Blue Line Autosampler Syringes with PTFE-Tipped Plungers

Suitable for gas and liquid samples, the PTFE tip of the plunger creates a tight seal between the plunger and glass, helping to reduce carry-over and increase syringe lifetime. Replacement plungers are available.

Needles, replacement, G4513-80236

Blue Line Autosampler Syringes with PTFE-Tipped Plungers

Volume (µL)	Description	Unit	Needle Gauge/ Length (mm)/Tip	Part No.
10	Straight, fixed		23/42/HP	G4513-80220
	Straight, fixed	6/pk	23/42/HP	G4513-80210
	Tapered, fixed		23-26/42/HP	G4513-80203*
	Replacement plunger for fixed needle			G4513-80227
	Tapered, fixed	6/pk	23-26s/42/HP	G4513-80208
	Straight, removable		23/42/HP	G4513-80219
	Replacement needle	3/pk	23/42/HP	G4513-80236
	Tapered, removable		23-26/42/HP	G4513-80233
	Replacement needle	3/pk	23-26/42/HP	G4513-80225
25	Straight, fixed		23/42/HP	G4513-80228
	Tapered, fixed		23-26/42/HP	G4513-80241
50	Straight, fixed		23/42/HP	G4513-80221
	Tapered, fixed		23-26/42/HP	G4513-80223
100	Tapered, fixed		23-26s/42/HP	G4513-80222

*Included in 7693A shipments

Blue line autosampler syringe, G4513-60560

Advanced Sample Enhancement Autosampler Syringes with PTFE-Tipped Plungers

Used with the 7693A optional Enhanced Sample Handling Syringe Carriage, these syringes can eliminate analyst-to-analyst variability and reduce re-work in sample preparation, such as dilution and internal standard addition.

Advanced Sample Enhancement Autosampler Syringes with PTFE-Tipped Plungers

Volume (µL)	Description	Needle Gauge/ Length (mm)/Tip	Part No.
250	Fixed, advanced sample enhancement	23/42/HP	G4513-60560
500	Fixed, advanced sample enhancement	23/42/HP	G4513-60561

Gold Standard Autosampler Syringes

Use one needle and get the benefits of two. The upper portion of the tapered needle offers the strength of a 23-gauge needle, while the lower portion at 26s-gauge allows use with split/splitless or on-column injections with 0.53 mm id columns. All standard plungers are stainless steel.

Tapered Needle, 23-26s Gauge Autosampler Syringes

Volume (µL)	Description	Unit	Needle Gauge/ Length (mm)/ Tip	Part No.
5	Tapered, fixed		23-26s/42/HP	5181-1273
	Tapered, fixed	6/pk	23-26s/42/HP	5181-8810
	Tapered, removable		23-26s/42/HP	5182-0835
	Replacement needle for 5 µL syringe	3/pk		5182-0832
10	Tapered, fixed		23-26s/42/HP	5181-1267
	Tapered, fixed	6/pk	23-26s/42/HP	5181-3360
	Tapered, removable		23-26s/42/HP	5181-3321
	Replacement needle for 10 µL syringe	3/pk		5181-3319
	Tapered, fixed, PTFE-tipped plunger		23-26s/42/HP	5181-3354
	Tapered, fixed, PTFE-tipped plunger	6/pk	23-26s/42/HP	5181-3361
	Replacement plunger with PTFE tip for fixed needle 10 µL syringe			5181-3365
	Tapered, removable		23-26s/42/HP	5181-3356
	Replacement plunger with PTFE tip for removable needle 10 µL syringe			5181-3358
50	Tapered, fixed, PTFE-tipped plunger		23-26s/42/HP	5183-0314
100	Tapered, fixed, PTFE-tipped plunger		23-26s/42/HP	5183-2042

Autosampler Syringes

Straight Needle, 23 and 26s Gauge Autosampler Syringes

Volume (µL)	Description	Unit	Needle Gauge/ Length (mm)/Tip	Part No.
1	Cone-tipped		23/42/HP	5188-5246
1	Replacement needle/plunger for 1.0 µL syringe		23/42/HP	5188-5370
0.5	Replacement needle/plunger for 0.5 µL syringe	1/ea	23-26/42/HP	5190-3193
2	Cone-tipped		23/42/HP	5188-5247
	Replacement needle/plunger for 2.0 µL syringe		23/42/HP	5188-5371
5	Straight, fixed		26s/42/HP	9301-0891
	Straight, fixed	6/pk	26s/42/HP	5183-4728
	Straight, fixed		23/42/HP	9301-0892
	Straight, fixed	6/pk	23/42/HP	5182-0875
	Straight, removable		23/42/HP	5182-0834
	Replacement needle for 5 µL syringe	3/pk		5182-0830
10	Straight, fixed		26s/42/HP	9301-0714
	Straight, fixed	6/pk	26s/42/HP	5183-4729
	Straight, fixed		23/42/HP	9301-0713
	Straight, fixed	6/pk	23/42/HP	9301-0725
	Straight, fixed, PTFE-tipped plunger		23/42/HP	5181-8809
	Straight, fixed, PTFE-tipped plunger	6/pk	23/42/HP	5183-4730
	Replacement plunger for 10 µL fixed needle syringe			5181-8808
	Straight, removable		23/42/HP	5181-8806
	Straight, removable, PTFE-tipped plunger		23/42/HP	5181-8813
	Replacement needle for 10 µL syringe	3/pk		5181-8811
	Replacement plunger with PTFE tip for removable needle 10 µL syringe			5181-3358
25	Straight, fixed, PTFE-tipped plunger		23/42/HP	5183-0316
50	Straight, fixed, PTFE-tipped plunger		23/42/HP	5183-0318
100	Straight, fixed, PTFE-tipped plunger		23/42/HP	5183-2058

7673/7683 On-Column Autosampler Syringes

Agilent 7673/7683 on-column syringes with needle diameter for columns ranging from 0.25 mm to 0.53 mm are specifically designed for the 7673/7683 Autosampler.

7673/7683 On-Column Autosampler Syringes

Volume (µL)	Description	Unit	Part No.
5	Removable needle, syringe only		5182-0836
	Stainless steel needle for 0.53 mm column	3/pk	5182-0832
	Stainless steel needle for 0.32 mm column	3/pk	5182-0831
	Stainless steel needle for 0.25 mm column	3/pk	5182-0833
	Plunger button	10/pk	5181-8866

HP 7670/71/72 Autosampler Syringes

This syringe has a long needle and regular plunger button for compatibility with HP 7670/71/72 autosamplers. Available with a fixed or removable needle.

HP 7670/71/72 Autosampler Syringes

Volume (µL)	Description	Needle	Part No.
1	Straight, removable	23/56/2	5182-9622
10	Straight, fixed	23/50/HP	5182-9734
	Straight, removable	23/50/HP	5182-9626
	Straight, fixed, PTFE-tipped plunger	23/50/HP	5182-9799

Autosampler syringe, 10 µL, straight, RN, 5182-9626

TIPS & TOOLS

Agilent color-coded manual syringes allow you to determine syringe volume with one quick glance, so you can more efficiently perform manual dilution, extraction, and sample prep. For your manual syringe selection, see pages 69-76 of the General Chromatography Supplies Catalog, publication number 5991-1056EN.

Agilent CrossLab

Supplies for major brand GC Systems

Agilent CrossLab is a growing portfolio of supplies critical to instrument performance and productivity. CrossLab GC supplies are designed and manufactured to perform seamlessly with a variety of other major brands of GCs in your lab.

We currently support:

- Bruker/Varian
- CTC
- PerkinElmer
- Shimadzu
- Thermo Scientific

Our growing GC Supplies portfolio includes the following products, featuring easy-to-use packaging for improved productivity:

- Premium non-stick inlet septa
- Ultra Inert inlet liners
- Liner O-rings
- Column ferrules and nuts
- Autosampler syringes
- Vials and closures
  (See the complete CrossLab Vials and Closures section of our General Chromatography catalog, publication number 5991-1056EN)

Agilent CrossLab is more than supplies:

- Over 40 years of chromatography expertise and ongoing innovation
- Technical and application support
- Optimal performance for both routine and challenging applications
- Dependable worldwide product availability and delivery
- Convenience of consolidated purchasing
- 90-day risk-free money-back guarantee

Agilent CrossLab works with BRUKER/VARIAN | CTC | PERKINELMER | SHIMADZU | THERMO | AND MORE

Agilent CrossLab Inlet Liners

Liners are the centerpiece of the inlet system where sample is vaporized and mixed with the carrier gas. CrossLab GC inlet liners have the perfect mix of liner configurations and chemistries to solve your application challenges.

Choose from split, splitless, PTV, and other inlet liner designs in either the new, innovative Ultra Inert deactivation or Agilent's popular proprietary deactivation, now referred to as Agilent Original deactivation. With part number and lot number silk screened on CrossLab liners, identification and re-ordering have never been easier.

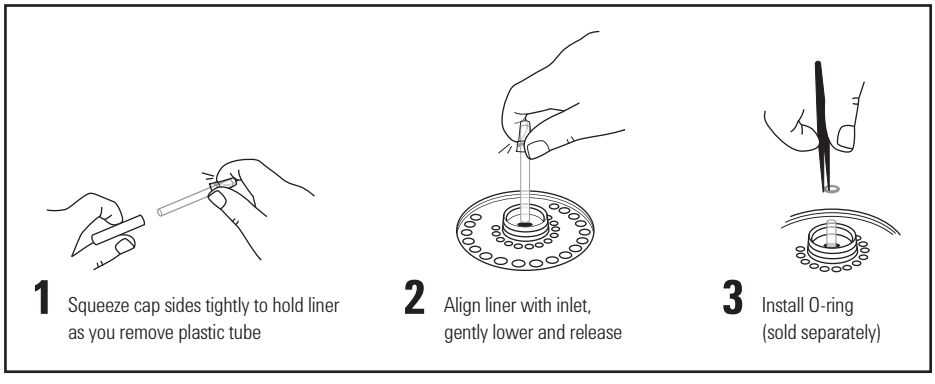
Agilent CrossLab Liners with Ultra Inert Deactivation

Developed for high sensitivity analysis, Agilent's Ultra Inert deactivation provides extreme surface inertness – even for liners containing glass wool. Ultra Inert chemistry was developed using a suite of tests specifically designed to stress then evaluate liner activity, resulting in liners featuring:

- **Reproducibility** – highest level and consistent inertness for active compounds such as acids and bases
- **Robustness** – tested with a sequence of 100 injections of Endrin/DDT with <20% degradation, allowing use of glass wool even with highly active compounds at trace (0.5 ng on-column) levels
- **Reliability** – lot-tested for inertness to ensure consistent and efficient deactivation using both acidic and basic probes at trace level (2 ng) on-column, with low to no bleed or background contamination

Ultra Inert liners are delivered in Agilent's exclusive Touchless packaging. Touchless packaging aids in easy installation of the new, clean, preconditioned liner – without risk of contamination from touching.

To view a demonstration of the Touchless Packaging for CrossLab Ultra Inert Liners please visit **www.agilent.com/chem/CLTouchless**



Agilent CrossLab Ultra Inert Touchless liner packaging includes visual installation guide.

Consider the following to determine how often to change your liners:

- Previous use pattern
- Sample cleanliness
- Chromatographic abnormalities, such as

✓ Peak shape changes

✓ Peak discrimination

✓ Poor reproducibility

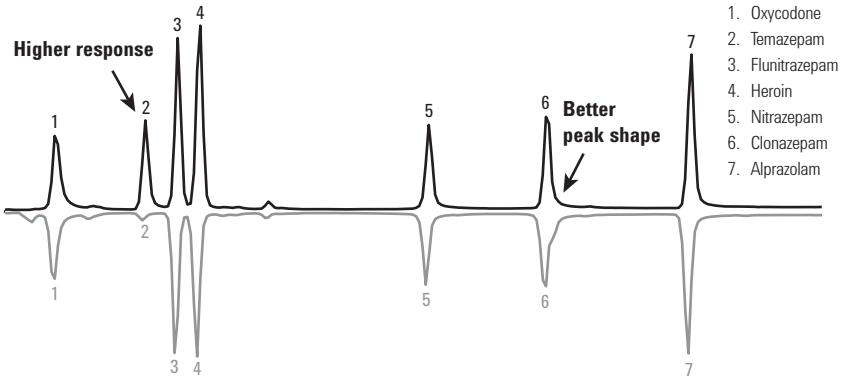
✓ Sample pyrolysis

✓ Active analyte response loss or decomposition

Get a robust, reproducible, and reliable inert flow path with Agilent CrossLab Ultra Inert Inlet Liners – even when containing glass wool

Forensic basic drugs test conditions	
Column:	**DB-5ms Ultra Inert 122-5512UI 15 m x 0.25 mm, 0.25 µm**
Sample:	5 mg/L Checkout mixture for GC/MS forensic/toxicology analyzer (p/n 5190-0471)
Injection:	1 µL splitless at 280 °C (hold 0.75 min)
Oven:	100 °C (0.5 min) to 325 °C at 20 °C/min and hold 2.5 min
Carrier:	He, 18.74 psi (adj to RT lock), constant pressure
Detector:	MSD; Source temp at 300 °C, Quad temp at 150 °C, Transfer line at 300 °C; Acquisition mode, SIM/scan

Agilent CrossLab Ultra Inert single taper liner with wool



Restek Siltek deactivated gooseneck liner with deactivated wool (cat. no. 22406.213.5)

Agilent CrossLab Ultra Inert deactivated liners with wool contribute to higher response and better peak shape for very active forensic basic drug compounds than similar Restek Siltek liners.

Agilent CrossLab Liners with Agilent Original Deactivation

Developed to complement fused silica capillary column technology, Agilent's proprietary deactivation, now referred to as Agilent Original deactivation, has been successfully used for years. Proven to deliver a long-lasting surface deactivation, this proprietary chemistry and manufacturing process was previously available for Agilent gas chromatographs only, but is now available for other GC systems. Agilent Original deactivation is recommended for everyday analysis.

Agilent CrossLab Liner O-rings

- Liners are sealed in the inlet with fluoroelastomer or graphite O-rings
- Graphite O-rings are used when inlet temperatures exceed 350 °C
- Fluoroelastomer O-rings are easier to replace than graphite O-rings, which deform and flake apart more easily

Ready for chromatographic use, CrossLab fluoroelastomer O-rings feature:

- Proprietary two-step cleaning and conditioning process eliminates out-gassing of contaminants, which is especially important for trace, ECD, and MSD analyses
- Plasma-treatment for a non-stick, contaminant-free surface that won't stick to the inlet metal surface
- Novel translucent dial package that conveniently delivers one clean O-ring at a time and makes it easy to know when to reorder

Agilent CrossLab Column Ferrules

A variety of column ferrules are available to meet your application requirements, including 100% graphite, 100% polyimide, and polyimide/graphite ferrules.

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

The ideal ferrule provides a leak-free seal, accommodates various column outer diameters, seals with minimum torque, withstands temperature cycling, and does not stick to the column or fittings.

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

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

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

TIPS & TOOLS

Look for the following signals that indicate ferrule damage:

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

Ferrule Selection Recommendations

Ferrule Type	Upper Temp. Limit	Usages	Advantages	Limitations
Graphite (100%)	450 °C	• General purpose for capillary columns • Suitable for FID and NPD • Recommended for high temperature and cool on-column applications	• Easy-to-use stable seal • Higher temperature limit • Can be removed easily	• Not for MS or oxygen-sensitive detectors • Soft, easily deformed or destroyed • Possible system contamination
Polyimide/graphite (85%/15% or 60%/40%)	350 °C	• General purpose for capillary columns • Recommended for MS and oxygen-sensitive detectors • Most reliable leak-free connection	• Mechanically robust • Long lifetime	• Not reusable • Flows at elevated temperature • Must re-tighten frequently
Polyimide (100%)	280 °C	• Isothermal operation • Can be reused or removed easily • Excellent sealing material when making metal or glass connections	• Mechanically robust • Long lifetime • Can be reused or removed easily	• Leaks after temperature cycle • Flows at elevated temperature • Must re-tighten frequently

TIPS & TOOLS

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

Agilent CrossLab Autosampler Syringes

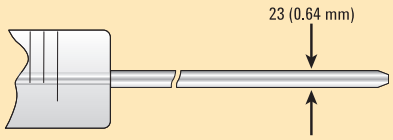
With a broad selection of syringes for auto injection, CrossLab autosampler syringes provide what you need for accurate and effective sampling. CrossLab syringes meet all fit, form, and function criteria for specific autosampler models. Agilent delivers more value in every autosampler syringe:

- Lot number printed directly on the barrel with a corresponding Certificate of Conformance
- Illuminating backing strip, for effortless viewing of the volume scale
- Environmentally friendly packaging and improved design that reduces waste
- Individually packaged for contaminant-free use right out of the box

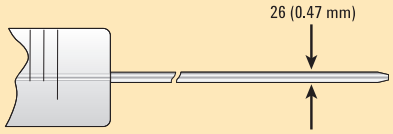
Typical Needle Gauge Dimensions

	OD		ID	
Gauge	**mm**	**in**	**mm**	**in**
23	0.64	0.0248	0.11	0.0043
25	0.50	0.0197	0.20	0.0079
26	0.47	0.0184	0.11	0.0043

Needle Gauge



Single Gauge 23 (0.64 mm)
Packed column injector ports
Split/splitless injector ports



Single Gauge 26 (0.47 mm)
Packed column injector ports
Split/splitless injector ports

Needle Termination

Needle terminations are available in fixed or removable, with various tip styles.

Fixed (cemented)

- Economical, reproducible injections for autosamplers
- Preferred for applications requiring trace level samples
- Recommended for use where probability of needle bending is minimal
- Can be heated up to 70 °C

Removable needle

- Versatile option for injections
- Needle can be replaced if damaged or clogged
- Allows needle to be changed for different applications
- Can be heated up to 120 °C

Agilent CrossLab Inlet Septa

Inlet septa are a key component of sample introduction. Septa maintain the leak-free seal and exclude air from the inlet. They come in many different sizes and are made from different types of materials specific to inlet type and analysis needs.

Replace septa regularly to avoid:

- Leaks
- Decomposition
- Sample loss
- Reduced column or split vent flow
- Ghost peaks
- Column degradation

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

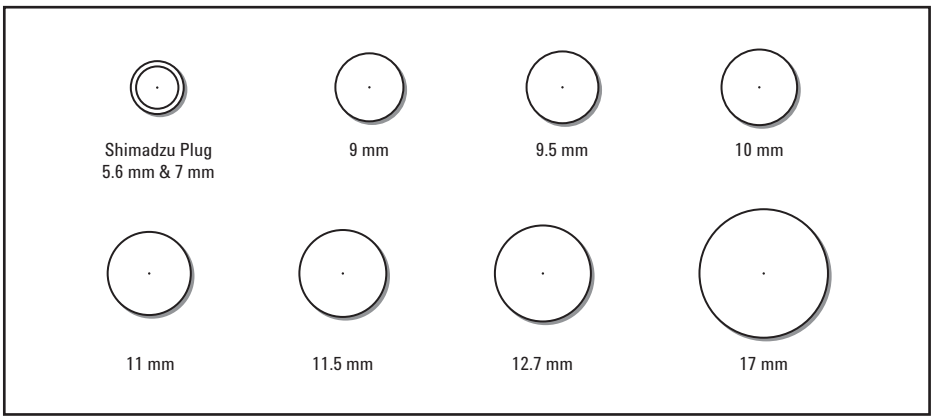
- Use within the recommended temperature range
- Change regularly
- Use septum purge when available
- Use autoinjectors
- Regularly inspect needle tips for wear

Agilent CrossLab Inlet Septa Selection Guide

GC Manufacturer	Instrument Model	Diameter (mm)	Diameter (in)
Bruker, Varian*	1177 Split/Splitless Injector	9	
	1078/1079 Programmable Temperature Vaporizing Injector	11.5	
	1093 Cold On-Column Injector	11	7/16
	1075/1077 Split/Splitless Injector	11	7/16
	1061 Packed/0.53 mm Capillary Column Flash Vaporization Injector	9.5	3/8
	1041 Packed/Wide Bore On-Column Injector	9.5	3/8
PerkinElmer	Clarus System	11	7/16
	AutoSystem	11	7/16
	AutoSystem XL	11	7/16
	8000 Series	11	7/16
	Sigma Series	11	7/16
Thermo Scientific Trace GC Ultra and Focus GC	Split/Splitless Injector	17	
	Large Volume Splitless Injector	9	
	Programmable Temperature Vaporizing Injector	12.7	1/2
	Purged Packed Column Injector	11	
	Packed Column Injector	11	
Thermo Scientific Finnigan	Trace 2000 Series	9.5	
	9001 GC	9.5	
Shimadzu	All Models	Shimadzu Plug	

*Formerly Varian systems, now Bruker products

Septa Diameters



Premium Non-Stick Septa

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

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

Summary of Premium Inlet Septum Characteristics

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

✓✓✓ = best ✓✓ = very good ✓ = good

Agilent CrossLab Non-Stick Bleed Temperature Optimized (BTO) Inlet Septa

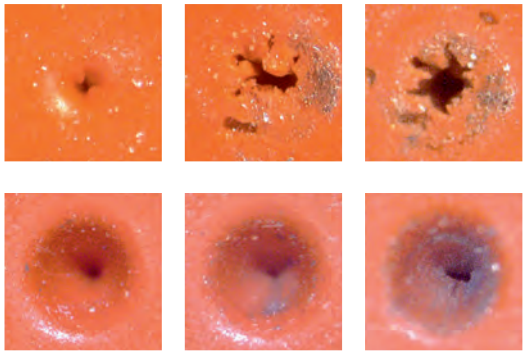
- Extended temperature range, lowest bleed
- Maximum injection port temperature 400 °C
- Plasma treatment eliminates sticking in the injection port
- Pre-conditioned; ready to use
- Blister packaging maintains cleanliness and convenience
- Ideal for use with low-bleed, "Mass Spec" capillary columns

BTO septa, 8010-0223, 8010-0224

Non-Stick Bleed and Temperature Optimized (BTO) Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	8010-0217	8010-0218
9.5 mm	8010-0219	8010-0220
10 mm	8010-0221	8010-0222
11 mm, CenterGuide	8010-0223	8010-0224
11.5 mm, CenterGuide	8010-0225	8010-0226
Shimadzu plug	8010-0231	8010-0232
Description	**24/pk**	**48/pk**
12.7 mm, CenterGuide	8010-0227	8010-0228
17 mm, CenterGuide	8010-0229	8010-0230

Comparison of septum purity: TIC profile of isooctane extractions



Competitor's High-Temperature Septa without CenterGuide

Major coring before 100 autoinjections

Agilent CrossLab BTO Septa with CenterGuide

Very little coring, even after 700 autoinjections

Agilent CrossLab Non-Stick Advanced Green Inlet Septa

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

Advanced green septa, 8010-0207, 8010-0208

Non-Stick Advanced Green Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	8010-0201	8010-0202
9.5 mm	8010-0203	8010-0204
10 mm	8010-0205	8010-0206
11 mm, CenterGuide	8010-0207	8010-0208
11.5 mm, CenterGuide	8010-0209	8010-0210
Shimadzu plug	8010-0215	8010-0216
Description	**24/pk**	**48/pk**
12.7 mm, CenterGuide	8010-0211	8010-0212
17 mm, CenterGuide	8010-0213	8010-0214

Agilent CrossLab Non-Stick Long-Life Inlet Septa

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

Long-life septa, 8010-0239, 8010-0240

Non-Stick Long-Life Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	8010-0233	8010-0234
11 mm, CenterGuide	8010-0239	8010-0240
11.5 mm, CenterGuide	8010-0241	8010-0242
Description	**24/pk**	**48/pk**
12.7 mm, CenterGuide	8010-0243	8010-0244
17 mm, CenterGuide	8010-0245	8010-0246

Agilent CrossLab Gray General Purpose Inlet Septa

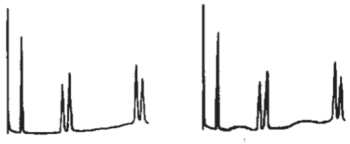
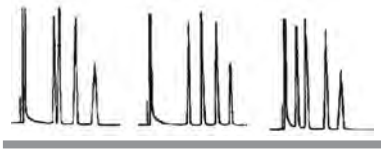
Agilent CrossLab general purpose septa are made from an enhanced injection-molded silicone rubber and are good for routine use. The septa material, gray in color, is specified to withstand over 200 automatic injections at an injection port temperature of 350 °C.

