10.....	399	18900-20280.....	42
126-1713LTM.....	291	128-0112.....	245	160-2250-5.....	399	18900-20281.....	42
126-7012.....	304	128-0112LTM.....	245	160-2255-1.....	398	18900-20300.....	42
126-7012LTM.....	304	128-0122.....	245	160-2255-10.....	398	18900-60640.....	108
126-7013.....	304	128-0122E.....	245	160-2255-30.....	398	18900-80255.....	42
126-7013LTM.....	304	128-0122LTM.....	245	160-2255-5.....	37, 46, 398	19091-20050.....	399
127-0112.....	245	128-1012.....	270	160-2320-10.....	399	19091-21050.....	399
127-0112LTM.....	245	128-1012LTM.....	270	160-2320-5.....	399	19091-60010.....	387
127-0113.....	245	128-1022.....	270	160-2325-1.....	398	19091-60010E.....	387
127-0122.....	245	128-1022LTM.....	270	160-2325-10.....	398	19091-60312.....	273
127-0123.....	245	128-1034.....	270	160-2325-30.....	398	19091-60620E.....	397
127-0123LTM.....	245	128-1034LTM.....	270	160-2325-5.....	37, 46, 398	19091A-002.....	279
127-0722.....	301	128-1052.....	270	160-2450-10.....	399	19091A-002LTM.....	279
127-0722LTM.....	301	128-1056.....	235, 321	160-2450-5.....	399	19091A-005.....	279
127-0723.....	301	128-1212.....	254	160-2455-1.....	398	19091A-008.....	279
127-0723LTM.....	301	128-1212E.....	254	160-2455-10.....	398	19091A-008LTM.....	279
127-100A.....	269	128-1222.....	254	160-2455-5.....	46, 398	19091A-012.....	279
127-100ALTM.....	269	128-1324.....	345	160-2530-10.....	399	19091A-012LTM.....	279
127-1012.....	269	128-1324E.....	345	160-2530-5.....	399	19091A-015.....	279
127-1012E.....	269	128-1324LTM.....	345	160-2535-1.....	398	19091A-101.....	279
127-1012LTM.....	269	128-3812.....	256	160-2535-10.....	398	19091A-101LTM.....	279
127-1013.....	269	128-3822.....	256	160-2535-30.....	398	19091A-102.....	279
127-1013E.....	269	128-5012.....	282	160-2535-5.....	37, 46, 398	19091A-102E.....	279
127-1013LTM.....	269	128-5012LTM.....	282	160-2610-10.....	399	19091A-102LTM.....	279
127-1022.....	269	128-5022.....	282	160-2610-5.....	399	19091A-105.....	279
127-1022E.....	269	128-5022LTM.....	282	160-2615-1.....	397	19091A-108.....	279
127-1022LTM.....	269	128-5052.....	282	160-2615-10.....	397	19091A-108LTM.....	279
127-1023.....	269	128-50H7.....	282	160-2615-5.....	397	19091A-112.....	279

19091A-112LTM.....	279	19091J-113E.....	285	19091N-030.....	307	19091P-U04.....	374
19091A-115.....	279	19091J-113LTM.....	285	19091N-030LTM.....	307	19091P-U04E.....	374
19091B-002.....	280	19091J-115.....	285	19091N-033.....	307	19091P-U04LTM.....	374
19091B-002LTM.....	280	19091J-115E.....	285	19091N-033LTM.....	307	19091R-303.....	348
19091B-005.....	280	19091J-202.....	284	19091N-036.....	307	19091R-303LTM.....	348
19091B-012.....	280	19091J-202LTM.....	284	19091N-102.....	307	19091R-306.....	215, 219, 225, 348
19091B-012E.....	280	19091J-205.....	284	19091N-102LTM.....	307	19091R-316.....	348
19091B-012LTM.....	280	19091J-212.....	285	19091N-105.....	307	19091R-319.....	348
19091B-015.....	280	19091J-212LTM.....	285	19091N-105E.....	307	19091S-001.....	233-234, 319
19091B-101.....	280	19091J-213.....	285	19091N-111.....	307	19091S-001E.....	319
19091B-101LTM.....	280	19091J-213E.....	285	19091N-111LTM.....	307	19091S-010.....	337
19091B-102.....	280	19091J-213LTM.....	285	19091N-113.....	233, 307	19091S-010LTM.....	337
19091B-102E.....	280	19091J-215.....	285	19091N-113E.....	307	19091S-101.....	251
19091B-102LTM.....	280	19091J-215E.....	285	19091N-113LTM.....	307	19091S-101LTM.....	251
19091B-105.....	280	19091J-216.....	285	19091N-116.....	229, 236, 307	19091S-102.....	251
19091B-105E.....	280	19091J-216E.....	285	19091N-130.....	307	19091S-102E.....	251
19091B-112.....	280	19091J-231.....	284	19091N-130LTM.....	307	19091S-102LTM.....	251
19091B-112LTM.....	280	19091J-231LTM.....	284	19091N-131.....	307	19091S-105.....	251
19091B-115.....	280	19091J-233.....	220, 284	19091N-131E.....	307	19091S-112.....	251
19091B-115E.....	280	19091J-233LTM.....	284	19091N-131LTM.....	307	19091S-112E.....	251
19091F-102.....	311	19091J-236.....	284	19091N-133.....	307	19091S-112LTM.....	251
19091F-102E.....	311	19091J-236E.....	284	19091N-133E.....	307	19091S-113.....	218, 223-224, 251
19091F-102LTM.....	311	19091J-313.....	285	19091N-133LTM.....	307	19091S-113LTM.....	251
19091F-105.....	311	19091J-313LTM.....	285	19091N-136.....	229, 307	19091S-133.....	215, 218, 222-223, 226-227, 251
19091F-105E.....	311	19091J-330.....	284	19091N-136E.....	307	19091S-133LTM.....	251
19091F-112.....	311	19091J-330LTM.....	284	19091N-202.....	307	19091S-133UI.....	219, 224, 241
19091F-112E.....	311	19091J-333.....	284	19091N-202LTM.....	307	19091S-133UILTM.....	241
19091F-112LTM.....	311	19091J-333LTM.....	284	19091N-205.....	307	19091S-139.....	342
19091F-115.....	311	19091J-411.....	285	19091N-205E.....	307	19091S-139LTM.....	342
19091F-115E.....	311	19091J-411LTM.....	285	19091N-213.....	307	19091S-213.....	227, 233, 251
19091F-413.....	311	19091J-413.....	285	19091N-213E.....	307	19091S-213LTM.....	251
19091F-413LTM.....	311	19091J-413E.....	285	19091N-213LTM.....	307	19091S-213UI.....	241
19091F-433.....	311	19091J-413LTM.....	285	19091N-216.....	232-233, 307	19091S-213UILTM.....	241
19091F-433E.....	311	19091J-416.....	285	19091N-216E.....	307	19091S-231.....	251
19091F-433LTM.....	311	19091J-431.....	284	19091N-231.....	221, 307	19091S-231LTM.....	251
19091G-113.....	290	19091J-431E.....	284	19091N-231LTM.....	307	19091S-233.....	251
19091G-113LTM.....	290	19091J-431LTM.....	284	19091N-233.....	227, 307	19091S-233E.....	251
19091G-131.....	290	19091J-433.....	284	19091N-233E.....	307	19091S-233LTM.....	251
19091G-131E.....	290	19091J-433E.....	284	19091N-233LTM.....	307	19091S-233UI.....	214, 241
19091G-131LTM.....	290	19091J-433LTM.....	284	19091N-236.....	307	19091S-233UIE.....	241
19091G-133.....	290	19091J-436.....	284	19091N-330.....	307	19091S-233UILTM.....	241
19091G-133LTM.....	290	19091J-436E.....	284	19091N-331.....	307	19091S-313.....	251
19091G-213.....	290	19091J-577.....	284	19091N-577.....	307	19091S-313LTM.....	251
19091G-213LTM.....	290	19091J-577E.....	284	19091N-577E.....	307	19091S-331.....	251
19091G-B113.....	359	19091J-577LTM.....	284	19091N-577LTM.....	307	19091S-331LTM.....	251
19091G-B133.....	359	19091L-101.....	292	19091P-K15.....	374	19091S-333.....	251
19091G-B213.....	359	19091L-101LTM.....	292	19091P-K15E.....	374	19091S-333LTM.....	251
19091G-B213E.....	359	19091L-111.....	292	19091P-K33.....	374	19091S-336.....	251
19091G-B233.....	359	19091L-111LTM.....	292	19091P-K33E.....	374	19091S-413.....	236, 251
19091G-B233E.....	359	19091L-113.....	292	19091P-K33LTM.....	374	19091S-413E.....	251
19091J-002.....	284	19091L-113E.....	292	19091P-M15.....	380	19091S-413LTM.....	251
19091J-002LTM.....	284	19091L-113LTM.....	292	19091P-M15E.....	380	19091S-413UI.....	225, 241
19091J-005.....	284	19091L-133.....	292	19091P-MS4.....	384	19091S-413UILTM.....	241
19091J-012.....	285	19091L-133LTM.....	292	19091P-MS4E.....	384	19091S-416.....	251
19091J-012E.....	285	19091L-330.....	292	19091P-MS4LTM.....	384	19091S-431.....	251
19091J-012LTM.....	285	19091L-330LTM.....	292	19091P-MS7.....	384	19091S-431LTM.....	251
19091J-015.....	285	19091L-333.....	292	19091P-MS7LTM.....	384	19091S-431UI.....	215, 241
19091J-015E.....	285	19091L-333LTM.....	292	19091P-MS8.....	384	19091S-431UILTM.....	241
19091J-101.....	284	19091L-413.....	292	19091P-MS8LTM.....	384	19091S-433.....	215, 234-235, 251
19091J-101LTM.....	284	19091L-413E.....	292	19091P-Q03.....	371	19091S-433E.....	251
19091J-102.....	284	19091L-413LTM.....	292	19091P-Q03LTM.....	371	19091S-433LTM.....	251
19091J-102E.....	284	19091L-416.....	292	19091P-Q04.....	371	19091S-433UI.....	214, 216, 219, 241
19091J-102LTM.....	284	19091L-431.....	292	19091P-Q04E.....	371	19091S-433UIE.....	241
19091J-105.....	284	19091L-431LTM.....	292	19091P-Q04LTM.....	371	19091S-433UILTM.....	241
19091J-105E.....	284	19091L-433.....	292	19091P-S12.....	378	19091S-436.....	251
19091J-108.....	284	19091L-433LTM.....	292	19091P-S12LTM.....	378	19091S-436E.....	251
19091J-112.....	285	19091L-577.....	292	19091P-S15.....	378	19091S-436UI.....	241
19091J-112E.....	285	19091L-577LTM.....	292	19091P-S15E.....	378	19091S-510.....	363
19091J-112LTM.....	285	19091N-013.....	307	19091P-S33.....	378	19091S-510E.....	363
19091J-113.....	285	19091N-013LTM.....	307	19091P-S33LTM.....	378		

PART NUMBER INDEX

19091S-510LTM.....	363	19091Z-008LTM.....	273	19095F-120E.....	311	19095P-S25.....	232, 378
19091S-577.....	251	19091Z-012.....	274	19095F-120LTM.....	311	19095P-S25E.....	378
19091S-577LTM.....	251	19091Z-012E.....	274	19095F-121.....	311	19095P-U03.....	374
19091S-577UI.....	214, 241	19091Z-012LTM.....	274	19095F-121LTM.....	311	19095P-U03LTM.....	374
19091S-577UILTM.....	241	19091Z-015.....	274	19095F-123.....	311	19095P-U04.....	235, 374
19091S-602.....	246	19091Z-102.....	273	19095F-123E.....	311	19095P-U04E.....	374
19091S-602E.....	246	19091Z-102E.....	273	19095F-123LTM.....	311	19095P-U04LTM.....	374
19091S-602LTM.....	246	19091Z-102LTM.....	273	19095J-023.....	285	19095R-420.....	348
19091S-612.....	246	19091Z-105.....	273	19095J-023E.....	285	19095R-429.....	348
19091S-612LTM.....	246	19091Z-112.....	274	19095J-023LTM.....	285	19095S-100.....	274
19091S-612UI.....	240	19091Z-112E.....	274	19095J-121.....	285	19095S-100E.....	274
19091S-633.....	246	19091Z-112LTM.....	274	19095J-121E.....	285	19095S-100LTM.....	274
19091S-633LTM.....	246	19091Z-115.....	232, 236, 274	19095J-121LTM.....	285	19095S-200.....	321
19091S-633UI.....	240	19091Z-115E.....	274	19095J-123.....	285	19095S-205.....	321
19091S-677.....	246	19091Z-202.....	273	19095J-123E.....	285	19095V-420.....	364
19091S-677E.....	246	19091Z-202LTM.....	273	19095J-123LTM.....	285	19095V-420E.....	364
19091S-677LTM.....	246	19091Z-205.....	273, 319	19095J-321.....	223, 285	19095V-420LTM.....	364
19091S-677UI.....	240	19091Z-205E.....	319	19095J-321LTM.....	285	19095W-121.....	313
19091S-677UIE.....	240	19091Z-211.....	274	19095J-323.....	285	19095W-121LTM.....	313
19091S-713.....	231, 234, 246	19091Z-211LTM.....	274	19095J-323E.....	285	19095W-123.....	313
19091S-713LTM.....	246	19091Z-212.....	274	19095J-323LTM.....	285	19095W-123LTM.....	313
19091S-713UI.....	240	19091Z-212LTM.....	274	19095J-621.....	285	19095Z-020.....	230, 274
19091S-733.....	246	19091Z-213.....	274	19095J-621LTM.....	285	19095Z-021.....	230, 274
19091S-733E.....	246	19091Z-213E.....	274	19095J-623.....	236, 285	19095Z-021E.....	274
19091S-733LTM.....	246	19091Z-213LTM.....	274	19095J-623E.....	285	19095Z-021LTM.....	274
19091S-733UI.....	240	19091Z-215.....	274	19095J-623LTM.....	285	19095Z-023.....	274
19091S-733UIE.....	240	19091Z-216.....	274	19095L-021.....	292	19095Z-023E.....	274
19091S-833.....	246	19091Z-216E.....	274	19095L-021LTM.....	292	19095Z-023LTM.....	274
19091S-833LTM.....	246	19091Z-231.....	273	19095L-023.....	292	19095Z-121.....	274
19091S-911.....	246	19091Z-231LTM.....	273	19095L-023E.....	292	19095Z-121E.....	274
19091S-911LTM.....	246	19091Z-233.....	273	19095L-023LTM.....	292	19095Z-121LTM.....	274
19091S-911UI.....	240	19091Z-233E.....	273	19095L-121.....	387	19095Z-123.....	274
19091S-913.....	246	19091Z-233LTM.....	273	19095L-121LTM.....	387	19095Z-123E.....	274
19091S-913E.....	246	19091Z-236.....	235-236, 273	19095L-523.....	292	19095Z-123LTM.....	274
19091S-913LTM.....	246	19091Z-236E.....	273	19095L-523E.....	292	19095Z-220.....	274
19091S-913UI.....	240	19091Z-313.....	274	19095L-523LTM.....	292	19095Z-221.....	274
19091S-913UIE.....	240	19091Z-313E.....	274	19095N-121.....	307	19095Z-221E.....	274
19091S-916.....	246	19091Z-313LTM.....	274	19095N-121E.....	307	19095Z-321.....	274
19091S-931.....	246	19091Z-331.....	273	19095N-121LTM.....	307	19095Z-321LTM.....	274
19091S-931E.....	246	19091Z-331LTM.....	273	19095N-123.....	307	19095Z-323.....	274
19091S-931LTM.....	246	19091Z-333.....	273	19095N-123E.....	307	19095Z-323E.....	274
19091S-931UI.....	240	19091Z-333LTM.....	273	19095N-123LTM.....	307	19095Z-323LTM.....	274
19091S-931UIE.....	240	19091Z-411.....	274	19095N-126.....	307	19095Z-421.....	274
19091S-933.....	246	19091Z-411E.....	274	19095P-K23.....	229, 374	19095Z-421LTM.....	274
19091S-933E.....	246	19091Z-411LTM.....	274	19095P-K23LTM.....	374	19095Z-423.....	274
19091S-933LTM.....	246	19091Z-413.....	274	19095P-K25.....	236, 374	19095Z-423E.....	274
19091S-933UI.....	240	19091Z-413E.....	274	19095P-K25E.....	374	19095Z-423LTM.....	274
19091S-933UIE.....	240	19091Z-413LTM.....	274	19095P-M23.....	380	19095Z-621.....	233, 274
19091S-936.....	246	19091Z-416.....	274	19095P-M23LTM.....	380	19095Z-621LTM.....	274
19091S-936E.....	246	19091Z-431.....	273	19095P-M25.....	380	19095Z-623.....	274
19091W-012.....	313	19091Z-431LTM.....	273	19095P-MS0.....	229, 384	19095Z-623E.....	274
19091W-012E.....	313	19091Z-433.....	273	19095P-MS0E.....	384	19095Z-623LTM.....	274
19091W-012LTM.....	313	19091Z-433E.....	273	19095P-MS0LTM.....	384	19095Z-626.....	236, 274
19091W-015.....	313	19091Z-433LTM.....	273	19095P-MS5.....	384	19095Z-627.....	234, 274
19091W-015E.....	313	19091Z-436.....	273	19095P-MS5LTM.....	384	19095Z-627E.....	274
19091W-102.....	313	19091Z-513.....	274	19095P-MS6.....	384	19095Z-627LTM.....	274
19091W-102LTM.....	313	19091Z-513E.....	274	19095P-MS6E.....	384	1909BD-113.....	329
19091W-105.....	313	19091Z-513LTM.....	274	19095P-MS6LTM.....	384	19231-20910.....	84
19091Y-012.....	387	19091Z-530.....	234, 273, 319	19095P-MS9.....	229, 384	19231-20940.....	84
19091Y-012E.....	387	19091Z-530E.....	273, 319	19095P-MS9LTM.....	384	19231-20990.....	84
19091Y-012LTM.....	387	19091Z-577.....	273	19095P-Q03.....	229, 233, 235, 371	19231-21050.....	84
19091Y-015.....	387	19091Z-577E.....	273	19095P-Q03E.....	371	19231-21060.....	84
19091Y-101.....	387	19091Z-577LTM.....	273	19095P-Q03LTM.....	371	19231-60680.....	84-85
19091Y-102.....	387	19091Z-613.....	235, 274	19095P-Q04.....	234-235, 371	19231-80520.....	84-85, 105
19091Y-102LTM.....	387	19091Z-613LTM.....	274	19095P-Q04E.....	371	19231-80530.....	84-85, 105
19091Y-105.....	387	19091Z-713.....	274	19095P-Q04LTM.....	371	19233-20625.....	88
19091Z-002.....	273	19091Z-713E.....	274	19095P-S21.....	378	19233-20755.....	88
19091Z-002LTM.....	273	19091Z-713LTM.....	274	19095P-S21LTM.....	378	19234-60700.....	76
19091Z-005.....	273	19091Z-716.....	274	19095P-S23.....	229, 378	19234-60715.....	76
19091Z-008.....	273	19095F-120.....	311	19095P-S23LTM.....	378	19234-60720.....	77, 84, 88, 105

19243-000681	64	222-1131LTM	314, 395	390607401	168	393060191	136
19243-00070	63	222-1334LTM	345, 396	390607900	168	393065201	138
19243-80530	77	222-1534LTM	347, 396	390812700	164-165	393082491	134
19243-80540	77	222-2912LTM	262, 396	390820601	161-165	393101291	134
19243-80570	76-77	222-2932LTM	262, 396	390842300	161-165	393112601	135
19244-80540	76-77	222-3212LTM	310, 396	391821100	163	393112702	135
19244-80560	81, 85, 104-105	222-3232LTM	310, 396	391866306	163	393113001	135
19244-80610	84-85, 105	222-3812LTM	256, 396	391866308	161	393161001	134
19244-80620	81, 104	222-3832LTM	256, 396	391867600	162	393164493	134
19251-00100	63	222-4712LTM	258, 396	392017401	134	393167593	134
19251-60540	25, 63	222-4732LTM	258, 396	392027300	135-136	393171201	134
19251-60575	62	222-5512LTM	250, 395	392027500	136	393175101	134
19256-00090	100	222-5512UULTM	395	392030500	135-136	393847701	135
19256-00200	100	222-5532LTM	250, 395	392035300	135-136	394958700	166
19256-00320	100	222-5532UULTM	395	392043700	136	394966601	162-163
19256-20550	99	222-5711LTM	315, 395	392047100	136	4177-0607	46
19256-20580	99	222-5731LTM	315, 395	392511901	167-168	500-1200	38
19256-20590	99	222-7013LTM	304, 396	392512800	168	500-2114	33
19256-20690	99	222-7033LTM	305, 396	392513800	167	500-2118	33
19256-20705	99	2302533140	48	392514300	167-168	5020-8292	34
19256-20900	100	2307230001	48	392514500	167-168	5020-8293	34
19256-20910	100	2307232901	48	392515101	167	5020-8294	34
19256-60510	100	232-2790010-EHS	49	392515102	167	5021-7133	39
19256-60700	99	232-2790012-EHS	49	392515103	167	5021-7134	39
19256-60800	99	2321700003	48-49	392515104	167	5021-7136	39
19256-80000	100	2321700004	48-49	392515105	167	5021-7137	39
19256-80010	100	2322590004	48-49	392515500	167-168	5021-7146	39
19256-80030	99	2322590005	48-49	392517100	167	5021-7148	39
19256-80045	99	2322700011	48	392517600	167	5021-7164	39
19256-80560	99	2710100200	135	392517700	167	5021-7166	39
19256-80600	99	2710100400	135	392517800	167	5021-7168	39
19258-20830	49	2710100500	135	392517901	167	5021-7169	39
19258-20870	49	2722990700	136	392519200	167	5021-7170	39
19298-60500	108	2735000500	135	392543101	165	5040-4669	47
19301-00150	85	2740236100	168	392544001	162	5060-9086	108
19301-20720	85	2740292400	167	392544011	162	5061-5869	63
19301-60660	85	2740928202	168	392544391	167	5061-5886	100
19325-60660	41	29091N-133LTM	307, 396	392548201	165	5061-5890	100
19354-60510	108	29091N-577LTM	307, 396	392548301	164	5061-5896	116, 133
200-0010	411	29091R-303LTM	348, 396	392560591	166	5062-0208	47
200-0032	411	29091S-431UULTM	395	392561290	166	5062-3506	33, 117
200-0070	411	29091S-433LTM	246, 251, 396	392567111	134	5062-3507	33
200-0110	411	29091S-433UULTM	395	392585291	166	5062-3508	33, 117
200-0113	411	29091S-577UULTM	395	392585292	166	5062-3511	33
200-0185	411	29091S-677LTM	246, 395	392595501	164-165	5062-3512	33
200-0310	411	29091S-833LTM	246, 395	392597101	161	5062-3513	33
200-0370	411	29091S-931LTM	246, 395	392597301	161	5062-3514	33
200187500	166	2950-0232	41	392597302	161	5062-3515	33
200187600	168	301-011-HSP	49	392597303	161	5062-3516	33
200193800	166, 168	301-015-HSP	49	392597501	161	5062-3525	39, 71-72
210-3003	26	301-016-HSP	49	392599401	161	5062-3538	33
210-3003-5	26	301-017-HSP	49	392599411	161	5062-3587	26, 63
210-4004-5	25	301-152-HSP	49	392599501	161	5062-9508	40
210-4022-5	25	301-169-HSP	49	392609901	21	5062-9509	40
2100003100	168	301-170-HSP	49	392609902	21	5062-9510	40
2100003200	166, 168	301-205-HSP	49, 62	392609903	21	5062-9511	40
2190-0584	99	301-211-HSP	49	393001991	136	5080-4978	85
221-0122LTM	245, 395	301-212-HSP	49	393010918	134	5080-5400	116, 133
221-1324LTM	345, 396	3150-0602	71	393010920	134	5080-8716	108
221-1524LTM	347, 396	3162-1057	132	393010924	134	5080-8728-100	19
221-3822LTM	256, 396	321-002-HSP	49	393011391	136	5080-8728-50	19
221-4722LTM	258, 396	321-055-HSP	49	393031501	136	5080-8732	76-77
221-5522LTM	250, 395	321-056-HSP	49	393050292	136	5080-8750	77
221-5522UULTM	395	321-057-HSP	49	393050293	136	5080-8751	77
221-6822LTM	336, 396	325-062-HSP	49	393050392	136	5080-8755	108
222-0112LTM	245, 395	325-132-HSP	49	393050393	136	5080-8756	108
222-0132LTM	245, 395	325-185-HSP	49	393050492	136	5080-8759	108
222-0732LTM	396	3600500001	49	393050493	136	5080-8761	108
222-1032LTM	395	3600500002	49	393053501	136	5080-8768	108
222-1111LTM	314, 395	390607400	168	393053502	134, 136	5080-8769	108

PART NUMBER INDEX

5080-8773.....	91, 105	5182-0850.....	50	5183-4732.....	34, 63, 91	5190-1445.....	51
5080-8774.....	76-77, 88, 91, 99, 105	5182-0851.....	50	5183-4741.....	52	5190-1446.....	51
5080-8853.....	33, 91, 105	5182-0852.....	50	5183-4757.....	16, 62-64, 77	5190-2209.....	14, 56
5080-8858.....	411	5182-0853.....	20	5183-4757-100.....	16	5190-2231.....	51
5080-8894-100.....	19	5182-3438.....	21	5183-4758.....	16	5190-2232.....	51
5080-8896-50.....	19	5182-3439.....	21	5183-4759.....	17	5190-2233.....	51
5080-8898.....	76-77	5182-3442.....	20	5183-4759-100.....	17	5190-2234.....	51
5180-4103.....	91-92	5182-3444.....	20, 64, 71, 77	5183-4760.....	17	5190-2235.....	51
5180-4105.....	76-77, 88, 91, 105	5182-3445.....	20, 64, 71, 76-77	5183-4761.....	17	5190-2265.....	48
5180-4150.....	85	5182-3450.....	85	5183-4761-100.....	17	5190-2266.....	48
5180-4152.....	85	5182-3466.....	117	5183-4762.....	17	5190-2268.....	14, 29, 57
5180-4153.....	63, 85	5182-3477.....	92	5184-3569.....	117	5190-2269.....	14, 29
5180-4165.....	82	5182-8815.....	76	5184-3570.....	117	5190-2270.....	14, 26
5180-4168.....	29, 62	5182-9651.....	73	5184-3571.....	117, 124	5190-2271.....	14, 26
5180-4173.....	29, 62	5182-9652.....	56, 63	5188-1447.....	51	5190-2272.....	14, 26
5180-4181.....	84	5182-9673.....	92	5188-1448.....	51	5190-2275.....	14, 25
5180-8830.....	76	5182-9676.....	92	5188-2717.....	57, 63	5190-2292.....	24
5181-1260.....	19	5182-9677.....	92	5188-5241.....	63	5190-2293.....	24
5181-1261.....	19	5182-9679.....	92	5188-5245.....	99	5190-2294.....	24
5181-1291.....	41	5182-9722.....	105	5188-5311.....	29	5190-2295.....	24, 62
5181-1292.....	41	5182-9733.....	48-49	5188-5312.....	34	5190-2296.....	27, 64
5181-3308.....	33	5182-9747.....	71	5188-5313.....	28, 73	5190-2297.....	24, 27
5181-3311.....	84	5182-9748.....	71-72	5188-5315.....	35	5190-3157.....	14, 16
5181-3315.....	26	5182-9749.....	71	5188-5316.....	108	5190-3158.....	14, 17
5181-3316.....	26, 62	5182-9754.....	71	5188-5317.....	108	5190-3162.....	24
5181-3316i.....	26	5182-9756.....	71	5188-5347.....	138	5190-3163.....	24
5181-3322.....	33	5182-9757.....	71-72	5188-5348.....	138	5190-3164.....	24
5181-3323.....	33, 117	5182-9758.....	71-72	5188-5356.....	28, 73	5190-3165.....	24
5181-3351.....	386	5182-9759.....	71-72	5188-5357.....	138	5190-3166.....	24, 62
5181-3352.....	386	5182-9760.....	71-72	5188-5361.....	35, 37, 41, 124	5190-3167.....	24
5181-3382.....	77	5182-9761.....	71	5188-5362.....	35, 37, 41, 124	5190-3168.....	24
5181-3395.....	38	5182-9762.....	71	5188-5363.....	35, 37, 41, 124	5190-3169.....	24, 62
5181-3396.....	38	5182-9763.....	71-72	5188-5365.....	29, 62-64	5190-3170.....	14, 24
5181-3397.....	38	5182-9768.....	71	5188-5366.....	29, 57, 62	5190-3171.....	14, 24
5181-3398.....	38	5182-9769.....	71	5188-5367.....	56, 63	5190-3172.....	14, 24
5181-7459.....	40	5182-9770.....	71	5188-5372.....	85	5190-3173.....	14, 24
5181-7460.....	40	5182-9775.....	71-72	5188-5379.....	411	5190-3976.....	52
5181-8815.....	20	5183-0318.....	73	5188-5953.....	99	5190-3978.....	52
5181-8816.....	20	5183-0379.....	88	5188-6471.....	27	5190-3983.....	24
5181-8818.....	26, 63	5183-2007.....	101, 105	5188-6493.....	55, 62	5190-4006.....	24, 27
5181-8830.....	34, 63, 77, 91, 105, 117	5183-2036.....	28, 73	5188-6494.....	55, 62	5190-4007.....	24
5181-8833.....	20	5183-2037.....	28, 73	5188-6495.....	55, 63	5190-4022.....	14
5181-8836.....	46	5183-2038.....	28, 73	5188-6496.....	55, 62	5190-4023.....	14
5181-8838.....	63	5183-2058.....	73	5188-6497.....	55, 62	5190-4024.....	14
5181-8839.....	20	5183-2096.....	116	5188-6498.....	55, 77	5190-4047.....	24, 27
5181-8863.....	116	5183-4477.....	47	5188-8813.....	51	5190-4048.....	24, 27
5181-8866.....	68	5183-4647.....	24-26, 62	5188-8814.....	51	5190-4054.....	33
5182-0551.....	43	5183-4691.....	25	5188-8815.....	51	5958-9441.....	44
5182-0739.....	76	5183-4692.....	25	5188-8816.....	51	5958-9442.....	44
5182-0773.....	51	5183-4693.....	26	5188-8817.....	51	5958-9443.....	44
5182-0774.....	51	5183-4694.....	26	5188-8818.....	51	5958-9444.....	44
5182-0775.....	51	5183-4695.....	26	5188-8819.....	51	5958-9445.....	44
5182-0781.....	51	5183-4696.....	26, 62	5188-8820.....	51	5958-9450.....	44
5182-0783.....	51	5183-4697.....	27	5188-8821.....	51	5982-0024.....	137
5182-0794.....	50	5183-4698.....	27	5188-8822.....	51	5982-0025.....	137
5182-0795.....	50	5183-4699.....	27	5190-0468.....	137	6040-0289.....	131, 133
5182-0796.....	50	5183-4700.....	27	5190-0471.....	137	6040-0621.....	132
5182-0831.....	68	5183-4701.....	24-28	5190-0472.....	137	6040-0809.....	131-132
5182-0832.....	68	5183-4702.....	24-28, 62	5190-0473.....	137	6040-0834.....	131
5182-0833.....	68	5183-4703.....	26	5190-0490.....	137	621-9723.....	242, 340
5182-0836.....	68	5183-4704.....	26	5190-0493.....	137	622-9732.....	242, 340
5182-0837.....	47	5183-4705.....	26	5190-0494.....	137	6410090050.....	48
5182-0838.....	47	5183-4706.....	26	5190-1407.....	329	705-0825.....	38
5182-0840.....	47	5183-4707.....	26	5190-1408.....	329	705-0903.....	38
5182-0844.....	50	5183-4708.....	26	5190-1409.....	329	705-0905.....	38
5182-0845.....	50	5183-4709.....	26	5190-1410.....	329	705-0925.....	38
5182-0846.....	50	5183-4710.....	26	5190-1426.....	28, 73	7200008400.....	161-165
5182-0847.....	50	5183-4711.....	25	5190-1437.....	46	8001-0004.....	180
5182-0848.....	50	5183-4712.....	25	5190-1438.....	46	8001-0005.....	180
5182-0849.....	50	5183-4713.....	25	5190-1441.....	137	8001-0006.....	180
						8001-0007.....	180

8001-0010.....	180	8002-0222.....	183	8004-0119.....	154	8010-0231.....	150, 181
8001-0011.....	180	8002-0311.....	184	8004-0151.....	154	8010-0232.....	150, 181
8001-0012.....	180	8002-0312.....	184	8004-0152.....	154	8010-0233.....	152, 160-161, 186
8001-0013.....	180	8003-0001.....	173	8004-0153.....	154	8010-0234.....	152, 160, 186
8001-0014.....	180	8003-0002.....	173	8004-0154.....	154	8010-0239.....	152, 160, 174, 186
8001-0101.....	175-177	8003-0003.....	173	8004-0155.....	154	8010-0240.....	152, 160, 174, 186
8001-0102.....	175, 177	8003-0004.....	173	8004-0156.....	154	8010-0241.....	152, 160, 162-163, 186
8001-0103.....	175-177	8003-0005.....	173	8004-0157.....	154	8010-0242.....	152, 160, 186
8001-0104.....	176	8003-0006.....	173	8004-0158.....	154	8010-0243.....	152, 186
8001-0105.....	178	8003-0007.....	173	8004-0159.....	155	8010-0244.....	152, 186
8001-0106.....	175-176	8003-0008.....	173	8004-0160.....	155	8010-0245.....	152, 186
8001-0151.....	175-177	8003-0101.....	169	8004-0161.....	155	8010-0246.....	152, 186
8001-0152.....	175, 177	8003-0102.....	169	8004-0162.....	155, 163	8010-0249.....	153, 160, 186
8001-0153.....	175-177	8003-0103.....	169	8004-0163.....	156	8010-0250.....	153, 160, 186
8001-0154.....	176	8003-0104.....	170	8004-0164.....	155, 162	8010-0251.....	153, 160, 186
8001-0155.....	178	8003-0105.....	169	8004-0165.....	154, 161	8010-0252.....	153, 160, 186
8001-0156.....	175-176	8003-0106.....	169	8004-0167.....	155, 163	8010-0253.....	153, 160, 186
8001-0157.....	175-177	8003-0107.....	169	8004-0168.....	156, 164	8010-0254.....	153, 160, 186
8001-0158.....	175-177	8003-0108.....	170	8004-0170.....	154	8010-0255.....	153, 160, 174, 186
8001-0159.....	175-177	8003-0109.....	170	8004-0171.....	155	8010-0256.....	153, 160, 174, 186
8001-0160.....	175-177	8003-0110.....	169	8004-0173.....	154	8010-0257.....	153, 160, 186
8001-0162.....	176	8003-0111.....	169	8004-0176.....	155	8010-0258.....	153, 160, 186
8001-0163.....	176	8003-0151.....	169	8004-0178.....	154	8010-0259.....	153, 186
8001-0201.....	178	8003-0152.....	169	8004-0201.....	156, 159, 161, 174, 181, 185	8010-0260.....	153, 186
8001-0202.....	178	8003-0153.....	169	8004-0202.....	156, 161	8010-0261.....	153, 186
8001-0203.....	178	8003-0154.....	170	8004-0203.....	156	8010-0262.....	153, 186
8001-0211.....	179	8003-0155.....	170	8004-0204.....	156, 162	8010-0263.....	153, 181
8001-0212.....	179	8003-0157.....	169	8004-0211.....	157	8010-0264.....	153, 181
8001-0213.....	179	8003-0158.....	169	8004-0212.....	157	8010-0301.....	157, 171
8001-0214.....	179	8003-0159.....	169	8004-0213.....	157	8010-0302.....	157, 171
8001-0221.....	179	8003-0160.....	169	8004-0214.....	157	8010-0303.....	157, 171
8001-0222.....	179	8003-0162.....	169	8004-0215.....	157	8010-0304.....	157, 171
8001-0223.....	179	8003-0163.....	170	8004-0216.....	157	8010-0305.....	158, 163-165, 172
8001-0224.....	179	8003-0165.....	169	8004-0217.....	158, 163-165	8010-0306.....	157, 171
8001-0311.....	180	8003-0166.....	169	8004-0218.....	157	8010-0307.....	157, 171
8001-0312.....	180	8003-0202.....	170	8004-0219.....	157	8010-0308.....	157, 171
8002-0001.....	184	8003-0203.....	170	8004-0311.....	158, 161-165	8010-0309.....	157, 171
8002-0002.....	184	8003-0204.....	170	8004-0312.....	158, 163	8010-0310.....	171, 179, 183
8002-0003.....	184, 187	8003-0205.....	170	8010-0201.....	151, 159, 161, 185	8010-0311.....	171, 179, 183
8002-0004.....	184, 187	8003-0211.....	172	8010-0202.....	151, 159, 185	8010-0312.....	171, 179
8002-0005.....	184, 187	8003-0212.....	172	8010-0203.....	151, 159, 164-165, 185	8010-0313.....	171, 179
8002-0101.....	182	8003-0216.....	171	8010-0204.....	151, 159, 185	8010-0314.....	172, 179
8002-0102.....	182	8003-0219.....	172	8010-0205.....	151, 159, 185	8010-0315.....	172, 179
8002-0103.....	182	8003-0221.....	172	8010-0206.....	151, 159, 185	8010-0351.....	158, 184, 187
8002-0104.....	182	8003-0222.....	172	8010-0207.....	151, 159, 174, 185	8010-0352.....	184, 187
8002-0105.....	182	8003-0223.....	172	8010-0208.....	151, 159, 174, 185	8010-0353.....	184, 187
8002-0106.....	182	8003-0311.....	172	8010-0209.....	151, 159, 162-163, 185	8010-0354.....	184, 187
8002-0107.....	182	8004-0001.....	158	8010-0210.....	151, 159, 185	8010-0355.....	184, 187
8002-0151.....	182	8004-0002.....	158	8010-0211.....	151, 185-186	8010-0356.....	187
8002-0152.....	182	8004-0003.....	158	8010-0212.....	151, 185-186	8010-0357.....	187
8002-0153.....	182	8004-0004.....	158	8010-0213.....	151, 185	8010-0358.....	187
8002-0154.....	182	8004-0005.....	158	8010-0214.....	151, 185	8010-0359.....	187
8002-0155.....	182	8004-0006.....	158	8010-0215.....	151, 181	8010-0360.....	187
8002-0156.....	182	8004-0007.....	158	8010-0216.....	151, 181	8010-0361.....	187
8002-0157.....	182	8004-0101.....	154	8010-0217.....	150, 159-161, 185	8010-0362.....	187
8002-0159.....	182	8004-0102.....	154	8010-0218.....	150-153, 159, 174, 181, 185-186	8010-0363.....	187
8002-0160.....	182	8004-0103.....	154	8010-0219.....	150, 159, 164-165, 185	8010-0364.....	187
8002-0161.....	182	8004-0104.....	154	8010-0220.....	150, 159, 185	8010-0365.....	187
8002-0201.....	183	8004-0105.....	154	8010-0221.....	150, 159, 185	8010-0366.....	187
8002-0203.....	183	8004-0106.....	154	8010-0222.....	150, 159, 185	8010-0367.....	184, 187
8002-0204.....	183	8004-0107.....	154	8010-0223.....	150, 159, 174, 185	8010-0368.....	184
8002-0211.....	183	8004-0108.....	155	8010-0224.....	150, 159, 174, 185	8010-0401.....	170, 183
8002-0212.....	183	8004-0109.....	155	8010-0225.....	150, 159, 162-163, 185	8500-0656.....	116, 138
8002-0213.....	183	8004-0110.....	155	8010-0226.....	150, 159, 185	8500-1233.....	116
8002-0214.....	183	8004-0111.....	156	8010-0227.....	150, 185	8500-4789.....	63
8002-0215.....	183	8004-0112.....	155	8010-0228.....	150, 185	8500-5440.....	138
8002-0216.....	183	8004-0113.....	154	8010-0229.....	150, 185	8500-5808.....	138
8002-0217.....	183	8004-0114.....	154	8010-0230.....	150, 185	8500-5851.....	138
8002-0220.....	183	8004-0116.....	154	8010-0231.....	150, 185	8500-5995.....	138
8002-0221.....	183	8004-0118.....	155	8010-0232.....	150, 185	8500-6812.....	411