CrossLab general purpose inlet septa, 8010-0257

General Purpose Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
9 mm	8010-0249	8010-0250
9.5 mm	8010-0251	8010-0252
10 mm	8010-0253	8010-0254
11 mm	8010-0255	8010-0256
11.5 mm	8010-0257	8010-0258
12.7 mm	8010-0259	8010-0260
17 mm	8010-0261	8010-0262
Shimadzu plug	8010-0263	8010-0264

Septa Troubleshooting

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

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Liners for 1177 Split/Splitless Injector Ports

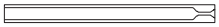
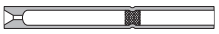
	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Split/Splitless Liners										
	Single taper	4.0	6.3	78.5	1000	5/pk	RT207992145 SG092017	8004-0151	SG092017	8004-0101
	Single taper, with wool	4.0	6.3	78.5	1000	5/pk	SG092019	8004-0152	SG092019	8004-0102
	Double taper	4.0	6.3	78.5	1000	5/pk	SG092018	8004-0155	SG092018	8004-0105
	Gooseneck, with wool	4.0	6.5	78.5	1000	5/pk	392611936	8004-0170	392611936	8004-0114
	Recessed gooseneck, with wool	4.0	6.3	78.5	1000	5/pk	SG092010	8004-0153	SG092010	8004-0103
	Gooseneck	2.0	6.5	78.5	250	5/pk	392611926	8004-0178	392611926	8004-0119
Splitless Liners										
	Straight, with wool	4.0	6.5	78.5	1000	5/pk	392611937	8004-0173	392611937	8004-0116
	Gooseneck	4.0	6.5	78.5	1000	5/pk	392611927	8004-0165	392611927	8004-0113
Split Liners										
	Straight-through	4.0	6.3	78.5	1000	5/pk	RT207732145 SG092007	8004-0156	SG092007	8004-0106
	Straight, with wool	4.0	6.3	78.5	1000	5/pk	SG092001 392611934	8004-0154	SG092001 392611934	8004-0104
	With frit, gooseneck	4.0	6.3	78.5	1000	5/pk	RT210462145	8004-0158		
Direct Liners										
	Straight-through	1.2	6.3	78.5	90	5/pk	SG092016	8004-0157	SG092016	8004-0107

***Formerly Varian systems, now Bruker products**

The cross references to the original equipment manufacturer (OEM) part numbers listed here serve as a recommendation that the Agilent CrossLab products are viable alternatives to OEM products. CrossLab products are compatible with the corresponding OEM instruments, although in some cases, the CrossLab products may have slightly different designs as compared to the OEM counterparts. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Liners for 1078/1079 Injector Ports

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Split/Splitless Liners										
	Single taper	3.4	5.0	54	500	5/pk	RT209012145 SG092038	8004-0160	SG092038	8004-0108
	Gooseneck, with wool	2.0	5.0	54	250	5/pk			392611953	8004-0118
Splitless Liners										
	Single taper	2.0	5.0	54	170	5/pk	RT207122145 SG092039	8004-0161	SG092039	8004-0109
Split Liners										
	Gooseneck	3.4	5.0	54	500	5/pk	392611945	8004-0164	392611945	8004-0112
	With frit, gooseneck	3.4	5.0	54	500	5/pk	RT217092145	8004-0159		
	With frit, gooseneck	3.4	5.0	54	500	5/pk	392611946	8004-0171		
Other Liners										
	SPME, straight	0.8	5.0	54	30	5/pk	392611948	8004-0176		

Liners for 1093/1094 Injector Ports

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Direct Liners										
	SPI for 0.25/0.32 mm id columns	0.5	4.6	54	10	5/pk	190010906	8004-0167		
	SPI with 0.5 mm restriction for 0.53 mm id on-column	0.8	4.6	54	30	5/pk	SG092034 190010907	8004-0162	SG092034 190010907	8004-0110

***Formerly Varian systems, now Bruker products**

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Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Liners for 1075/1077 Injector Ports

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Split Liners										
	With wool	4.0	6.3	72	1000	5/pk	SG092021 190010901	8004-0163	SG092021 190010901	8004-0111

Liners for 1060/1061 Injector Ports

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Direct Liners										
	Double gooseneck	0.9	6.3	72	1000	5/pk	392611943	8004-0168		

Graphite liner O-ring, 8004-0202

Liner O-rings

Description	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
Non-stick fluoroelastomer O-ring, 1177 split/splitless, 6.3/6.5 mm od	10/pk	8850103100	8004-0201
Graphite O-ring, 1177 split/splitless, 6.5 mm od	10/pk	392611930	8004-0202
Graphite O-ring, 1177 split/splitless, 6.3 mm od	10/pk	392611935	8004-0203
Graphite liner seal, 1078/1079 injector, 5 mm id	10/pk	392534201	8004-0204

***Formerly Varian systems, now Bruker products**

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Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Column Ferrules

Capillary Column Ferrules

Injector	Fitting Size (in)	Ferrule ID (mm)	Column ID (mm)	Hole	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
60% Polyimide/40% Graphite Capillary Column Ferrules							
1177, 1079	1/16	0.3	0.18 or smaller	1	10/pk	CR213103	8004-0211
	1/16	0.425	0.25	2	10/pk	CR213124	8004-0213
	1/16	0.425	0.25	1	10/pk	CR213104	8004-0212
	1/16	0.5	0.32	1	10/pk	CR213105	8004-0214
	1/16	0.5	0.32	2	10/pk	CR213125	8004-0215
1177, 1079, 1061, 1041	1/16	0.8	0.53	1	10/pk	CR213108	8004-0216
Polyimide Capillary Column Ferrules							
1177, 1079	1/16	0.3	0.18	1	10/pk	CR212103	8010-0306
	1/16	0.4	0.25	1	10/pk		8010-0307
	1/16	0.425	0.25	1	10/pk	CR212104	8004-0219
	1/16	0.5	0.32	1	10/pk	CR212105	8010-0308
	1/16	0.5	0.32	2	10/pk	CR212125	8004-0218*
1177, 1079, 1061, 1041	1/16	0.8	0.53	1	10/pk	CR212108	8010-0309
Graphite Capillary Column Ferrules							
1177, 1079	1/16	0.4	0.25	1	10/pk	CR211104	8010-0301
	1/16	0.5	0.32	1	10/pk	CR211105	8010-0302
	1/16	0.5	0.32	2	10/pk	CR211125	8010-0303
1177, 1079, 1061, 1041	1/16	0.8	0.53	1	10/pk	CR211108	8010-0304

*1177 Injector only

***Formerly Varian systems, now Bruker products**

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Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Packed Column Ferrules

Injector	Fitting Size (in)	Ferrule ID (in)	Column OD (in)	Hole	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
60% Polyimide/40% graphite Packed Column Ferrules							
1093, 1061, 1041	1/4	1/4	1/4	1	10/pk	CR213400	8004-0217*
Graphite Packed Column Ferrules							
1093, 1061, 1041	1/4	1/4	1/4	1	10/pk	CR211400	8010-0305*

*Straight body

Column Nuts

Description	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
Column nut, brass, 1177, 1079, 1061, or 1041 injector	2/pk	394955100	8004-0311
Column nut, stainless steel, 1093 injector	2/pk	CP743117	8004-0312

Autosampler Syringes for Bruker/Varian GC Systems

Model	Volume (µL)	Description	Needle Gauge/ Length (mm)/Tip	Similar to OEM Syringe Part No.	Agilent CrossLab Syringe Part No.	Agilent CrossLab Replacement Needle Part No.	Agilent CrossLab Replacement Plunger Part No.
Varian CP8400, CP8410, CP9010, CP9050	10	Fixed needle	26/50/bevel tip		8004-0001		
		Removable needle	26/50/cone tip	SG002982	8004-0003	8004-0004, 2/pk	
Varian 8035, 8100, 8200		Fixed needle, gas tight	26/53/side hole tip		8004-0002		8004-0007
		Removable needle, gas tight	25/53/side hole tip		8004-0005	8004-0006	8004-0007

***Formerly Varian systems, now Bruker products**

The cross references to the original equipment manufacturer (OEM) part numbers listed here serve as a recommendation that the Agilent CrossLab products are viable alternatives to OEM products. CrossLab products are compatible with the corresponding OEM instruments, although in some cases, the CrossLab products may have slightly different designs as compared to the OEM counterparts. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Inlet Septa

Non-stick bleed and temperature optimized septa, 10 mm, 50/pk, 8010-0221

Non-Stick Bleed and Temperature Optimized (BTO) Septa

Description	Agilent CrossLab Part No. 50/pk	Similar to OEM Part No.	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	8010-0217	CR298713	8010-0218
9.5 mm	8010-0219	CR298705	8010-0220
10 mm	8010-0221	CR298745	8010-0222
11 mm, CenterGuide	8010-0223	CR298717	8010-0224
11.5 mm, CenterGuide	8010-0225	CR298777	8010-0226

Non-Stick Advanced Green Septa

Description	Agilent CrossLab Part No. 50/pk	Similar to OEM Part No.	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	8010-0201	CR246713	8010-0202
9.5 mm	8010-0203	CR246124	8010-0204
10 mm	8010-0205		8010-0206
11 mm, CenterGuide	8010-0207	CR246225	8010-0208
11.5 mm, CenterGuide	8010-0209	CR246725	8010-0210

***Formerly Varian systems, now Bruker products**

The cross references to the original equipment manufacturer (OEM) part numbers listed here serve as a recommendation that the Agilent CrossLab products are viable alternatives to OEM products. CrossLab products are compatible with the corresponding OEM instruments, although in some cases, the CrossLab products may have slightly different designs as compared to the OEM counterparts. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Long-life septa, 8010-0239, 8010-0240

Non-Stick Long-Life Septa

Description	Agilent CrossLab Part No. 50/pk	Similar to OEM Part No.	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	8010-0233	CR239778	8010-0234
11 mm, CenterGuide	8010-0239	CR239287	8010-0240
11.5 mm, CenterGuide	8010-0241	CR239287	8010-0242

General Purpose Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
General Purpose Septa		
9 mm	8010-0249	8010-0250
9.5 mm	8010-0251	8010-0252
10 mm	8010-0253	8010-0254
11 mm	8010-0255	8010-0256
11.5 mm	8010-0257	8010-0258

***Formerly Varian systems, now Bruker products**

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TIPS & TOOLS

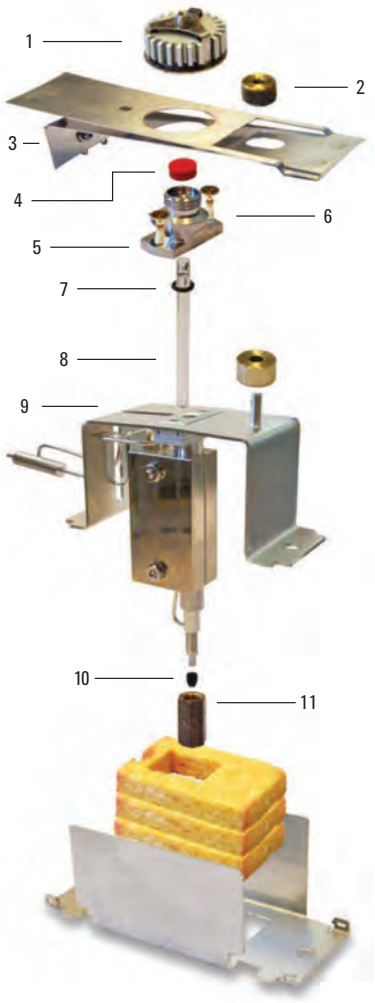
For a comprehensive vial compatibility chart, identification guide, septum recommendations, visit **www.agilent.com/chem/vialsposter**

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Injector Replacement Parts and Supplies

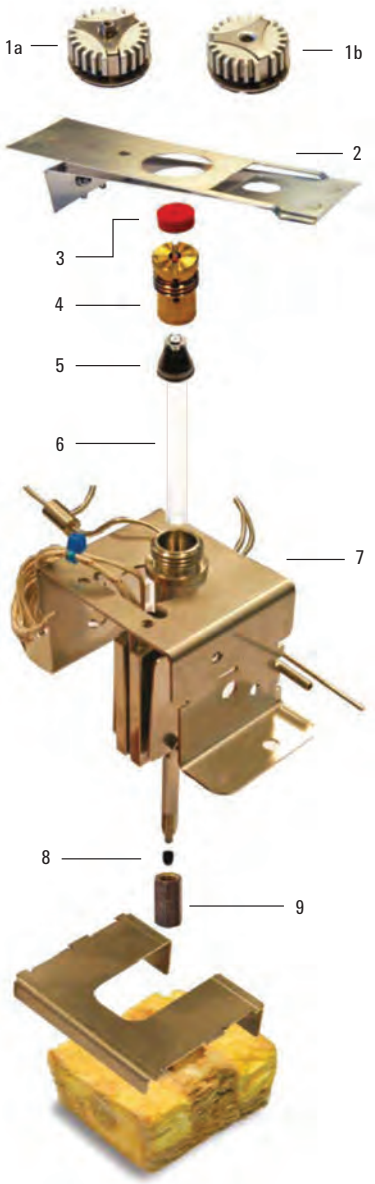
1177 Split/Splitless Injector

Item	Description	Agilent CrossLab and Agilent Part No.
1	Injector nut	392597501
	Injector nut wrench	390842300
2	Knob	392597101
3	Automatic start switch	390820601
4	Septum, 9 mm	
	BTO	8010-0217
	Long-Life	8010-0233
	Advanced Green	8010-0201
	Septum pick	7200008400
5	Septum purge head	
	EFC21 (stainless steel)	392597301
	EFC21 (UltiMetal)	392597303
	EFC25 or Manual Pneumatics	392597302
6	Purge head screw	391866308
7	Graphite liner O-ring, splitless, 6.5 mm	8004-0202
	Non-stick fluoroelastomer liner O-ring, 6.3 mm	8004-0201
8	Glass liner	8004-0165
9	Injector body	
	Stainless steel	392599401
	UltiMetal	392599411
	Manual	392599501
10	For replacement ferrules, see complete CrossLab column ferrules ordering information, **see page 209**.	
11	Bottom nut	8004-0311



***Formerly Varian systems, now Bruker products**

Agilent CrossLab Supplies for Bruker, Varian* GC Systems



1079 Large Volume Injector (LVI)

Item	Description	Agilent CrossLab and Agilent Part No.
1a	Injector nut	394966601
1b	Injector nut	394966601
	Injector nut wrench	390842300
2	Automatic start switch	390820601
3	Septum, 11.5 mm	
	BTO	8010-0225
	Long-Life	8010-0241
	Advanced Green	8010-0209
	Septum pick	7200008400
4	Septum support	391867600
5	Graphite liner seal	8004-0204
6	Glass liner	8004-0164
7	Injector body, EFC type	
	Stainless steel	392544001
	UltiMetal	392544011
8	For replacement ferrules, see complete CrossLab column ferrules ordering information, **see page 209**.	
9	Bottom nut	8004-0311

***Formerly Varian systems, now Bruker products**

TIPS & TOOLS

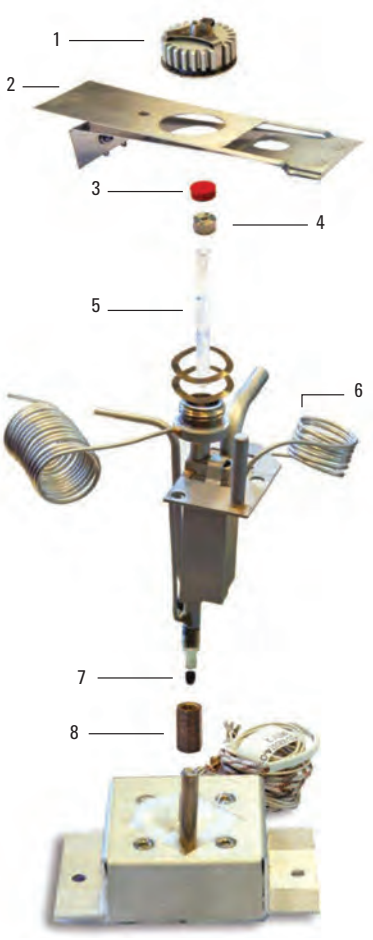
For a comprehensive vial compatibility chart, identification guide, septum recommendations, visit **www.agilent.com/chem/vialsposter**

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

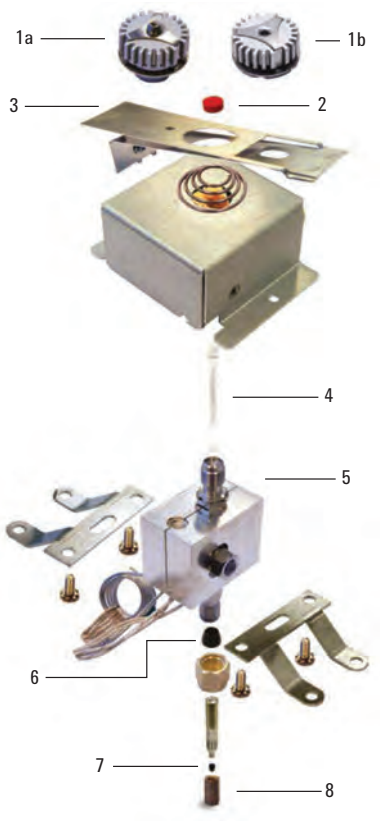
1093 Cool On-Column (COC) Injector

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

***Formerly Varian systems, now Bruker products**



Agilent CrossLab Supplies for Bruker, Varian* GC Systems



1061 Packed/530 µm Capillary Column Injector

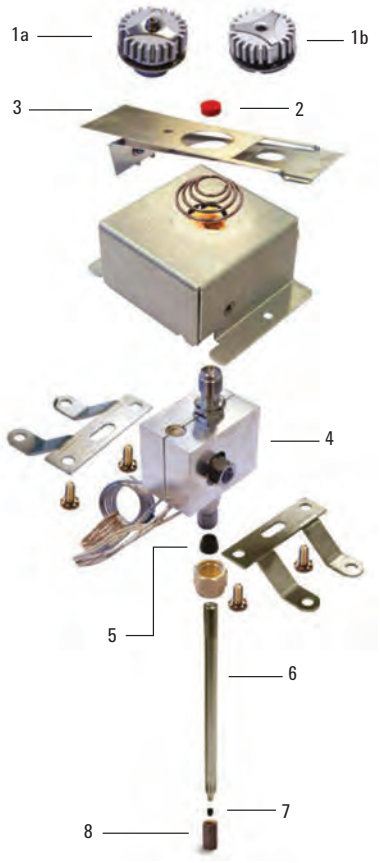
Item	Description	Agilent CrossLab and Agilent Part No.
1a	Injector nut	390812700
1b	Injector nut	392595501
	Injector nut wrench	390842300
2	Septum, 9.5 mm	
	BTO	8010-0219
	Advanced Green	8010-0203
	Septum pick	7200008400
3	Automatic start switch	390820601
4	Glass liner	8004-0168
5	Injector body, EFC23	392548301
6	Graphite/polyimide ferrule	8004-0217
	Graphite ferrule	8010-0305
7	For replacement ferrules, see complete CrossLab column ferrules ordering information, **see page 209**.	
8	Bottom nut	8004-0311

***Formerly Varian systems, now Bruker products**

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

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

Item	Description	Agilent CrossLab and Agilent Part No.
1a	Injector nut	390812700
1b	Injector nut	392595501
	Injector nut wrench	390842300
2	Septum, 9.5 mm	
	BTO	8010-0219
	Advanced Green	8010-0203
	Septum pick	7200008400
3	Automatic start switch	390820601
4	Injector body, EFC type	392548201
5	Graphite/polyimide ferrule	8004-0217
	Graphite ferrule	8010-0305
6	Injector insert, stainless steel	392543101
7	For replacement ferrules, see complete CrossLab column ferrules ordering information, **see page 209**.	
8	Bottom nut	8004-0311



***Formerly Varian systems, now Bruker products**

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Detector Replacement Parts and Supplies

Thermal Conductivity Detector (TCD)

Description	Agilent Part No.
Adapter TCD/DEFC capillary makeup gas	392585291
Adapter TCD/DEFC reference gas kit	392585292
Adapter TCD capillary makeup gas, MPC, 3800	392560591
TCD DEFC 14 (Non-H_2), 2 channels	392561290

Flame Ionization Detector (FID)

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

***Formerly Varian systems, now Bruker products**

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Pulsed Flame Photometric Detector (PFPD)

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

PFPD Filter Assemblies

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

***Formerly Varian systems, now Bruker products**

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

PFPD Nitrogen Mode Maintenance

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

Thermionic Specific Detector (TSD)

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

***Formerly Varian systems, now Bruker products**

TIPS & TOOLS

For a comprehensive vial compatibility chart, identification guide, septum recommendations, visit **www.agilent.com/chem/vialsposter**

Agilent CrossLab Parts and Supplies for PerkinElmer GC Systems

Liners for AutoSystem, AutoSystem XL, Clarus Systems

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Split/Splitless Liners										
	PSS straight	2.0	4.0	86.2		5/pk	N6502002	8003-0153		8003-0103
	PSS straight with bottom restriction	2.0	4.0	86.2	260	5/pk	N6121004	8003-0158		
	PSS on-column	2.0	4.0	86.2	250	5/pk	N6101539	8003-0165	N6101539	8003-0110
	PSS straight	1.0	4.0	86.2	65	5/pk	N6121006	8003-0157		
Split/Large Volume Splitless Liners										
	Straight with bottom restriction	4.0	6.2	92.1	1150	5/pk	N6121001	8003-0159	N6121001	8003-0105
Splitless Liners										
	Straight	2.0	6.2	92.1	300	5/pk	N6101372	8003-0162	N6101372	8003-0107
Split Liners										
	Straight-through	4.0	6.2	92.1	1150	5/pk		8003-0151		8003-0101
	Straight, wool	4.0	6.2	92.1	1100	5/pk	N6121020	8003-0160	N6121020	8003-0106
	Straight with bottom restriction	4.0	6.2	92.1	1100	5/pk	N6101052	8003-0166	N6101052	8003-0111

(Continued)

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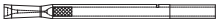
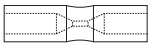
Agilent CrossLab Parts and Supplies for PerkinElmer GC Systems

Liners for AutoSystem, AutoSystem XL, Clarus Systems

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Direct Liners										
	Gooseneck, drilled hole on top, wool	4.0	6.2	92.1		5/pk	N6121022	8003-0155		
Other Liners										
	Packed column, straight	3.0	6.2	112	800	5/pk	N6121000	8003-0163	N6121000	8003-0108
	Programmable on-column, hour glass	2.2	4.0	16		5/pk			N6101703	8003-0109*
	PTV, 0.25 mm id restriction, recessed gooseneck	1.0	2.0	88	70	5/pk		8003-0154		8003-0104

*p/n 8003-0109 is not deactivated

Graphite O-rings, 8003-0205

Liner O-rings

Description	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
Non-stick fluoroelastomer O-ring	10/pk	N9302783	8010-0401
Non-stick fluoroelastomer O-ring, PSS Injector	10/pk	N6101747	8003-0202
Silicone O-ring	10/pk	N6101374	8003-0203
Graphite O-ring, PSS Injector	10/pk	N6101751	8003-0204
Graphite O-ring	10/pk	N6101378	8003-0205

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Agilent CrossLab Parts and Supplies for PerkinElmer GC Systems

Column Ferrules

Capillary Column Ferrules

Model	Fitting Size (in)	Ferrule ID (mm)	Column ID (mm)	Hole	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
85% Polyimide/15% Graphite Capillary Column Ferrules							
AutoSystem, AutoSystem XL, Clarus	1/16	0.4	0.25	1	10/pk	09920104	8010-0310
	1/16	0.4	0.25	2	10/pk	04972392	8010-0312
	1/16	0.5	0.32	1	10/pk	09920105	8010-0311
	1/16	0.5	0.32	2	10/pk	N9306000	8003-0216
	1/16	0.8	0.53	1	10/pk	09920107	8010-0313
Graphite Capillary Column Ferrules							
AutoSystem, AutoSystem XL, Clarus	1/16	0.4	0.25	1	10/pk		8010-0301
	1/16	0.5	0.32	1	10/pk	09903700	8010-0302
	1/16	0.5	0.32	2	10/pk	N9306001	8010-0303
	1/16	0.8	0.53	1	10/pk	09920141	8010-0304
Polyimide Capillary Column Ferrules							
AutoSystem, AutoSystem XL, Clarus	1/16	0.3	0.18 or smaller	1	10/pk		8010-0306
	1/16	0.4	0.25	1	10/pk		8010-0307
	1/16	0.5	0.32	1	10/pk		8010-0308
	1/16	0.8	0.53	1	10/pk		8010-0309

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Agilent CrossLab Parts and Supplies for PerkinElmer GC Systems

Packed Column Ferrules

Model	Fitting Size (in)	Ferrule ID (in)	Column OD (in)	Hole	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
85% Polyimide/15% Graphite Packed Column Ferrules							
AutoSystem, AutoSystem XL, Clarus	1/4	1/4	1/4	1	10/pk	09903739	8010-0314
	1/8	1/8	1/8	1	10/pk	N9302081	8003-0219
	1/16	1/16	1/16	1	10/pk	09920127	8010-0315
Graphite Packed Column Ferrules							
AutoSystem, AutoSystem XL, Clarus	1/4	1/4	1/4	1	10/pk	09920140	8010-0305
	1/8	1/8	1/8	1	10/pk	09903915	8003-0212
	1/16	1/16	1/16	1	10/pk	02450972	8003-0211
Polyimide Packed Column Ferrules							
AutoSystem, AutoSystem XL, Clarus	1/4	1/4	1/4	1	10/pk	N9301361	8003-0223
	1/8	1/8	1/8	1	10/pk	N9301360	8003-0222
	1/16	1/16	1/16	1	10/pk		8003-0221

Column Nuts

Description	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
Column nut, 1/16 in	2/pk	09903392	8003-0311

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Agilent CrossLab Parts and Supplies for PerkinElmer GC Systems