PART NUMBER INDEX

8500-6813.....	411	CP2073.....	409	CP7195.....	278, 366	CP7437.....	331
8500-8510.....	138	CP4016.....	386	CP7196.....	287, 367	CP7440.....	339, 367
8650-0029.....	116, 133	CP4017.....	386	CP7198.....	309, 367	CP7441.....	276
8650-0030.....	116, 133	CP4018.....	386	CP7300.....	275	CP7442.....	276
8660-0791.....	116, 133	CP4788.....	386	CP7310.....	275	CP7443.....	276
8710-0510.....	34, 117	CP4789.....	386	CP7310I5.....	275	CP7443I5.....	276
8710-0899.....	117	CP4795.....	386	CP7311.....	275	CP7444.....	276
8710-0900.....	117	CP4796.....	386	CP7312.....	275	CP7444I5.....	276
8710-1220.....	117	CP5850.....	230	CP7313.....	275	CP7446.....	331
8710-1346.....	85	CP5881.....	247	CP7319.....	286	CP7447.....	331
8710-1561.....	85	CP5882.....	259	CP7319I5.....	286	CP7447I5.....	331
8710-1615.....	117	CP5883.....	259	CP7331.....	302	CP7448.....	331
8710-1622.....	117	CP5884.....	259	CP7334.....	308	CP7448I5.....	331
8829951700.....	135	CP5885.....	260	CP7334I5.....	308	CP7451.....	286
8829953800.....	135	CP5886.....	260	CP7335.....	308	CP7451I5.....	286
9300003590.....	134	CP5887.....	257	CP7340.....	302	CP7452.....	287
9301-0713.....	21, 73	CP5888.....	257	CP7347.....	368-369	CP7453.....	286
9301-0723.....	43	CP5889.....	257	CP7347I5.....	368	CP7453I5.....	286
9301-0892.....	21, 73	CP5891.....	261	CP7348.....	368	CP7454.....	287
9301-0985.....	85	CP5892.....	261	CP7348I5.....	368	CP7461.....	338
9301-1031.....	43	CP5893.....	261	CP7350.....	231, 368	CP7462.....	338
9310-4828.....	116, 133	CP6172.....	353	CP7350I5.....	368	CP7463.....	357, 367
998-0000053-EHS.....	49	CP6172I5.....	353	CP7351.....	232-233, 368	CP7475.....	319
C-102SSC.....	54	CP6173.....	353	CP7351I5.....	368	CP7475I5.....	319
C-AT010C.....	54	CP6173I5.....	353	CP7352.....	368	CP7476.....	342
C-B010M.....	53	CP6174.....	353	CP7352I5.....	368	CP7477.....	342
C-BI010.....	53	CP6174I5.....	353	CP7353.....	231, 368	CP7478.....	342
C-BTX1UG.....	54	CP6175.....	353	CP7353I5.....	368	CP7481.....	335
C-CF020.....	53	CP6530.....	330	CP7354.....	221, 232-233, 368	CP7482.....	232, 340
C-CPLOK.....	53	CP6540.....	324, 365-366	CP7354I5.....	368	CP7483.....	357
C-DF010.....	53	CP6550.....	324, 365-366	CP7355.....	368	CP7485.....	358
C-G1CM10.....	54	CP6560.....	324	CP7360.....	302	CP7485I5.....	358
C-GAT010C.....	54	CP6666.....	278, 366	CP7371.....	382	CP7486.....	230, 358
C-GT010.....	53	CP6666I5.....	278, 366	CP7372.....	382	CP7486I5.....	358
C-HY010C.....	54	CP6670.....	278, 366	CP7374.....	229, 382	CP7487.....	354
C-PL010.....	53	CP6671.....	278, 366	CP7375.....	382	CP7488.....	229-230, 354
C-TBE10.....	53	CP6680.....	287, 367	CP7406.....	336	CP7489.....	354
C-TBP1C1C.....	54	CP6681.....	367	CP7407.....	336	CP7491.....	351
C-TBP1CXC.....	54	CP67569.....	366	CP7407I5.....	336	CP749103.....	351
C-TBP1TC.....	53	CP6918.....	367, 376	CP7408.....	336	CP749106.....	351
C-TNXTA.....	53	CP6937.....	367, 385	CP7409.....	336	CP7491I5.....	351
C-UN010C.....	54	CP6937I5.....	367, 385	CP7411.....	346	CP7493.....	351
CP0005.....	412	CP6938.....	367, 385	CP7411I5.....	346	CP7494.....	360
CP0031.....	412	CP6938I5.....	367, 385	CP7412.....	346	CP7494I5.....	360
CP1305.....	408	CP6953.....	367, 370	CP7413.....	346	CP7495.....	360
CP1306.....	409	CP6953I5.....	367, 370	CP7413I5.....	346	CP7495I5.....	360
CP1307.....	408	CP6954.....	367, 370	CP7414.....	230, 346	CP7497.....	343
CP1308.....	408	CP6954I5.....	367, 370	CP7414I5.....	346	CP7498.....	343
CP1309.....	409	CP6955.....	367, 370	CP7415.....	346	CP7499.....	343
CP1480.....	408	CP6968.....	367, 377	CP7415I5.....	346	CP7500.....	361
CP1481.....	409	CP7120.....	278, 366	CP7416.....	346	CP7500I5.....	361
CP1482.....	408	CP7121.....	367	CP7416I5.....	346	CP7501.....	361
CP1483.....	409	CP7125.....	366	CP7417.....	230, 346	CP7502.....	360
CP17973.....	132	CP7128.....	309	CP7418.....	346	CP7502I5.....	360
CP17974.....	132	CP7129.....	367	CP7419.....	354	CP7503.....	360
CP2045.....	409	CP7130.....	366	CP7419I5.....	354	CP7503I5.....	360
CP2046.....	409	CP7135.....	278, 366	CP7420.....	354	CP7504.....	335
CP2047.....	408	CP7135I5.....	278, 366	CP7420I5.....	354	CP7511.....	376
CP2050.....	409	CP7138.....	309, 367	CP7421.....	354	CP7511I5.....	376
CP2055.....	408	CP7140.....	278, 366	CP7422.....	332	CP7512.....	324, 365-366
CP2056.....	409	CP7141.....	367	CP7422I5.....	332	CP7512I5.....	324
CP2057.....	408	CP7148.....	309, 367	CP7424.....	332	CP7513.....	382
CP2058.....	408	CP7150.....	278, 366	CP7428.....	232	CP7514.....	382
CP2059.....	409	CP7158.....	309, 367	CP7429.....	327	CP7515.....	230, 376
CP2060.....	409	CP7160.....	278, 366	CP7430.....	327	CP7515I5.....	376
CP2062.....	408	CP7168.....	309, 367	CP7431.....	327	CP7516.....	376
CP2065.....	409	CP7170.....	278, 366	CP7432.....	327	CP7517.....	376
CP2068.....	408	CP7177.....	309, 367	CP7433.....	327	CP7518.....	229-230, 376
CP2071.....	409	CP7178.....	309, 367	CP7434.....	331	CP7519.....	376
CP2072.....	409	CP7179.....	309, 367	CP7435.....	331	CP7519I5.....	376

CP7521	323	CP757715	376	CP7656	287	CP7724	325
CP7522	323	CP7579	373	CP7657	303	CP7725	298
CP752215	323	CP7580	373	CP7658	309	CP772515	298
CP7525	231-233, 235, 325	CP7581	373	CP765815	309	CP7727	312
CP752515	325	CP7582	230, 324, 365-366	CP7659	288	CP7730	276
CP7527	356	CP758215	324	CP7664	312	CP7731	287
CP752715	356	CP7583	373	CP7665	312	CP7732	303
CP7528	350	CP758315	373	CP7666	287	CP7733	309
CP7529	234, 326	CP7584	373	CP7667	303	CP773315	309
CP752915	326	CP758415	373	CP7668	309	CP7735	298
CP7530	320	CP7586	377	CP7669	288	CP7739	276
CP753015	320	CP7587	377	CP7670	276	CP7740	276
CP7531	233, 320	CP7588	218-219, 227, 343	CP767015	276	CP7741	287
CP753115	320	CP7591	332	CP7671	286	CP774115	287
CP7532	230, 324, 365-366	CP759115	332	CP7672	302	CP7742	303
CP753215	324, 365	CP7592	231, 324, 365-366	CP7673	308	CP7743	309
CP7533	229, 385	CP7593	324, 365-366	CP767315	308	CP7745	298
CP7534	385	CP7594	332	CP7675	277	CP7747	312
CP753415	385	CP7595	332	CP767515	277	CP774715	312
CP7535	385	CP759515	332	CP7676	287	CP7749	276
CP753515	385	CP7596	217, 332	CP7678	309	CP774915	276
CP7536	385	CP759615	332	CP7680	276	CP7750	276
CP753615	385	CP7597	222, 332	CP768015	276	CP775015	276
CP7537	229, 385	CP759715	332	CP7681	287	CP7751	287
CP7538	385	CP7598	224, 332	CP768115	287	CP775115	287
CP753815	385	CP759815	332	CP7682	275	CP7752	303
CP7539	385	CP7599	332	CP768215	275	CP7753	309
CP7540	385	CP7602	275	CP7684	275	CP775315	309
CP754015	385	CP7604	275	CP768415	275	CP7754	325
CP7541	323	CP7608	277	CP7685	236, 277	CP775415	325
CP7542	324, 365-366	CP7609	288	CP768515	277	CP7757	312
CP754215	324, 365	CP7614	233, 312	CP7686	358	CP7758	276
CP7543	385	CP761415	312	CP768615	358	CP775815	276
CP7544	385	CP7615	236, 356	CP7688	277	CP7759	286
CP754415	385	CP761515	356	CP7690	276	CP7760	276
CP7548	369	CP7617	356	CP769015	276	CP776015	276
CP7549	369	CP761715	356	CP7691	287	CP7761	287
CP754915	369	CP7619	288	CP769115	287	CP7762	303
CP7550	369	CP7620	277	CP7692	275	CP7763	309
CP755015	369	CP762015	277	CP769215	275	CP776315	309
CP7551	369	CP7621	287	CP7693	275	CP7764	325
CP755115	369	CP7622	275	CP7694	275	CP7765	308
CP7552	369	CP7624	312	CP7695	277	CP7767	312
CP7553	369	CP7625	277	CP7696	287	CP7769	286
CP755315	369	CP7628	309	CP7697	303	CP7770	276
CP7554	230, 369	CP7629	288	CP7698	309	CP777015	276
CP755415	369	CP7630	277	CP769815	309	CP7771	287
CP7555	369	CP7631	287	CP7700	276	CP7772	303
CP7556	370	CP7633	275	CP7702	302	CP7773	309
CP7557	370	CP7634	287	CP7703	308	CP777315	309
CP755715	370	CP7635	277	CP7709	276	CP7774	325
CP7558	229, 370	CP763515	277	CP7710	276	CP7775	308
CP755815	370	CP7636	287	CP771015	276	CP7777	312
CP7559	370	CP7637	303	CP7711	286	CP7778	312
CP755915	370	CP7638	309	CP7712	302	CP7779	287
CP7561	377	CP7640	277	CP7713	308	CP7785	308
CP7562	324, 365-366	CP7641	287	CP771315	308	CP7787	312
CP7565	377	CP7642	275	CP7714	325	CP778715	312
CP756515	377	CP7643	275	CP771415	325	CP7789	287
CP7567	232, 377	CP764315	275	CP7715	298	CP7791	308
CP7568	377	CP7644	275	CP771515	298	CP779115	308
CP7569	324, 365-366	CP764415	275	CP7717	312	CP7792	308
CP756915	324, 365	CP7645	277	CP771715	312	CP779215	308
CP7570	230, 324, 365-366	CP7646	287	CP7719	276	CP7797	312
CP7571	324, 365-366	CP7647	303	CP771915	276	CP7809	302
CP7572	324, 365-366	CP7648	309	CP7720	276	CP7813	288
CP7574	373	CP7649	288	CP7721	286	CP7819	302
CP757415	373	CP7650	277	CP7722	302	CP781915	302
CP7576	376	CP7653	325	CP7723	308	CP7820	293
CP7577	376	CP7654	221, 312	CP772315	308	CP7821	293

PART NUMBER INDEX

CP7822	293	CP8542	303	CP8736	220, 287	CP882015	260
CP782215	293	CP854215	303	CP873615	287	CP8821	260
CP7824	293	CP8543	309	CP8737	303	CP882115	260
CP782515	293	CP8550	276	CP8738	230-231, 236, 309	CP8822	260
CP7829	303	CP855015	276	CP873815	309	CP882215	260
CP7830	293	CP8553	309	CP8741	276	CP8823	260
CP783015	293	CP8560	276	CP874115	276	CP8824	260
CP7831	293	CP856015	276	CP8742	276	CP882415	260
CP783115	293	CP8562	302	CP874215	276	CP8825	260
CP7832	293	CP856215	302	CP8743	276	CP8826	260
CP7834	293	CP8564	381	CP874315	276	CP8827	260
CP783415	293	CP8565	381	CP8744	276	CP8828	260
CP7839	303	CP8566	381	CP874415	276	CP8829	260
CP7870	293	CP856615	381	CP8745	308	CP8830	260
CP7871	293	CP8567	381	CP8746	308	CP8831	260
CP787115	293	CP856715	381	CP874615	308	CP8842	303
CP7879	309	CP8568	381	CP8748	308	CP8843	309
CP7884	286	CP856815	381	CP8750	286	CP884315	309
CP7885	286	CP8570	381	CP8751	227, 286	CP8852	303
CP7889	309	CP857015	381	CP875115	286	CP8853	309
CP7894	286	CP8571	381	CP8752	287	CP8855	261
CP7900	286	CP8574	381	CP875215	287	CP885515	261
CP7906	288	CP8575	326	CP8753	286	CP8856	261
CP7907	288	CP8587	318	CP8754	287	CP8857	261
CP7916	288	CP858715	318	CP8756	287	CP8858	219, 261
CP7917	288	CP8592	302	CP875615	287	CP8859	261
CP7921	286	CP859215	302	CP8760	230, 232, 276	CP885915	261
CP7926	288	CP8602	300	CP876015	276	CP8860	218, 261
CP792615	288	CP8604	300	CP8761	287	CP886015	261
CP7927	288	CP8605	300	CP876115	287	CP8861	261
CP7936	288	CP8607	300	CP8762	303	CP8862	261
CP7937	288	CP8608	300	CP8763	230-231, 236, 309	CP8863	261
CP7941	286	CP8610	300	CP876315	309	CP8864	261
CP7945	320	CP8611	300	CP8770	276	CP8865	261
CP7946	288	CP8613	300	CP8771	286	CP886515	261
CP7947	288	CP8662	303	CP877115	286	CP8866	223, 261
CP7950	286	CP8663	303	CP8772	303	CP8867	261
CP7977	288	CP86677	408	CP877215	303	CP8868	224, 261
CP797715	288	CP86678	408	CP8773	233, 309	CP886815	261
CP8014	287	CP8673	277	CP8774	277	CP8870	276
CP801415	287	CP867315	277	CP8775	235, 277	CP8871	287
CP8015	351	CP8674	277	CP877515	277	CP887115	287
CP8073	309	CP867415	277	CP8780	276	CP8872	257
CP807315	309	CP8675	277	CP878015	276	CP8873	257
CP81025	409	CP8676	277	CP8781	286	CP8874	257
CP81069	408	CP8677	231-232, 277	CP8791	287	CP8875	257
CP81071	409	CP867715	277	CP8796	287	CP8876	257
CP81073	408	CP8678	287	CP8798	231, 309	CP8877	218, 225, 257
CP8120	355	CP8685	277	CP8799	277	CP887715	257
CP8121	337	CP8687	231-232, 276	CP8800	255	CP8878	257
CP8131	337	CP868715	276	CP8801	255	CP887815	257
CP8132	337	CP8688	276	CP8802	255	CP8879	222, 257
CP8133	337	CP868815	276	CP8803	255	CP8880	257
CP8134	337	CP8689	276	CP8805	255	CP8881	257
CP8430	231, 276	CP8690	276	CP8806	255	CP8882	257
CP843015	276	CP869015	276	CP880615	255	CP8883	257
CP8431	287	CP8710	276	CP8807	255	CP888315	257
CP8502	302	CP8712	302	CP8808	255	CP8884	257
CP8510	276	CP871215	302	CP8809	255	CP8885	257
CP8511	286	CP8713	308	CP8810	255	CP8886	257
CP8512	302	CP871315	308	CP8811	255	CP8887	257
CP851215	302	CP8716	287	CP8812	255	CP8888	224, 257
CP8513	308	CP8718	309	CP8813	255	CP8900	247
CP8521	286	CP8722	302	CP8814	255	CP8901	247
CP8529	276	CP8723	308	CP8815	255	CP8902	247
CP8530	276	CP872315	308	CP8816	255	CP8903	247
CP8531	287	CP8730	277	CP8817	255	CP8904	247
CP8533	309	CP873015	277	CP8818	255	CP8905	247
CP8540	276	CP8735	229-232, 277	CP8819	260	CP8906	231-232, 235, 248
CP8541	287	CP873515	277	CP8820	260	CP890615	248

CP8907	248	CP8960	219, 253	CP9044	317	CP9149	267
CP8907I5	248	CP8960I5	253	CP9045	317	CP9149I5	267
CP8908	248	CP8961	253	CP9046	317	CP9150	267
CP8908I5	248	CP8961I5	253	CP9047	317	CP9151	214, 216, 267
CP8909	248	CP8962	253	CP9048	317	CP9151I5	267
CP8910	248	CP8963	253	CP9050	266	CP9152	267
CP8911	248	CP8964	362	CP9051	266	CP9152I5	267
CP8911I5	248	CP8965	248	CP9052	266	CP9153	267
CP8912	248	CP8967	223, 248	CP9053	266	CP9154	267
CP8912I5	248	CP8968	248	CP9054	215, 266	CP9154I5	267
CP8913	215, 248	CP8969	224, 248	CP9055	266	CP9155	267
CP8913I5	248	CP8970	248	CP9056	266	CP9155I5	267
CP8914	248	CP8971	253	CP9057	266	CP9156	267
CP8915	248	CP8972	253	CP9058	266	CP9157	268
CP8916	248	CP8973	223, 253	CP9059	266	CP9158	268
CP8916I5	248	CP8974	253	CP9060	266	CP9159	268
CP8917	248	CP8975	224, 253	CP9060I5	266	CP9160	268
CP8917I5	248	CP8976	218, 221-222, 224, 253	CP9061	266	CP9161	268
CP8918	248	CP8977	259	CP9062	266	CP9162	268
CP8918I5	248	CP8979	259	CP9063	266	CP9163	213, 268
CP8919	248	CP8980	259	CP9064	266	CP9164	268
CP8920	248	CP8981	259	CP9066	266	CP9165	268
CP8920I5	248	CP8982	218, 259	CP9070	213-214, 218-219, 225, 335	CP9166	268
CP8921	248	CP8982I5	259	CP9071	335	CP9166I5	268
CP8922	248	CP8983	219, 259	CP9072	335	CP9167	268
CP8923	248	CP8984	259	CP9073	334	CP9168	268
CP8924	213, 220, 248	CP8986	259	CP9074	213-215, 218-219, 225, 334	CP9169	268
CP8925	248	CP8987	259	CP9075	334	CP9170	268
CP8926	213, 248	CP8990	259	CP9076	330, 367	CP9171	221-224, 268
CP8927	248	CP8990I5	259	CP9077	330, 367	CP9172	268
CP8928	248	CP8991	213, 259	CP9078	236, 330, 367	CP9173	268
CP8929	248	CP8994	259	CP9079	330, 367	CP9174	268
CP8930	248	CP8996	259	CP9080	330	CP9175	267
CP8933	252	CP8998	259	CP9083	330	CP9176	392
CP8934	252	CP9000	259	CP9090	317, 365	CP9177	392
CP8935	252	CP9001	221, 259	CP9091	317, 366	CP9200	263
CP8935I5	252	CP9002	222, 259	CP9092	317, 365	CP9201	263
CP8936	252	CP9010	392	CP9092I5	317	CP9202	263
CP8936I5	252	CP9011	392	CP9093	317, 366	CP9203	263
CP8937	252	CP9012	392	CP9094	317, 365	CP9204	263
CP8938	253	CP9013	392	CP9094I5	317, 365	CP9205	263
CP8939	215, 253	CP9014	392	CP9095	317, 366	CP9205I5	263
CP8940	253	CP9015	392	CP9096	317, 365	CP9206	217, 263
CP8941	253	CP9016	392	CP9097	317, 366	CP9207	263
CP8941I5	253	CP9018	392	CP9100	265	CP9208	264
CP8942	253	CP9019	392	CP9101	265	CP9209	264
CP8943	218, 253	CP9020	392	CP9101I5	265	CP9210	264
CP8943I5	253	CP9021	392	CP9102	213, 215, 217, 265	CP9211	264
CP8944	214-219, 223-224, 226-227, 253	CP9022	392	CP9102I5	265	CP9212	264
CP8944I5	253	CP9023	392	CP9103	213, 215, 221, 225-226, 265	CP9212I5	264
CP8945	218, 226-227, 253	CP9024	392	CP9103I5	265	CP9213	264
CP8946	214, 222, 226-227, 253	CP9025	392	CP9104	265	CP9214	264
CP8947	253	CP9026	392	CP9104I5	265	CP9215	220, 224, 227, 264
CP8948	218, 253	CP9027	392	CP9105	217, 219, 226, 265	CP9216	264
CP8948I5	253	CP9030	247	CP9105I5	265	CP9217	264
CP8949	253	CP9031	247	CP9106	265	CP9218	263
CP8950	253	CP9032	247	CP9106I5	265	CP9219	263
CP8951	253	CP9032I5	247	CP9107	221, 265	CP9220	263
CP8952	253	CP9034	252	CP9108	217, 219, 265	CP9221	263
CP8953	253	CP9034I5	252	CP9109	265	CP9222	263
CP8954	253	CP9035	252	CP9110	265	CP9223	263
CP8954I5	253	CP9036	252	CP9140	267	CP9224	264
CP8955	213, 227, 253	CP9036I5	252	CP9141	267	CP9225	264
CP8955I5	253	CP9037	252	CP9142	267	CP9225I5	264
CP8956	253	CP9038	252	CP9143	267	CP9226	221, 264
CP8957	215, 225, 253	CP9039	252	CP9144	267	CP9226I5	264
CP8957I5	253	CP9039I5	252	CP9145	267	CP9227	264
CP8958	253	CP9040	252	CP9146	267	CP9228	264
CP8959	253	CP9041	255	CP9147	267	CP9229	263
		CP9042	260	CP9148	267	CP9229I5	263

PART NUMBER INDEX

CP97638.....	355	G1533-80565.....	88	G2618-80500.....	71	G3591-70017.....	404
CP97638I5.....	355	G1534-20530.....	105	G2619-60501.....	71-72	G3591-70018.....	406
CP97658.....	355	G1534-20590.....	105	G2630-60710.....	107	G3591-74001.....	403
CP97658I5.....	355	G1534-40020.....	105	G2630-61230.....	93	G3591-80000.....	407
CP97711.....	355	G1534-40030.....	105	G2855-20530.....	37, 41	G3591-80001.....	401
CP97711I5.....	355	G1534-60570.....	101, 105	G2855-20555.....	37, 41	G3591-80002.....	403
CP97713.....	355	G1534-60610.....	105	G2855-20590.....	37, 46	G3591-80003.....	404
CP97721.....	355	G1534-80500.....	105	G2855-40001.....	46	G3591-80004.....	403
CP97723.....	355	G1534-80510.....	105	G2855-60200.....	37, 41, 46, 117	G3591-80005.....	406
CP97723I5.....	355	G1534-80540.....	105	G2855-60570.....	46, 117	G3591-80006.....	407
CP97743.....	355	G1534-80580.....	104	G2933-85001.....	107	G3591-80007.....	407
CP97753.....	355	G1534-80590.....	104	G2933-85003.....	107	G3591-80008.....	407
CP97753I5.....	355	G1535-00010.....	100	G3163-20530.....	120	G3591-80011.....	402
CP97763.....	355	G1535-00030.....	100	G3170-20126.....	120-121	G3591-80012.....	404
CP97763I5.....	355	G1535-60600.....	99	G3170-20530.....	120	G3591-80013.....	406
CP97773.....	355	G1535-60610.....	100	G3170-20540.....	121	G3591-80014.....	407
CP97773I5.....	355	G1535-80520.....	100	G3170-60050.....	120, 125, 133	G3591-80015.....	407
CR213105.....	157	G1540-85010.....	108	G3170-80001.....	125, 133	G3591-80016.....	406
DY50295500.....	52	G1543-00060.....	76	G3170-80002.....	116, 133	G3591-80017.....	404
DY50296800.....	52	G1543-00085.....	76	G3170-80008.....	127	G3591-80019.....	403
DY50390600.....	52	G1543-00100.....	76	G3170-80100.....	127	G3591-80020.....	403
DY50402400.....	52	G1543-00155.....	76	G3170-80103.....	127, 133	G3591-80021.....	401
DY50540700.....	52	G1543-20580.....	76	G3182-61580.....	36	G3591-80022.....	404
DY50546100.....	52	G1543-20765.....	76	G3182-61581.....	36	G3591-80023.....	403
DY50548400.....	52	G1543-61540.....	76	G3184-60065.....	37	G3591-80025.....	405
DY50549100.....	52	G1544-20590.....	63	G3185-60300.....	124	G3591-80026.....	406
DY50549290.....	52	G1544-60575.....	62	G3185-60361.....	124	G3591-80027.....	401
DY50549500.....	52	G1544-60585.....	62	G3185-60362.....	124	G3591-80028.....	404
DY50551400.....	52	G1544-60610.....	63	G3185-60363.....	124	G3591-80029.....	406
DY50559800.....	52	G1544-80530.....	63	G3185-60364.....	124	G3591-80030.....	401
DY50559900.....	52	G1544-80580.....	62	G3430-40035.....	55, 62	G3591-80031.....	404
DY50572600.....	52	G1544-80700.....	28	G3430-60011.....	62	G3591-80032.....	401
DY50573990.....	52	G1544-80730.....	28	G3431-00005.....	64, 76	G3591-80033.....	403
DY50574190.....	52	G1544-80731.....	28	G3431-60680.....	85	G3591-80034.....	407
DY50574500.....	52	G1580-60060.....	41	G3431-80507.....	84	G3591-80035.....	404
DY70001990.....	52	G1580-60062.....	41	G3431-80509.....	84	G3591-80036.....	405
DY70007701.....	52	G1580-60575.....	62	G3432-00003.....	76	G3591-80037.....	402
DY70007791.....	52	G1580-60585.....	62	G3432-00004.....	76	G3591-80039.....	401
DY70008101.....	52	G1580-80060.....	41	G3432-60220.....	93	G3591-80040.....	407
DY70008590.....	52	G1580-80062.....	41	G3432-60221.....	93	G3591-80043.....	404
G1072-20008.....	120	G1888-60701.....	49	G3433-63000.....	88	G3591-80044.....	405
G1099-20030.....	117	G1888-60702.....	48	G3434-60806.....	101	G3591-80045.....	402
G1099-20130.....	120	G1888-60703.....	48	G3434-67500.....	105	G3591-80046.....	404
G1099-20132.....	120	G1888-60704.....	48	G3434-67540.....	105	G3591-80047.....	403
G1099-20133.....	120	G1946-00034.....	132	G3451-80501.....	76	G3591-80048.....	405
G1099-20136.....	120	G1946-20168.....	76, 84	G3452-60100.....	62	G3591-80049.....	407
G1099-60566.....	116	G1999-20021.....	120-121	G3452-60730.....	64	G3591-80050.....	401
G1099-80001.....	127	G1999-20430.....	121	G3452-60730.....	62	G3591-80051.....	406
G1099-80039.....	131-132	G1999-20432.....	121	G3452-60835.....	46	G3591-80052.....	406
G1099-80053.....	121, 125, 133	G1999-20433.....	121	G3480-67585.....	62	G3591-80053.....	406
G1530-61950.....	84	G1999-20443.....	121	G3500-80000.....	72	G3591-80054.....	404
G1530-80650.....	107	G1999-20444.....	121	G3500-80001.....	72	G3591-80055.....	401
G1531-00105.....	84	G1999-20446.....	121	G3504-20504.....	34	G3591-80056.....	404
G1531-20550.....	82	G1999-60412.....	121	G3510-20018.....	64	G3591-80058.....	404
G1531-20690.....	84	G1999-80410.....	132	G3520-20210.....	46	G3591-80059.....	405
G1531-20700.....	84	G2397-20540.....	88	G3520-67001.....	46	G3591-80060.....	402
G1531-20740.....	85	G2589-20043.....	120	G3591-70001.....	406	G3591-80061.....	404
G1531-21090.....	84	G2589-20044.....	120	G3591-70002.....	404	G3591-80062.....	404
G1531-40020.....	105	G2589-20045.....	120	G3591-70003.....	404	G3591-80063.....	407
G1531-60680.....	85	G2589-20100.....	120	G3591-70004.....	404	G3591-80064.....	404
G1531-60690.....	85	G2617-20510.....	71-72	G3591-70005.....	403	G3591-80065.....	404
G1531-60700.....	84	G2617-60506.....	71-72	G3591-70006.....	403	G3591-80066.....	406
G1531-80560.....	81, 104-105	G2617-60507.....	71-72	G3591-70007.....	403	G3591-80067.....	402
G1531-80620.....	81, 104	G2617-60508.....	71-72	G3591-70008.....	404	G3591-80068.....	407
G1532-20710.....	91	G2617-60510.....	71-72	G3591-70009.....	406	G3591-80071.....	406
G1532-60675.....	93	G2617-60517.....	72	G3591-70010.....	406	G3591-80072.....	405
G1532-60685.....	93	G2617-60518.....	72	G3591-70011.....	403	G3591-80074.....	404
G1532-60690.....	93	G2617-80540.....	71	G3591-70013.....	404	G3591-80075.....	404
G1532-60695.....	93	G2617-80550.....	72	G3591-70014.....	406	G3591-80077.....	404
G1532-80540.....	91			G3591-70015.....	404	G3591-80082.....	401
						G3591-80083.....	406

G3591-80084.....	400	G3591-81034.....	407	G3591-81140.....	401	G3591-82071.....	406
G3591-80085.....	404	G3591-81035.....	404	G3591-81141.....	407	G3591-82072.....	405
G3591-80086.....	405	G3591-81036.....	405	G3591-81142.....	407	G3591-82074.....	404
G3591-80087.....	405	G3591-81037.....	402	G3591-81148.....	403	G3591-82075.....	404
G3591-80088.....	402	G3591-81039.....	401	G3591-81149.....	404	G3591-82077.....	404
G3591-80090.....	404	G3591-81040.....	407	G3591-81150.....	403	G3591-82082.....	401
G3591-80091.....	402	G3591-81043.....	404	G3591-81160.....	402	G3591-82083.....	406
G3591-80093.....	405	G3591-81044.....	405	G3591-81161.....	402	G3591-82084.....	400
G3591-80094.....	407	G3591-81045.....	402	G3591-81162.....	405	G3591-82085.....	404
G3591-80095.....	400	G3591-81046.....	404	G3591-82000.....	407	G3591-82086.....	405
G3591-80096.....	406	G3591-81047.....	403	G3591-82001.....	401	G3591-82087.....	405
G3591-80097.....	404	G3591-81048.....	405	G3591-82002.....	403	G3591-82088.....	402
G3591-80098.....	404	G3591-81049.....	407	G3591-82003.....	404	G3591-82090.....	404
G3591-80099.....	400	G3591-81050.....	401	G3591-82004.....	403	G3591-82091.....	402
G3591-80100.....	403	G3591-81051.....	406	G3591-82005.....	406	G3591-82093.....	405
G3591-80101.....	404	G3591-81052.....	406	G3591-82006.....	407	G3591-82094.....	407
G3591-80102.....	403	G3591-81053.....	406	G3591-82007.....	407	G3591-82095.....	400
G3591-80103.....	404	G3591-81054.....	404	G3591-82008.....	407	G3591-82096.....	406
G3591-80104.....	404	G3591-81055.....	401	G3591-82011.....	402	G3591-82097.....	404
G3591-80105.....	400	G3591-81056.....	404	G3591-82012.....	404	G3591-82098.....	404
G3591-80106.....	406	G3591-81058.....	404	G3591-82013.....	406	G3591-82099.....	400
G3591-80107.....	404	G3591-81059.....	405	G3591-82014.....	407	G3591-82100.....	403
G3591-80108.....	407	G3591-81060.....	402	G3591-82015.....	407	G3591-82101.....	404
G3591-80110.....	405	G3591-81061.....	404	G3591-82016.....	406	G3591-82102.....	403
G3591-80119.....	405	G3591-81062.....	404	G3591-82017.....	404	G3591-82103.....	404
G3591-80120.....	406	G3591-81063.....	407	G3591-82019.....	403	G3591-82104.....	404
G3591-80121.....	403	G3591-81064.....	404	G3591-82020.....	403	G3591-82105.....	400
G3591-80122.....	405	G3591-81065.....	404	G3591-82021.....	401	G3591-82106.....	406
G3591-80123.....	405	G3591-81066.....	406	G3591-82022.....	404	G3591-82119.....	405
G3591-80125.....	401	G3591-81067.....	402	G3591-82023.....	403	G3591-82120.....	406
G3591-80135.....	406	G3591-81068.....	407	G3591-82025.....	405	G3591-82121.....	403
G3591-80136.....	406	G3591-81071.....	406	G3591-82026.....	406	G3591-82122.....	405
G3591-80137.....	406	G3591-81072.....	405	G3591-82027.....	401	G3591-82123.....	405
G3591-80138.....	406	G3591-81074.....	404	G3591-82028.....	404	G3591-82125.....	401
G3591-80139.....	401	G3591-81075.....	404	G3591-82029.....	406	G3591-82135.....	406
G3591-80140.....	401	G3591-81077.....	404	G3591-82030.....	401	G3591-82136.....	406
G3591-80141.....	407	G3591-81082.....	401	G3591-82031.....	404	G3591-82137.....	406
G3591-80142.....	407	G3591-81083.....	406	G3591-82032.....	401	G3591-82138.....	406
G3591-80157.....	406	G3591-81084.....	400	G3591-82033.....	403	G3591-82139.....	401
G3591-80158.....	402	G3591-81085.....	404	G3591-82034.....	407	G3591-82140.....	401
G3591-80162.....	405	G3591-81086.....	405	G3591-82035.....	404	G3591-82141.....	407
G3591-81000.....	407	G3591-81087.....	405	G3591-82036.....	405	G3591-82142.....	407
G3591-81001.....	401	G3591-81088.....	402	G3591-82037.....	402	G3591-82159.....	403
G3591-81002.....	403	G3591-81090.....	404	G3591-82039.....	401	G3591-82162.....	405
G3591-81003.....	404	G3591-81091.....	402	G3591-82040.....	407	G3880-20030.....	117
G3591-81004.....	403	G3591-81093.....	405	G3591-82043.....	404	G3880-80010.....	125
G3591-81005.....	406	G3591-81094.....	407	G3591-82044.....	405	G3880-80011.....	125
G3591-81006.....	407	G3591-81095.....	400	G3591-82045.....	402	G3900-63001.....	395
G3591-81007.....	407	G3591-81096.....	406	G3591-82046.....	404	G3900-63002.....	395
G3591-81008.....	407	G3591-81097.....	404	G3591-82047.....	403	G3900-63003.....	396
G3591-81011.....	402	G3591-81098.....	404	G3591-82048.....	405	G3900-63004.....	395
G3591-81012.....	404	G3591-81099.....	400	G3591-82049.....	407	G3900-63005.....	395
G3591-81013.....	406	G3591-81100.....	403	G3591-82050.....	401	G3900-63006.....	396
G3591-81014.....	407	G3591-81101.....	404	G3591-82051.....	406	G3900-63007.....	396
G3591-81015.....	407	G3591-81102.....	403	G3591-82052.....	406	G3900-63008.....	396
G3591-81016.....	406	G3591-81103.....	404	G3591-82053.....	406	G3900-63009.....	395
G3591-81017.....	404	G3591-81104.....	404	G3591-82054.....	404	G3900-63010.....	396
G3591-81019.....	403	G3591-81105.....	400	G3591-82055.....	401	G3900-63011.....	396
G3591-81020.....	403	G3591-81106.....	406	G3591-82056.....	404	G3900-63012.....	396
G3591-81021.....	401	G3591-81119.....	405	G3591-82058.....	404	G3900-63013.....	395
G3591-81022.....	404	G3591-81120.....	406	G3591-82059.....	405	G3900-63014.....	395
G3591-81023.....	403	G3591-81121.....	403	G3591-82060.....	402	G3900-63015.....	396
G3591-81025.....	405	G3591-81122.....	405	G3591-82061.....	404	G3900-63016.....	395
G3591-81026.....	406	G3591-81123.....	405	G3591-82062.....	404	G3900-63017.....	395
G3591-81027.....	401	G3591-81125.....	401	G3591-82063.....	407	G3900-63018.....	395
G3591-81028.....	404	G3591-81135.....	406	G3591-82064.....	404	G3900-63019.....	395
G3591-81029.....	406	G3591-81136.....	406	G3591-82065.....	404	G3900-63020.....	396
G3591-81031.....	404	G3591-81137.....	406	G3591-82066.....	406	G3900-63021.....	396
G3591-81032.....	401	G3591-81138.....	406	G3591-82067.....	402	G3900-63022.....	396
G3591-81033.....	403	G3591-81139.....	401	G3591-82068.....	407	G3900-63023.....	396

PART NUMBER INDEX

G3900-63024.....	396	MKI-MTD-1169.....	53
G3900-63025.....	396	MKI-MTD-1204.....	53
G3900-63026.....	396	MKI-U-COV06.....	53
G3900-63027.....	396	MKI-U-COV07.....	53
G3900-63028.....	396	MKI-U-COV10.....	53
G3900-63029.....	396	MKI-U-DISK1.....	53
G3900-63030.....	395	MKI-U-DISK3.....	53
G3900-63031.....	395	MKI-U-T11GPC.....	53
G3900-63032.....	395	MKI-U-T11GPC-2S.....	53
G3900-63033.....	395	MKI-U-T12ME.....	53
G3900-63034.....	396	MKI-U-T12ME-2S.....	53
G3900-63035.....	396	MKI-U-T3ATX.....	53
G3900-63036.....	396	MKI-U-T3ATX-2S.....	53
G3900-63037.....	396	MKI-UTD-5064.....	53
G3900-63038.....	395	MKI-UTD-5105.....	53
G3900-63039.....	395	MKI-Z-0285.....	53
G3900-63040.....	395	MKI-Z-0351.....	53
G3900-63041.....	395	RDT-1020.....	46
G3900-63042.....	395	UMC-2.....	132
G4513-20561.....	43		
G4513-40525.....	43		
G4513-40529.....	43		
G4513-80209.....	21		
G4513-80213.....	21		
G4514-60710.....	43		
G4514-67505.....	43		
G4525-60701.....	43		
G4525-60702.....	43		
G4525-60703.....	43		
G4525-60704.....	43		
G4556-60019.....	46		
G4556-60125.....	46		
G4556-60690.....	46		
G4556-67010.....	46		
G4556-80101.....	47		
G4556-80102.....	47		
G4556-80103.....	47		
G4556-80105.....	47		
G4556-80106.....	47		
G4556-80108.....	47		
G4556-80109.....	47		
G4556-80111.....	47		
G4556-80112.....	47		
G4556-80113.....	47		
G4556-80115.....	47		
G4556-80116.....	47		
G4556-80118.....	47		
G4556-80119.....	47		
G4556-80126.....	47		
G4556-80128.....	47		
G4556-90500.....	46		
G6600-60037.....	107		
G6600-60038.....	106		
G6600-67006.....	107		
G6600-67007.....	106		
G6600-67008.....	106-107		
G6600-67009.....	106		
G6600-80018.....	35, 106-107		
G6600-80042.....	106		
G6600-80043.....	106-107, 132		
G6600-80044.....	106-107		
G6600-80045.....	106		
G6600-80050.....	106		
G6600-80051.....	106-107		
G6600-80063.....	106		
G6600-85000.....	107		
G6600-85001.....	106-107		
G6600-85002.....	106-107		
IDP3TS.....	131		
MKI-C-QSC10.....	53		