Autosampler Syringes for PerkinElmer GC Systems

Model	Volume (µL)	Description	Needle Gauge/ Length (mm)/Tip	Similar to OEM Syringe Part No.	Agilent CrossLab Syringe Part No.	Similar to OEM Replacement Needle and Plunger Repair Kit Part No.	Agilent CrossLab Replacement Needle and Plunger Repair Kit Part No.
AutoSystem, AutoSystem XL, Clarus	0.5	Removable needle	23/70/cone tip	N6101252	8003-0005	N6101469	8003-0006
AutoSystem, AutoSystem XL, Clarus		Removable needle	26/70/bevelled cone tip		8003-0007		8003-0008
AutoSystem, AutoSystem XL, Clarus	5	Fixed needle	23/70/cone tip	N6101251	8003-0001		
AutoSystem, AutoSystem XL, Clarus		Fixed needle, gas tight	23/70/cone tip	N6101390	8003-0002		
AutoSystem, AutoSystem XL, Clarus		Fixed needle	26/70/cone tip	N6101380	8003-0003		
AutoSystem, AutoSystem XL, Clarus	50	Fixed needle	23/70/cone tip	N6101760	8003-0004		

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Agilent CrossLab Parts and Supplies for PerkinElmer GC Systems

Inlet Septa

Long-life septa, 8010-0239, 8010-0240

Non-Stick Bleed and Temperature Optimized (BTO) Septa

Description	Agilent CrossLab Part No. 50/pk	Similar to OEM Part No.	Agilent CrossLab Part No. 100/pk
11 mm, CenterGuide	8010-0223	N9302972	8010-0224

Non-Stick Advanced Green Septa

Description	Agilent CrossLab Part No. 50/pk	Similar to OEM Part No.	Agilent CrossLab Part No. 100/pk
11 mm, CenterGuide	8010-0207	N6621028 N9306219	8010-0208

Non-Stick Long-Life Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
11 mm, CenterGuide	8010-0239	8010-0240

General Purpose Septa

Description	Agilent CrossLab Part No. 50/pk	Similar to OEM Part No.	Agilent CrossLab Part No. 100/pk
11 mm	8010-0255	54019985	8010-0256

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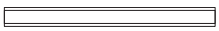
Agilent CrossLab Supplies for Shimadzu GC Systems

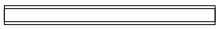
Liners for 2014 Systems

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Splitless Liners										
	Single taper, wool	3.5	5.0	95		5/pk	221-48876-02	8001-0160		
	Double taper, drilled hole near top	3.5	5.0	95		5/pk	220-94734-01	8001-0158		
	Double taper, drilled hole near bottom	3.5	5.0	95		5/pk	220-94734-02	8001-0159		
	Straight-through	2.6	5.0	95	500	5/pk	220-94767-00	8001-0151	220-94767-00	8001-0101
Split Liners										
	Straight with middle restriction	3.5	5.0	95	800	5/pk	221-41444-01	8001-0156	221-41444-01	8001-0106
	Straight with middle restriction, wool	3.5	5.0	95	800	5/pk	220-90784-00	8001-0157		
	Straight-through	3.4	5.0	95	860	5/pk		8001-0153		8001-0103
Direct Liners										
	For 0.53 mm id column	2.6	5.0	95	450	5/pk	220-94768-00	8001-0152	220-94768-00	8001-0102

The cross references to the original equipment manufacturer (OEM) part numbers listed here serve as a recommendation that the Agilent CrossLab products are viable alternatives to OEM products. CrossLab products are compatible with the corresponding OEM instruments, although in some cases, the CrossLab products may have slightly different designs as compared to the OEM counterparts. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

Agilent CrossLab Supplies for Shimadzu GC Systems

Liners for 2010 and 2010 Plus Systems

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Split/Splitless Liners										
	Single taper	3.4	5.0	95		5/pk	961-01480-07	8001-0154		8001-0104
Splitless Liners										
	Single taper, wool	3.5	5.0	95		5/pk	221-48335-01 221-48876-02	8001-0160		
	Double taper, drilled hole near top	3.5	5.0	95		5/pk	220-94734-01	8001-0158		
	Double taper, drilled hole near bottom	3.5	5.0	95		5/pk	220-94734-02	8001-0159		
	Straight-through	2.6	5.0	95	500	5/pk	220-94767-00	8001-0151	220-94767-00	8001-0101
Split Liners										
	Straight-through	3.4	5.0	95	860	5/pk		8001-0153		8001-0103
	Straight with middle restriction	3.5	5.0	95	800	5/pk	221-41444-01	8001-0156	221-41444-01	8001-0106
	Straight with middle restriction, wool	3.5	5.0	95	800	5/pk	220-90784-00	8001-0157		
Other Liners										
	PTV	1.25	3.5	95	100	5/pk	221-49300-00	8001-0163		
	SPME or Purge and Trap, straight	0.75	5.0	95	50	5/pk	220-94769-00	8001-0162		

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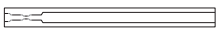
Agilent CrossLab Supplies for Shimadzu GC Systems

Liners for 17A Systems

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Splitless Liners										
	Single taper, wool	3.5	5.0	95		5/pk	221-48335-01 221-48876-02	8001-0160		
	Double taper, drilled hole near top	3.5	5.0	95		5/pk	220-94734-01	8001-0158		
	Double taper, drilled hole near bottom	3.5	5.0	95		5/pk	220-94734-02	8001-0159		
	Straight-through	2.6	5.0	95	500	5/pk	220-94767-00	8001-0151	220-94767-00	8001-0101
Split Liners										
	Straight with middle restriction, wool	3.5	5.0	95	800	5/pk	220-90784-00	8001-0157		
	Straight-through	3.4	5.0	95	860	5/pk		8001-0153		8001-0103
Direct Liners										
	For 0.53 mm id column	2.6	5.0	95	450	5/pk	220-94768-00	8001-0152	220-94768-00	8001-0102

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Agilent CrossLab Supplies for Shimadzu GC Systems

Liners for 14 Systems

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Agilent Ultra Inert Deactivation	Agilent Original Deactivation
Split/Splitless Liners								
	2.0 mm middle gooseneck	3.4	5.0	99	850	5/pk	8001-0155	8001-0105

Graphite liner O-rings, 8001-0202

Liner O-rings

Description	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
Non-stick fluoroelastomer O-ring	10/pk	036-11203-84	8001-0201
Graphite O-ring, split	10/pk	221-48393-91	8001-0202
Graphite O-ring, splitless	10/pk	221-47222-91	8001-0203

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Agilent CrossLab Supplies for Shimadzu GC Systems

Column Ferrules

Capillary Column Ferrules

Model	Fitting Size (in)	Ferrule ID (mm)	Column ID (mm)	Hole	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
85% Polyimide/15% Graphite Capillary Column Ferrules							
QP5000/5050 Standard MS	1/16	0.3	0.18 or smaller	1	10/pk	220-90700-01	8001-0224
	1/16	0.4	0.25	1	10/pk	220-90700-02	8001-0221
	1/16	0.5	0.32	1	10/pk	220-90700-03	8001-0222
	1/16	0.8	0.53	1	10/pk	220-90700-04	8001-0223
QP2010	1/16	0.4	0.25	1	10/pk	220-90418-14	8010-0310
	1/16	0.4	0.25	2	10/pk	225-19056-00	8010-0312
	1/16	0.5	0.32	1	10/pk	220-90418-15	8010-0311
	1/16	0.8	0.53	1	10/pk	220-90418-18	8010-0313
Graphite Capillary Column Ferrules							
2010, 2010 Plus, 2014, 17A, 14A	1/16	0.4	0.25	1	10/pk	220-90765-00	8001-0211
	1/16	0.5	0.32	1	10/pk	221-32126-05	8001-0212
	1/16	0.8	0.53	1	10/pk	221-32126-08	8001-0213

Packed Column Ferrules

Model	Fitting Size (in)	Ferrule ID (in)	Column OD (in)	Hole	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
85% Polyimide/15% Graphite Packed Column Ferrules							
QP5000/5050 Standard MS	1/4	1/4	1/4	1	10/pk	225-09028-00	8010-0314
QP5000/5050 Wide Bore MS	1/16	1/16	1/16	1	10/pk	220-90418-28	8010-0315
QP2010	1/16	1/16	1/16	1	10/pk		8010-0315
17A	5 mm	5 mm	5 mm	1	10/pk	221-46403-92	8001-0214

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Graphite capillary column ferrules, 8001-0213

Agilent CrossLab Supplies for Shimadzu GC Systems

Column Nuts

Description	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
Column nut, slotted, 6-sided	2/pk	221-32705-00	8001-0311
Column nut, no slot, 6-sided	2/pk	221-41533-00	8001-0312

Autosampler Syringes for Shimadzu GC Systems

Model	Volume (µL)	Description	Needle Gauge/ Length (mm)/ Tip	Similar to OEM Syringe Part No.	Agilent CrossLab Syringe Part No.	Similar to OEM Replacement Needle and Plunger Repair Kit Part No.	Agilent CrossLab Replacement Needle Part No.
AOC-14, AOC-17, AOC-20	5	Removable needle	23/42/cone tip		8001-0010		8001-0011
AOC-14, AOC-17, AOC-20	10	Removable needle	23/42/cone tip	220-90282-20	8001-0004	220-90281-20	8001-0005, 2/pk
AOC-14, AOC-17, AOC-20	10	Removable needle	26/42/cone tip	220-90282-21	8001-0006	220-90281-21	8001-0007, 2/pk
AOC-14, AOC-17, AOC-20	50	Removable needle	23/42/cone tip	221-45243-00	8001-0012		8001-0014
AOC-14, AOC-17, AOC-20	250	Removable needle, gas tight	23/42/cone tip	221-45244-00	8001-0013		8001-0014

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TIPS & TOOLS

For a comprehensive vial compatibility chart, identification guide, septum recommendations, visit **www.agilent.com/chem/vialsposter**

Agilent CrossLab Supplies for Shimadzu GC Systems

Inlet Septa

Non-Stick Bleed and Temperature Optimized (BTO) Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
Shimadzu plug	8010-0231	8010-0232

Non-Stick Advanced Green Septa

Description	Similar to OEM Part No.	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
Shimadzu plug	220-90547-00 220-94781-00	8010-0215	8010-0216

General Purpose Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
Shimadzu plug	8010-0263	8010-0264

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Agilent CrossLab Supplies for Thermo Scientific GC Systems

Liners for Trace, Focus Systems

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Splitless Liners										
	Single taper	5.0	8.0	105	1750	5/pk	45350033	8002-0153	45350033	8002-0103
	Single taper	3.0	8.0	105		5/pk	45350032	8002-0154	45350032	8002-0104
Split Liners										
	Straight	5.0	8.0	105	2000	5/pk	45350030	8002-0151	45350030	8002-0101
	Straight	3.0	8.0	105	750	5/pk	45350031	8002-0152	45350031	8002-0102
PTV Liners										
	Straight	2.0	2.75	120	375	5/pk	45322045	8002-0156*	45322045	8002-0106*
	Straight with bottom restriction	2.0	2.75	120	375	5/pk	45352057	8002-0157	45352057	8002-0107
	6 baffles	2.0	2.75	120		5/pk	453T2120	8002-0160*		
	Straight	1.75	2.75	120	300	5/pk		8002-0155		8002-0105
	Straight	1.0	2.75	120	90	5/pk	45352054	8002-0161		
	3 baffles	1.0	2.75	120		5/pk	45352062	8002-0159*		

*Use in Trace systems only

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Agilent CrossLab Supplies for Thermo Scientific GC Systems

Liner O-rings

Description	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
Non-stick fluoroelastomer O-ring, sintered liner	10/pk	29031305	8002-0201
Non-stick fluoroelastomer O-ring	10/pk	29030306	8010-0401
Graphite O-ring, 8 mm id	2/pk	29033406	8002-0203
Graphite O-ring, PTV	2/pk	29013417	8002-0204

Column Ferrules

Capillary Column Ferrules

Model	Fitting Size (in)	Ferrule ID (mm)	Column ID (mm)	Hole	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
85% Polyimide/15% Graphite Capillary Column Ferrules							
Injectors/Detectors	1/16	0.4	0.25	1	10/pk	290VT186	8002-0220
	1/16	0.5	0.32	1	10/pk	290VT187	8002-0221
	1/16	0.8	0.53	1	10/pk	290VT188	8002-0222
Any GC/MS Interface	1/16	0.4	0.25	1	10/pk	29033496	8010-0310
	1/16	0.5	0.32	1	10/pk	29033497	8010-0311
Graphite Capillary Column Ferrules							
Trace/Focus Injectors/Detectors (not for GC/MS Interface)	M4	0.3	0.18	1	10/pk		8002-0211
	M4	0.4	0.25	1	10/pk	29053488	8002-0212
	M4	0.5	0.32	1	10/pk	29053487	8002-0213
	M4	0.8	0.53	1	10/pk	29053486	8002-0214
Injectors/Detectors	1/16	0.4	0.25	1	10/pk		8002-0215
	1/16	0.5	0.32	1	10/pk		8002-0216
	1/16	0.8	0.53	1	10/pk		8002-0217

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Agilent CrossLab Supplies for Thermo Scientific GC Systems

Column Nuts

Description	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
Column nut, stainless steel, split/splitless injector	2/pk	35032423	8002-0311
Column nut, brass	2/pk	290BT239	8002-0312

Autosampler Syringes for Thermo GC Systems

Model	Volume (µL)	Description	Needle Gauge/ Length (mm)/Tip	Similar to OEM Syringe Part No.	Agilent CrossLab Syringe Part No.	Similar to OEM Replacement Needle or Plunger Part No.	Agilent CrossLab Replacement Needle or Plunger Part No.
TriPlus, AS3000	0.5	Plunger-in-needle	23/50/cone tip	36504045	8010-0355		8010-0367*
TriPlus	5	Fixed needle	26/50/cone tip	36504047	8010-0353		
TriPlus, AS3000, AS2000, AS200, AS800	10	Fixed needle	25/50/cone tip	36500525	8002-0003		
TriPlus, AS2000	10	Fixed needle	23/80/cone tip	36520061	8002-0002		
TriPlus, AS2000	10	Fixed needle	26/80/cone tip	36502019	8002-0001		
TriPlus, AS2000, AS200, AS800	100	Fixed needle, gas tight	23/50/cone tip		8010-0354		8010-0368**
TriPlus, AS2000	100	Removable needle, gas tight	23/50/side hole tip	36520050	8002-0004	36540040	8002-0005***

*Needle and plunger repair kit

**Replacement plunger

***Replacement needle

The cross references to the original equipment manufacturer (OEM) part numbers listed here serve as a recommendation that the Agilent CrossLab products are viable alternatives to OEM products. CrossLab products are compatible with the corresponding OEM instruments, although in some cases, the CrossLab products may have slightly different designs as compared to the OEM counterparts. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

Agilent CrossLab Supplies for Thermo Scientific GC Systems

Inlet Septa

Non-Stick Bleed and Temperature Optimized (BTO) Septa

Description	Similar to OEM Part No.	Agilent CrossLab Part No. 50/pk	Similar to OEM Part No.	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	31303240	8010-0217		8010-0218
9.5 mm		8010-0219		8010-0220
10 mm		8010-0221		8010-0222
11 mm, CenterGuide		8010-0223		8010-0224
11.5 mm, CenterGuide	31303230	8010-0225		8010-0226
Description		**24/pk**		**48/pk**
12.7 mm, CenterGuide		8010-0227	31303228	8010-0228
17 mm, CenterGuide		8010-0229	31303211	8010-0230

Non-Stick Advanced Green Septa

Description	Similar to OEM Part No.	Agilent CrossLab Part No. 50/pk	Similar to OEM Part No.	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	313G3240	8010-0201		8010-0202
9.5 mm		8010-0203		8010-0204
10 mm		8010-0205		8010-0206
11 mm, CenterGuide	313G3230	8010-0207		8010-0208
11.5 mm, CenterGuide		8010-0209		8010-0210
Description		**24/pk**		**48/pk**
12.7 mm, CenterGuide		8010-0211	313G3228	8010-0212
17 mm, CenterGuide		8010-0213	313G3211	8010-0214

Non-stick advanced green septum, 11 mm, CenterGuide, 8010-0207

The cross references to the original equipment manufacturer (OEM) part numbers listed here serve as a recommendation that the Agilent CrossLab products are viable alternatives to OEM products. CrossLab products are compatible with the corresponding OEM instruments, although in some cases, the CrossLab products may have slightly different designs as compared to the OEM counterparts. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

Agilent CrossLab Supplies for Thermo Scientific GC Systems

Long-life septa, 8010-0239, 8010-0240

Non-Stick Long-Life Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	8010-0233	8010-0234
11 mm, CenterGuide	8010-0239	8010-0240
11.5 mm, CenterGuide	8010-0241	8010-0242
Description	**24/pk**	**48/pk**
12.7 mm, CenterGuide	8010-0243	8010-0244
17 mm, CenterGuide	8010-0245	8010-0246

General Purpose Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
9 mm	8010-0249	8010-0250
9.5 mm	8010-0251	8010-0252
10 mm	8010-0253	8010-0254
11 mm	8010-0255	8010-0256
11.5 mm	8010-0257	8010-0258
12.7 mm	8010-0259	8010-0260
17 mm	8010-0261	8010-0262

The cross references to the original equipment manufacturer (OEM) part numbers listed here serve as a recommendation that the Agilent CrossLab products are viable alternatives to OEM products. CrossLab products are compatible with the corresponding OEM instruments, although in some cases, the CrossLab products may have slightly different designs as compared to the OEM counterparts. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

Agilent CrossLab Supplies for CTC GC Autosamplers

Agilent PAL Sampler

Autosampler Syringes for CTC CombiPAL and GC PAL

Volume (µL)	Description	Needle Gauge/ Length (mm)/Tip	Agilent CrossLab Syringe Part No.	Agilent CrossLab Replacement Needle or Plunger Part No.
0.5	Plunger-in-needle	23/50/cone tip	8010-0355	8010-0367*
5	Fixed needle	23/50/cone tip	8010-0356	
10	Fixed needle	23/50/cone tip	8010-0351	
	Fixed needle, gas tight	23/50/cone tip	8010-0371	8010-0359**
	Fixed needle	26/50/cone tip	8010-0352	
	Fixed needle, gas tight	26/50/cone tip	8010-0357	8010-0359**
	Fixed needle	26/50/bevel tip	8010-0358	
25	Fixed needle	26/50/cone tip	8010-0360	
100	Removable needle, gas tight	23/50/side hole tip	8002-0004	8002-0005***
	Fixed needle	26/50/cone tip	8010-0361	
250	Fixed needle, gas tight	26/50/cone tip	8010-0362	

Volume (mL)	Description	Needle Gauge/ Length (mm)/Tip	Agilent CrossLab Syringe Part No.	Agilent CrossLab Replacement Needle or Plunger Part No.
1	Fixed needle, gas tight, headspace	23/56/side hole tip	8010-0363	8010-0365
2.5	Fixed needle, gas tight, headspace	23/56/side hole tip	8010-0364	8010-0366

*Needle and plunger repair kit

**Replacement plunger

***Replacement needle

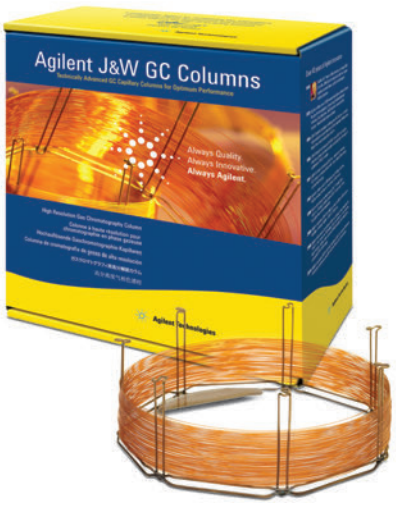
Agilent J&W GC columns

The story behind Agilent J&W GC Columns

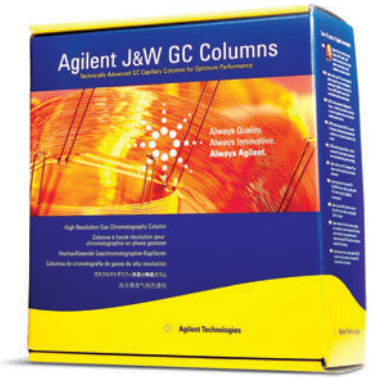
In 2000, Agilent Technologies, the inventor of fused silica GC tubing, merged with J&W Scientific, the creator of the first GC stationary phase made from cross-linked siloxane polymers. In 2010, Agilent acquired Varian adding PLOT, Select, VF, CP-Sil, UltiMetal, and packed to the existing Ultra Inert, High Efficiency, LTM, PAH, 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 over 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 3500 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

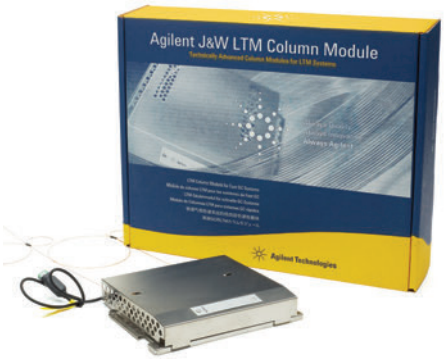
Agilent J&W columns adhere to tight retention factor (k) specifications, promoting consistent retention and separation. They also feature narrow retention indexes and a high number of theoretical plates per meter, ensuring narrow peaks and improving the resolution of closely eluting peaks.

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 shipment from Agilent regional logistic centers, 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



LTM II standard format with 5 in column toroid

Agilent J&W LTM II Column Modules

Agilent J&W LTM II Low Thermal Mass Column Modules for 7890A/B Series GC Systems

Available in a wide variety of Wall Coated Open Tubular (WCOT) and select Porous Layer Open Tubular (PLOT) column configurations.

- The capacity to run up to four column modules simultaneously – with four different temperature programs – to maximize your productivity
- Rapid temperature programming rates for higher analysis speeds
- Faster cooling times – as low as one minute or less – to decrease idling and downtime
- Excellent retention time repeatability and performance – comparable to conventional GC

All LTM II column modules are packaged with:

- Two 1 m guard columns (one each for the inlet and detector) fused silica the same id as the analytical column
- Flexible Metal ferrules that fit the dimensions of the analytical and guard columns

Agilent J&W LTM II Low Thermal Mass Column Modules for 7890A/B Series GC Systems

This LTM 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:

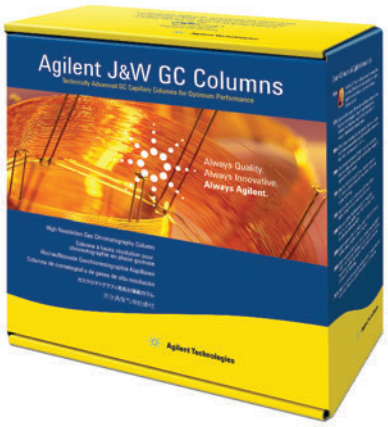
- Faster heating and cooling times – as low as one minute or less – for more rapid analytical cycle times
- Excellent retention time repeatability and performance comparable to conventional GC
- Less power consumption for longer in-field operation
- Integrated module design to facilitate easy column 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, and the 5975T GC/MS.

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**.

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Column Selection Principles

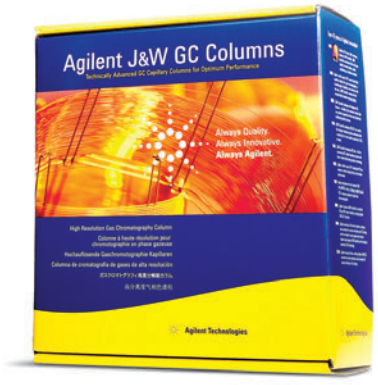
Narrow your choices, save time, and reduce trial and error

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 and 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).

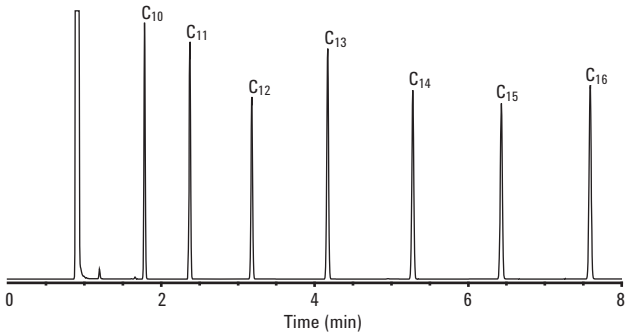
Figure 1: Boiling Point Elution Order for Homologous Series

Column: **DB-1, 15 m x 0.25 mm, 0.25 µm**

Carrier: Helium at 30 cm/s

Oven: 60 °C for 1 min, 60-180 °C at 20 °C/min

	Boiling Point (°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

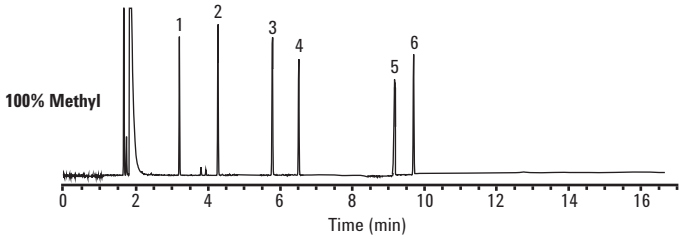


Homologous series of hydrocarbons. The solutes elute in order of their increasing boiling points; however, the peaks are not spaced in proportion to their respective boiling points.