Application Title Index

1,3-Butadiene	561	Boiling Point Elution Order for Homologous Series.....	197	Ethylene Glycol Mixture.....	521
1,3-Butadiene Purity	562	Bourbon	493	Ethylene Oxide.....	531
122-5512UI	141	Butter Triglycerides I.....	499	Ethylene Oxide Synthetic Standard.....	569
15+1 EU Priority PAHs	433	Butter Triglycerides II	499	European Red List Volatiles.....	470
69 Component FAME Mix	496			Extended Analyte List for EPA Method 8021	468
A					
Acids	495	C		Extended Hydrocarbon Analysis I	563
Acrylate Impurities I.....	527	CCLP Pesticides	441	Extended Hydrocarbon Analysis II	564
Acrylate Impurities II	528	Canola Oil Margarine Partially Hydrogenated FAMES		Extended Temperature Program	
Acrylates	528	AOCS Method 1c-89	499	Resolving Congeners 52 and 138	460
Agilent's Ultra Inert Test Probe Mixture.....	458	Chiral Compounds in Essential Oils and Fragrances.....	484		
Alcohol Beverage Standard	492	Chlorinated Isooctane	523	F	
Alcohols I.....	501	Chlorinated Pesticides, EPA Method 508	448	FAME Standard	497-498
Alcohols II	505	Citrus Flavored Carbonated Beverage (Soda).....	492	FAMES	485
Alcohols III	505	Cold-Pressed Orange Oil.....	489	Fast Analysis of Aromatic Solvent.....	552
Aldehydes and Acids.....	511	Common Drug Screen	541	Fast Analysis of Permanent Gases and COFast Separation of Silanes.....	533
Aldehydes and Ketones	512	Common Industrial Solvents.....	525	Fast VOC Analysis	469
Alditol Acetates	493	Congeners in DIN Method PCBs.....	459	Fast analysis of lemon oil using Rapid-MS.....	488
Amines and Alcohols	506			Fast screening of FAME isomers in butter	500
Amines and Nitriles	510	D		Fentanyls.....	545
Amines in Water.....	511	DNPH Derivative	513	Flavor Mixture	487
Amphetamines and Precursors – TMS Derivatives.....	536	Denatured Fuel Ethanol – ASTM D5501.....	570	Formaldehyde Underivatized.....	513
Anabolic Steroids	548	Detailed Hydrocarbon Analysis of Petroleum Naphthas Through N-nonane Using ASTM D-5134	576	Formaldehyde, 50ppb.....	474
Analysis of Acetylenes Mixture.....	534	Determination of Chlorophenols in Water and Soil.....	430	Fragrance Allergens.....	487
Analysis of Amino Alcohols in Water	506	Deviation from Boiling Point Order	197	Fragrance Reference Standard.....	482-483
Analysis of Ethanolamines.....	506	Diesel Analysis.....	575	Free Organic Acids/C4-C5 Isomers	508
Analysis of Fragrance and Allergens.....	485	Diesel Fuel	431	Free Phenols.....	455
Analysis of Gases C1 to C4.....	576	Dioxins and Dibenzofurans	432	Free Steroids.....	548
Analysis of Oxygenates in a C1 to C5 Hydrocarbon Mix.....	575	Dipole Interactions	198		
Analysis of Polycyclic		Direct Comparison for Rapid CLP (Contract Laboratory Program)		G	
Aromatic Hydrocarbons	431	Pesticide Analysis	440	Gasoline Unleaded ASTM D 5769.....	574
Analysis of Semivolatiles.....	437	Direct Injection of Gasoline and Diesel Fuel in Methylene Chloride.....	575	Glycols I	519
Analysis of Solvents	526	Drug Screen	540	Glycols II	520
Anesthetics	543			Glycols III	520
Anilines	529	E		Glycols/Diols	522
Anticonvulsants	543	EPA 625 Halogenated Pesticides on "1701" Type Phases.....	455		
Antiepileptic Drugs.....	544	EPA Air Analysis Compendium Method TO-14 Standard	473	H	
Antihistamines.....	544	EPA Air Analysis Method TO-15 (1 ppbV Standard).....	477	Hallucinogens.....	545
Aroclors 1016-1268 (without 1221).....	441	EPA Method 525.2.....	445	Halocarbons.....	531
Aromatic Solvents	503	EPA Method 551	470	Halogenated Hydrocarbons I.....	502
Aromatics Analysis – ASTM D16 Analytes.....	568	EPA Method 552.2.....	467	Halogenated Hydrocarbons II.....	522
Aromatics Analysis – Ethylbenzene Impurities.....	568	EPA Volatiles by GC/MS (Split Injector).....	444, 471	Halothane	532
Aromatics I.....	514	Esters I	517	Herbicides I	453
Aromatics II.....	515	Esters II	518	Herbicides II	453
Aromatics in Finished Gasoline – ASTM Method 5769	571	Esters III	518	High Resolution Phenol Analysis by GC/MS.....	466
Aspirin and Ibuprofen in Methanol.....	547	Ethers.....	519	High Resolution Separation of Xylene Isomers.....	532
B					
Bacterial Fatty Acid Methyl Esters	495	Ethoxyethanol.....	507	High Speed VOC, EPA Method 8260	442
Barbiturates	537	Ethylene	559	Hydrogen Bonding Interactions	199
Baseline Resolution of Air/CO, COBenzodiazepines I.....	536				
Benzodiazepines II	540			I	
Blood Alcohols I (Static Headspace/Split).....	538			Impurities in Ethylbenzene.....	516
Blood Alcohols II (Static Headspace/Split).....	538			Impurities in Ethylene.....	559
Blood Pollutants I.....	549			Impurities in Mixed Xylenes	532
Blood Pollutants II.....	549			Impurities in Propylene	560
				Impurities in Styrene.....	516
				Impurities in p-Xylene – ASTM D3798	569
				Inorganic Gases	504
				Inorganic Hydride Gases.....	533

L	
Lavender Oil Characterization.....	480
Lemon Oil	488
M	
Marijuana (Δ^9 -THC) and Major Metabolites – TMS Derivatives	548
Menthol.....	484
Mercaptans	567
Methyl Tert-Butyl Ether (MTBE) FID, Extended 8020 Analysis	429
N	
Narcotics	537
Narcotics and Adulterants	546
Natural Gas	558
Nitrogen Based Solvents I	526
Nitrogen Based Solvents II	527
Nitrogen Containing Herbicides (EPA Method 507)	454
Nitrogen/Phosphorus Containing Pesticides, EPA Method 507	452
Noble Gases	557
n-Paraffin Standard	554
O	
Organic Acids	494, 507
Organochlorine Pesticides	452
Organochlorine Pesticides I	449
Organochlorine Pesticides I EPA Method 8081A	447, 456
Organochlorine Pesticides II	449
Organochlorine Pesticides II EPA Method 8081A	457
Organochlorine Pesticides III	450
Organochlorine Pesticides IV	450
Organochlorine Pesticides to EPA 625 via GC/MS	456
Organochlorine Pesticides, DB-5/DB-1701P	451
Organohalide Pesticides in Water, EPA Method 505	448
Organophosphorus Pesticide Residues in Olive Oil Extract	486
Organotin Compounds I	461
Organotin Compounds II	461
Over-the-Counter Pain Killers – TMS Derivatives	547
Oxygenates	570
Oxygenates in Gasoline ASTM D5599 (GC-OFID)	570
P	
PAHs	465
PBDEs	443
PBDEs by ECD	430
PCBs by EPA Method 8082	460
PFBHA Derivative	514
PONA Mix as Specified by AFNOR Method #2	571
Peppermint Oil	489
Perfume	484
Permanent Gases	557
Permanent Gases on a Thick Film Molsieve Column	476
Pesticides in sunflower oil	500
Pesticides, EPA 508.1	438
Phenols	464
Phenols According to EPA Method 8040	466
Phenols I	504
Phenols II	530
Phenols III	530
Phenoxy Acid Herbicides – Methyl Derivatives, EPA 8151A	439
Phenyl Content Retention	199
Polarity – Retention Relationship	200
Polyethylene	574
Polyethyleneamines	509
Polymer Additives	533
Primary Amines	509
Propylene	560
Pyrethrins	461
Pyrolysates of Polystyrene	517
R	
Reference Gas Oil	572
Refinery Gas	565
Refinery Gas I	553
Regular Unleaded Gasoline (California Phase 1) – "Normal" GC Run I	573
Regular Unleaded Gasoline (California Phase 1) – "Normal" GC Run II	573
Residual Solvents	551
Residual Solvents, DMI Diluent	539
Residual Solvents, USP 467	550
Rosemary Oil	491
S	
Sedative Hypnotics	546
Selected Oxygenates	557
Semivolatile Compounds, US EPA Method 8270	462
Separation of TMS-derivatized sugars using VF-1ms	494
Separation of <i>cis-trans</i> FAME isomers	496
Simulated Distillation	572
Solvents I	523
Solvents II	524
Solvents III	524
Solvents IV	525
Spearmint Oil (Western)	490
Strawberry Syrup	493
Substituted Anilines	529
Sulfur Compounds in Naphtha	568
Sulfur Compounds in Natural Gas – Synthetic Mixture	567
Sulfur Compounds in Propylene (1 ppm)	555, 566
Sulfur Gas Analysis in Light Hydrocarbon Streams I	565
Sulfur Gas Analysis in Light Hydrocarbon Streams II	566
Sulfur Gases	534
Sulfur Impurities in Propylene	555
Sulfur in Air	474
T	
Tetrachlorodibenzo-p-furans	459
Tocopherols	545
Trace Active Amines, 10 ng on-column	508
Trace Level Polycyclic Aromatic Hydrocarbon (PAH) Analyses	458
Trace Oxygenates in Light Hydrocarbon Matrices	556
Trace Sulfur Compounds in Methane (50 ppbv)	556
Tricyclic Antipsychotics	544
Triethylene Glycol and Impurities	521
U	
US EPA Method 551.1	436
US EPA Method 8061 (Phthalate Esters)	463
US EPA Method 8270 Short Mix	463
Undervatized Drugs of Abuse – Agilent Fast Toxicology Analyzer	539
Unleaded Gasoline	429, 553
Urine Drug Screen	542
V	
Volatile Amines	508
Volatile Sulfur Compounds	554
Y	
Ylang Ylang Oil	490-491

Compound Index

A	
Acetaldehyde.....	556
Acenaphthalene.....	465
Acenaphthalene-d10.....	446
Acenaphthene.....	431, 458, 462, 465
Acenaphthene-d10.....	445, 462-463
Acenaphthylene.....	431, 445, 458, 462
Acephate.....	486
Acetal (acetaldehyde diethyl acetal).....	519
Acetaldehyde.....	474, 477, 492-493, 512, 538, 549, 575
Acetaminophen.....	541, 547
Acetic acid.....	435, 492-495, 507, 511
Acetic acid, ethyl ester.....	570
Acetic acid, methyl ester.....	570
Acetone.....	442, 444, 471, 474, 477-478, 482-483, 492, 494, 512, 524-526, 532, 538-539, 549-550, 556-557, 575
Acetone-d6.....	474
Acetonitrile.....	442, 524, 526-527, 535, 539, 549-550
Acetyl aldehyde.....	478
Acetylcedrene.....	484
6-Acetylcodeine.....	537, 546
Acetylene.....	559-565
Acetylsalicylic acid (aspirin).....	547
Acifluorofen.....	439
Acrolein.....	442, 512, 526-527
Acrylamide.....	510
Acrylic acid.....	435
Acrylonitrile.....	442, 444, 471, 526-527
Adrin.....	448
Alachlor.....	435, 438, 445, 447-448, 451-453, 456-457
Aldrin.....	434-435, 438, 440-441, 445, 447-452, 456-457
Alfentanil.....	545
Allobarbitol.....	537, 541
Allyl acrylate.....	528
Allyl alcohol.....	442, 556
Allyl butyrate.....	482-483
Allyl chloride.....	442, 444, 468, 471
Allyl ether.....	519
Allyl ethyl ether.....	519
Alphenal.....	537
Alprazolam.....	141, 536, 539-540
Ametryn.....	445, 452-453
2-Aminoazotoluene.....	529
4-Aminobiphenyl.....	463
2-Amino-1-butanol.....	506
2-Amino-ethanol.....	506
Aminoethylethanolamine.....	511
n-(2-Aminoethyl) piperazine.....	511
2-Aminonaphthalene.....	529
1-Amino-4-nitronaphthalene.....	465
5-Amino-1-pentanol.....	506
1-Amino-2-propaol.....	506
Amitriptyline.....	542
Amobarbital.....	537, 541
Amphetamine.....	536, 539, 542
Amyl acetate.....	478, 493, 517-518
Amyl alcohol.....	478, 549
n-Amyl alcohol.....	492
Amyl butyrate.....	493
Amyl cinnamic alcohol.....	485
Amyl cinnamyl alcohol.....	487
Amyl cinnamyl aldehyde.....	485
n-Amyl mercaptan.....	567
tert-Amyl mercaptan.....	567
tert-Amyl methyl ether (TAME).....	429, 442, 519, 556, 570, 574-575
n-Amyl salicylate.....	482-484
5 α -Androstan-17 α -ol-3-one (Stanolone).....	548
Androsterone.....	548
5- β -Androsterone.....	548
Aniline.....	462-463, 510, 529
Anisic alcohol.....	485
Anisyl alcohol.....	487
Antazoline.....	544
Anthracene.....	431, 445, 458, 462, 465
Anthracene-d10.....	446
Aprobarbital.....	537, 541
Arabinitol.....	493
Arabitol.....	494
Arachidic acid (eicosanoic acid).....	494
Arachidic acid methyl ester.....	497-498
Arachidonic acid methyl ester.....	497-498
Argon.....	476, 557
Arsine.....	533
Atraton.....	452-453
Atrazine.....	438, 445-446, 448, 452-454
Azinphos-ethyl.....	486
Azinphos-methyl.....	486
Azobenzene.....	462
Azulene.....	465
B	
Balan.....	454
Barbital.....	537
Behenic acid methyl ester.....	497-498
Benactyzine.....	541
Benazone.....	439
Benthocarb.....	446
Benylamine.....	509
Benzaldehyde.....	482-483, 487, 512
Benzaldehyde, 3 methoxy.....	478
Benz[a]anthracene.....	433, 445, 458
Benz[a]anthracene-7,12-dione.....	465
1,2-Benzanthracene.....	465
Benzene.....	429, 442, 444, 468-469, 471, 473, 477, 503, 514-516, 523-524, 526, 532, 535, 549-553, 561-564, 568, 571, 574, 576
Benzene-d6.....	571
Benzene ethanol.....	482-484
α -Benzene hexachloride (BHC).....	434-435, 438, 440-441, 445, 447-452, 456-457
β -Benzene hexachloride.....	434-435, 438, 440-441, 445, 447-452, 456-457
δ -Benzene hexachloride.....	434-435, 438, 440-441, 445, 447-452, 456-457
γ -Benzene hexachloride.....	434-435, 438, 440-441, 445, 447-452, 456-457
Benzydene.....	432
Benzidine.....	462-463, 529
Benzo[a]anthracene.....	431, 462
Benzocaine.....	543
Benzo[b]fluoranthene.....	431, 433, 445, 458, 462-463, 465
Benzo[j]fluoranthene.....	433
Benzo[k]fluoranthene.....	431, 433, 445, 458, 462-463, 465
Benzo[c]fluorene.....	433
2,3-Benzofluorene.....	465
Benzo[g,h,i]perylene.....	431-433, 445, 458, 462, 465
Benzo[a]pyrene.....	431, 433, 445, 458, 462, 465
Benzo[e]pyrene.....	465
Benzoic acid.....	462
Benzonitrile.....	510, 526-527
Benzophenone.....	482-483
5,6-Benzoquinoline.....	465
Benzothiophene.....	568
Benzphetamine.....	536, 541
Benzyl acetate.....	482-484, 490-491, 517-518
Benzyl alcohol.....	462, 482-483, 485, 487, 501, 505
Benzylamine.....	510
Benzyl benzoate.....	463, 482-485, 487, 490-491, 493
Benzyl butyl phthalate.....	445
Benzyl chloride.....	442, 468, 477
Benzyl cinnamate.....	485, 487
Benzyl ether.....	519
n-Benzylmethylamine.....	510
Benzyl salicylate.....	482, 484-485, 487, 490-491
α -Bergamotene.....	480
trans- α -Bergamotene.....	488
Bifenthrin.....	446
Bioallethrin.....	446
Biphenyl.....	465
β -Bisabolene.....	483, 488, 491
α -Bisabolol.....	480
Borneol.....	480, 482-484, 491
Borneol acetate.....	480
Bornyl acetate.....	481-482
α -Bourbonene.....	479
β -Bourbonene.....	479, 489-490
Bromacil.....	445-446, 452-454
Bromazepam.....	536, 540
Bromoacetic acid.....	467
Bromoacetone.....	442
4-Bromoaniline.....	510, 529
Bromobenzene.....	442, 444, 468-469, 471, 514-515
2-Bromobiphenyl.....	447, 456-457
Bromochloroacetic acid.....	467
Bromochloroacetonitrile.....	436, 470
Bromochlorodifluoromethane.....	454
Bromochloromethane.....	442, 444, 468-469, 471, 473-474, 477, 522
Bromodichloroacetic acid.....	467
Bromodichloromethane.....	436, 442, 444, 468-471, 477, 522
2-Bromo-4,6-dinitroaniline.....	529
Bromoethane (ethyl bromide).....	477, 522
Bromofluorobenzene.....	469
4-Bromofluorobenzene.....	442, 444, 471, 473-474, 477
Bromoform.....	436, 442, 444, 468-471, 477, 522
Bromofos.....	500
Bromomethane.....	442, 444, 468-469, 471, 473, 477
1-Bromo-2-nitrobenzene.....	435, 447, 456-457
Bromopheniramine.....	541, 544
4-Bromophenyl-phenylether.....	462
3-Bromopyridine.....	510
Bromotrifluoromethane.....	454
Bucizine.....	544
Bufotenine.....	545
Butabarbital.....	537, 541
Butacaine.....	543
Butachlor.....	445, 452-453
1,2-Butadiene.....	534, 561-562
1,3-Butadiene.....	477, 534, 559-566
Butalbital.....	537
Butanal.....	511
Butane.....	574, 576
n-Butane.....	534, 553, 558-565, 570-571
n-Butane/ <i>cis</i> -2-Butene.....	566
1,3-Butanediol.....	519-520, 522
1,4-Butanediol.....	519-520
2,3-Butanediol.....	519-520
2,3-Butanedione.....	478, 482-483
1-Butanethiol.....	554-556, 566
Butanol.....	526-528
1-Butanol.....	442, 478, 501, 505, 549, 570, 575
2-Butanol.....	535, 478, 539, 551
n-Butanol.....	492, 524, 550
sec-Butanol.....	492, 501, 505, 524-525, 550, 570
tert-Butanol.....	501, 505, 524, 550, 570
2-Butanone (MEK).....	442, 444, 471, 474, 477, 512, 526, 539, 549, 551, 575
2-Butanthiol.....	556
Butene.....	517
Butene-1.....	559, 561-562
1-Butene.....	517, 534, 559-560, 563-566
<i>cis</i> -2-Butene.....	559-565
<i>trans</i> -2-Butene.....	559-566
1-Butene/methyl acetylene.....	565
2-Buten-1-ol (crotyl alcohol).....	501, 505
3-Buten-1-ol.....	501, 505
Butethal.....	537
bis(2-n-butoxyethyl) phthalate.....	463
Butyl acetate.....	517-518, 527-528
n-Butyl acetate.....	525
sec-Butyl acetate.....	517-518
tert-Butyl acetate.....	517-518
Butyl acrylate.....	527-528
n-Butyl acrylate.....	528
n-Butyl alcohol.....	525, 556