Figure 2: Deviation from Boiling Point Order

Column: **DB-1, 30 m x 0.25 mm, 0.25 µm**

	Boiling Point (°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.

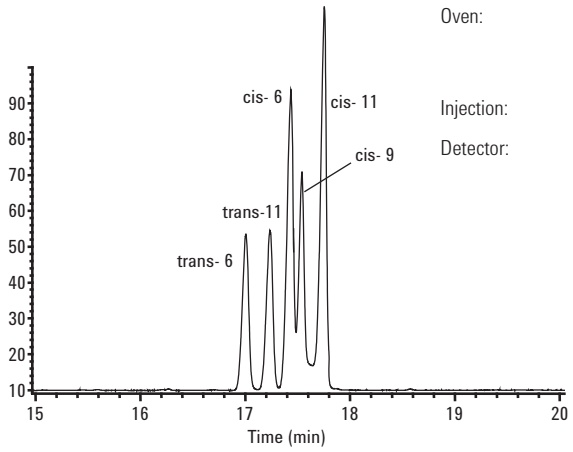
Table 1: Stationary Phase Interactions

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, 0.25 µm**

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 µL
Detector:	FID, 250 °C

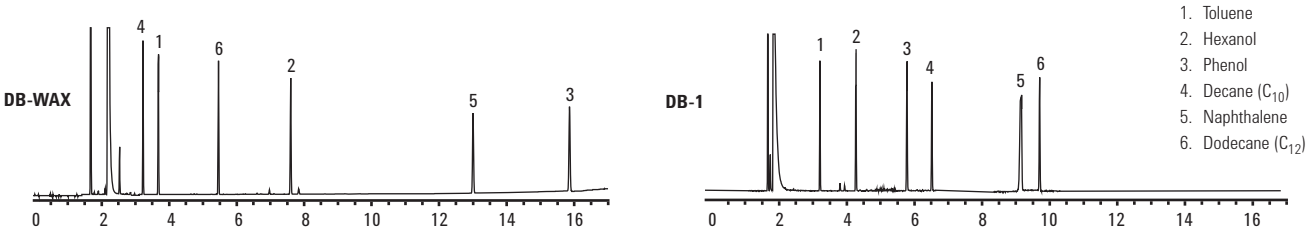
The hydrogen bonding interaction occurs if there is hydrogen bonding between the solute molecules and the stationary phase. **Table 2** lists the types of compounds that can form hydrogen bonds along with their relative bonding strengths. It is the difference in the strength of the hydrogen bonding that 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

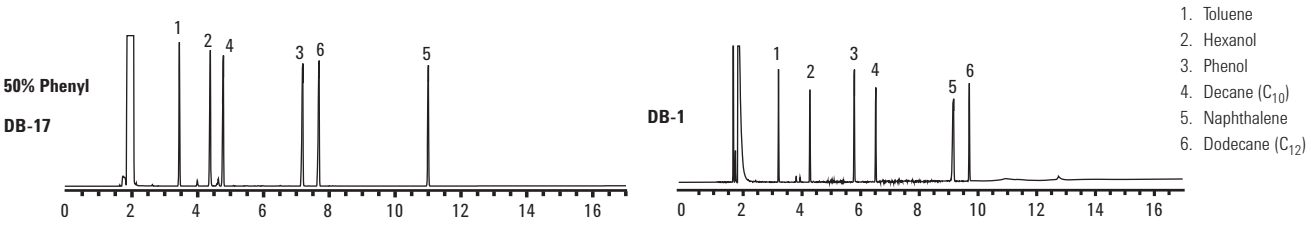
Column: 15 m x 0.25 mm, 0.25 µm



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.

Figure 5: Phenyl Content Retention

Column: 15 m x 0.25 mm, 0.25 µm



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.

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.

Polarity

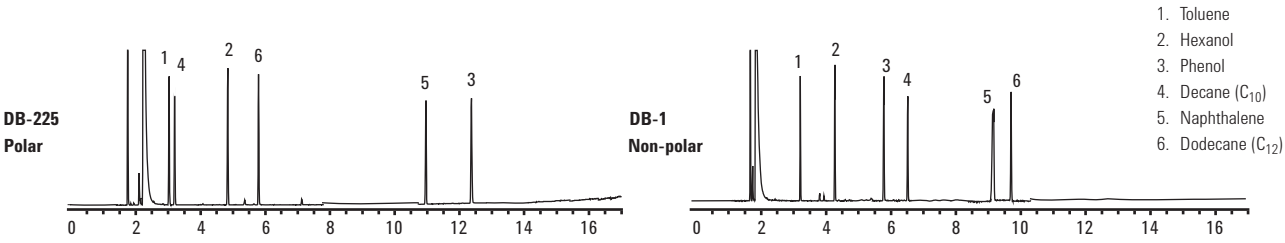
Stationary phase polarity is determined by the polarity of the substituted groups and their relative amounts. **Table 3** lists a variety of stationary phases in order of their increasing polarity. Polarity is often erroneously used to select columns or to determine separation characteristics. Stationary 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, 0.25 µm



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	DB-ALC2			DB-WAX FF	
	DB-2887	DB-5.625	HP-50+	DX-1			CP-FFAP CB	
	DB-Petro/ PONA	DB & VF-5ht	DB-17ht				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		DB-624ms/UI					
	DB-Sulfur SCD		VF-624ms					
			DB-Select 624 UI					
			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. Solutes 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 C_1-C_{10} 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 C_1-C_3 hydrocarbons, but C_4 and higher hydrocarbons are better separated with an Alumina PLOT column. PLOT Q exhibits extremely long retention times and very broad peaks for C_6 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

Dispersive

Shape/Size		**Ionic Surface**
Zeolites	⟷	Alumina/Al_2O_3
		GS-OxyPLOT

Dispersive

Shape/Size		**Ionic Surface**
Molecular Sieves	**Porous Polymers**	Bonded Silica
Bonded Graphitized Carbon	⟷	

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/Al_2O_3:	GS-Alumina, GS-Alumina KCl, HP-PLOT Al_2O_3 KCl, HP-PLOT Al_2O_3 "S", HP-PLOT Al_2O_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.

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.

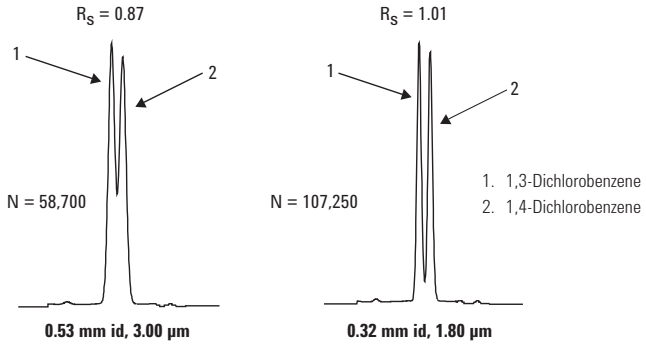
Column efficiency (N/m) is inversely proportional to column diameter. The efficiencies listed in **Table 4** show that smaller diameter columns have higher theoretical plates per meter. Resolution is a square root function of the theoretical plate number. Therefore, doubling column efficiency theoretically 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 µL) 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_f.

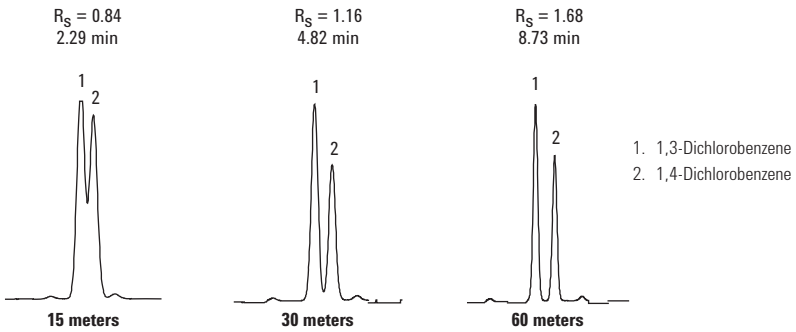
Column Length

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, 0.30 µm
30 m x 0.53 mm, 0.30 µm
60 m x 0.53 mm, 0.30 µm



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.

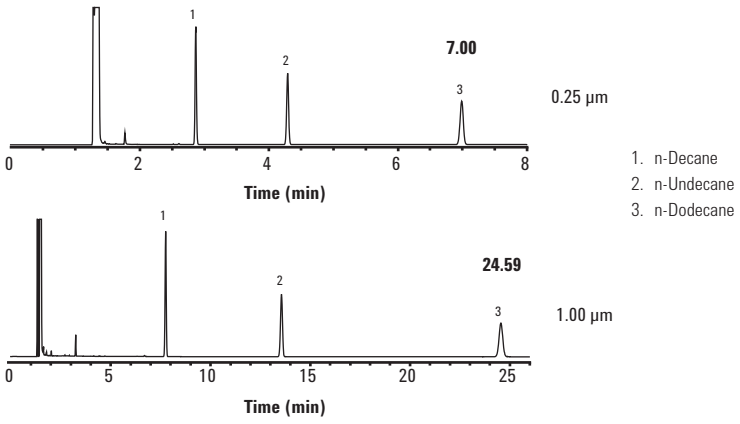
Solutes with k values less than 2 are very difficult to resolve due to insufficient retention by the column. Changing to a thicker film column results in better resolution since solute retention is increased. The resolution improvement depends on the solute k value for the original column. For solutes 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**

Carrier: Helium at 38 cm/s

Oven: 100 °C isothermal



1. n-Decane
2. n-Undecane
3. n-Dodecane

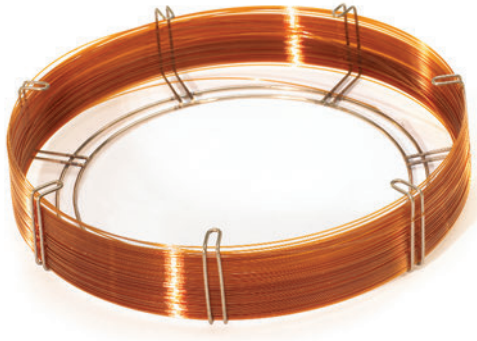
For a given stationary phase, column bleed increases as film thickness increases. Since thicker film columns are more retentive, later eluting peaks may shift into a region of much higher column bleed when increasing film thickness. The upper temperature limits of thick film columns may be lower due 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_2O_3 MAPD, Alumina PLOT PT family
	C_1-C_6 alcohols, aromatic C_6-C_{10}	CP-TCEP for Alcohols in Gasoline
	Sulfur impurities in propylene streams	DB-Select SCD, 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)	DB-Dioxin
	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

Search the application library to find GC applications and standard methods of all types, old and new.
To view, please visit **www.agilent.com/chem/library**

EPA Method

Drinking Water

EPA Method	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 µm	122-1534
		DB-624, 30 m x 0.25 mm, 1.40 µm	122-1334
		VF-624ms, 30 m x 0.25 mm, 1.40 µm	CP9102
		DB-624 Ultra Inert, 30 m x 0.25 mm, 1.40 µm	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 µm	122-1564
		DB-624, 60 m x 0.25 mm, 1.40 µm	122-1364
		VF-624ms, 60 m x 0.25 mm, 1.40 µm	CP9103
		DB-624 Ultra Inert, 60 m x 0.25 mm, 1.40 µm	122-1364UI
		VF-624ms, 30 m x 0.25 mm, 1.40 µm	CP9102
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 µm	122-1534
		DB-624, 30 m x 0.25 mm, 1.40 µm	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 µm	123-8232
		DB-CLP2, 30 m x 0.32 mm, 0.50 µm	123-8336
		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
		DB-624 Ultra Inert, 30 m x 0.25 mm, 1.40 µm	122-1334UI
		VF-1ms, 30 m x 0.32 mm, 1.00 µm	CP8926
		VF-1701ms, 30 m x 0.32 mm, 1.00 µm	CP9163
505	Analysis of organohalide pesticides and commercial polychlorinated biphenyl (PCB) products in water by microextraction and GC	DB-CLP1, 30 m x 0.32 mm, 0.25 µm	123-8232
		DB-CLP2, 30 m x 0.32 mm, 0.50 µm	123-8336
		DB-XLB, 30 m x 0.25 mm, 0.50 µm	122-1236
		VF-1ms, 30 m x 0.32 mm, 1.00 µm	CP8926
		VF-17ms, 30 m x 0.32 mm, 0.50 µm	CP8991
506	Determination of phthalate and adipate esters in drinking water by liquid-liquid extraction or liquid-solid extraction and GC with photoionization detection	DB-5ms, 30 m x 0.25 mm, 0.25 µm	122-5532
		VF-5ms, 30 m x 0.32 mm, 0.25 µm	CP8955
		VF-1ms, 30 m x 0.32 mm, 0.25 µm	CP8924
507	Determination of nitrogen and phosphorus-containing pesticides in water by GC with a nitrogen phosphorus detector	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-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

(Continued)

Drinking Water

EPA Method	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, 0.50 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, 0.50 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 Method	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, 1.40 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, 1.40 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

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Drinking Water

EPA Method	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, 0.50 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, 0.50 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, 0.50 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 µm	122-1564
		DB-624, 75 m x 0.45 mm, 2.55 µm	124-1374
		DB-624, 60 m x 0.25 mm, 1.40 µm	122-1364
		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
602	Purgeable aromatics	DB-624, 75 m x 0.53 mm, 3.00 µm	125-1374
		DB-624, 30 m x 0.25 mm, 1.40 µm	122-1334
		DB-VRX, 30 m x 0.25 mm, 1.40 µm	122-1534
		VF-624ms, 75 m x 0.53 mm, 3.00 µm	CP9108
		VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
		VF-624ms, 30 m x 0.25 mm, 1.40 µm	CP9102
603	Acrolein and acrylonitrile	DB-624, 30 m x 0.25 mm, 1.40 µm	122-1334
		DB-VRX, 30 m x 0.25 mm, 1.40 µm	122-1534
		VF-WAXms, 30 m x 0.25 mm, 1.00 µm	CP9206
		VF-624ms, 30 m x 0.25 mm, 1.40 µm	CP9102
604	Phenols	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm	122-5532UI
		DB-XLB, 30 m x 0.25 mm, 0.25 µm	122-1232
		VF-5ms, 60 m x 0.32 mm, 1.80 µm	CP9105
		VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
605	Benzidines	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm	122-5532UI
		DB-608, 30 m x 0.25 mm, 0.25 µm	122-6832
606	Phthalate esters	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm	122-5532UI
		DB-608, 30 m x 0.25 mm, 0.25 µm	122-6832
		VF-5ms, 30 m x 0.25 mm, 0.25 µm	CP8944
607	Nitrosamines	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm	122-5532UI
		CP-Sil 8 CB for Amines, 30 m x 0.32 mm, 1.00 µm	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

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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

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, 1.40 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, 1.40 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
		VF-WAXms, 30 m x 0.53 mm, 1.00 µm	CP9215
		CP-Sil 8 CB, 30 m x 0.53 mm, 1.50 µm	CP8736
8020	Volatile aromatic organic compounds list by EPA method 8021	DB-624, 30 m x 0.25 mm, 1.40 µm	122-1334
		DB-624 Ultra Inert, 30 m x 0.25 mm, 1.40 µm	122-1334UI
		DB-VRX, 30 m x 0.25 mm, 1.40 µm	122-1534
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
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, 1.40 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

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Solid Waste

EPA Method	Application	Column	Part No.
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
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, 0.50 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-CLP1, 30 m x 0.32 mm, 0.25 µm	123-8232
		DB-CLP2, 30 m x 0.32 mm, 0.50 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-5ms, 30 m x 0.25 mm, 1.00 µm	122-5533
		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
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-1ms, 15 m x 0.53 mm, 1.50 µm	CP8967
8100	Polynuclear aromatic hydrocarbons	DB-5ms, 30 m x 0.25 mm, 0.25 µm	122-5532
		DB-5ms, 30 m x 0.32 mm, 0.25 µm	123-5532
		DB-1ms, 30 m x 0.25 mm, 0.25 µm	122-0132
		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

(Continued)

Solid Waste

EPA Method	Application	Column	Part No.
8111	Haloethers by GC	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
		DB-1701, 30 m x 0.25 mm, 1.00 µm	122-0733
		VF-1701ms, 30 m x 0.53 mm, 1.00 µm	CP9171
8120	Chlorinated hydrocarbons by gas chromatography	DB-5ms, 30 m x 0.32 mm, 0.50 µm	123-5536
		HP-5ms, 30 m x 0.32 mm, 0.50 µm	19091S-113
		DB-1, 30 m x 0.32 mm, 0.50 µm	123-103E
8121	Chlorinated hydrocarbons by GC: capillary column technique	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	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, 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
8150	Chlorinated herbicides	DB-35ms, 30 m x 0.32 mm, 0.25 µm	123-3832

(Continued)

Solid Waste

EPA Method	Application	Column	Part No.
8151, 8151b	Chlorinated herbicides by GC using methylation or pentafluorobenzylation 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, 0.50 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, 1.40 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, 1.40 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
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, 1.80 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, 1.00 µm	121-1324UI
		VF-624ms, 60 m x 0.25 mm, 1.40 µm	CP9103

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Solid Waste

EPA Method	Application	Column	Part No.
8270, 8270d	Semivolatile organic compounds by gas chromatography/mass spectrometry (GC/MS)	DB-UI 8270D Ultra Inert, 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
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
8280b	Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) by high resolution gas chromatography/low resolution mass spectrometry (HRGC/LRMS)	DB-5ms Ultra Inert, 60 m x 0.25 mm, 0.25 µm	122-5562UI
		CP-Sil 8 CB, 30 m x 0.25 mm, 0.25 µm	CP8751
8290b	Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) by high resolution gas chromatography/high resolution mass spectrometry (HRGC/HRMS)	DB-5ms Ultra Inert, 60 m x 0.25 mm, 0.25 µm	122-5562UI
		CP-Sil 8 CB, 30 m x 0.25 mm, 0.25 µm	CP8751
		CP-Sil 88 for Dioxins, 50 m x 0.25 mm, 0.20 µm	CP7588
8410	Gas chromatography/Fourier transform infrared (GC/FTIR) 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
8430	Analysis of bis(2-chloroethyl) ether and hydrolysis products by direct aqueous injection (GC/FTIR)	DB-WAX, 30 m x 0.25 mm, 0.50 µm	122-7033
		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

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, HP-1ms UI, DB-1ms UI, CP-Sil 5 CB, CP-Sil 5 CB Low Bleed/MS
G2	Dimethylpolysiloxane gum	HP-1*, DB-1*, HP-1ms*, DB-1ms*, VF-1ms, HP-1ms UI, DB-1ms UI, 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, DB-5ms UI, HP-5ms UI, 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, DB-35ms UI
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, DB-35ms UI
G43	6% Cyanopropylphenyl 94% dimethylpolysiloxane	DB-624*, DB-1301, VF-624ms, VF-1301ms, CP-1301, DB-Select 624 UI
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.
D1945	Standard Test Method for the Analysis of Natural Gas by GC	HP-PLOT Molesieve, 15 m x 0.53 mm, 50.00 µm	19095P-MS9
		HP-PLOT Q PT, 15 m x 0.53 mm, 40.00 µm	19095P-QO3PT
		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
D1946	Standard Test Method for the Analysis of Reformed Gas by GC	HP-PLOT Molesieve, 15 m x 0.53 mm, 50.00 µm	19095P-MS9
		HP-PLOT Q PT, 15 m x 0.53 mm, 40.00 µm	19095P-QO3PT
		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
D1983	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
D2163	Standard Test Method for the Analysis of Liquified Petroleum (LP) Gases and Propene Concentrates by GC	HP-PLOT Al_2O_3 KCl PT, 30 m x 0.53 mm, 15.00 µm	19095P-K23PT
		HP-PLOT Al_2O_3 S PT, 30 m x 0.53 mm, 15.00 µm	19095P-S23PT
D2195	Standard Test Methods for Pentaerythritol	CP-Sil 5 CB, 30 m x 0.53 mm, 1.50 µm	CP8735
D2268	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
D2306	Standard Test Method for C_8 Aromatic Hydrocarbons by GC	HP-INNOWax, 60 m x 0.25 mm, 0.25 µm	19091N-136
D2360	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
D2426	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
D2427	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 PT, 30 m x 0.53 mm,	115-3532PT
		CP-Al_2O_3/KCl PT, 50 m x 0.53 mm, 10.00 µm	CP7518PT
D2245	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
D2504	Standard Test Method for Noncondensable Gases in C_2 and Lighter Hydrocarbon Products by GC	HP-PLOT Molesieve, 30 m x 0.53 mm, 50.00 µm	19095P-MS0
		CarboBOND, 25 m x 0.53 mm, 10.00 µm	CP7374
D2505	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.
D2580	Standard Test Method for Phenols in Water by Gas-Liquid Chromatography	CP-FFAP CB, 25 m x 0.53 mm, 1.00 µm	CP7486
D2593	Standard Test Method for Butadiene Purity and Hydrocarbon Impurities by GC	GS-Alumina PT, 30 m x 0.53 mm	115-3532PT
		CP-Al_2O_3/KCl PT, 50 m x 0.32 mm, 5.00 µm	CP7515PT
		CP-Al_2O_3/KCl PT, 50 m x 0.53 mm, 10.00 µm	CP7518PT
D2712	Standard Test Method for Hydrocarbon Traces in Propylene Concentrates by GC	GS-Alumina PT, 50 m x 0.53 mm	115-3552PT
D2743	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
D2804	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
D2887	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 D2887	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
D2908	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
D3054	Standard Test Method for Analysis of Cyclohexane by GC	DB-1, 60 m x 0.32 mm, 0.50 µm	123-106E
D3168	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
D3257	Standard Test Method for Aromatics in Mineral Spirits by GC	DB-624, 30 m x 0.53 mm, 3.00 µm	125-1334
D3271	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.
D3328	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
D3329	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
D3432	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
D3447	Standard Test Method for Purity of Halogenated Organic Solvents	DB-624, 30 m x 0.53 mm, 3.00 µm	125-1334
D3452	Standard Practice for Rubber – Identification by Pyrolysis-Gas Chromatography	CP-Sil 5 CB, 30 m x 0.53 mm, 1.50 µm	CP8735
D3465	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
D3524	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
D3545	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
D3606	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
D3687	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
D3695	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
D3710	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
D3749	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 PT, 10 m x 0.53 mm, 10.00 µm	CP7353PT

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ASTM Methods

Method	Title	Recommended Agilent Column	Part No.
D3760	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
D3792	Standard Test Method for Water Content of Coatings by Direct Injection Into a Gas Chromatograph	PoraBOND Q PT, 25 m x 0.32 mm, 5.00 µm	CP7351PT
		PoraBOND Q PT, 25 m x 0.53 mm, 10.00 µm	CP7354PT
D3797	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
D3798	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
D3871	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
D3876	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
D3893	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
D3973	Standard Test Method for Low-Molecular Weight Halogenated Hydrocarbons in Water	DB-VRX, 30 m x 0.45 mm, 2.55 µm	124-1534
D4059	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
D4275	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
D4322	Standard Test Method for Residual Acrylonitrile Monomer Styrene-Acrylonitrile Copolymers and Nitrile Rubber by Headspace Gas Chromatography	PoraBOND Q PT, 25 m x 0.53 mm, 10.00 µm	CP7354PT
D4367	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
D4415	Standard Test Method for Determination of Dimer in Acrylic Acid	DB-FFAP, 30 m x 0.32 mm, 0.25 µm	123-3232
D4424	Standard Test Method for Butylene Analysis by GC	HP-PLOT Al_2O_3 S PT, 50 m x 0.53 mm, 15.00 µm	19095P-S25PT
		CP-Al_2O_3/Na_2SO_4, 25 m x 0.53 mm, 10.00 µm	CP7567
D4443	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.
D4492	Standard Test Method for Analysis of Benzene by Gas Chromatography	CP-TCEP for Alcohols in Gasoline, 50 m x 0.25 mm, 0.40 µm	CP7525
D4509	Standard Test Methods for Determining the 24-Hour Gas (AIR) Space Acetaldehyde Content of Freshly Blown PET Bottles	PoraBOND Q PT, 25 m x 0.32 mm, 5.00 µm	CP7351PT
		PoraBOND Q PT, 25 m x 0.53 mm, 10.00 µm	CP7354PT
D4534	Test Method for Benzene Content of Cyclic Products by Gas Chromatography	CP-TCEP for Alcohols in Gasoline, 50 m x 0.25 mm, 0.40 µm	CP7525
D4735	Standard Test Method for Determination of Trace Thiophene in Refined Benzene by GC	DB-FFAP, 30 m x 0.45 mm, 0.85 µm	124-3232
		CP-Wax 58 FFAP CB, 25 m x 0.53 mm, 1.00 µm	CP7614
D4768	Standard Test Method for Analysis of 2,6-Ditertiary-Butyl Para-Cresol and 2,6-Ditertiary-Butyl Phenol in Insulating Liquids by Gas Chromatography	CP-Wax 58 FFAP CB, 25 m x 0.53 mm, 1.00 µm	CP7614
D4864	Standard Test Method for Determination of Traces of Methanol in Propylene Concentrates by GC	DB-WAX, 30 m x 0.45 mm, 0.85 µm	124-7032
D4947	Standard Test Method for Chlordane and Heptachlor Residues in Indoor Air	DB-5, 30 m x 0.53 mm, 1.50 µm	125-5032
		DB-608, 30 m x 0.53 mm, 0.83 µm	125-1730
D4961	Standard Test Method for GC Analysis of Major Organic Impurities in Phenol Produced by the Cumene Process	DB-FFAP, 30 m x 0.45 mm, 0.85 µm	124-3232
		HP-PLOT Q PT, 15 m x 0.53 mm, 40.00 µm	19095P-QO3PT
D4983	Standard Test Method for Cyclohexylamine Morpholine and Diethylaminoethanol in Water and Condensed Steam by Direct Aqueous Injection GC	HP-5ms, 30 m x 0.32 mm, 1.00 µm	19091S-213
		CAM, 30 m x 0.53 mm, 1.00 µm	115-2132
D5008	Standard Test Method for Ethyl Methyl Pentonol Content and Purity Value of 2-Ethylhexanol by GC	HP-1, 15 m x 0.53 mm, 5.00 µm	19095Z-621
		HP-INNOWax, 30 m x 0.32 mm, 0.25 µm	19091N-113
D5060	Standard Test Method for Determining Impurities in High-Purity Ethylbenzene by GC	HP-INNOWax, 60 m x 0.32 mm, 0.50 µm	19091N-216
		CP-Wax 52 CB, 60 m x 0.32 mm, 0.50 µm	CP8773
D5075	Standard Test Method for Nicotine in Indoor Air	DB-5, 30 m x 0.53 mm, 1.50 µm	125-5032
		DB-5, 30 m x 0.32 mm, 1.00 µm	123-5033
D5134	Standard Test Method for Detailed Analysis of Petroleum Naphthas Through n-Nonane by Capillary GC	HP-PONA, 50 m x 0.20 mm, 0.50 µm	19091S-001
		CP-Sil PONA for ASTM D5134, 50 m x 0.21 mm, 0.50 µm	CP7531
D5135	Standard Test Method for Analysis of Styrene by Capillary GC	HP-INNOWax, 60 m x 0.32 mm, 0.50 µm	19091N-216
		CP-Wax 52 CB, 60 m x 0.32 mm, 0.50 µm	CP8773
D5175	Standard Test Method for Organohalide Pesticides and Polychlorinated Biphenyls in Water by Microextraction and GC	DB-1, 30 m x 0.32 mm, 1.00 µm	123-1033
		DB-608, 30 m x 0.32 mm, 0.50 µm	123-1730
		DB-XLB, 30 m x 0.25 mm, 0.25 µm	122-1232

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ASTM Methods

Method	Title	Recommended Agilent Column	Part No.
D5303	Standard Test Method for Trace Carbonyl Sulfide in Propylene by GC	GS-GasPro, 30 m x 0.32 mm	113-4332
		HP-PLOT Q PT, 30 m x 0.53 mm, 40.00 µm	19095P-QO4PT
D5307	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
D5310	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
D5316	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
D5317	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-1701, 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
D5320	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
D5399	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
D5441	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
D5442	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
D5475	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-1701, 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
D5480	Standard Test Method for Engine Oil Volatility by GC	DB-PS1, 15 m x 0.53 mm, 0.15 µm	145-1011
D5501	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
D5504	Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence	DB-Sulfur SCD, 70 m x 0.53 mm, 4.30 µm	G3903-63003
		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.
D5507	Standard Test Method for Determination of Trace Organic Impurities in Monomer Grade Vinyl Chloride by Capillary Column/Multi-dimensional GC	HP-PLOT Q PT, 15 m x 0.53 mm, 40.00 µm	19095P-QO3PT
		HP-PLOT U PT, 30 m x 0.53 mm, 20.00 µm	19095P-UO4PT
D5508	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 PT, 30 m x 0.53 mm, 40.00 µm	19095P-QO4PT
D5580	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
D5599	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
D5623	Standard Test Method for Sulfur Compounds in Light Petroleum Liquids by GC and Sulfur Selective Detection	DB-Sulfur SCD, 60 m x 0.32 mm, 4.20 µm	G3903-63001
		HP-1, 30 m x 0.32 mm, 4.00 µm	19091Z-613
D5713	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
D5739	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
D5769	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
D5790	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
D5812	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-1701, 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.
D5917	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
D5974	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
D5986	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
D6144	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
D6159	Standard Test Method for Determination of Hydrocarbon Impurities in Ethylene by GC	HP-PLOT Al_2O_3 KCl PT, 50 m x 0.53 mm, 15.00 µm	19095P-K25PT
		GS-Alumina PT, 50 m x 0.53 mm	115-3552PT
		DB-1, 30 m x 0.53 mm, 5.00 µm	125-1035
D6160	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
D6352	Standard Test Method for Boiling Range Distribution of Petroleum Distillates in Boiling Range from 174 to 700 °C by GC	DB-HT Sim Dis, 5 m x 0.53 mm, 0.15 µm	145-1001
D6387	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
D6417	Standard Test Method for Estimation of Engine Oil Volatility by Capillary GC	DB-HT Sim Dis, 5 m x 0.53 mm, 0.15 µm	145-1001
D6584	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
D6806	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
E1616	Standard Test Method for Analysis of Acetic Anhydride Using GC	HP-1, 50 m x 0.32 mm, 0.52 µm	19091Z-115
E1863	Standard Test Method for Analysis of Acrylonitrile by GC	DB-WAXetr, 60 m x 0.32 mm, 1.00 µm	123-7364
E0202	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, 0.20 µm	CP7615
E0475	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

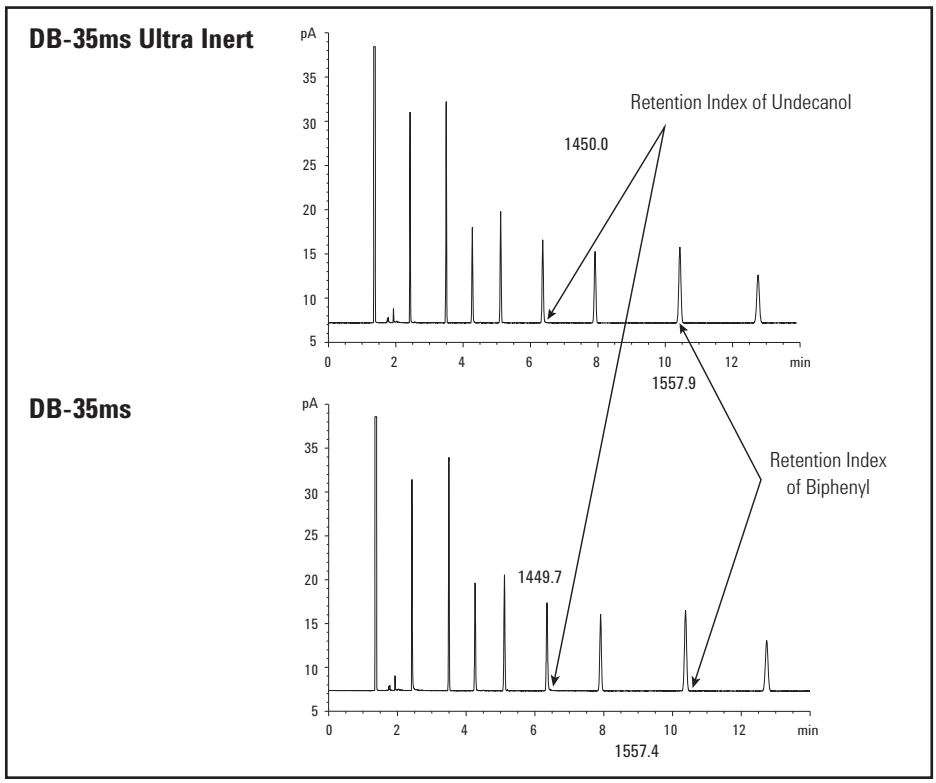
GC Capillary Columns

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.

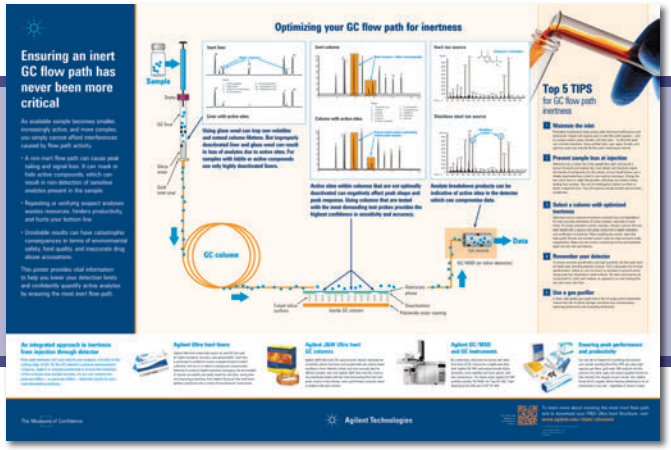
The test probes in Agilent's Ultra Inert test probe mixture have low molecular weights, low boiling points and no steric shielding of their active groups. These characteristics allow the probative portion of the test molecules to penetrate – and fully interact with – the stationary phase and column surface.

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. Naphthalene	9. Methyldecanoate

TIPS & TOOLS

Clearly Better Inertness

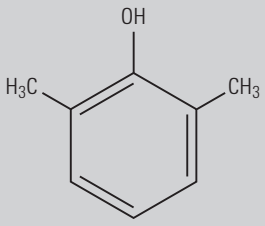
To learn more and order your free poster, visit
www.agilent.com/chem/inert



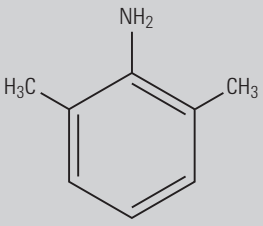
Agilent's more demanding Ultra Inert test probe mixture for 5ms, 1ms, and 35ms Ultra Inert columns

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

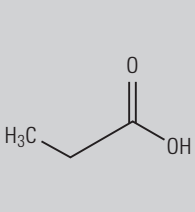


2,6-Dimethylphenol

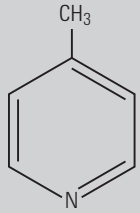


2,6-Dimethylaniline

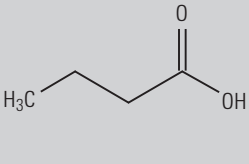
Weak probe molecules: The acidic and basic portions of these molecules are shielded by the two methyl groups on their phenyl rings, making them less probative.



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
0.18	*20*	*0.18*	*-60 to 325/350*	*121-0122UI*	
0.25	15	0.25	-60 to 325/350	122-0112UI	
	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

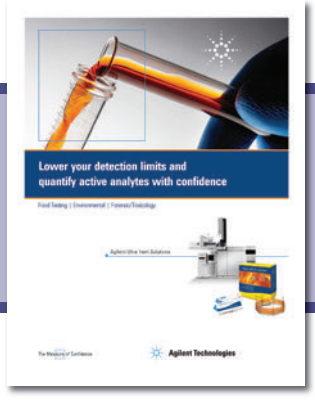
ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.18	*20*	*0.18*	*-60 to 325/350*	*19091S-677UI*
0.25	15	0.25	-60 to 325/350	19091S-931UI
	30	0.25	-60 to 325/350	19091S-933UI
		0.50	-60 to 325/350	19091S-633UI
		1.00	-60 to 325/350	19091S-733UI
0.32	15	0.25	-60 to 325/350	19091S-911UI
	25	0.52	-60 to 325/350	19091S-612UI
	30	0.25	-60 to 325/350	19091S-913UI
		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 II Module
0.18	*20*	*0.18*	*-60 to 325/350*	*121-5522UI*		*121-5522UILTM*
		0.36	*-60 to 325/350*	*121-5523UI*		*121-5523UILTM*
0.25	15	0.25	-60 to 325/350	122-5512UI		122-5512UILTM
		1.00	-60 to 325/350	122-5513UI		
	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		122-5533UILTM
	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	
		0.50	-60 to 325/350	123-5536UI		
		1.00	-60 to 325/350	123-5533UI		
	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, 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 II Module
HP-5ms Ultra Inert						
0.18	*20*	*0.18*	*-60 to 325/350*	*19091S-577UI*		*19091S-577UILTM*
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-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
0.18	*20*	*0.18*	*50 to 340/360*	*121-3822UI*
0.25	15	0.25	50 to 340/360	122-3812UI
	30	0.25	50 to 340/360	122-3832UI
0.32	15	0.25	50 to 340/360	
	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
0.18	*20*	*1.00*	*-20 to 260*	*121-1324UI*
0.25	30	1.40	-20 to 260	122-1334UI
	60	1.40	-20 to 260	122-1364UI
0.32	30	1.80	-20 to 260	123-1334UI
	60	1.80	-20 to 260	123-1364UI
0.53	30	3.00	-20 to 260	125-1334UI
	75	3.00	-20 to 260	125-1374UI

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

TIPS & TOOLS

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

DB-Select 624 UI for <467>

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.25	30	1.40	40 to 260/260	122-0334UI
	60	1.40	40 to 260/260	122-0364UI
0.32	30	1.80	40 to 260/260	123-0334UI
	60	1.80	40 to 260/260	123-0364UI
0.53	30	3.00	40 to 260/260	125-0334UI

DB-UI 8270D Ultra Inert

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.18	*20*	*0.36*	*-60 to 325/350*	*121-9723*
				*621-9723, 6/pk**
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.

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.

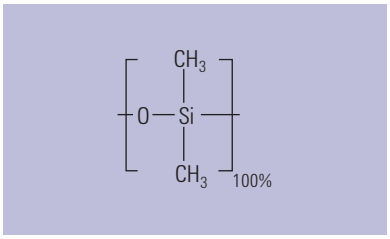
The mass spectrum of septum bleed can look very much like GC column bleed, so the two are often confused. An easy way to tell the two apart: column bleed will be indicated by a rise in the baseline, not peaks. If you see bleed peaks, these generally come from lower quality septa or septa being used beyond 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



Structure of DB-1ms

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

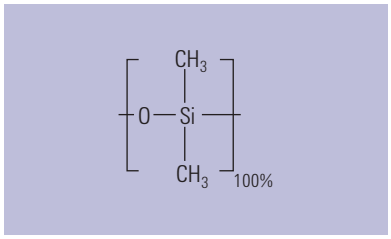
DB-1ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM II Module
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
0.18	*20*	*0.18*	*-60 to 340/360*	*121-0122*		*121-0122LTM*
0.20	12	0.33	-60 to 340/350	128-0112		
	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
	30	0.10	-60 to 340/360	122-0131		
		0.25	-60 to 340/360	122-0132	122-0132E	
	60	0.25	-60 to 340/360	122-0162		
0.32	15	0.25	-60 to 340/360	123-0112		
	30	0.10	-60 to 340/360	123-0131		
		0.25	-60 to 340/360	123-0132		
	60	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

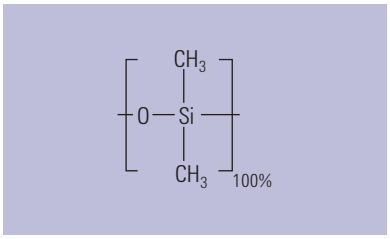
Similar Phases: Rtx-1ms, Rxi-1ms, MDN-1, AT-1, ZB-1ms, Equity-1

HP-1ms

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



Structure of 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 at 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	
0.15	*10*	*0.15*	*-60 to 325/350*	*CP9030*	
	15	*0.15*	*-60 to 325/350*	*CP5881*	
	20	*0.15*	*-60 to 325/350*	*CP9031*	
		0.60	*-60 to 325/350*	*CP9032*	
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

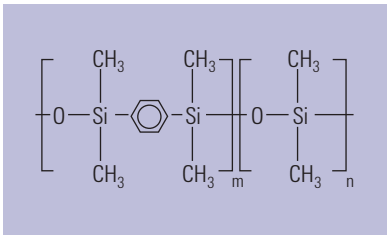
(Continued)

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	
		0.25	-60 to 325/350	CP8907	
		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	
		0.25	-60 to 325/350	CP8912	CP8912I5
		1.00	-60 to 325/350	CP8913	
	50	0.25	-60 to 325/350	CP8914	
		0.40	-60 to 325/350	CP8915	
	60	0.25	-60 to 325/350	CP8916	
		1.00	-60 to 325/350	CP8917	
0.32	15	0.10	-60 to 325/350		
		0.25	-60 to 325/350	CP8919	
		1.00	-60 to 325/350		
	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		
		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	

DB-5ms



Structure of 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

TIPS & TOOLS

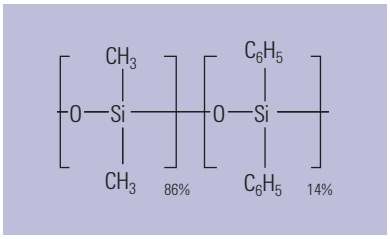
Learn more about the Agilent 7890B GC System at **www.agilent.com/chem/7890BGC**

DB-5ms

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

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

HP-5ms



Structure of HP-5ms

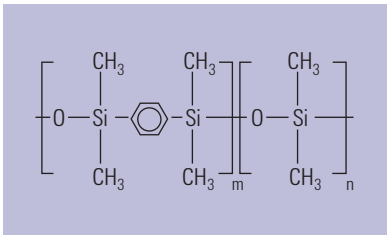
- (5%-Phenyl)-methylpolysiloxane
- Identical selectivity to HP-5
- Non-polar
- Very low bleed characteristics, ideal for GC/MS
- Excellent inertness for active compounds including acidic and basic compounds
- Improved signal-to-noise ratio for better sensitivity and mass spectral integrity
- Bonded and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

HP-5ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM II Module
0.18	*20*	*0.18*	*-60 to 325/350*	*19091S-577*		*19091S-577LTM*
0.20	12	0.33	-60 to 325/350	19091S-101		19091S-101LTM
	25	0.33	-60 to 325/350	19091S-102	19091S-102E	19091S-102LTM
	50	0.33	-60 to 325/350	19091S-105		
0.25	15	0.10	-60 to 325/350	19091S-331		19091S-331LTM
		0.25	-60 to 325/350	19091S-431		19091S-431LTM
		1.00	-60 to 325/350	19091S-231		
	30	0.10	-60 to 325/350	19091S-333		
		0.25	-60 to 325/350	19091S-433	19091S-433E	19091S-433LTM
		0.50	-60 to 325/350	19091S-133		
		1.00	-60 to 325/350	19091S-233	19091S-233E	
	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	
	30	0.10	-60 to 325/350	19091S-313		
		0.25	-60 to 325/350	19091S-413	19091S-413E	19091S-413LTM
		0.50	-60 to 325/350	19091S-113		
		1.00	-60 to 325/350	19091S-213		
	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 at 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	
0.15	*10*	*0.15*	*-60 to 325/350*	*CP9034*	
	15	*0.15*	*-60 to 325/350*	*CP9035*	
	20	*0.15*	*-60 to 325/350*	*CP9036*	
		0.30	*-60 to 325/350*	*CP9037*	
		0.60	*-60 to 325/350*	*CP9038*	
	40	*0.15*	*-60 to 325/350*	*CP9039*	
0.20	12	0.33	-60 to 325/350	CP8935	
	25	0.33	-60 to 325/350	CP8936	
	50	0.33	-60 to 325/350	CP8937	

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

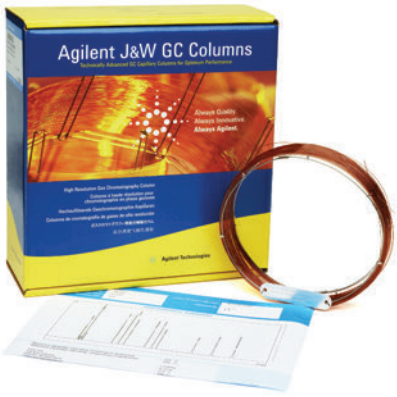
(Continued)

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 (°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	
	30	0.10	-60 to 325/350	CP8943	
		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	
		0.25	-60 to 325/350	CP8960	
		1.00	-60 to 325/350	CP8949	
0.32	15	0.10	-60 to 325/350	CP8950	
		0.25	-60 to 325/350	CP8951	
	25	0.52	-60 to 325/350	CP8953	
	30	0.25	-60 to 325/350	CP8955	
		0.50	-60 to 325/350	CP8956	
		1.00	-60 to 325/350	CP8957	
	50	0.25	-60 to 325/350	CP8958	
		0.40	-60 to 325/350	CP8959	
	60	0.25	-60 to 325/350	CP8961	
		1.00	-60 to 325/350	CP8962	
0.53	15	0.50	-60 to 325/350	CP8971	
	30	0.50	-60 to 325/350	CP8974	
		1.00	-60 to 325/350	CP8975	
		1.50	-60 to 310/335	CP8976	



Column on 5 in cage

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

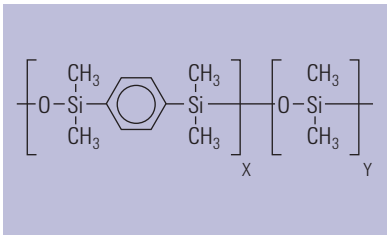
ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	7890/6890 LTM II Module
0.18	*20*	*0.18*	*30 to 340/360*	*121-1222*	
	30	*0.18*	*30 to 340/360*	*121-1232*	
0.20	25	0.33	30 to 340/360	128-1222	
0.25	15	0.10	30 to 340/360	122-1211	122-1211LTM
		0.25	30 to 340/360	122-1212	
	30	0.10	30 to 340/360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

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 semivolatile 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



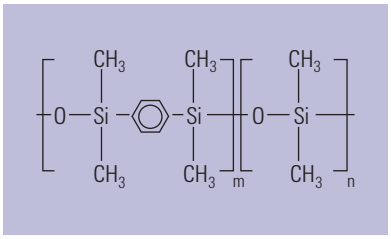
Structure of VF-Xms

VF-Xms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.15	*20*	*0.15*	*30 to 340/360*	*CP9041*
0.20	25	0.33	30 to 340/360	CP8801
0.25	30	0.10	30 to 340/360	CP8805
		0.25	30 to 340/360	CP8806
		0.50	30 to 340/360	CP8807
	60	0.25	30 to 340/360	CP8809
0.32	30	0.25	30 to 340/360	CP8813
	60	0.25	30 to 340/360	CP8816

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

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

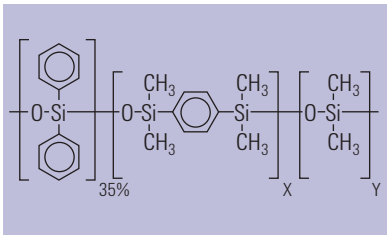
Similar Phases: Rtx-35, Rtx-35ms, Rxi-35Sil MS, SPB-35, AT-35, Sup-Herb, MDN-35, BPX-34, ZB-35, ZB-35 ht

DB-35ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM II Module
0.18	*20*	*0.18*	*50 to 340/360*	*121-3822*		
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		
	30	0.15	50 to 340/360	122-3831		
	30	0.25	50 to 340/360	122-3832	122-3832E	122-3832LTM
	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		
	30	1.00	50 to 320/340	125-3832		

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

VF-35ms



Structure of VF-35ms

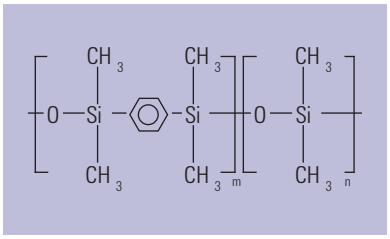
- Stabilized arylene-modified equivalent of a 35% phenylmethyl phase
- Ideal for dual column confirmational analyses
- Ultra low bleed, highly stable column with a programmable maximum temperature of 360 °C
- Medium polarity column ideal for trace environmental and chemical analyses
- 0.15 mm id columns 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

VF-35ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.15	*10*	*0.15*	*40 to 340/360*	*CP5887*
	20	*0.15*	*40 to 340/360*	*CP5889*
0.20	15	0.33	40 to 340/360	CP8872
	25	0.33	40 to 340/360	CP8873
0.25	15	0.25	40 to 340/360	CP8874
	30	0.10	40 to 340/360	CP8875
		0.25	40 to 340/360	CP8877
		0.50	40 to 340/360	CP8878
		1.00	40 to 340/360	CP8879
	60	0.25	40 to 340/360	CP8880
0.32	30	0.25	40 to 340/360	CP8882
		0.50	40 to 340/360	CP8883
		1.00	40 to 340/360	CP8884
0.53	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 II Module
0.18	*20*	*0.18*	*40 to 320/340*	*121-4722*		*121-4722LTM*
0.25	15	0.15	40 to 320/340	122-4711		122-4711LTM
		0.25	40 to 320/340	122-4712		122-4712LTM
	30	0.15	40 to 320/340	122-4731		
		0.25	40 to 320/340	122-4732	122-4732E	122-4732LTM
	60	0.25	40 to 320/340	122-4762		
0.32	15	0.25	40 to 320/340	123-4712		
	30	0.25	40 to 320/340	123-4732		123-4732LTM