<i>sec</i> -Butyl alcohol	524, 549, 556
<i>tert</i> -Butyl alcohol	442, 549, 556
Butylaldehyde	478, 556
Butylate	445, 452
Butylated hydroxy toluene (BHT)	485, 492, 533
Butylbenzene	442, 514-515, 553
<i>n</i> -Butylbenzene	444, 468, 471, 503, 532, 552, 568, 571
<i>sec</i> -Butylbenzene	442, 444, 468-469, 471, 503, 514-515, 552-553, 568
<i>tert</i> -Butylbenzene	442, 444, 468-469, 471, 503, 514-515, 552, 568, 576
Butyl benzyl phthalate	462-463
Butyl caproate	518
Butyl cellosolve	501, 505, 525
Butyl cellosolve acetate	525
Butyl ether	519
Butyl ethyl ether	519
Butyl heptanoate	518
1-Butyl mercaptan	567
<i>n</i> -Butyl mercaptan	567
<i>sec</i> -Butyl methacrylate	528
Butyl methyl ether	519
<i>tert</i> -Butyl methyl ether (MTBE)	477
Butylpentyltin	461
Butyl propionate	518, 527-528
Butyl valerate	518
2-Butyne (dimethylacetylene)	561-562
1-Butyne (ethylacetylene)	561-562
2- <i>sec</i> -Butyl-4,-dinitrophenol (Dinoseb)	466
<i>tert</i> -Butyl mercaptan	556, 567
4- <i>tert</i> -Butyltoluene	514-515
Butylaldehyde	512, 575
Butyric acid	494-495, 507-508, 511
<i>n</i> -Butyric acid	435
Butyric acid methyl ester	497-498

C

Cadinene	489
δ -Cadinene	481-483, 491
γ -Cadinene	480-481
Caffeine	536, 540-541, 546-547
Camphene	480, 482-484, 488, 491
Camphor	480, 482-483, 491
Capric acid methyl ester	497-498
Caproic acid (hexanoic acid)	494, 507
Caproic acid methyl ester	497-498
Caprylic acid methyl ester	497-498
Captafol	435, 447, 456-457
Captan	447, 451, 456-457
Carbamazepine	543
Carbazepine	540
Carbazole	462, 465
Carbepoxide 10/11	544
Carbinoxamine	544
Carbon dioxide (CO ₂)	473, 476, 504, 553, 558, 576
Carbon disulfide (CS ₂)	444, 471, 474, 477, 554-555, 566
Carbon monoxide (CO-air)	476, 553, 557-558, 576
Carbon tetrachloride	436, 442, 444, 468-471, 473, 477, 502, 522, 535, 549
Carbonyl sulfide (COS)	474, 504, 534, 553-556, 566
Carbophenothion	451, 486
Carboxin	445, 452-453
3-Carene	480
Δ -Carane	481
Carfentanyl	545
<i>cis</i> -Carveol	487, 490
<i>trans</i> -Carveol	479, 487, 490
l-Carvone	479
(+/-)-Carvone	490
<i>cis</i> -Carvyl acetate	479, 490
Caryophyllene	480
α -Caryophyllene	491
β -Caryophyllene	479, 481-483, 488-491
Caryophyllene oxide	480
Celestocide	482
Cellosolve acetate	525
Cetearyl decanoate	482-483

Cetearyl octanoate	482-483
Chloral hydrate	436, 470
Chloramben	439
Chlorcyclizine	541, 544
α -Chlordane	434-435, 438, 440-441, 445, 447-451, 456-457
δ -Chlordane	448
γ -Chlordane	434-435, 438, 440-441, 445, 447-451, 456-457
Chlordiazepoxide	536
Chloroacetic acid	467
Chloroacetonitrile	442, 444, 471
2-Chloroaniline	510, 529
3-Chloroaniline	510, 529
4-Chloroaniline	462, 510, 529
Chlorobenzene	442, 444, 468-469, 471, 473, 477, 503, 514-515, 523
Chlorobenzene-d ₅	473-474, 477
Chlorobenzilate	435, 438, 445, 447-448, 451, 456-457
4-Chlorobenzonitrile	510
2-Chlorobiphenyl	445
1-Chlorobutane	442, 444, 471, 502, 522, 549
2-Chlorobutane	549
Chlorodibromoacetic acid	467
1-Chloro-1,1-difluoroethane	454
2-Chloro-4,6-dinitroaniline	529
Chloroethane	442, 444, 454, 468-469, 471, 473, 477
2-Chloroethanol	442, 531
bis(2-chloroethoxy) methane	462
bis(2-chloroethyl) ether	462
2-Chloroethyl vinyl ether	468
1-Chloro-3-fluorobenzene	444, 468, 471
Chloroform	436, 442, 444, 468-471, 473, 477, 502, 522, 524, 535, 549-551
1-Chlorohexane	442, 502, 522
1-Chloro isooctane	523
3-Chloro isooctane	523
4-Chloro isooctane	523
bis(2-chloroisopropyl) ether	462, 468
Chloromethane	442, 444, 454, 468-469, 471, 473, 477
4-Chloro-2-methylaniline	529
4-Chloromethyl 2,2'-dimethyl pentane	523
2-Chloro-5-methylphenol	464
4-Chloro-2-methylphenol	464
4-Chloro-3-methylphenol	455, 462, 464, 466, 504
2-Chloronaphthalene	462
Chloroneb	435, 438, 445, 447-448, 451, 456-457
2-Chloro-4-nitroaniline	529
4-Chloro-2-nitroaniline	529
1-Chloro-4-nitrobenzene	514-515
4-Chloro-3-nitrobenzotrifluoride	447, 456-457
Chloropentafluoroethane	454
2-Chlorophenol	430, 455, 462, 464, 466, 504, 530
3-Chlorophenol	430
4-Chlorophenol	430, 464
4-Chlorophenyl-phenyl ether	462
Chloropicrin	436, 470
Chloroprene	468
2-Chloropropane	468, 569
3-Chloropropene (allyl chloride)	477, 502, 522
3-Chloropropionitrile	442
Chloropropylate	435, 447, 456-457
Chloropyrifos	500
4-Chlorostyrene	514-515
2-Chloro-1,1,1,2-tetrafluoroethane	454
Chlorothalonil	435, 438, 445, 447-448, 456-457
2-Chlorotoluene	442, 444, 468-469, 471, 503, 514-515
3-Chlorotoluene	503, 514-515
4-Chlorotoluene	442, 444, 468, 471, 503, 514-515, 523
Chlorotrifluoromethane	454
Chlorpheniramine	541, 544
Chlorpothixene	544
Chlorpropopham	445, 452
Chlorpyrifos	451, 453, 486
4-Chlortestosterone-17-acetate (Clostebal)	548
Cholesterol	548
Chrysene	431, 433, 445, 458, 462, 465
Chrysene-d ₁₂	445-446, 462-463
1,8-Cineol	479, 482-483, 489-490

Cineole	484
Cinerin I	461
Cinerin II	461
Cinnamaldehyde	485, 487
<i>trans</i> -Cinnamaldehyde	484
Cinnamic alcohol	487
Cinnamyl acetate	487, 490
<i>trans</i> -Cinnamyl acetate	491
Cinnamyl alcohol	485
Cinnamyl cinnamate	482-483
Cinnamyl phenyl acetate	482-483
Cinnanzine	544
Citral (geranial)	487
Citronellal	482, 484, 488-489
Citronellic acid	435
Citronellol	481-485, 487, 493
Citronellyl acetate	482-483
Citronellyl formate	481-482
Citronellyl propionate	482
Citronellyl tiglate	482-483
<i>cis</i> -Citronellyl tiglate	487
<i>trans</i> -Citronellyl tiglate	487
Clemizole	544
Clobazam	536, 540
Clonazepam	141, 536, 539-540
Cocaine	539-542, 546
Codeine	537, 539, 541-542, 546
Commamyl acetate	484
α -Copaene	479, 482-483, 491
Coprostane (5- α -cholestane)	548
Cotinine	542
Coumarin	484-485, 487
2-Cresol	530
3-Cresol	530
4-Cresol	530
m-Cresol	466, 530
o-Cresol	466, 530
p-Cresol	466, 530
Crotonaldehyde	442, 512
Cumene	429, 516, 523, 532, 552, 568
Cumic aldehyde	480
Cyanazine	438, 445, 453
2-Cyanopyridine	510
3-Cyanopyridine	510
Cyclizine	544
Cycloate	445, 452
Cyclohexane	477, 523-524, 526, 535, 539, 550, 552-553, 563-564, 568
Cyclohexanol	501, 505
Cyclohexanone	512, 525
2-Cyclohexyl-4,6-dinitrophenol	464
Cyclohexyl methacrylate	528
Cyclopentane	563-564, 571, 576
Cyclopenta[c,d]pyrene	433
Cyclopentanol	501, 505
Cyclopentanone	512
Cyclopentene	563-564
1-Cyclopentene	571
Cyclopentylbarbital	537
Cyclopropane	559-562
Cyheptamide	542
o-Cymene	480
p-Cymene	482-483, 492
r-Cymene	479, 488-490

D

Dacthal (DCPA methyl ester)	445, 447, 453, 456-457
Dalapon	439, 467
Decachlorobiphenyl	434-435, 440-441, 449-451, 460
Decanal	488-489, 511
Decane	197, 199-200, 523, 552, 568, 574
<i>n</i> -Decane	197, 208, 458, 553, 571-572
1,10-Decanediol	519-520, 522
Decanoic acid	494, 511
Decanol	492
1-Decanol	501, 505
<i>n</i> -Decylamine	509-510

Dehydroisoandrosterone (Prasterone).....	548	2,3-Dichlorobiphenyl.....	445	9,10-Dihydroanthracene.....	465
1-Dehydrotestosterone (Boldenone).....	548	p,p'-Dichlorobiphenyl.....	451	<i>trans</i> -Dihydrocarveol acetate.....	479
1-Dehydrotestosterone acetate.....	548	<i>cis</i> -Dichlorobutene.....	442	Dihydrocarvone.....	479, 490
1-Dehydrotestosterone benzoate.....	548	<i>cis</i> -1,4-Dichlorobutene.....	468	<i>trans</i> -Dihydrocarvyl.....	490
1-Dehydrotestosterone undecylenate.....	548	<i>trans</i> -Dichlorobutene.....	442	Dihydrocodeine.....	537
Delorazepam.....	540	<i>trans</i> -1,4-Dichloro-2-butene.....	444, 471, 502, 522	Dihydropentaborane.....	533
Demoxepam.....	536, 540	Dichlorodifluoromethane.....	442, 444, 454, 468, 471, 473, 477	Diisobutyl phthalate.....	463
Desalkyl Aurazepam.....	536	Dichlorodimethyl silane.....	533	Diisopropylamine.....	510
Desipramine.....	540	1,1-Dichloroethane.....	442, 444, 468-471, 473, 477, 502, 522	1,3-Diisopropylbenzene.....	503, 514-515
Desmethyl diazepam.....	540	1,2-Dichloroethane.....	442, 444, 468, 470-471, 473, 477, 502, 522, 535	1,4-Diisopropylbenzene.....	503, 514-515
n-Desmethyl methsuximide.....	543	Dichloroethane-d4.....	442	Diisopropyl ether (DIPE).....	442, 429, 556, 570, 575
Dextromethorphan.....	537	1,1-Dichloroethene.....	442, 444, 468-469, 471, 473, 477, 502, 522	Dimenhydrinate.....	541, 544
Diacetone-alcohol.....	525	<i>cis</i> -1,2-Dichloroethene.....	442, 444, 468, 471, 473, 477	Dimethoate.....	446, 486
Diacetyl.....	492	<i>trans</i> -1,2-Dichloroethene.....	442, 444, 468-469, 471, 477, 522	3,3'-Dimethoxybenzidine.....	529
Diacetylmorphine (Heroin).....	141, 537, 539-541, 546	1,1-Dichloroethylene.....	470, 535	1,2-Dimethoxyethane.....	539, 570
Di-allyle A.....	447, 456-457	<i>cis</i> -1,2-Dichloroethylene.....	535	n,n-Dimethylacetamide.....	539
Di-allyle B.....	447, 456-457	<i>trans</i> -1,2-Dichloroethylene.....	535	Dimethylamine.....	508
Diallate isomers.....	435	1,1-Dichloro-1-fluoroethane.....	454	Dimethylamphetamine.....	536
2,4-Diaminoanisole.....	529	Dichlorofluoromethane.....	454, 469	2,4-Dimethylaniline.....	510
2,4-Diaminotoluene.....	529	Dichloromethane.....	454, 525-526, 533, 535, 570	2,6-Dimethylaniline.....	510, 529
3,4-Diaminotoluene.....	510	Dichloromethyl silane.....	533	7,12-Dimethylbenz[a]anthracene.....	465
Diamyl phthalate.....	463	2,6-Dichloro-4-nitroaniline.....	529	1,2-Dimethylbenzene.....	484
Diazepam.....	536, 539-542	2,3-Dichlorophenol.....	430, 464	n,n-Dimethylbenzylamine.....	510
Diazinon.....	445, 452, 486	2,4-Dichlorophenol.....	430, 455, 462, 464, 466, 504, 530	2,2-Dimethylbutane.....	563-564, 571, 574
Dibenz[a,h]anthracene.....	431, 433, 445, 458, 462	2,5-Dichlorophenol.....	430, 464	2,3-Dimethylbutane.....	563-564, 571, 574
1,2,3,4-Dibenzanthracene.....	465	2,6-Dichlorophenol.....	430, 464	Dimethyl ether.....	556
1,2,5,6-Dibenzanthracene.....	465	3,4-Dichlorophenol.....	430, 464	Dimethylformamide (DMF).....	524, 526-527, 550
Dibenzo-p-dioxin.....	465	3,5-Dichlorophenol.....	430, 464	n,n-Dimethylformamide (DMF).....	526, 539
Dibenzofuran.....	462, 465	1,1-Dichloropropane.....	442, 444, 468-469, 471, 473, 477, 502, 522	2,6-Dimethylhept-5-enal.....	482-483
Dibenzo[a,e]pyrene.....	433	1,2-Dichloropropane.....	442, 444, 468-469, 471, 473, 477, 502, 522	2,2-Dimethylhexane.....	444, 471, 574
Dibenzo[a,h]pyrene.....	433	1,3-Dichloropropane.....	442, 444, 468, 471, 522	1,3-Dimethyl-2-imidazolidinone (DMI).....	539
Dibenzo[a,i]pyrene.....	433	2,2-Dichloropropane.....	442, 444, 468-469, 471, 522	2,6-Dimethylnaphthalene.....	465
Dibenzo[a,j]pyrene.....	433	1,3-Dichloro-2-propanol.....	442	1,2-Dimethyl-2-nitrobenzene.....	446
Dibenzothiophene.....	465	1,1-Dichloro-2-propanone.....	436, 444, 470-471	1,3-Dimethyl-2-nitrobenzene.....	445
Dibenzyl ether.....	482-483	1,1-Dichloropropene.....	442, 444, 468, 471	2,2-Dimethylpentane.....	571, 574
Dibenzyl phthalate.....	463	<i>cis</i> -1,2-Dichloropropene.....	502	2,3-Dimethylpentane.....	563-564, 574
Diborane.....	533	<i>trans</i> -1,2-Dichloropropene.....	502	2,4-Dimethylpentane.....	563-564, 571, 574
Dibromoacetic acid.....	467	<i>cis</i> -1,3-Dichloropropene.....	442, 444, 468-469, 471, 473, 477, 522	Dimethylpentyltin.....	461
Dibromoacetone.....	436, 470	<i>trans</i> -1,3-Dichloropropene.....	442, 444, 468-469, 471, 473, 477, 522	3,6-Dimethylphenanthrene.....	465
1,2-Dibromobenzene.....	473	Dichlorotetrafluoroethane.....	477	2,3-Dimethylphenol.....	464
4,4'-Dibromobiphenyl.....	438	1,2-Dichloro-1,1,2,2-tetrafluoroethane.....	454, 473	2,4-Dimethylphenol.....	455, 462, 464, 466, 504
Dibromochloromethane.....	436, 442, 444, 468-471, 477	2,2-Dichloro-1,1,1-trifluoroethane.....	454	2,5-Dimethylphenol.....	464
1,2-Dibromo-3-chloropropane.....	435-436, 442, 444, 447, 456-457, 468-471	Dichlorvos.....	445, 452	2,6-Dimethylphenol.....	464
1,2-Dibromo-3-chloropropane (DBCP).....	502, 522	Dicyclohexylamine.....	509-510	3,4-Dimethylphenol.....	464
1,2-Dibromoethane.....	436, 442, 444, 468, 470-471, 473, 477, 502, 522	Dicyclohexyl phthalate.....	463	Dimethyl phthalate.....	445, 462-463
Dibromofluoromethane.....	442	Dieldrin.....	434-435, 438, 440-441, 445, 447-452, 456-457, 500	Dimethyl sulfide.....	474, 526, 554-556, 566-567
Dibromomethane.....	442, 444, 468-469, 471, 522	Diethanolamine (DEA).....	506	Dimethyl sulfoxide (DMSO).....	526-527, 539, 549
1,2-Dibromomethane.....	469	Diethylamine.....	510	Dimethyl-tetrachloro-terephthalate (DCPA).....	435, 438-439, 448, 451
2,6-Dibromo-4-nitroaniline.....	529	2,6-Diethylaniline.....	510	2,5-Dimethylthiophene.....	554
4,4'-Dibromooctafluorobiphenyl.....	439	n,n-Diethylaniline.....	510	Dimethyltryptamine.....	545
2,4-Dibromophenol.....	464	Diethylbenzene.....	568	2,4-Dinitroaniline.....	529
1,2-Dibromopropane.....	470	1,2-Diethylbenzene.....	552, 571	2,2'-Dinitrobiphenyl.....	465
2,3-Dibromopropionic acid.....	467	1,3-Diethylbenzene.....	552, 571	2,7-Dinitrofluorene.....	465
1,2-Dibromo-1,1,2,2-tetrafluoroethane.....	454	1,4-Diethylbenzene.....	571	4,6-Dinitro-2-methylphenol.....	462
α,α -Dibromo-m-xylene.....	447, 456-457	Diethylene glycol.....	520-521	1,3-Dinitronaphthalene.....	465
Dibucaine.....	543	Diethylene glycol dimethyl ether (diglyme).....	519-520	1,5-Dinitronaphthalene.....	465
Dibutylchlorendate.....	447, 456-457	Diethylene glycol monobutyl ether.....	519-520	2,4-Dinitrophenol.....	455, 462-464, 466, 504, 530
<i>tert</i> -Dibutyl disulfide.....	567	Diethylene glycol monoethyl ether.....	519-520	2,5-Dinitrophenol.....	464
Dibutyl ether.....	527-528	Diethylene glycol monomethyl ether.....	519-520	2,4-Dinitrotoluene.....	445, 462
Dibutylpentytin.....	461	Diethylenetriamine.....	511	2,6-Dinitrotoluene.....	445, 462
Di-n-butyl phthalate.....	445, 462-463	Diethyl ether.....	444, 471, 526, 532, 535, 549, 551, 556, 570, 575	Di-n-octyl phthalate.....	462-463
Dicamba.....	439	1,2-Diethyl-4-ethylbenzene.....	571	Dinonyl phthalate.....	463
Dichlobenil.....	453	1,3-Diethyl-5-ethylbenzene.....	571	Dinoseb.....	439, 464
Dichlone.....	435	Diethyl formamide (DEF).....	445	1,3-Dioxalane.....	519
Dichloroacetic acid.....	467	Diethyl phthalate.....	445, 462-463, 484	1,4-Dioxane.....	442, 477, 519, 524-526, 535, 550, 552, 568
Dichloroacetone.....	436, 470	Diethyl sulfide.....	554-556	Diphenamid.....	445, 452-453
3,4-Dichloroaniline.....	510, 529	Diethyltryptamine.....	545	Diphenhydramine.....	544
1,2-Dichlorobenzene.....	442, 444, 462, 468-469, 471, 473, 477, 503, 514-515, 523	1,4-Difluorobenzene.....	444, 471, 473-474, 477	Diphenylamine.....	510
1,3-Dichlorobenzene.....	204, 206, 442, 444, 462, 468-469, 471, 473, 477, 503, 514-515, 523	1,1-Difluoroethane.....	454	9,10-Diphenylanthracene.....	465
1,4-Dichlorobenzene.....	204, 206, 442, 444, 462-463, 468-469, 471, 473, 477, 503, 514-515, 523	Difolotan.....	453	Diphenyl isophthalate.....	463
1,4-Dichlorobenzene-d4.....	442, 462-463	Dihexyl phthalate.....	463	Diphenyl oxide.....	482-483
3,3'-Dichlorobenzidine.....	462-463, 529			Diphenyl phthalate.....	463
3,5-Dichlorobenzoic acid.....	439			Diphenylpyraline.....	544

cis-13,16-Docosadienoic acid methyl ester497-498
cis-4,7,10,13,16,19-Docosahexaenoic acid methyl ester497-498
 Dodecahydrotriphenylene465
 γ -Dodecalactone482-483
 Dodecane197, 199-200, 523, 552-553, 568
 n-Dodecane197, 208, 557, 571-572
 Dodecanoic acid494
 Dodecanal489
 Dodecanol482-483
 n-Dotriacontane572
 Doxylamine541, 544
 Droperidol546
 Dursban (Chlorpyrifos)445-446