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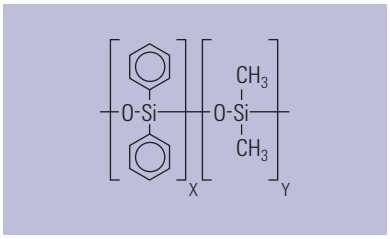
TIPS & TOOLS

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

VF-17ms



Structure of 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 at 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

VF-17ms

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

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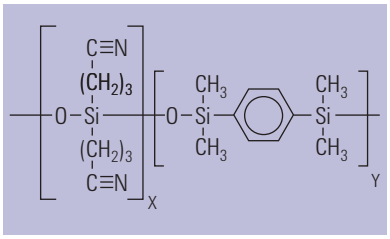


Structure of VF-23ms

VF-23ms

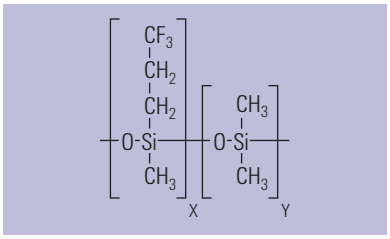
- High polarity and highly substituted cyanopropyl low bleed phase
- Engineered for accurate analysis of very polar analytes
- 100% bonded phase permits column rinsing to enhance column lifetime
- Operating temperature up to 260 °C
- Expands application ranges to higher molecular weight compounds
- 0.15 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
0.25	30	0.15	40 to 260/260	CP8821	
		0.25	40 to 260/260	CP8822	CP8822I5
	60	0.25	40 to 260/260	CP8824	CP8824I5
0.32	30	0.25	40 to 260/260	CP8827	
	60	0.15	40 to 260/260	CP8828	
		0.25	40 to 260/260	CP8829	
0.53	30	0.50	40 to 245/245	CP8831	

VF-200ms



Structure of 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
0.15	*20*	*0.15*	*0 to 325/350*	*CP5891*	
		0.60	*0 to 325/350*	*CP5892*	
0.25	15	0.25	0 to 325/350	CP8855	
	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	
	60	0.25	0 to 325/350	CP8861	
0.32	30	0.50	0 to 325/350	CP8864	
		1.00	0 to 325/350	CP8865	
0.53	30	0.50	0 to 300/325	CP8867	
		1.00	0 to 300/325	CP8868	

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

DB-225ms

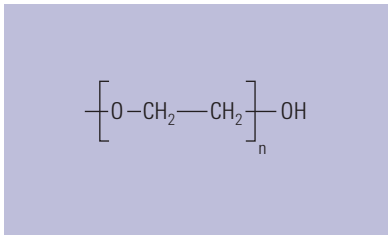
- Virtually equivalent to (50%-cyanopropylphenyl)-methylpolysiloxane
- Mid/high polarity
- Excellent for separations of cis- and trans-fatty acid methyl esters (FAMEs)
- Low bleed
- Bonded and cross-linked
- Solvent rinsable
- Close equivalent to USP Phase G7

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 LTM II Module
0.25	15	0.25	40 to 240	122-2912		122-2912LTM
	30	0.25	40 to 240	122-2932	122-2932E	122-2932LTM
	60	0.25	40 to 240	122-2962		
0.32	30	0.25	40 to 240	123-2932		

VF-WAXms



Structure of 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

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	
0.15	*15*	*0.15*	*20 to 250/260*	*CP9201*	
	20	*0.15*	*20 to 250/260*	*CP9220*	
	30	*0.15*	*20 to 250/260*	*CP9202*	
0.25	15	0.25	20 to 250/260	CP9203	
		0.50	20 to 250/260	CP9221	
	25	0.20	20 to 250/260	CP9204	
	30	0.25	20 to 250/260	CP9205	CP9205I5
		0.50	20 to 250/260	CP9222	
		1.00	20 to 240	CP9206	
	60	0.25	20 to 250/260	CP9207	
		0.50	20 to 240	CP9223	

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VF-WAXms

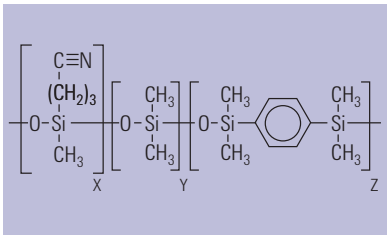
ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
0.32	30	0.25	20 to 250/260	CP9212	
		0.50	20 to 250/260	CP9210	
		1.00	20 to 240	CP9211	
	60	0.25	20 to 250/260	CP9214	
		0.50	20 to 240	CP9225	
		1.00	20 to 230	CP9213	
0.53	15	1.00	20 to 250/260	CP9226	
		2.00	20 to 240		
	30	1.00	20 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 co-elution 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



Structure of VF-624ms and VF-1301ms

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
0.15	*15*	*0.84*	*-40 to 280/300*	*CP9101*	
	20	*0.84*	*-40 to 280/300*	*CP9100*	
	30	*0.84*	*-40 to 280/300*	*CP9109*	
	40	*0.84*	*-40 to 280/300*	*CP9110*	
0.25	30	1.40	-40 to 280/300	CP9102	CP9102I5
	60	1.40	-40 to 280/300	CP9103	CP9103I5
0.32	30	1.80	-40 to 280/300	CP9104	CP9104I5
	60	1.80	-40 to 280/300	CP9105	
0.53	30	3.00	-40 to 280/300	CP9106	CP9106I5
	60	3.00	-40 to 265/280	CP9107	
	75	3.00	-40 to 265/280	CP9108	

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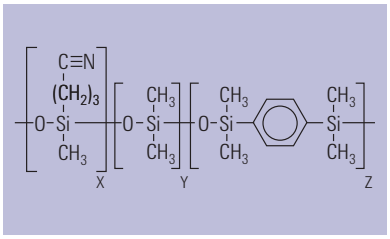
Similar Phases: Rtx-1301, PE-1301

VF-1301ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.10	10	1.00	-40 to 280/300	CP9066
0.25	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
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

VF-1701ms



Structure of 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 at 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

VF-1701ms

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
0.15	*20*	*0.15*	*-20 to 280/300*	*CP9145*	
0.25	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	0.25	-20 to 280/300	CP9154	
		1.00	-20 to 280/300	CP9156	
0.32	30	0.25	-20 to 280/300	CP9162	
		1.00	-20 to 280/300	CP9163	
	60	0.25	-20 to 280/300	CP9165	
		1.00	-20 to 280/300	CP9166	
0.53	30	0.50	-20 to 280/300	CP9170	
		1.00	-20 to 280/300	CP9171	

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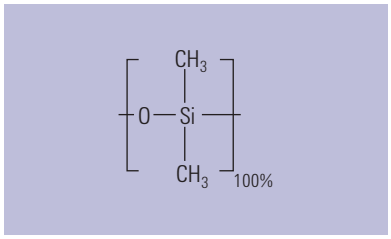


Structure of DB-1

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

DB-1

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM II Module
0.05	10	0.05	-60 to 325/350	126-1012		
		0.20	-60 to 325/350	126-1013		
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	
		0.40	-60 to 325/350	127-1023		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 II Module
0.15	*10*	*1.20*	*-60 to 325/350*	*12A-1015*		*12A-1015LTM*
0.18	*10*	*0.18*	*-60 to 325/350*	*121-1012*	*121-1012E*	*121-1012LTM*
		0.20	*-60 to 325/350*	*121-101A*		*121-101ALTM*
		0.40	*-60 to 325/350*	*121-1013*		*121-1013LTM*
	20	*0.18*	*-60 to 325/350*	*121-1022*	*121-1022E*	*121-1022LTM*
		0.40	*-60 to 325/350*	*121-1023*		*121-1023LTM*
	40	*0.40*	*-60 to 325/350*	*121-1043*		
0.20	12	0.33	-60 to 325/350	128-1012		128-1012LTM
	25	0.33	-60 to 325/350	128-1022		128-1022LTM
	30	0.80	-60 to 325/350	128-1034		
	50	0.33	-60 to 325/350	128-1052		
0.25	15	0.10	-60 to 325/350	122-1011		
		0.25	-60 to 325/350	122-1012		122-1012LTM
		1.00	-60 to 325/350	122-1013		
	25	0.25	-60 to 325/350	122-1022		122-1022LTM
	30	0.10	-60 to 325/350	122-1031		
		0.25	-60 to 325/350	122-1032	122-1032E	122-1032LTM*
		0.50	-60 to 325/350	122-103E		122-103ELTM
		1.00	-60 to 325/350	122-1033	122-1033E	122-1033LTM
	50	0.25	-60 to 325/350	122-1052		
	60	0.10	-60 to 325/350	122-1061		
		0.25	-60 to 325/350	122-1062		
		0.50	-60 to 325/350	122-106E		
		1.00	-60 to 325/350	122-1063		
	100	0.50	-60 to 325/350	122-10AE		
	150	1.00	-60 to 325/350	122-10G3		

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

(Continued)

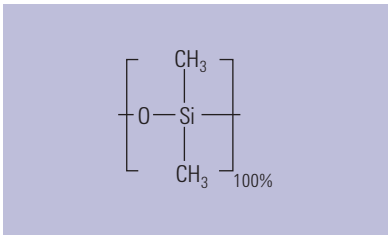
DB-1

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM II Module
0.32	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		
		3.00	-60 to 280/300	123-1014		
		5.00	-60 to 280/300	123-1015		123-1015LTM
	25	0.12	-60 to 325/350	123-1027		
		0.25	-60 to 325/350	123-1022		
		0.52	-60 to 325/350	123-1026		
		1.05	-60 to 325/350	123-102F		
	30	0.10	-60 to 325/350	123-1031		
		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		
		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		
		2.55	-60 to 260/280	124-1034		

(Continued)

DB-1

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



Structure of HP-1

HP-1

- 100% Dimethylpolysiloxane
- Non-polar
- Excellent general purpose column – "Industry Standard"
- Wide range of applications
- Superior performance for low molecular weight alcohols (<C_5)
- 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

HP-1

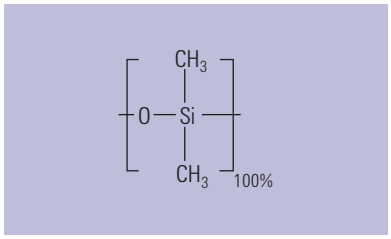
ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM II Module
0.18	*20*	*0.18*	*-60 to 325/350*	*19091Z-577*	*19091Z-577E*	
0.20	12	0.33	-60 to 325/350	19091-60312		
	17	0.11	-60 to 325/350	19091Z-008		
	25	0.11	-60 to 325/350	19091Z-002		19091Z-002LTM
		0.33	-60 to 325/350	19091Z-102	19091Z-102E	
		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		
		0.25	-60 to 325/350	19091Z-431		
		1.00	-60 to 325/350	19091Z-231		
	30	0.10	-60 to 325/350	19091Z-333		
		0.25	-60 to 325/350	19091Z-433	19091Z-433E	
		1.00	-60 to 325/350	19091Z-233	19091Z-233E	
	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

(Continued)

HP-1

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM II Module
0.32	15	0.25	-60 to 325/350	19091Z-411		
		1.00	-60 to 325/350	19091Z-211		
	25	0.17	-60 to 325/350	19091Z-012		19091Z-012LTM
		0.52	-60 to 325/350	19091Z-112	19091Z-112E	
		1.05	-60 to 325/350	19091Z-212		
	30	0.10	-60 to 325/350	19091Z-313		19091Z-313LTM
		0.25	-60 to 325/350	19091Z-413	19091Z-413E	
		1.00	-60 to 325/350	19091Z-213	19091Z-213E	
		3.00	-60 to 260/280	19091Z-513	19091Z-513E	
		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		
		2.65	-60 to 260/280	19095S-100	19095S-100E	
	7.5	5.00	-60 to 260/280	19095Z-627		
	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		
		3.00	-60 to 260/280	19095Z-421		
		5.00	-60 to 260/280	19095Z-621		
	30	0.88	-60 to 300/320	19095Z-023	19095Z-023E	19095Z-023LTM
		1.50	-60 to 300/320	19095Z-323	19095Z-323E	
		2.65	-60 to 260/280	19095Z-123	19095Z-123E	19095Z-123LTM
		3.00	-60 to 260/280	19095Z-423	19095Z-423E	
		5.00	-60 to 260/280	19095Z-623	19095Z-623E	19095Z-623LTM
	60	5.00	-60 to 260/280	19095Z-626		



Structure of CP-Sil 5 CB

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

CP-Sil 5 CB

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
0.10	10	0.10	-60 to 330/350	CP7311	
		0.12	-60 to 330/350	CP7310	
0.15	*10*	*0.12*	*-60 to 330/350*	*CP7684*	
		2.00	*-60 to 325/350*	*CP7682*	
	25	*0.12*	*-60 to 330/350*	*CP7694*	
		1.20	*-60 to 325/350*	*CP7693*	
		2.00	*-60 to 325/350*	*CP7692*	
0.20	25	0.33	-60 to 325/350	CP7622	
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	
		0.25	-60 to 330/350	CP7441	
		0.40	-60 to 325/350	CP7709	
		1.20	-60 to 325/350	CP7670	CP7670I5
	30	0.10	-60 to 330/350	CP8710	
		0.25	-60 to 330/350	CP8741	CP8741I5
		1.00	-60 to 325/350	CP8770	
	50	0.12	-60 to 330/350	CP7720	
		0.25	-60 to 330/350	CP7443	CP7443I5
		0.40	-60 to 325/350	CP7719	
	60	0.25	-60 to 330/350	CP8743	
		1.00	-60 to 325/350	CP8780	

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

(Continued)

CP-Sil 5 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	CP7730	
		1.20	-60 to 325/350	CP7758	
	15	0.10	-60 to 330/350	CP8529	
		0.25	-60 to 325/350	CP8530	
		3.00	-60 to 325/350	CP8550	
		1.00	-60 to 325/350	CP8540	
		5.00	-60 to 300/325	CP8560	
	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	
		1.20	-60 to 325/350	CP7760	
		5.00	-60 to 300/325	CP7680	CP7680I5
	30	0.25	-60 to 325/350	CP8742	
		1.00	-60 to 325/350	CP8760	
		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	
		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	
		1.00	-60 to 325/350	CP8870	
		3.00	-60 to 310/335	CP8689	
		5.00	-60 to 300/325	CP8690	CP8690I5

(Continued)

CP-Sil 5 CB

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

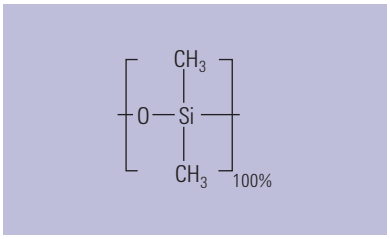
CP-Sil 5 CB UltiMetal

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

Ultra 1

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

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



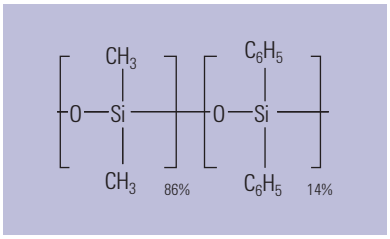
Structure of Ultra 1

Ultra 1

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

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**



Structure of Ultra 2

Ultra 2

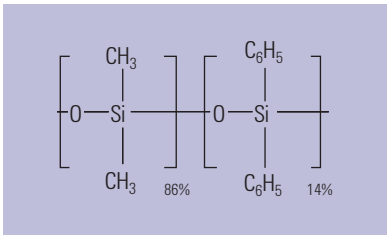
- (5%-Phenyl)-methylpolysiloxane
- Non-polar
- Equivalent to HP-5 with tighter specifications for retention index and capacity factors
- Bonded and cross-linked
- Solvent rinsable

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 II Module
0.20	12	0.33	-60 to 325/350	19091B-101		19091B-101LTM
	25	0.11	-60 to 325/350	19091B-002		
		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	
		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



Structure of 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

DB-5

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM II Module
0.10	10	0.10	-60 to 325/350	127-5012	127-5012E	127-5012LTM
		0.17	-60 to 325/350	127-501E		127-501ELTM
		0.33	-60 to 325/350	127-501N		
		0.40	-60 to 325/350	127-5013		127-5013LTM
	20	0.10	-60 to 325/350	127-5022		
		0.40	-60 to 325/350	127-5023		
0.15	*10*	*1.20*	*-60 to 300/320*	*12A-5015*		*12A-5015LTM*
0.18	*10*	*0.18*	*-60 to 325/350*	*121-5012*	*121-5012E*	*121-5012LTM*
		0.40	*-60 to 325/350*	*121-5013*		*121-5013LTM*
	20	*0.18*	*-60 to 325/350*	*121-5022*	*121-5022E*	*121-5022LTM*
		0.40	*-60 to 325/350*	*121-5023*		*121-5023LTM*
	40	*0.18*	*-60 to 325/350*	*121-5042*		

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

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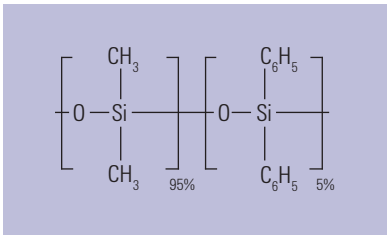
DB-5

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM II Module
0.20	12	0.33	-60 to 325/350	128-5012		
	15	0.20	-60 to 325/350	128-50H7		
	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		
		0.25	-60 to 325/350	122-5012		122-5012LTM
		0.50	-60 to 325/350	122-501E		
		1.00	-60 to 325/350	122-5013		
	25	0.25	-60 to 325/350	122-5022		
	30	0.10	-60 to 325/350	122-5031		
		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
	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		
		0.25	-60 to 325/350	123-5022		123-5022LTM
		0.52	-60 to 325/350	123-5026		
		1.05	-60 to 325/350	123-502F		
	30	0.10	-60 to 325/350	123-5031		
		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	
		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		

(Continued)

DB-5

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM II Module
0.45	30	0.42	-60 to 300/320	124-5037		
		1.27	-60 to 300/320	124-5032		
0.53	10	2.65	-60 to 260/280	125-50HB		
	15	0.25	-60 to 300/320	125-501K		
		0.50	-60 to 300/320	125-5017		
		1.00	-60 to 300/320	125-501J		
		1.50	-60 to 300/320	125-5012	125-5012E	125-5012LTM
	25	5.00	-60 to 260/280	125-5025		
	30	0.25	-60 to 300/320	125-503K		
		0.50	-60 to 300/320	125-5037		
		0.88	-60 to 300/320	125-503D		
		1.00	-60 to 300/320	125-503J		
		1.50	-60 to 300/320	125-5032	125-5032E	125-5032LTM
		2.65	-60 to 260/280	125-503B		
		3.00	-60 to 260/280	125-5034		
		5.00	-60 to 260/280	125-5035	125-5035E	125-5035LTM
	60	1.50	-60 to 300/320	125-5062		
		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 II Module
0.18	*20*	*0.18*	*-60 to 325/350*	*19091J-577*	*19091J-577E*	*19091J-577LTM*
0.20	12	0.33	-60 to 325/350	19091J-101		
	17	0.33	-60 to 325/350	19091J-108		
	25	0.11	-60 to 325/350	19091J-002		
		0.33	-60 to 325/350	19091J-102	19091J-102E	
		0.50	-60 to 325/350	19091J-202		
	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		

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

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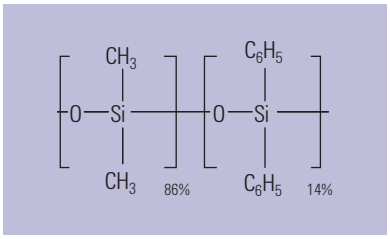
HP-5

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM II Module
0.25	5	0.10	-60 to 325/350	19091J-330		19091J-330LTM
	15	0.25	-60 to 325/350	19091J-431	19091J-431E	
		1.00	-60 to 325/350	19091J-231		
	30	0.10	-60 to 325/350	19091J-333		
		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		
0.32	15	0.25	-60 to 325/350	19091J-411		19091J-411LTM
	25	0.17	-60 to 325/350	19091J-012		
		0.52	-60 to 325/350	19091J-112	19091J-112E	
		1.05	-60 to 325/350	19091J-212		
	30	0.10	-60 to 325/350	19091J-313		
		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	
	50	0.17	-60 to 325/350	19091J-015		
		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		
		5.00	-60 to 260/280	19095J-621		
	30	0.88	-60 to 300/320	19095J-023	19095J-023E	
		1.50	-60 to 300/320	19095J-323	19095J-323E	
		2.65	-60 to 260/280	19095J-123	19095J-123E	
		5.00	-60 to 260/280	19095J-623	19095J-623E	



Structure of CP-Sil 8 CB

CP-Sil 8 CB

- (5%-Phenyl)-methylpolysiloxane
- Non-polar
- General purpose phase
- Bonded and cross-linked
- 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
0.15	*10*	*0.12*	*-60 to 330/350*	*CP7884*	
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	
		1.20	-60 to 325/350	CP7671	
	30	0.25	-60 to 330/350	CP8751	
		1.00	-60 to 325/350	CP8771	
	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

(Continued)

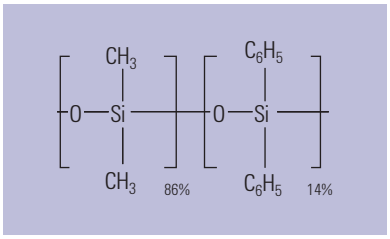
CP-Sil 8 CB

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
0.32	10	0.12	-60 to 330/350	CP7731	
		5.00	-60 to 300/325	CP8014	
	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	
	30	0.10	-60 to 330/350	CP8791	
		0.25	-60 to 325/350	CP8752	
		1.00	-60 to 325/350	CP8761	
	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	
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	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	
	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	

Column shown with EZ-GRIP

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	0.50	-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
0.15	*25*	*0.40*	*-25 to 300/330*	*CP7813*	
0.25	25	0.20	-25 to 300/330	CP7906	
		1.20	-25 to 300/330	CP7977	
	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	0.40	-25 to 300/330	CP7937	
		1.20	-25 to 300/330	CP7947	
0.53	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	

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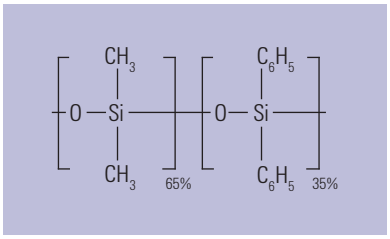
DB-35



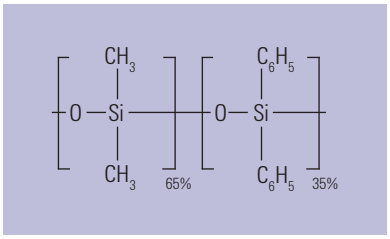
Structure of DB-35

- (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

DB-35

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

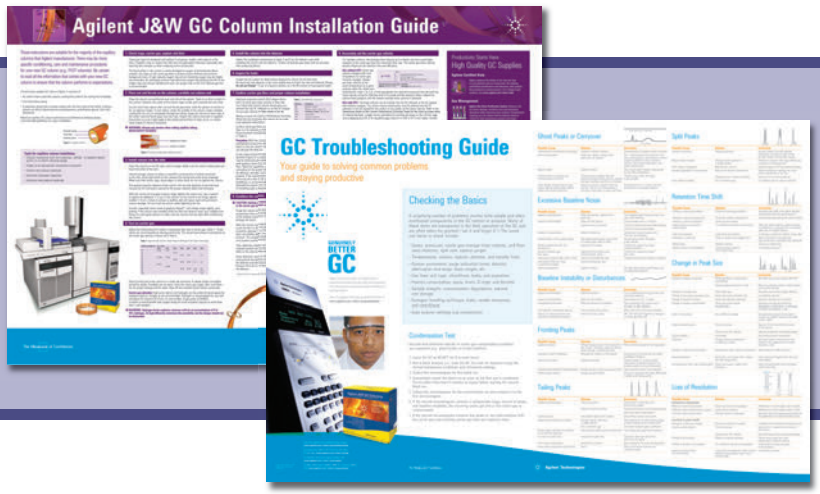
Similar Phases: Rtx-35ms, Rxi-35Sil MS, SPB-35, AT-35, Sup-Herb, MDN-35, BPX-34, ZB-35, ZB-35 ht

HP-35

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

TIPS & TOOLS

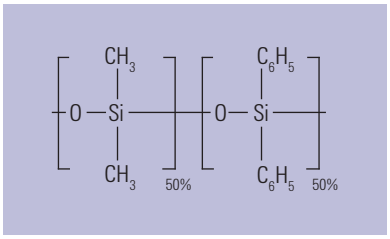
Order your free GC troubleshooting and GC column installation posters at **www.agilent.com/chem/GCposteroffer**



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 II Module
0.10	10	0.10	40 to 280/300	127-1712		127-1712LTM
		0.20	40 to 280/300	127-1713		
	20	0.10	40 to 280/300	127-1722		
0.18	*20*	*0.18*	*40 to 280/300*	*121-1722*		*121-1722LTM*
		0.30	*40 to 280/300*	*121-1723*		
0.25	15	0.25	40 to 280/300	122-1712		
		0.50	40 to 280/300	122-1713	122-1713E	
	30	0.15	40 to 280/300	122-1731	122-1731E	
		0.25	40 to 280/300	122-1732	122-1732E	122-1732LTM
		0.50	40 to 280/300	122-1733		
	60	0.25	40 to 280/300	122-1762		
0.32	15	0.15	40 to 280/300	123-1711		
		0.25	40 to 280/300	123-1712		
		0.50	40 to 280/300	123-1713		
	30	0.15	40 to 280/300	123-1731		
		0.25	40 to 280/300	123-1732	123-1732E	123-1732LTM
		0.50	40 to 280/300	123-1733	123-1733E	
	60	0.25	40 to 280/300	123-1762		
0.53	5	2.00	40 to 280/300	125-1704		
	15	0.25	40 to 260/280	125-1711		
		0.50	40 to 260/280	125-1717		
		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		
		0.50	40 to 260/280	125-1737		
		1.00	40 to 260/280	125-1732	125-1732E	125-1732LTM
		1.50	40 to 260/280	125-1733		
	60	1.00	40 to 260/280	125-1762		

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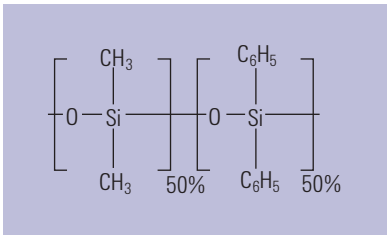


Structure of HP-50+

HP-50+

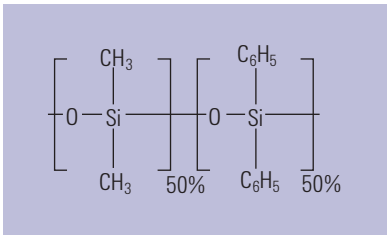
- (50%-Phenyl)-methylpolysiloxane
- Mid polarity – slightly less polar than DB-17
- Excellent for confirmational analyses
- Bonded and cross-linked
- Solvent rinsable
- Equivalent to USP Phase G3

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 II Module
0.20	12	0.31	40 to 280/300	19091L-101		
0.25	5	0.15	40 to 280/300	19091L-330		19091L-330LTM
	15	0.25	40 to 280/300	19091L-431		19091L-431LTM
	30	0.15	40 to 280/300	19091L-333		
		0.25	40 to 280/300	19091L-433		19091L-433LTM
		0.50	40 to 280/300	19091L-133		
0.32	30	0.25	40 to 280/300	19091L-413	19091L-413E	
		0.50	40 to 280/300	19091L-113	19091L-113E	
	60	0.25	40 to 280/300	19091L-416		
0.53	15	1.00	40 to 260/280	19095L-021		19095L-021LTM
	30	0.50	40 to 260/280	19095L-523		
		1.00	40 to 260/280	19095L-023	19095L-023E	

CP-Sil 24 CB



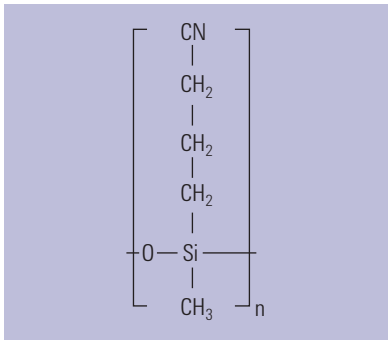
Structure of CP-Sil 24 CB

- 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
0.32	15	0.25	40 to 280/300	CP7830	
	30	0.25	40 to 280/300	CP7831	
	60	0.25	40 to 280/300	CP7832	
0.53	30	0.50	40 to 280/300	CP7834	CP1834I5
		1.00	40 to 265/290	CP7871	CP7871I5



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

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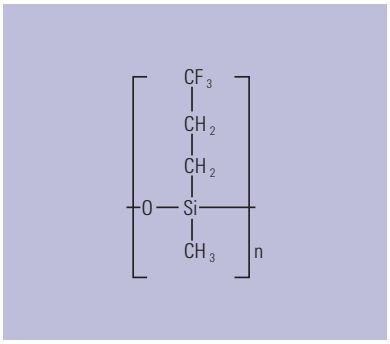
DB-200

- (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

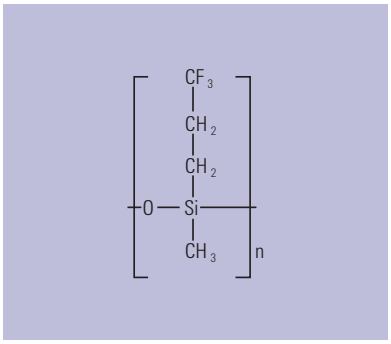
Similar Phases: Rtx-200



Structure of DB-200

DB-200

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



Structure of DB-210

DB-210

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

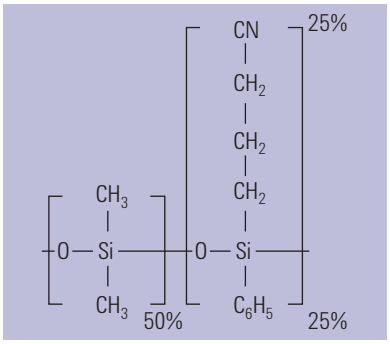
Similar Phases: SP-2401

DB-210

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM II Module
0.25	15	0.25	45 to 240/260	122-0212		
	30	0.25	45 to 240/260	122-0232	122-0232E	
		0.50	45 to 240/260	122-0233		
0.32	15	0.50	45 to 240/260	123-0213		
	30	0.25	45 to 240/260	123-0232		
		0.50	45 to 240/260	123-0233		
0.53	15	1.00	45 to 220/240	125-0212		
	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



Structure of DB-225

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 II Module
0.10	20	0.10	40 to 220/240	127-2222		
0.18	*20*	*0.20*	*40 to 220/240*	*121-2223*		
0.25	15	0.25	40 to 220/240	122-2212		122-2212LTM
	30	0.15	40 to 220/240	122-2231		
		0.25	40 to 220/240	122-2232		122-2232LTM
0.32	30	0.25	40 to 220/240	123-2232	123-2232E	
0.53	15	1.00	40 to 200/220	125-2212		
	30	0.50	40 to 200/220	125-2237		
		1.00	40 to 200/220	125-2232		

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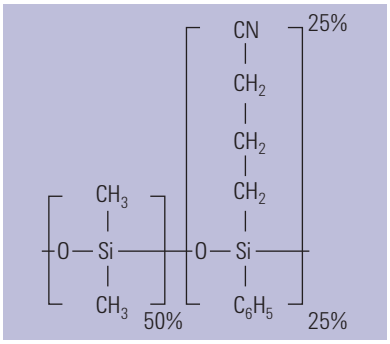
TIPS & TOOLS

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

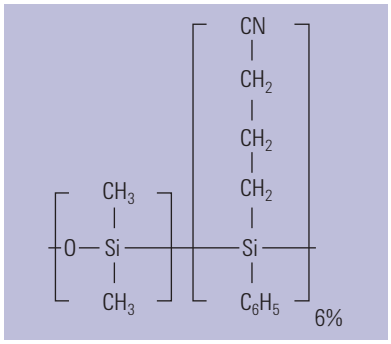
CP-Sil 43 CB

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.25	25	0.20	45 to 200/225	CP7715
	50	0.20	45 to 200/225	CP7725
0.32	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

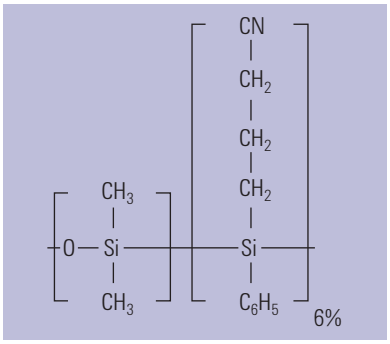
Similar Phases: Rtx-1301, PE-1301



Structure of DB-1301

DB-1301

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



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

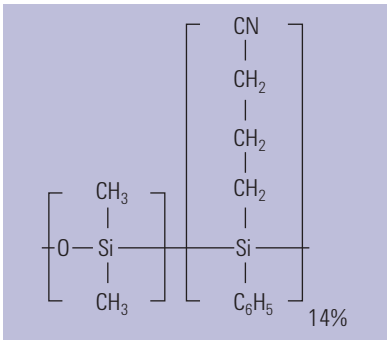
CP-1301

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



Structure of DB-1701

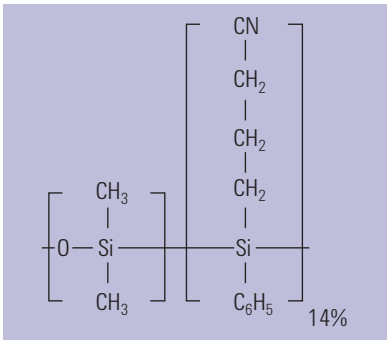
DB-1701

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM II Module
0.10	20	0.10	-20 to 280/300	127-0722		
		0.40	-20 to 280/300	127-0723		
0.18	*10*	*0.40*	*-20 to 280/300*	*121-0713*		
	20	*0.18*	*-20 to 280/300*	*121-0722*		*121-0722LTM*
0.25	15	0.25	-20 to 280/300	122-0712		
		1.00	-20 to 280/300	122-0713		122-0713LTM
	30	0.15	-20 to 280/300	122-0731		
		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		
	30	0.15	-20 to 280/300	123-0731		
		0.25	-20 to 280/300	123-0732	123-0732E	
		1.00	-20 to 280/300	123-0733	123-0733E	
	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		
		0.50	-20 to 260/280	125-0737		
		1.00	-20 to 260/280	125-0732	125-0732E	
		1.50	-20 to 260/280	125-0733		
	60	1.00	-20 to 260/280	125-0762	125-0762E	

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

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

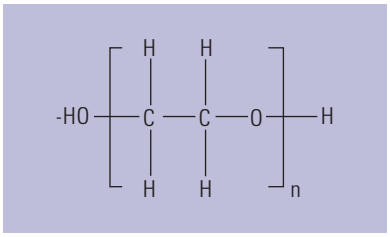
CP-Sil 19 CB

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.15	*25*	*0.50*	*-25 to 275/300*	*CP7340*
0.25	10	0.20	-25 to 275/300	CP7702
	25	0.20	-25 to 275/300	CP7712
		0.40	-25 to 275/300	CP7809
		1.20	-25 to 275/300	CP7672
	30	0.25	-25 to 275/300	CP8712
		1.00	-25 to 275/300	CP8562
	50	0.20	-25 to 275/300	CP7722
	60	0.25	-25 to 275/300	CP8722
0.32	10	0.20	-25 to 275/300	CP7732
	15	0.25	-25 to 275/300	CP8542
	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
		1.00	-25 to 275/300	CP8772
0.53	10	2.00	-25 to 275/300	CP7647
	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

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

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.



Structure of polyethylene glycol (PEG)
This structure is applicable for all
WAX and FFAP phases.

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 II Module
DB-WAX						
0.05	10	0.05	20 to 250/260	126-7012		
		0.10	20 to 240/250	126-7013		
0.10	10	0.10	20 to 250/260	127-7012	127-7012E	127-7012LTM
		0.20	20 to 240/250	127-7013		127-7013LTM
	20	0.10	20 to 250/260	127-7022		127-7022LTM
		0.20	20 to 240/250	127-7023	127-7023E	127-7023LTM
0.18	*10*	*0.18*	*20 to 250/260*	*121-7012*		*121-7012LTM*
	20	*0.18*	*20 to 250/260*	*121-7022*		*121-7022LTM*
		0.30	*20 to 240/250*	*121-7023*		*121-7023LTM*
	40	*0.18*	*20 to 250/260*	*121-7042*	*121-7042E*	
		0.30	*20 to 240/250*	*121-7043*		
0.20	25	0.20	20 to 250/260	128-7022		
	30	0.20	20 to 250/260	128-7032		128-7032LTM
	50	0.20	20 to 250/260	128-7052		

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 (°C)	7 in Cage	5 in Cage	7890/6890 LTM II Module
DB-WAX						
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		
		0.25	20 to 250/260	122-7032	122-7032E	122-7032LTM
		0.50	20 to 240/250	122-7033	122-7033E	122-7033LTM
	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		
		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		
0.53	15	0.50	20 to 230/240	125-7017		
		1.00	20 to 230/240	125-7012	125-7012E	
	30	0.25	20 to 230/240	125-7031		125-7031LTM
		0.50	20 to 230/240	125-7037		
		1.00	20 to 230/240	125-7032	125-7032E	125-7032LTM
	60	1.00	20 to 230/240	125-7062	125-7062E	
DB-WaxFF						
0.10	20	0.20	20 to 240/250	127-7023FF		

DB-WAXetr

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

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 II Module
0.20	25	0.40	30 to 250/260	128-7323		
0.25	30	0.25	30 to 260/280	122-7332	122-7332E	122-7332LTM
		0.50	30 to 250/260	122-7333		
	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		
		1.00	30 to 250/260	123-7314		
	30	0.25	30 to 260/280	123-7332		
		0.50	30 to 250/260	123-7333		
		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		
		2.00	50 to 230/250	125-7314		
	30	1.00	30 to 240/260	125-7332	125-7332E	
		1.50	30 to 230/240	125-7333		125-7333LTM
		2.00	50 to 230/250	125-7334	125-7334E	
	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 II Module
0.18	*20*	*0.18*	*40 to 260/270*	*19091N-577*	*19091N-577E*	*19091N-577LTM*
0.20	25	0.20	40 to 260/270	19091N-102		19091N-102LTM
		0.40	40 to 260/270	19091N-202		
	50	0.20	40 to 260/270	19091N-105	19091N-105E	
		0.40	40 to 260/270	19091N-205	19091N-205E	
0.25	5	0.15	40 to 260/270	19091N-030		19091N-030LTM
	15	0.10	40 to 260/270	19091N-331		
		0.25	40 to 260/270	19091N-131	19091N-131E	
		0.50	40 to 260/270	19091N-231		
	30	0.15	40 to 260/270	19091N-033		
		0.25	40 to 260/270	19091N-133	19091N-133E	19091N-133LTM
		0.50	40 to 260/270	19091N-233	19091N-233E	
	60	0.15	40 to 260/270	19091N-036		
		0.25	40 to 260/270	19091N-136	19091N-136E	
		0.50	40 to 260/270	19091N-236		
0.32	15	0.25	40 to 260/270	19091N-111		
	30	0.15	40 to 260/270	19091N-013		19091N-013LTM
		0.25	40 to 260/270	19091N-113	19091N-113E	
		0.50	40 to 260/270	19091N-213	19091N-213E	
	60	0.25	40 to 260/270	19091N-116		
		0.50	40 to 260/270	19091N-216	19091N-216E	
0.53	15	1.00	40 to 240/250	19095N-121		
	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

Column shown with EZ-GRIP

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	
		0.20	20 to 250/265	CP7335	
0.15	*15*	*0.12*	*20 to 250/265*	*CP7791*	
	25	*0.25*	*20 to 250/265*	*CP7792*	
0.20	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	
	50	0.20	20 to 250/265	CP7723	CP7723I5
	60	0.25	20 to 250/265	CP8723	
		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 (°C)	7 in Cage	5 in Cage
0.32	10	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	
	30	0.25	20 to 250/265	CP8843	
		0.50	20 to 250/265	CP8763	
	50	0.20	20 to 250/265	CP7753	
		0.40	20 to 250/265	CP7889	
		1.20	20 to 250/265	CP7773	CP7773I5
	60	0.25	20 to 250/265	CP8853	
		0.50	20 to 250/265	CP8773	
		1.20	20 to 250/265	CP8073	CP8073I5
0.53	10	2.00	20 to 250/265	CP7648	
	15	1.00	20 to 250/265	CP8718	
	25	1.00	20 to 250/265	CP7638	
		2.00	20 to 250/265	CP7658	CP7658I5
	30	1.00	20 to 250/265	CP8738	CP8738I5
	50	1.00	20 to 250/265	CP7698	CP7698I5
		2.00	20 to 250/265	CP7668	
	60	1.00	20 to 250/265	CP8798	
	100	2.00	20 to 250/265	CP7678	

CP-Wax 52 CB UltiMetal

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	Part No.
0.53	10	0.50	20 to 250/275	CP7128
		1.00	20 to 250/275	CP7148
	25	2.00	20 to 250/275	CP7178
	50	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 II Module
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		
	30	0.25	40 to 250	122-3232	122-3232E	122-3232LTM
		0.50	40 to 250	122-3233		
	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		
	25	0.50	40 to 250	123-3223		
	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		
0.53	10	1.00	40 to 250	125-32H2		
	15	0.50	40 to 250	125-3217		125-3217LTM
		1.00	40 to 250	125-3212		
	30	0.25	40 to 250	125-3231		
		0.50	40 to 250	125-3237		
		1.00	40 to 250	125-3232	125-3232E	
		1.50	40 to 250	125-3233		
	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 II Module
0.20	25	0.33	60 to 240/250	19091F-102	19091F-102E	19091F-102LTM
	50	0.33	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		
	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	
	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 (°C)	7 in Cage	5 in Cage
0.20	25	0.30	20 to 250/275	CP7787	
	50	0.30	20 to 250/275	CP7797	
0.25	25	0.20	20 to 250/275	CP7717	CP7717I5
	50	0.20	20 to 250/275	CP7727	
0.32	25	0.20	20 to 250/275	CP7747	
		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	
		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/myGCcolumns**

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)	7 in Cage	7890/6890 LTM II 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	

HP-20M

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM II Module
0.20	25	0.10	60 to 220	19091W-102		
	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		
	30	1.33	60 to 220	19095W-123		

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 matrixes.

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 LTM II Module
0.25	15	0.10	-60 to 400	122-1111	122-1111E	
	30	0.10	-60 to 400	122-1131		
0.32	15	0.10	-60 to 400	123-1111		123-1111LTM
	30	0.10	-60 to 400	123-1131	123-1131E	
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 LTM II Module
0.25	15	0.10	-60 to 400	122-5711	122-5711E	122-5711LTM
	30	0.10	-60 to 400	122-5731		122-5731LTM
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	

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	7890/6890 LTM II 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	
	60	0.15	40 to 340/365	123-1861	

TIPS & TOOLS

Learn more about the Agilent 7890B GC System at **www.agilent.com/chem/7890BGC**

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	
		0.10	-60 to 430/450	CP9093*	
0.32	15	0.10	-60 to 430/450	CP9094	CP9094I5
		0.10	-60 to 430/450	CP9095*	
	30	0.10	-60 to 430/450	CP9096	
		0.10	-60 to 430/450	CP9097*	

*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 D7059)
- 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 C_1 to C_{10} hydrocarbons
- Strong selectivity for a wide range of oxygenates (ethers, alcohols, aldehydes, and ketones) in complex matrixes 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

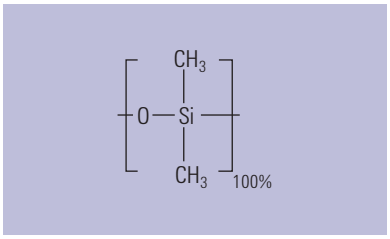
CP-Sil 5 CB for Formaldehyde

- 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
0.32	60	8.00	-60 to 300/325	CP7475

HP-PONA



Structure of HP-PONA

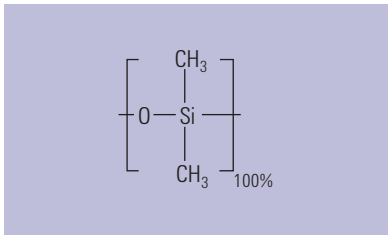
- 100% Dimethylpolysiloxane
- Configured for the analysis of petroleum process products
- Tested to ensure the resolution of m-xylene from p-xylene and of cyclopentane from 2,3-dimethylbutane
- PONA, PIANO
- High resolution
- Bonded and cross-linked
- Solvent rinsable

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 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	
0.25	150	1.00	250/275	CP7945	

CP-Sil PONA for ASTM D5134

- Optimized PONA analysis for ASTM D5134
- Exact dimensions as specified in the ASTM method for full compliance
- Inert to polar additives

CP-Sil PONA for ASTM D5134

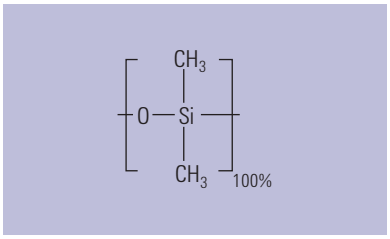
ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.21	50	0.50	250/275	CP7531

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



Structure of DB-Petro

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

DB-2887

- 100% Dimethylpolysiloxane
- Specifically designed for simulated distillation using ASTM Method D2887
- 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 II 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 C_6 to C_{110+}
- 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

TIPS & TOOLS

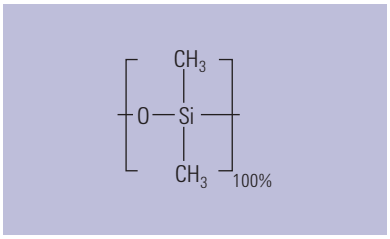
For fast simulated distillation for ASTM method D7798-13, see the LTM columns.

Turn to page 447.

CP-SimDist

- For simulated distillation analysis up to C_{100}
- 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 C_{100}. These columns are low bleed, typically only 4-5 pA at 400 °C. The high temperature stationary phase and polyimide coating extend column lifetime.



Structure of CP-SimDist

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

Turn to page 37.

CP-SimDist UltiMetal

- Designed for ASTM D2887 and the extended D2887 method compliance
- Low bleed
- Extended analysis to C_{120} 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	
		0.06	450/450	CP6540	
		0.53	450/450	CP7592	
		0.88	450/450	CP7512	CP7512I5
		1.20	450/450	CP7562	
		2.65	400/400	CP7582	
		5.00	400/400	CP7572	
	20	0.11	450/450	CP7593	
	25	0.06	450/450	CP6550	

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
0.25	25	0.25	25 to 200/200	CP7714
0.32	50	0.25	25 to 200/200	CP7754
	25	1.20	25 to 200/200	CP7764

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	CP7525I5

DB-Sulfur SCD

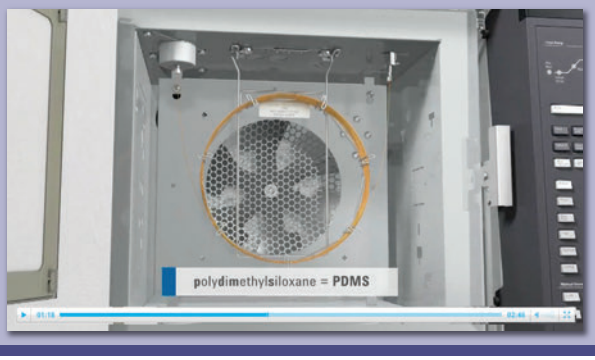
- Engineered for sulfur chemiluminescence detection (SCD) to provide low bleed performance and reduced SCD ceramic tube fouling
- Extends SCD signal stability which greatly reduces instrument downtime and operational cost for detector maintenance
- Excellent peak shape for a wide range of reactive sulfur compounds from H_2S, COS, mercaptans and thiophenes
- 100% Dimethyl polysiloxane stationary phase (PDMS) as specified in ASTM methods such as D5623 and D5504
- Custom configurations are available through the custom column shop, **www.agilent.com/chem/CustomColumn**

DB-Sulfur SCD

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.32	40	0.75	-60 to 270/290	G3903-63002
	40	3.00	-60 to 25/270	G3903-63004
	60	4.20	-60 to 25/270	G3903-63001
0.53	70	4.30	-60 to 25/270	G3903-63003

TIPS & TOOLS

J&W DB-Sulfur SCD GC Columns are optimized for low bleed and enhanced SCD signal stability. To view a video with more information, visit **www.agilent.com/chem/db-sulfur_scd**



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

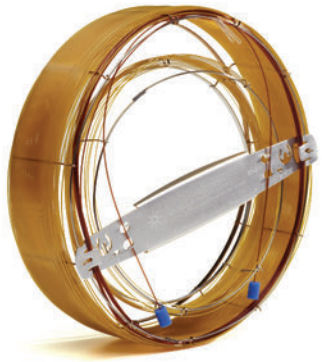
ID (mm)	Length (m)	Temp Limits (°C)	7 in Cage
0.32	60	185	CP8575

CP-Sil 5 CB for Sulfur

- Optimized for analysis of volatile sulfur compounds
- Trace analysis of sulfur compounds to C_7 mercaptan for high productivity
- Non-polar phase provides accurate separations based on volatility
- High inertness, elutes SO_2 for high quality data and low detection limits

CP-Sil 5 CB for Sulfur

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



Select for Permanent Gases/CO_2 Column, CP7429

Select for Permanent Gases – Dual Column

- Set of two parallel columns: CP-Molsieve 5Å for permanent gases and PoraBOND Q for CO_2 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 CO_2 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 Al_2O_3 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 Al_2O_3 MAPD

ID (mm)	Length (m)	Temp Limits (°C)	7 in Cage
0.32	25	-100 to 200/200	CP7433
	50	-100 to 200/200	CP7431
0.53	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 (°C)	7 in Cage
Biodiesel ASTM D6584 Free/Total Glycerin	0.32	15	0.10	-60 to 400	123-BD11
Biodiesel EN14105 Free/Total Glycerin	0.32	10	0.10	-60 to 400	123-BD01
Biodiesel EN14103 FAME Analysis	0.32	30	0.25	40 to 260/270	1909BD-113
Biodiesel EN14110 Residual Methanol	0.32	30	1.80	20 to 260/280	123-BD34

Biodiesel Test Samples

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

Select Biodiesel

- Complete set of biodiesel columns for full compliance and ease-of-use
- UltiMetal stainless steel 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 stainless steel 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 D6584	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 2 m retention gap	0.32	15	0.10	CP9078
For glycerides, UltiMetal	0.32	15	0.10	CP9079
For glycerides, UltiMetal, with 2 m 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	CP7447I5
	60	265/275	CP7448	CP7448I5

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 enables separations of amines up to C_{20} 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
0.15	*25*	*2.00*	*325/350*	*CP7599*	
0.25	30	0.25	325/350	CP7598	CP7598I5
	30	0.50	325/350	CP7595	CP7595I5
0.32	30	1.00	325/350	CP7596	CP7596I5
0.53	30	1.00	325/350	CP7597	

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
0.32	25	1.20	220/220	CP7422
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
0.32	25	10.00	-100 to 220/220	CP7591
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 produce 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-CLP1 and DB-CLP2

- 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
- DB-CLP1 and DB-CLP2 columns are regularly used in sets. Connect them together easily with an Agilent Ultra Inert, universal press fit Y-splitter (5190-6980), or an UltiMetal Plus deactivated CFT un-purged splitter (G3184-60065)
- 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-CLP1 and DB-CLP2

Description	ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
DB-CLP1	0.32	30	0.25	50 to 340/360	123-8232
DB-CLP2	0.32	30	0.50	50 to 340/360	123-8336

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 (°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

TIPS & TOOLS

Tips and tricks for making better connections...