E

cis-11,14-Eicosadienoic acid methyl ester497-498
 Eicosane482
 n-Eicosane572
cis-5,8,11,14,17-Eicosapentaenoic acid methyl ester497-498
cis-8,11,14-Eicosatrienoic acid methyl ester498
cis-11,14,17-Eicosatrienoic acid methyl ester497-498
cis-11-Eicosenoic acid methyl ester497-498
 Elaidic acid methyl ester497-498
 Endosulfan I434-435, 438, 440-441, 445, 447-452, 456-457
 Endosulfan II434-435, 438, 440-441, 445, 447-452, 456-457
 α -Endosulfan500
 b-Endosulfan500
 Endosulfan sulfate434-435, 438, 440-441, 445, 447-452, 456-457, 500
 Endrin434-435, 438, 440-441, 445, 447-452, 456-457
 Endrin aldehyde434-435, 438, 440-441, 445, 447-452, 456-457
 Endrin ketone434-435, 440-441, 445, 447, 449-451, 456-457
 Ephedrine536
 Epiandrosterone (*trans*-androsterone)548
 Epichlorohydrin442, 519
 Eptam454
 EPTC445, 452-453
 Erucic acid methyl ester497-498
 Erythritol494
 Esfenvalerate446
 Estazolam536
 17- α -Estradiol548
 β -Estradiol548
 Estrinol548
 Estrone548
 Ethane534, 558-560, 563-566, 571, 576
 Ethanol442, 478, 492-493, 501, 505, 523-528, 535, 538-539, 549-551, 556, 570-571, 575
 Ethchlorvynol546
 Ethinamate546
 2-(Ethlamino)-ethanol506
 Ethoprop445, 452-453
 Ethosuximide543
 Ethotoin544
 2-Ethoxyethanol (Cellosolve)501, 505, 507, 535, 539
 2-Ethoxyethyl acetate507, 517-518
 bis(2-ethoxyethyl) phthalate463
 Ethyl acetate551
 Ethyl acetylene534
 Ethyl acetate442, 477-478, 482-483, 492-493, 517-518, 524-528, 535, 539, 549-550
 Ethyl acrylate517-518, 526-528
 Ethyl alcohol507
 Ethyl and dimethyl thiophenes568
 Ethylbenzene429, 442, 444, 468-469, 471, 473, 477, 503, 514-516, 523, 532, 539, 549, 552-553, 563-564, 568-569, 571, 574, 576
 Ethylbenzene-d10571
 Ethyl benzoate493, 517-518
 2-Ethyl-1-butanol505
 Ethyl butanonate478
 Ethyl butyrate482-483, 493, 518
 Ethyl caprate478

Ethyl caproate518
 Ethyl caprylate478
 Ethyl cellosolve525
 Ethyl decanoate482-483
 Ethyl disulfide554
 Ethyl dodecanoate482-483
 Ethylene534, 553, 559-560, 563-565, 576
 Ethylene/acetylene566
 Ethylenediamine511
 Ethylene glycol501, 505, 519-522, 531, 549
 Ethylene glycol/monoacetate507
 Ethylene glycol monobutyl ether519-520
 Ethylene glycol monoethyl ether519-520
 Ethylene glycol/monoformate507
 Ethylene glycol monomethyl ether519-520
 Ethylene glycol phenyl ether522
 Ethylene oxide504, 507, 531, 569
 Ethyl ether442, 519, 524, 550
 Ethyl formate492, 507, 517-518, 524, 549
 Ethyl heptanoate482-483
 Ethyl hexadecanoate482-483
 Ethyl hexanoate482-483
 2-Ethyl hexanoic acid435
 2-Ethyl-1-hexanol492, 501, 505
 bis-2-ethylhexyl adipate445
 bis(2-ethylhexyl) phthalate445, 462-463
 Ethyl isovalerate482-483
 Ethyl mercaptan554-556, 566-567
 Ethyl methacrylate442, 444, 471, 528
 Ethyl methyl sulfide554
 Ethylmorphine537
 Ethyl nonanoate482-483
 Ethyl octadecanoate482-483
 Ethyl octanoate482-483
 Ethyl parathion500
 Ethyl pentadecanoate482-483
 Ethyl pentanoate482-483
 a-Ethylphenethyl alcohol501, 505
 b-Ethylphenethyl alcohol501, 505
 2-Ethylphenol530
 4-Ethylphenol530
 Ethyl-3-phenyl oxiran carboxylate493
 Ethyl propanoate478
 Ethyl propionate482-483, 517-518, 527-528
 Ethyl-*tert*-butyl ether (ETBE)429, 442, 556, 570, 575
 Ethyl tetradecanoate482-483
 2-Ethylthiophene554
 4-Ethyltoluene477
 m-Ethyltoluene552, 568
 p-Ethyltoluene552, 568
 Ethyl undecanoate482-483
 Ethyl valerate518
 Ethyl vinyl ether519
 Etridiazole435, 438, 448, 451
 Eucalyptol480-481
 Eugenol485, 487
 Eugenyl acetate482-483
 Eugenyl methyl ether483
 Evernyl482

F

Faneosolacetate490
 Farnesene491
 β -Farnesene480
trans- β -Farnesene479, 481, 490
 Farnesol487
 Farnesol 1487
 Farnesyl acetate491
 Fenamiphos445-446, 452
 Fenarimol445, 452
 Fenchone487
 Fenchyl acetate482
 Fenitrothion486, 500
 Fentanyl540, 545
 Fenthion486
 Fenvalerate446
 Florazone482-483

Flunitrazepam141, 536, 539-540
 Fluoranthene431-432, 458, 462, 465
 Fluorene431, 445, 458, 462, 465
 Fluorobenzene442, 444, 468-469, 471, 514-515
 2-Fluorobiphenyl462
 2-Fluorophenol462
 Flurazepam540, 542
 Fluridone445, 452-453
 Fonofos453
 Formaldehyde474, 477, 513
 Formaldehyde-DNPH513
 Formaldehyde-PFBHA514
 Formic acid435, 494, 507
 Frambione (raspberry ketone)482-483
 Fucitol493
 Furan519
 Furfural482-483, 512
 Furfuryl alcohol501, 505

G

Galactitol493-494
 Geranial482-483, 488-489
 Geranial acetate491
 Geraniol482-483, 485, 487, 490, 493
cis-Geraniol480
trans-Geraniol487
 Geranyl acetate480, 482-483, 488, 490
 Geranyl butyrate453
 Geranyl formate482-483
 Geranyl-2-methyl valerate482
 Geranyl tiglate482-483
 Germacrene-d479-480, 489-491
 Gesatamine (Atraton)445
 Glucitol493
 Glucuron acid494
 Glucuron acid-1,5-lactone494
 Glutethimide540, 546
 Glycidol501, 505
 3,7-Guaiaadiene482
 α -Gurjunene491

H

Halazepam536, 540
 Haloperidol546
 Halothane532
 Helium476
 Heneicosane482
 Heneicosanoic acid methyl ester497-498
 1,7-Heptanediol522
 Heptachlor434-435, 438, 440-441, 445, 447-452, 456-457
 Heptachlor epoxide434-435, 438, 440-441, 445, 447-452, 456-457
 2,2',3,3',4,4',6-Heptachlorobiphenyl445
 Heptadecane461
 n-Heptadecane572
 Heptadecanoic acid methyl ester497-498
 Heptadec-1-ene482
cis-10-Heptadecenoic acid methyl ester497-498
 Heptanal478, 511-512
 Heptane516, 523, 539, 549, 552, 568, 576
 n-Heptane477, 524, 535, 550, 553, 563-564, 571-572
 1,7-Heptanediol519-520
 1-Heptanethiol554
 Heptanoic acid494, 507, 511
 n-Heptanoic acid435
 1-Heptanol458, 501, 505
 2-Heptanol501, 505
 3-Heptanol501, 505
 2-Heptanone512
 3-Heptanone512
 4-Heptanone512
cis-4-Hepten-1-ol501, 505
trans-2-Hepten-1-ol501, 505
 Hercolyn D (tetrahydro & dihydro methyl abietate)482
 Hexabromobenzene (HBB)438, 448, 451

Hexabromobiphenyl.....	446
Hexachlorobenzene.....	435, 445, 447-448, 451, 456-457, 462
2,2',4,4',5,6'-Hexachlorobiphenyl.....	445
Hexachlorobutadiene.....	442, 444, 462, 468-469, 471, 477, 502, 522
Hexachloro-1,3-butadiene.....	473
β-Hexachlorocyclohexane (HCH).....	500
δ-Hexachlorocyclohexane.....	500
γ-Hexachlorocyclohexane.....	500
Hexachlorocyclopentadiene.....	435, 438, 445, 448, 462, 502, 522
Hexachloroethane.....	442, 444, 462, 471, 502, 522
Hexachloropentadiene.....	447, 456-457
n-Hexadecane.....	197, 572
Hexadecanoic acid.....	494
2,4-Hexadienal.....	481
Hexanal.....	478, 511-512
Hexane.....	444, 471, 523-524, 526, 539, 549, 551, 570, 574, 576
n-Hexane.....	477, 524, 535, 550, 553, 558-560, 563-564, 571-572
1,6-Hexanediol.....	519-520
1-Hexanethiol.....	554
Hexanoic acid.....	511
Hexanol.....	197, 199-200, 482-483
1-Hexanol.....	478, 501, 505
2-Hexanol.....	501, 505
3-Hexanol.....	501, 505
2-Hexanone.....	444, 471, 477, 512
3-Hexanone.....	512
n-Hexatriacontane.....	572
Hexazinone.....	445-446, 452-454
cis-2-Hexene.....	563-564
trans-2-Hexene.....	563-564
cis-2-Hexen-1-ol.....	501, 505
cis-3-Hexen-1-ol.....	501, 505
Hexobarbital.....	537, 541
Hexyl acetate.....	483
Hexyl butyrate.....	480
Hexyl cinnamaldehyde.....	487
Hexyl cinnamic aldehyde.....	485
Hexylene glycol.....	482-483
Hexyl 2-ethylhexyl phthalate.....	463
1-Hexyl mercaptan.....	567
n-Hexyl mercaptan.....	567
Hexyl methacrylate.....	528
α-Humulene.....	488
Hydrocarbon.....	516
Hydrocodone.....	539, 541
Hydrogen sulfide (H ₂ S).....	474, 504, 534, 553-556, 558, 566-567
Hydroxy acetate.....	507
Hydroxy citronellal.....	482-483, 485, 487
4-Hydroxy-4-methyl-2-pentanone.....	501, 505
Hydroxyphenamate.....	541
Hydroxypropionitrile.....	442
Hydroxypropyl acrylate.....	528
Hydroxyzine.....	544
I	
Ibogaine.....	540, 545
Ibuprofen.....	541, 547
Imipramine.....	542
Indan.....	571
Indeno[1,2,3-cd]pyrene.....	431, 433, 445, 458, 462
Inositol.....	493
Iodobenzene.....	514-515
Iodoform.....	502, 522
Iodomethane.....	444, 468, 471, 502, 522
Irgafos.....	533
Irganox.....	533
Isoamyl acetate.....	478, 493, 517-518
Isoamyl alcohol.....	478, 492
Isoamyl butyrate.....	493
Isoamyl mercaptan.....	567
Isoamyl salicylate.....	482, 484
Isoborneol.....	482-483-484, 491
Isobutane.....	558-566, 574
Isobutanol.....	442, 492-493, 501, 505, 525-528, 556, 570
Iso-butene.....	534
Iso-buteraldehyde.....	557
Isobutyl acetate.....	478, 482-483, 517-518, 524, 527-528
Isobutyl acrylate.....	527-528
Isobutyl alcohol.....	478
Isobutyraldehyde.....	478, 556
Isobutylbenzene.....	503, 514-515, 553
Isobutylene.....	559-562
Isobutyl mercaptan.....	567
Isobutyl propionate.....	527-528
Isobutyraldehyde.....	512, 575
Isobutyric acid.....	435, 494-495, 507-508, 511
Isocaproic acid.....	494, 507
Isodrin.....	435, 447, 451, 456-457
Isoeugenol.....	485, 487
trans-Isoeugenol.....	487
Isomenthol.....	481
Isomenthone.....	479, 481-483
d-Isomenthone.....	489
a-Isomethyl ionone.....	487
Isonox 129.....	533
Isooctane.....	429, 523-524, 535, 551, 553, 563-564, 571
Isopentane.....	553, 558-566, 570-571
Isopentanoic acid.....	435
Isophorone.....	445, 462
Isoprene.....	561-564
Isopropanol.....	478, 501, 505, 524-525, 538, 550, 556
Isopropyl acetate.....	517-518, 524-525, 539
Isopropyl acrylate.....	527-528
Isopropyl alcohol.....	442, 477, 524, 549
Isopropyl amine (IPA).....	506, 549
Isopropylbenzene (cumene).....	442, 444, 468-469, 471, 503, 514-516, 553, 563-564, 568
Isopropyl ether.....	519
Isopropyl mercaptan.....	567
Isopropylmyristate.....	482-483
2-Isopropylphenol.....	530
Isopropyltoluene.....	442
4-Isopropyltoluene.....	469
p-Isopropyltoluene.....	444, 468, 471
Isovaleraldehyde.....	556, 575
Isovaleric acid.....	494-495, 507, 511
J	
Jasmolin I.....	461
Jasmolin II.....	461
cis-Jasmone.....	479, 490
K	
Kelthane.....	435, 447, 456-457
Kepone.....	446
Ketamine.....	546
Ketimine.....	545
Krypton.....	557
L	
Lactose.....	494
Lactulose.....	494
Lauric acid methyl ester.....	497-498
Lavandulol.....	480
Lavandulyl acetate.....	480
Levulinic acid.....	435
Lidocaine.....	540, 543, 546
Lignoceric acid methyl ester.....	497-498
Lilial.....	485, 487
Limonen.....	489
Limonene.....	479, 482-484, 487, 489-492
δ-Limonene butyrate.....	480-481, 488
Linalool.....	479, 482-485, 487-492
β-Linalool.....	480
Linalool acetate.....	480
cis-Linalool oxide.....	483
trans-Linalool oxide.....	482, 483
Linalyl acetate.....	482-484
Lindane.....	448
Linoleic acid methyl ester.....	497-498
Linoleic acid methyl ester.....	497-498
Linolenic acid methyl ester.....	497-498
γ-Linolenic acid methyl ester.....	497-498
Lofentanyl.....	545
Lorazepam.....	536, 539-540
Lormetazepam.....	536
Lyrall.....	485
Lyrall 1.....	487
Lyrall 2.....	487
Lysergic acid diethylamide (LSD).....	540, 545
M	
β-Maaliene.....	481
Malathion.....	446, 486, 500
Manitol.....	494
Mannitol.....	493
Meclizine.....	544
Medazepam.....	536, 540
Menthofuran.....	481
Menthol.....	481, 484, 489
Menthone.....	481-483
Menthyl acetate.....	489
Meperidine.....	539, 542
Mephobarbital.....	537
Mepivacaine.....	543
Meprobamate.....	541, 546
Merphos.....	445, 452
Mescaline.....	545
Mesitylene.....	523
Mesityl oxide.....	525
Mesterolone.....	548
Methacrolein.....	512, 526-527
Methacrylic acid.....	435
Methacrylonitrile.....	442, 444, 471, 526-527
Methadone.....	539-540, 542
Methamidophos.....	486
Methamphetamine.....	536, 539, 542
Methandrostenolone.....	548
Methane.....	476, 526, 534-535, 553, 557-560, 563-566, 576
Methanol (MeOH).....	478, 492-493, 501, 505-506, 513, 523-528, 535, 538-539, 549-551, 553, 556-557, 570, 575
Methapyrilene.....	541, 544
Methaqualone.....	540, 546
Methidathion.....	486
Methofuran.....	489
Methohexital.....	537
Methone.....	489-490
Methoprene.....	461
Methoxychlor.....	434-435, 438, 440-441, 445, 447-451, 456-457
2-Methoxyethanol (methyl Cellosolve).....	501, 505, 526
bis(4-methoxyethyl) phthalate.....	463
2-Methoxy-5-methylaniline.....	529
1-Methoxy-2-propanol.....	539
Methsuximide.....	543
3-Methyl-1-butanol.....	535
Methylcyclohexane.....	535
Methyl acetate.....	517-518, 527-528, 535
Methyl acetylene.....	566
Methyl acrylate.....	442, 444, 471, 527-528
Methylamine.....	508
4-Methylaminorex.....	545
2-Methylanthracene.....	465
9-Methylanthracene.....	465
r-Methylansiole.....	490
Methyl arachidate.....	495
Methyl benzoate.....	483, 490-491, 517-518
2-Methyl butanal.....	511
2-Methylbutane.....	574
2-Methyl-1-butanol (active amyl alcohol).....	493, 501, 505
2-Methyl-2-butanol (tert-amyl alcohol).....	501, 505
3-Methyl-1-butanol (isoamyl alcohol).....	493, 501, 505