- It's important to use ferrules and nuts appropriate for your application, so graphite/polyimide ferrules and Agilent Self Tightening column nuts for oxygen detectors, or UltiMetal Plus Flexible Metal ferrules for ultimate flow path inertness
- Never over tighten fittings to avoid soft ferrules extruding into the fitting, contaminating or creating active sites in the flow path
- Install column at the correct and consistent height, critical for accurate and reproducible results
- Reduce and eliminate leaks at the MS interface with the Agilent Self Tightening column nuts that give you a tight connection without expensive upgrades or adaptors

Watch the animation that shows how to make better column connections in a GC or GC/MS, at **www.agilent.com/chem/mbcvideo**

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 (°C)	7 in Cage	7890/6890 LTM II 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	
	30	0.25	-20 to 280/300	123-7732	
0.53	30	1.00	-20 to 260/280	125-7732	

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 (°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 (°C)	7 in Cage
0.25	50	0.12	300/325	CP7481
0.53	50	0.25	300/325	CP7504

CP-Sil 19 CB for Pesticides

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

CP-Sil 19 CB for Pesticides

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

DB-608

- Specifically designed for the analysis of chlorinated pesticides and PCBs
- US 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 (°C)	7 in Cage	7890/6890 LTM II Module
0.25	30	0.25	40 to 280/300	122-6832	
0.32	30	0.50	40 to 280/300	123-1730	123-1730LTM
0.53	30	0.50	40 to 260/280	125-6837	
		0.83	40 to 260/280	125-1730	

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
0.32	25	0.52	-60 to 325/350	19091S-010

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 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 benzofluoranthene (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
0.15	*15*	*0.10*	*40 to 325/350*	*CP7461*
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
0.18	*20*	*0.14*	*40 to 320/340*	*121-9627*
0.25	60	0.25	40 to 320/340	122-96L2

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CP-Sil PAH CB UltiMetal

- Separates all 16 PAHs according to EPA Method 610
- High temperature, low bleed phase
- Virtually unbreakable UltiMetal stainless steel 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 matrixes. 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 poof 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
0.18	*20*	*0.36*	*-60 to 325/350*	*121-9723*
			-60 to 325/350	*621-9723, 6/pk**
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 US

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
0.18	*20*	*0.18*	*-60 to 325/350*	*121-5621*
		0.36	*-60 to 325/350*	*121-5622*
0.25	30	0.25	-60 to 325/350	122-5631
		0.50	-60 to 325/350	122-5632
		1.00	-60 to 325/350	122-5633
	60	0.25	-60 to 325/350	122-5661
0.32	30	0.25	-60 to 325/350	123-5631
		0.50	-60 to 325/350	123-5632

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

HP-5ms Semivolatile

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

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

HP-5ms Semivolatile

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.25	30	0.50	-60 to 325/350	19091S-139

CP-Sil 5/C18 CB for PCB

- Engineered for high resolution PCB analysis
- Lower polarity than 100% polydimethylpolysiloxane due to its C_{18} 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

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 (°C)	7 in Cage
0.25	60	0.15	40 to 250/270	122-2461
		0.25	40 to 250/270	122-2462

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 °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 (°C)	7 in Cage
0.25	50	0.20	50 to 225/240	CP7588
	60	0.10	50 to 250/270	CP7498

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.

DB-624 Ultra Inert

- Environmental volatile organic compounds (VOCs) methods
- Excellent for US 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 peak shape for low molecular weight acidic compounds
- UI testing ensures 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
0.18	*20*	*1.00*	*-20 to 260*	*121-1324UI*
0.25	30	1.40	-20 to 260	122-1334UI
	60	1.40	-20 to 260	122-1364UI
0.32	30	1.80	-20 to 260	123-1334UI
	60	1.80	-20 to 260	123-1364UI
0.53	30	3.00	-20 to 260	125-1334UI
	75	3.00	-20 to 260	125-1374UI

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

TIPS & TOOLS

Don't forget, we have special offers throughout the year. To learn more, visit **www.agilent.com/chem/specialoffers**

DB-624

- Specifically designed for the analysis of volatile priority pollutants and residual solvents
- No cryogenics needed for US EPA Method 502.2
- Excellent for US 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 (°C)	7 in Cage	5 in Cage	7890/6890 LTM II Module
0.18	*20*	*1.00*	*-20 to 260*	*121-1324*	*121-1324E*	*121-1324LTM*
0.20	25	1.12	-20 to 260	128-1324	128-1324E	128-1324LTM
0.25	30	1.40	-20 to 260	122-1334	122-1334E	122-1334LTM
	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
0.15	*25*	*0.84*	*265/280*	*CP7411*	
0.25	30	1.40	265/280	CP7412	
	60	1.40	265/280	CP7413	
0.32	30	1.80	265/280	CP7414	
	60	1.80	265/280	CP7415	
0.53	30	3.00	265/280	CP7416	CP7416I5
	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

DB-VRX

- Unique selectivity engineered for optimum resolution of volatiles analysis: US 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 co-elutions 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 co-elutions: 1) m- and p-xylene, for which US 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 co-eluting 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 II Module
0.18	*20*	*1.00*	*-10 to 260*	*121-1524*		*121-1524LTM*
	40	*1.00*	*-10 to 260*	*121-1544*	*121-1544E*	
0.25	30	1.40	-10 to 260	122-1534		122-1534LTM
	60	1.40	-10 to 260	122-1564	122-1564E	
0.32	30	1.80	-10 to 260	123-1534		
	60	1.80	-10 to 260	123-1564		
0.45	30	2.55	-10 to 260	124-1534		
	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 US 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

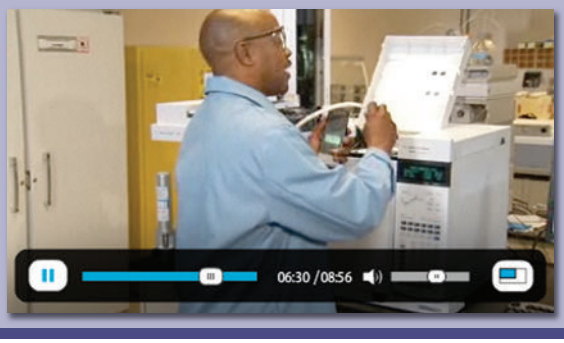
Similar Phases: NON-PAKD, Rtx-Volatiles, PE-Volatiles, 007-624, Rtx-VRX, Rtx-VGC

HP-VOC

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.20	30	1.10	-60 to 280/290	19091R-303
	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

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-502.2

- Available in 105 m for volatiles analyses
- Excellent peak shape
- Bonded and cross-linked
- Solvent rinsable

DB-502.2

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.32	60	1.80	0 to 260/280	123-1464
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 (°C)	7 in Cage
0.45	30	2.55	35 to 260/280	124-0034

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
0.32	30	0.25	-10 to 320	123-1632

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
- C_4 to C_{40} 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	CP7491I5
	15	0.10	-60 to 390/400	3/pk	CP749103	
	15	0.10	-60 to 390/400	6/pk	CP749106	
Retention gap						
0.53	4.0		-60 to 325/350	3/pk	CP8015	

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

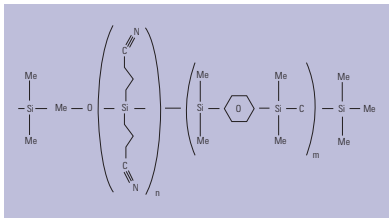
Food and flavor analyses place stringent demands on capillary columns. Samples have many components that are difficult to resolve and column-to-column reproducibility becomes critical. Agilent J&W GC columns are ideal for meeting these needs. Our rigorous quality control specifications and extensive 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

Note: Because HP-88 is not bonded or cross-linked, we do not recommend solvent rinsing.

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 II Module
0.25	100	0.20	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

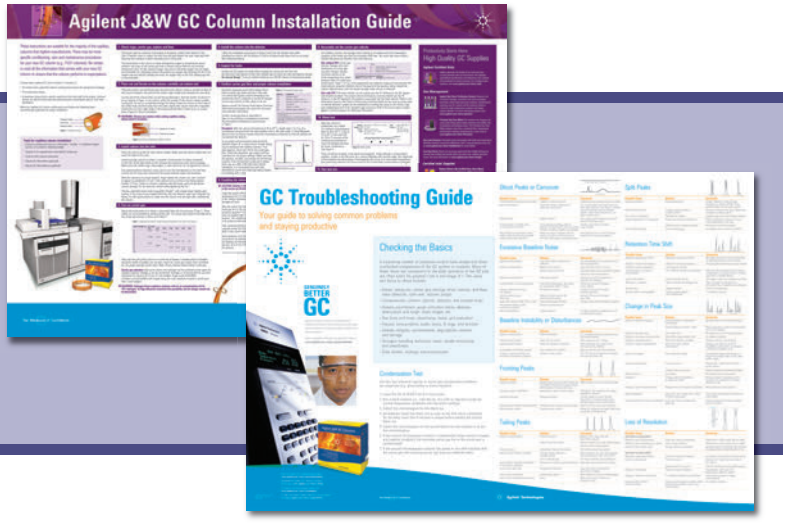
Similar Phases: SP-2560, SP-2340, SP-2330, BPX-70, BPX-90

CP-Sil 88

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage
0.25	25	0.20	50 to 225/240	CP6172
	50	0.20	50 to 225/240	CP6173
0.32	25	0.20	50 to 225/240	CP6174
	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-tans separation of FAMEs, especially C_{18} 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 $C_{18:1}$ isomer cluster

Select FAME

ID (mm)	Length (m)	Temp Limits (°C)	7 in Cage	5 in Cage
0.25	50	275/290	CP7419	CP7419I5
	100	275/290	CP7420	
	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 C_6 to C_{26} range

CP-Sil 88 for FAME

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

CP-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 (°C)	7 in Cage	5 in Cage
0.15	*30*	*0.12*	*20 to 200/225*	*CP97721*	
0.25	25	0.20	20 to 200/225	CP97713	
	50	0.20	20 to 200/225	CP97723	CP97723I5
	60	0.40	20 to 200/225	CP8120	
0.32	25	0.20	20 to 200/225	CP97743	
		1.20	20 to 200/225	CP97763	
	50	0.20	20 to 200/225	CP97753	CP97753I5
		1.20	20 to 200/225	CP97773	
0.53	25	1.00	20 to 200/225	CP97638	
	25	2.00	20 to 200/225	CP97658	

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 ensures performance and column-to-column reproducibility

CP-Carbowax 400 for Volatiles in Alcohol

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

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 (°C)	7 in Cage
0.25	25	0.20	200/200	CP7615
0.53	25	0.50	225/250	CP7617

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 (°C)	7 in Cage
0.25	25	0.10	350/360	CP7483

CP-TAP CB UltiMetal

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

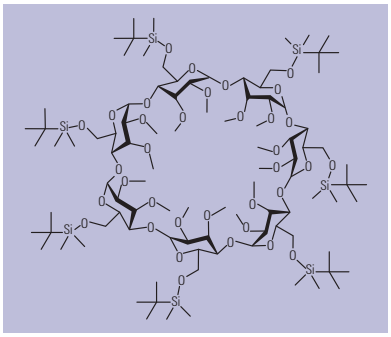
CP-FFAP CB for Free Fatty Acids in Dairy Products

- Ideal for flavors, aromas and free fatty acids C_1-C_{26}
- Separates C_2-C_{24} 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
0.15	*25*	*0.25*	*250/275*	*CP7686*	
0.32	25	0.30	250/275	CP7485	CP7485I5
0.53	25	1.00	250/275	CP7486	

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 II 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 (µm)	Temp Limits (°C)	7 in Cage	5 in Cage	7890/6890 LTM II 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	

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 (µm)	Temp Limits (°C)	7 in Cage	5 in Cage
HP-Chiral 10β					
0.25	30	0.25	30 to 240/250	19091G-B133	
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	

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 (°C)	7 in Cage	5 in Cage
Antipode D	0.25	25	0.08	200/200	CP7494	
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 (°C)	7 in Cage	5 in Cage
0.25	25	0.25	200/200	CP7502	CP7502I5
0.32	25	0.25	200/200	CP7503	

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 (°C)	7 in Cage	5 in Cage
0.25	25	0.25	225/250	CP7500	CP7500I5
	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 matrixes, 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 US blood alcohol analysis
- DB-ALC1 and DB-ALC2 columns are regularly used in sets. Connect them together easily with an Agilent Ultra Inert, universal press fit Y-splitter (5190-6980), or an UltiMetal Plus deactivated CFT un-purged splitter (G3184-60065)
- 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 II 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	
DB-ALC2						
0.32	30	1.20	20 to 260/280	123-9234	123-9234E	
0.53	30	2.00	20 to 260/280	125-9234		

TIPS & TOOLS

Tips and tricks for making better connections...

- It's important to use ferrules and nuts appropriate for your application, so graphite/polyimide ferrules and Agilent Self Tightening column nuts for oxygen detectors, or UltiMetal Plus Flexible Metal ferrules for ultimate flow path inertness
- Never over tighten fittings to avoid soft ferrules extruding into the fitting, contaminating or creating active sites in the flow path
- Install column at the correct and consistent height, critical for accurate and reproducible results
- Reduce and eliminate leaks at the MS interface with the Agilent Self Tightening column nuts that give you a tight connection without expensive upgrades or adaptors

Watch the animation that shows how to make better column connections in a GC or GC/MS, at **www.agilent.com/chem/mbcvideo**

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

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	1.40	40 to 260/260	122-0334UI
	60	1.40	40 to 260/260	122-0364UI
0.32	30	1.80	40 to 260/260	123-0334UI
	60	1.80	40 to 260/260	123-0364UI
0.53	30	3.00	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 II 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/Silcosteel columns

Metal Columns

Phase	ID (mm)	Length (m)	Film (µm)	7 in Cage	5 in Cage
Simulated distillation/high temperature					
DB-HT Sim Dis	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	CP7569I5
			0.17	CP7532	CP7532I5
			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	
VF-5ht UltiMetal	0.25	15	0.10	CP9090	
	0.32	15	0.10	CP9094	CP9094I5
	0.25	30	0.10	CP9092	
	0.32	30	0.10	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	2.00	CP7150	
			5.00	CP6666	
		25	0.50	CP7135	
			1.00	CP7130	
			2.00	CP7160	
			5.00	CP6670	
		50	1.00	CP7140	
			2.00	CP7170	
			5.00	CP6671	
DB-HT Sim Dis	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	25	5.00	CP6680	
		50	0.50	CP7196	
				CP6681	
CP-Sil 13 CB UltiMetal	0.53	25	1.00	CP7141	
DB-PSWAX	0.53	30	1.00	145-7032	
CP-Wax 52 CB UltiMetal	0.53	10	1.00	CP7148	
		25	2.00	CP7178	
		50	1.00	CP7168	
			2.00	CP7179	
PLOT columns					
PoraPLOT Q UltiMetal	0.53	10	20.00	CP6953	
		25	20.00	CP6954	
CP-Al_2O_3/KCl UltiMetal	0.53	50	10.00	CP6918	
CP-Al_2O_3/Na_2SO_4 UltiMetal	0.53	50	10.00	CP6968	
CP-Molsieve 5Å UltiMetal	0.53	10	50.00	CP6937	
		25	50.00	CP6938	CP6938I5
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 With retention gap	0.32	10	0.10	CP9076	
		15	0.10	CP9078	
Select Biodiesel	0.32	10	0.10	CP9077	
		15	0.10	CP9079	

Column shown with EZ-GRIP

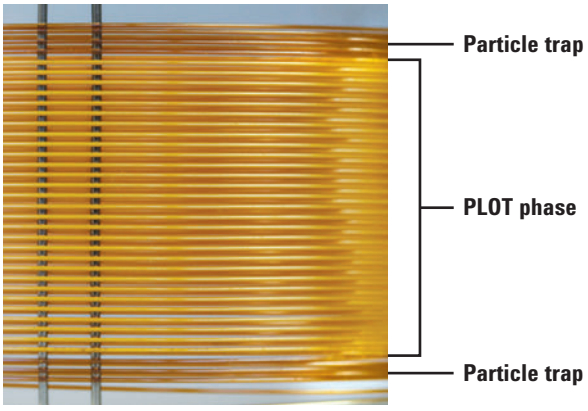
PLOT Columns

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.

PLOT PT

Agilent J&W PLOT PT columns are engineered to improve lab operations. Unlike current techniques used to prevent PLOT stationary phase particles from shedding downstream, the integral particle traps of the PLOT PT columns remove the aggravation of connecting separate traps. Operation is more convenient and there is no risk from leaks. The integrated particle-trapping technology on both ends of PLOT PT GC columns reduces downtime. What's more, with PLOT PT you can now use GC/MS for detailed, qualitative and quantitative analysis and due to the dual ended particle traps the PLOT PT columns can also be used for backflush applications. No other PLOT column offers this level of worry-free operation for your GC or GC/MS system.

Agilent J&W PLOT PT columns are available in porous polymers Q and U, Aluminum oxide and Molesieve stationary phases.



PLOT PT – with integrated particle traps

Phase	ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	Part No.
PoraBOND Q PT	0.25	10	3.00	-100 to 300/300	CP7348PT
PoraBOND Q PT	0.32	25	5.00	-100 to 300/300	CP7351PT
PoraBOND Q PT	0.32	50	5.00	-100 to 300/300	CP7352PT
PoraBOND Q PT	0.53	10	10.00	-100 to 300/300	CP7353PT
PoraBOND Q PT	0.53	25	10.00	-100 to 300/300	CP7354PT
PoraPLOT Q PT	0.32	10	10.00	-100 to 250/250	CP7550PT
PoraPLOT Q PT	0.32	25	10.00	-100 to 250/250	CP7551PT
PoraPLOT Q PT	0.53	25	20.00	-100 to 250/250	CP7554PT
PoraPLOT Q-HT PT	0.32	5	10.00	-100 to 290/290	CP7557PT
HP-PLOT Q PT	0.32	15	20.00	-60 to 270/290	19091P-QO3PT
HP-PLOT Q PT	0.32	30	20.00	-60 to 270/290	19091P-QO4PT
HP-PLOT Q PT	0.53	15	40.00	-60 to 270/290	19095P-QO3PT
HP-PLOT Q PT	0.53	30	40.00	-60 to 270/290	19095P-QO4PT
GS-Q PT	0.53	30		-60 to 250	115-3432PT
PoraPLOT U PT	0.53	25	20.00	-100 to 190/190	CP7584PT
HP-PLOT U PT	0.53	30	20.00	-60 to 190	19095P-UO4PT
HP-PLOT Al_2O_3 KCl PT	0.32	50	8.00	-60 to 200	19091P-K15PT
HP-PLOT Al_2O_3 KCl PT	0.53	30	15.00	-60 to 200	19095P-K23PT
HP-PLOT Al_2O_3 KCl PT	0.53	50	15.00	-60 to 200	19095P-K25PT
PoraPLOT U PT	0.53	25	20.00	-100 to 190/190	CP7584PT
CP-Al_2O_3/KCl PT	0.32	50	5.00	-100 to 200/200	CP7515PT
CP-Al_2O_3/KCl PT	0.53	25	10.00	-100 to 200/200	CP7517PT
CP-Al_2O_3/KCl PT	0.53	50	10.00	-100 to 200/200	CP7518PT
CP-Al_2O_3/Na_2SO_4 PT	0.32	50	5.00	-100 to 200/200	CP7565PT
CP-Al_2O_3/Na_2SO_4 PT	0.53	50	10.00	-100 to 200/200	CP7568PT
HP-PLOT Al_2O_3 S PT	0.32	25	8.00	-60 to 200	19091P-S12PT
HP-PLOT Al_2O_3 S PT	0.32	50	8.00	-60 to 200	19091P-S15PT
HP-PLOT Al_2O_3 S PT	0.53	30	15.00	-60 to 200	19095P-S23PT
HP-PLOT Al_2O_3 S PT	0.53	50	15.00	-60 to 200	19095P-S25PT
GS-Alumina PT	0.53	30		-60 to 200	115-3532PT
GS-Alumina PT	0.53	50		-60 to 200	115-3552PT
HP-PLOT Al_2O_3 M PT	0.53	50	15.00	-60 to 200	19095P-M25PT
CP-Molsieve 5A PT	0.32	30	10.00	-200 to 300	CP7534PT
CP-Molsieve 5A PT	0.32	25	30.00	-200 to 300	CP7536PT
CP-Molsieve 5A PT	0.53	25	50.00	-200 to 300	CP7538PT
CP-Molsieve 5A PT	0.53	50	50.00	-200 to 300	CP7539PT

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	PLOT PT
0.25	10	3.00	-100 to 300/300	CP7347		CP7348PT
	25	3.00	-100 to 300/320	CP7348		
0.32	10	5.00	-100 to 300/320	CP7350	CP7350I5	
	25	5.00	-100 to 300/320	CP7351	CP7351I5	CP7351PT
	50	5.00	-100 to 300/320	CP7352	CP7352I5	CP7352PT
0.53	10	10.00	-100 to 300/320	CP7353	CP7353I5	CP7353PT
	25	10.00	-100 to 300/320	CP7354	CP7354I5	CP7354PT
	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
0.32	25	7.00	-100 to 300/300	CP7381

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	PLOT PT
0.25	10	8.00	-100 to 250/250	CP7548		
	25	8.00	-100 to 250/250	CP7549		
0.32	10	10.00	-100 to 250/250	CP7550	CP7550I5	CP7550PT
	25	10.00	-100 to 250/250	CP7551	CP7551I5	CP7551PT
	50	10.00	-100 to 250/250	CP7552		
0.53	10	20.00	-100 to 250/250	CP7553		
	25	20.00	-100 to 250/250	CP7554	CP7554I5	CP7554PT
	50	20.00	-100 to 250/250	CP7555		

PoraPLOT Q UltiMetal

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

PoraPLOT Q-HT

ID (mm)	Length (m)	Film (µm)	Temp Limits (°C)	7 in Cage	PLOT PT
0.32	10	10.00	-100 to 290/290	CP7556	
	25	10.00	-100 to 290/290	CP7557	CP7557PT
0.53	10	20.00	-100 to 290/290	CP7558	
	25	20.00	-100 to 290/290	CP7559	

HP-PLOT Q

- Bonded polystyrene-divinylbenzene based column
- Polarity between Porapak-Q and Porapak-N
- Excellent column for C_1-C_3 isomers and alkanes to C_{12}, CO_2, methane, air/CO, oxygenated compounds, sulfur compounds and solvents
- Replaces packed gas-solid columns
- Separates ethane, ethylene and ethyne (acetylene)
- Improved resolution in less time than conventional packed columns
- Minimal conditioning time required – 1 hour
- Preferred "Q" column due to its robust nature

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 II Module	PLOT PT
0.32	15	20.00	-60 to 270/290	19091P-Q03		19091P-Q03LTM	19091P-Q03PT
	30	20.00	-60 to 270/290	19091P-Q04	19091P-Q04E	19091P-Q04LTM	19091P-Q04PT
0.53	15	40.00	-60 to 270/290	19095P-Q03	19095P-Q03E	19095P-Q03LTM	19095P-Q03PT
	30	40.00	-60 to 270/290	19095P-Q04	19095P-Q04E	19095P-Q04LTM	19095P-Q04PT

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)	7 in Cage	5 in Cage	PLOT PT	7890/6890 LTM II Module
0.32	30	-60 to 250	113-3432	113-3432E		113-3432LTM
0.53	10	-60 to 250	115-34H2			
	15	-60 to 250	115-3412			
	25	-60 to 250	115-3422			
	30	-60 to 250	115-3432	115-3432E	115-3432PT	

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, C_1-C_6 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	PLOT PT
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	
	25	20.00	-100 to 190/190	CP7584	CP7584PT

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
0.53	25	20.00	-100 to 250/250	CP7574