3-Methyl-2-butanone512, 535
 2-Methyl-1-butene571
 2-Methyl-2-butene559, 563-564, 571
 3-Methyl-1-butene561-564
trans-2-Methyl-2-butenic acid508
 2-Methyl-3-buten-2-ol501, 505
 3-Methyl-2-buten-1-ol501, 505
 2-Methylbutyl acetate517-518
 2-Methylbutyl alcohol482-483
 3-Methylbutyl alcohol482-483
 Methyl-*tert*-butyl ether (MTBE)429, 442, 444, 471, 519, 523, 539, 549, 556-557, 570-571, 575
 Methyl butyrate482-483
 2-Methyl butyric acid508
 Methyl chavicol485
 3-Methylcholanthrene465
 2-Methyl-4-chloro-phenoxy acetic acid (MCPA)439
 Methylchlorophenoxy propionic acid (MCPP)439
 5-Methylchrysene433
 Methyl-*cresol*482
 Methyl-*para-cresol*483
 Methyl-*p-cresol*491
 Methylcyclohexane539, 563-564, 574
 Methylcyclopentane553, 563-564, 571, 574
 1-Methyl-1-cyclopentene571
 Methyl decanoate518
 Methyl-2,4-dichlorophenylacetate439
 Methyl diethanolamine (MDEA)506
 4-Methyl-2,5-dimethoxyamphetamine536
 2-Methyl-4,6-dinitrophenol455, 463-464, 466, 504
 Methyl disulfide554
 Methyl dodecanoate518
 Methyl eicosenoate518
 Methyl elaidate495
 Methylene chloride442, 444, 468-469, 471, 473, 477, 502, 522, 524, 539, 549-550
 4,4'-Methylenedianiline529
 Methylenedioxy-amphetamine (MDA)536, 539, 542
 3,4-Methylenedioxy-ethylamphetamine536, 539, 542
 Methylenedioxy methamphetamine (MDMA)539, 542
 3,4-Methylenedioxy methylamphetamine536
 Methyl ephedrine536
 1-Methyl-2-ethylbenzene571
 1-Methyl-3-ethylbenzene571
 1-Methyl-4-ethylbenzene571
 Methyl ethyl ketone (MEK)524-525, 550, 556
 Methyl ethyl sulfide556
 Methyl eugenol485
 2-Methylfluoranthene465
 Methyl formate517-518, 525
 3-O-Methylglucose 1494
 3-O-Methylglucose 2494
 Methyl heptadecanoate495
 2-Methylheptane553, 563-564, 571
 3-Methylheptane563-564, 571
 4-Methylheptane553
 Methyl heptin carbonate485, 487
 Methyl hexadecanoate518
 2-Methylhexane563-564, 574
 3-Methylhexane563-564, 574
 Methyl 2-hydroxydecanoate495
 Methyl 2-hydroxydodecanoate495
 Methyl 3-hydroxydodecanoate495
 Methyl 2-hydroxyhexadecanoate495
 Methyl 2-hydroxytetradecanoate495
 Methyl 3-hydroxytetradecanoate495
 Methyl g-ionone485
 α -Methyl ionone484
 Methyl isobutyl ketone524-525, 539
 Methyl laurate495
 Methyl mercaptan474, 554-556, 566-567
 Methyl methacrylate442, 444, 471, 527-528
 Methyl *cis*-9,10-methylene octadecanoate495
 Methyl *cis*-9,10-methyl hexadecanoate495
 Methyl 14-methylhexadecanoate495
 Methyl 12-methyltetradecanoate495
 Methyl monoethanolamine (MMEA)506

Methyl myristate495
 1-Methylnaphthalene465, 571
 2-Methylnaphthalene462, 465, 571
 2-Methyl-5-nitroaniline529
 Methyl nonadecanoate495
 Methyl octadecanoate518
 Methyl octine carbonate485, 487
 Methyl oleate495
 Methyl palmitate495
 Methyl palmitoleate495
 2-Methylpentane574
 Methyl paraoxon445
 Methyl parathion500
 Methyl pentadecanoate495
 2-Methylpentane429, 563-564, 571
 3-Methylpentane429, 523, 563-564, 571, 574
 2-Methyl-2-pentanol556
 3-Methyl-3-pentanol505
 4-Methyl-2-pentanol501, 505
 2-Methyl-3-pentanone512
 4-Methyl-2-pentanone (MIBK)444, 471, 477, 512
 2-Methyl-1-pentene563-564, 571
 4-Methyl-1-pentene563-564
 bis(4-methyl-2-pentyl) phthalate463
 2-Methylphenol462, 464
 3-Methylphenol464
 4-Methylphenol462, 464
a-Methylphenyl alcohol501
 5-Methyl-5-phenylhydantoin543
 2-Methyl-1-propanethiol554-556, 566
 2-Methyl-2-propanethiol554-555, 566
 2-Methyl-1-propanol (isobutanol)575
 2-Methyl-2-propanol (*tert*-butanol)539, 575
 Methyl propionate517-518, 527-528
 1-Methyl-1-propnaethiol555, 566
 1-Methyl-3-propylbenzene571
 1-Methyl-1-propyl mercaptan567
 2-Methyl-1-propyl mercaptan567
 2-Methyl-2-propyl mercaptan567
 2-Methyl pyridine432
 1-Methyl-2-pyrrolidine510
 1-Methyl-2-pyrrolidinone526-527
n-Methylpyrrolidone539
 Methyl stearate495
 4-Methylstyrene514-515
 α -Methylstyrene514-516, 552, 568
 Methyl sulfide534
 17 α -Methyltestosterone548
 Methyl tetradecanoate518
 2-Methylthiophene554
 3-Methylthiophene554
 Methyl thiophenes568
 Methyl tridecanoate495
 Methyltripentyltin461
 Methylundecanoate495
 Metolachlor438, 445, 452-453
 Metribuzin438, 445, 452-453
 Mevinphos445, 452
 MGK 264445, 452
 Endo-MGK 264461
 Exo-MGK 264461
 Mirex435, 446-447, 451, 456-457
 Molinate445, 452-453
 6-Monoacetylmorphine537
 Mono-ethanolamine (MEA)506
 Mono ethylene glycol506
 Monuron453
 Morphine537, 541, 546
 Musk ketone484
 Musk T (ethylene brassylate)482-483
 Musk xylene484
 Myrcene479, 482-484, 488-490
 β -Myrcene480-481
 Myristic acid methyl ester497-498
 Myristoleic acid methyl ester497-498

N

Naphthalene197, 199-200, 429, 431, 442, 444, 458, 462, 465, 468-469, 471, 523, 553, 571
 Naphthalene-*d*8462-463, 571
 1-Naphthol530
 Napropamide445, 452-453
 Nefopam543
 Neomenthol484, 489
 Neon476, 557
 Neral482-483, 487-489
 Nerol481
 Nerol acetate480
cis-Nerolidol482
trans-Nerolidol482
 Nervonic acid methyl ester497-498
 Neryl acetate482-483, 488
 Nicotinamine536
 Nicotine539-541, 547
 Nitrazepam141, 536, 539
 2-Nitroaniline462, 510, 529
 3-Nitroaniline462, 510, 529
 4-Nitroaniline462, 510, 529
 Nitrobenzene442, 444, 462, 471, 514-515
 Nitrobenzene-*d*5462
 2-Nitrobiphenyl465
 3-Nitrobiphenyl465
 4-Nitrobiphenyl465
 Nitrofen435
 Nitrogen476, 504, 532, 557
 Nitromethane535
 1-Nitronaphthalene465
 2-Nitronaphthalene465
 Nitrophen446
 2-Nitrophenol455, 462, 464, 466, 504, 530
 3-Nitrophenol464
 4-Nitrophenol439, 455, 463-462, 464, 466, 504
 Nitropropane525
 2-Nitropropane442, 444, 471
n-Nitrosodimethylamine432, 462, 463
n-Nitrosodiphenylamine462
n-Nitroso-*di-n*-propylamine462
 2-Nitrotoluene503, 514-515
 3-Nitrotoluene503, 514-515
 4-Nitrotoluene503, 514-515
cis-Nonachlor448
trans-Nonachlor435, 445, 447-448, 456-457
 Nonadecane483
 Nonadec-1-ene482-483
 γ -Nonalactone482-483
 Nonanal488-489
 Nonane523, 552, 568, 574, 576
n-Nonane458, 553, 563-564, 571-572
 1,9-Nonanediol519-520, 522
 Nonanol492
 1-Nonanol501, 505
 Nonyl aldehyde512
n-Nonylamine509-510
 Nootkatone489
 Norcodeine537
 Nordazepam536
 Norethandrolone548
 Norflurazon445-446, 452-453
 Normorphine537
 19-Nortestosterone (Nandrolone)548
 19-Nortestosterone-17-decanoate548
 19-Nortestosterone-17-propionate548

O

trans-Ocimene479
 β -*cis*-Ocimene479-480, 489-490
 β -*trans*-Ocimene480
 1,2,3,4,6,7,8,9-OCDF432
 1,2,3,4,6,7,8,9-Octachlorodibenzodioxin (OCDD)432
 2,2',3,3',4,5',6,6'-Octachlorobiphenyl445
n-Octacosane572
 Octadecane461

Stanozolol.....	548
Stearic acid methyl ester.....	497-498
Stigmasterol.....	548
Stirofos.....	452
Strawberry aldehyde.....	493
Strychnine.....	539, 546
Styrene.....	442, 444, 468, 471, 473, 477, 503, 514-517, 523, 532, 552, 563-564, 568
Styrene dimer.....	517
Styrene oxide.....	514-515
Styrene trimer.....	517
Sucrose.....	494
Sufentanyl.....	545
Sulfallate.....	453
Sulfur dioxide.....	504, 534
Sulpiride.....	546
Sutan.....	454
T	
Talbutal.....	537, 546
Tebuthiuron.....	445, 452
Temazepam.....	141, 536, 539-540
Tenocyclidine (TCP).....	545
Terbacil.....	445, 452-454
Terbufos.....	445, 452-453
Terbus sulfone.....	446
Terbutylazine.....	453
Terbutryn.....	452-453
Terphenyl-d14.....	462
Terpinene.....	489, 491
α-Terpinene.....	479, 488-490
γ-Terpinene.....	479, 481-483, 490, 492
Terpinen-4-ol.....	479-480, 482-483, 488-490, 492
α-Terpinol.....	482-484, 488-490, 491-492
α-Terpinol.....	480
Terpinolene.....	479, 483, 488, 490
γ-Terpinolene.....	489
Terrazole.....	445, 447, 456-457
Testosterone.....	548
Tetraborane.....	533
Tetrabutyltin.....	461
Tetracaine.....	543
1,2,4,5-Tetrachlorobenzene.....	514-515
2,2',4,4'-Tetrachlorobiphenyl.....	445
2,3,7,8-Tetrachlorodibenzodioxin (TCDD).....	432
2,3,7,8-Tetrachlorodibenzofuran (TCDF).....	432
1,1,1,2-Tetrachloroethane.....	442, 444, 468-469, 471, 502, 522
1,1,2,2-Tetrachloroethane.....	442, 444, 468, 471, 473, 477, 502, 522
Tetrachloroethene.....	442, 444, 468-471, 473, 477, 522
Tetrachloroethylene.....	436, 470
2,3,4,5-Tetrachlorophenol.....	430, 464
2,3,4,6-Tetrachlorophenol.....	430, 464
2,3,5,6-Tetrachlorophenol.....	430, 464, 466
Tetrachloro-m-xylene.....	434-435, 440-441, 447, 451, 456-457, 460
2,4,5,6-Tetrachloro-m-xylene.....	449-450
Tetrachlorvinphos (Stirfos).....	445
n-Tetracontane.....	572
n-Tetracosane.....	572
Tetradecane.....	571
n-Tetradecane.....	197, 557, 572
Tetradecanoic acid.....	494
Tetraethylenepentamine.....	511
1,1,1,2-Tetrafluoroethane.....	454
1,1,2,2-Tetrafluoroethane.....	454
Tetrahydrofuran.....	526
Tetrahydrocannabinol.....	539
δ9-Tetrahydrocannabinol.....	548
1,2,3,4-Tetrahydrofluoranthene.....	465
Tetrahydrofuran (THF).....	444, 471, 477, 519, 524, 539, 550
Tetrahydropyran.....	519
Tetrahydrothiophene.....	554
1,2,3,5-Tetramethylbenzene.....	571
1,2,4,5-Tetramethylbenzene.....	553, 571
Tetrapentyltin.....	461
Thenyldiamine.....	541
Thiamylal.....	537
Thiazopyr.....	446
Thioacetamide (TAA).....	570
4,4'-Thiodianiline.....	529
Thiopental.....	537
Thiophene.....	554-556, 566-568
Thioridazine.....	544
Thonzylamine.....	544
Threhalose.....	494
Threitol.....	494
Thujone.....	487
α-Thujone.....	482, 488
β-Thujone.....	488
Tillam (Pebulate).....	445, 454
Tinuvin P.....	533
α-Tocopherol.....	545
β-Tocopherol.....	545
δ-Tocopherol.....	545
γ-Tocopherol.....	545
Tolban.....	454
o-Tolidine.....	529
m-Tolualdehyde.....	512
o-Tolualdehyde.....	512
p-Tolualdehyde.....	512
Toluene.....	197, 199-200, 429, 442, 444, 468-469, 471, 473, 477, 503, 514-517, 523-525, 532, 535, 539, 549-550, 552-553, 561-564, 568-569, 571, 574, 576
Toluene-d8.....	442, 473
Tonalid.....	482-484
Trazodone.....	539
Treflan.....	454
γ-Trepinene.....	488
Triadefefon.....	452
Triadimefon.....	445
Triazolam.....	536, 540
Tribromoacetic acid.....	467
2,4,6-Tribromophenol.....	462
Tributylpentyltin.....	461
Trichloroacetic acid.....	467
Trichloroacetoneitrile.....	436, 470
2,4,5-Trichloroaniline.....	529
1,2,3-Trichlorobenzene.....	442, 444, 468-469, 471, 514-515
1,2,4-Trichlorobenzene.....	442, 444, 462, 468-469, 471, 473, 477, 514-515
1,3,5-Trichlorobenzene.....	514-515
2,4,5-Trichlorobiphenyl.....	445
Trichloroethane.....	524
1,1-Trichloroethane.....	549
1,1,1-Trichloroethane.....	436, 442, 444, 468-471, 473, 477, 502, 522, 535
1,1,2-Trichloroethane.....	436, 442, 444, 468-469, 471, 473, 477, 502, 522
Trichloroethene.....	442, 444, 468-471, 473, 477, 522
Trichloroethylene.....	436, 470, 524, 526, 535, 550
Trichlorofluoromethane.....	442, 444, 454, 468-469, 471, 473, 477
Trichloromethane.....	526
Trichloromethyl silane.....	533
2,3,4-Trichlorophenol.....	430, 464, 466
2,3,5-Trichlorophenol.....	430, 464, 466
2,3,6-Trichlorophenol.....	430, 464, 466
2,4,5-Trichlorophenol.....	430, 462, 464, 466
2,4,6-Trichlorophenol.....	430, 455, 462, 464, 466, 530
3,4,5-Trichlorophenol.....	430, 464
2,4,5-Trichlorophenoxyacetic acid.....	439
1,2,3-Trichloropropane.....	436, 442, 444, 467-468, 471, 502, 522
1,1,1-Trichloropropanone.....	470
1,1,1-Trichloro-2-propanone.....	436
1,1,2-Trichlorotrifluoroethane.....	502, 522
1,1,2-Trichloro-1,2,2-trifluoroethane.....	454, 473, 477
Tricosanoic acid methyl ester.....	497-498
Tricyclazole.....	445, 452-453
Tridecane.....	552-553, 568
n-Tridecane.....	197, 557
Tridecanoic acid methyl ester.....	497-498
Triethanolamine (TEA).....	506
Triethylamine.....	510, 526-527
Triethylene glycol.....	521
Triethylene glycol dimethyl ether.....	519-520
Triethylenetetramine.....	511
1,1,1-Trifluoroethane.....	454
Trifluoromethane.....	454
Trifluorotoluene.....	468
α,α,α-Trifluorotoluene.....	429
Triflupromazine.....	544
Trifluralin.....	435, 438, 445, 447-448, 451, 456-457
Trimethylamine.....	508
2,4,5-Trimethylaniline.....	529
1,2,3-Trimethylbenzene (hemimellitene).....	429, 514-515, 553, 571, 574, 576
1,2,4-Trimethylbenzene (pseudocumene).....	429, 442, 444, 468-469, 471, 473, 477, 514-515, 523, 553, 563-564, 571
1,3,5-Trimethylbenzene (mesitylene).....	429, 442, 444, 468-469, 471, 473, 477, 514-515, 563-564, 571
Trimethylchloro silane.....	533
3,5,5-Trimethylhexanol.....	482-483
2,3,3-Trimethylpentane.....	553, 571
2,3,4-Trimethylpentane.....	563-564
2,2,4-Trimethylpentane.....	477
2,3,5-Trimethylphenol.....	530
Trimethyl phosphate.....	458
Trimipramine.....	540
2,4,6-Trinitrophenol.....	504
1,3,5-Trioxane.....	478
Tripeleannamine.....	544
Triphenyl phosphate.....	445-446, 486
Triprolidine.....	544
U	
Undecane.....	523, 552, 568, 574
n-Undecane.....	197, 208, 553, 571-572
Undecanoic acid methyl ester.....	497-498
V	
Valencene.....	489
Valeraldehyde.....	512, 556, 575
Valeric acid.....	494, 507, 508, 511
Valerolactone.....	508
Vanillin.....	487
Verapamil.....	539
Vernam.....	454
Vernolate.....	445, 452-453
Vertenex.....	482-483
Vinclozolin.....	500
Vinclozoline.....	446
Vinyl acetate.....	477, 517-518
Vinyl chloride.....	442, 444, 468-469, 471, 473, 477
Vinyl-trimethyl silane.....	533
Viridiflorol.....	479, 489-490
W	
Water (H2O).....	507, 553, 558, 570
X	
Xenon.....	557
m-Xylene.....	429, 442, 444, 468-469, 471, 473, 477, 503, 514-516, 523, 525, 532-533, 552, 563-564, 568-569, 571, 574, 576
o-Xylene.....	429, 442, 444, 468-469, 471, 473, 477, 503, 514-516, 523, 525, 532, 539, 549, 552-553, 563-564, 568-569, 571, 574, 576
p-Xylene.....	429, 442, 444, 468-469, 471, 473, 477, 503, 514-516, 523, 525, 532, 552-553, 563-564, 568-569, 571, 574, 576
m,p-Xylene.....	429, 539, 549
2,3-Xylenol.....	530
2,4-Xylenol.....	530
2,5-Xylenol.....	530
2,6-Xylenol.....	530
3,4-Xylenol.....	530
3,5-Xylenol.....	530
Xylose 1.....	494
Xylose 2.....	494

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If you are not satisfied with your Agilent product within the first 60 days, you may return your purchase in its original condition for a full refund or credit. A return policy statement is included in every Agilent shipment and posted under Product Information on the website. In the US and Canada, please call for a Return Authorization form and return instructions at **1-800-227-9770**. If your Agilent product was purchased from a distributor, please contact the distributor.

Shipping Damages

If items are damaged in transit, please follow the instructions below:

- If a shipment is visibly damaged upon arrival, do not accept it until the person making the delivery has endorsed the bill of lading with statement for the extent of the damage.
- If any damage is found after unpacking, retain all cartons and inner packaging and immediately request an inspection from the carrier.
- Notify the Agilent Customer Contact Center at **1-800-227-9770** about the damaged shipment so that we can make the appropriate sales adjustment and/or provide you with return instructions (Sales order number, product number and quantity damaged will be needed).

Easy Ways To Order

- Phone: **1-800-227-9770** (option 1, 1) in the US and Canada – Mon-Fri, 8AM to 8PM EST
- Fax: **1-302-633-8901** in the US
- Email: **cag_sales-na@agilent.com** in the US and Canada
- Online: **www.agilent.com/chem** in the US and Canada

Payment Options

- In the US, Visa, MasterCard, Discover and American Express are accepted with a minimum order of \$20 (not applicable in all countries).
- Email ePay@agilent.com to make an electronic payment using the ACH/EFT (Automated Clearing House/Electronic Funds Transfer) method.
- Establish a charge account through your Agilent Customer Service Representative or Your Local Agilent sales office. An account number will be assigned to you for charging your purchases. Payment terms are net 30 days from the invoice date. All orders are subject to credit approval.

We will be happy to supply a price quote via, phone, email or fax if you need it in writing.

Warranties

All Agilent Technologies products in this catalog are designed and manufactured to stringent standards under the Agilent quality system registered to ISO 9001. At Agilent, we back every product with a 90-day warranty and a money-back guarantee. If Agilent receives notice of defects during the warranty period. Agilent shall, at its option, either repair or replace products which prove to be defective. If Agilent is unable, within a reasonable time, to repair or replace any product to a condition as warranted, the buyer shall be entitled to a refund of the purchase price upon return of the product to Agilent. The warranty period for each product begins on the day of shipment.

This warranty shall not apply to any defect, failure, or damage caused by improper use or improper or inadequate maintenance or care. This warranty is exclusive and no other warranty, whether written or oral, is expressed or implied. Agilent specifically disclaims the implied warranties of merchantability and fitness for particular purposes. The remedies provided herein are the buyer's sole and exclusive remedies. In no event shall Agilent be liable for direct, indirect, special, incidental, or consequential damages (including loss of profits) whether based on contract, tort, or any other legal theory.

For more information

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